निदेशक का प्रतिवेदन एवं परीक्षणों की सारांश–तालिकाएं

DIRECTOR'S REPORT AND SUMMARY TABLES OF EXPERIMENTS

2017-2018

भा.कृ.अनु.प.–भारतीय सोयाबीन अनुसंधान संस्थान
ICAR-Indian Institute of Soybean Research
खण्डवा रोड, इन्दौर–452001 (म.प्र.)
Khandwa Road, Indore – 452001 (M.P.)

प्रकाशन के लिए नहीं
केवल कार्यालयीन उपयोग हेतु

भारतीय कृषि अनुसंधान परिषद्
Indian Council of Agricultural Research

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निदेशक का प्रतिवेदन

Director's Report

SOYBEAN SCENARIO AND RESEARCH HIGHLIGHTS

1. Global Scenario

Soybean (*Glycine max* (L.) Merril) has a prominent place among modern agricultural commodities, as the world's most important seed legume, which contributes about 25% to the global edible oil production, about two thirds of the world's protein concentrate for livestock feeding and is a valuable ingredient in formulated feeds for poultry and fish. It is also an important commodity for food manufacturers, pharma industry and many more industrial uses. It is therefore no surprise that global soybean demand is increasing rapidly. After the record world production of soybean during 2016-17, it is expected to marginally decline this year on account of expected decline in Brazil and Argentina. The estimates of world soybean area, production and productivity for 2017-18 are 126.64 million ha, 346.31 million tons and 2.74 t/ha, against the 2016-17 figures of 121.10 million ha, 348.85 million tons and 2.88 t/ha (Table 1). This shows an increase in area to the tune of 4.57%, whereas decline of 0.73 and 5.07% in production and productivity in 2017-18 over 2016-17. Decline in productivity of soybean was estimated for all major soybean producing countries on account of weather conditions. Among the major soybean growing countries, India ranks fourth in terms of area under soybean and fifth in terms of production as per AMIS, FAO estimates (Table 1). World soybean prices trading steady in the range 390-400 US$/T on account of record global supply and slow pace of exports of soybean from US and soyoil from Argentina mainly on account of reduced import by China.

2. National Scenario

The country has achieved maximum production of 14.67 million tons of soybean during *kharif*2012. After that its production has been declining progressively every year until *kharif* 2015 on account of weather aberrations led biotic and abiotic stresses. In 2013 excessive rainfall and in 2014 late arrival of monsoon and drought conditions were the main reasons for low productivity of soybean in India. In 2015, the worst year for the soybean production and productivity, very unusual weather conditions comprising of long period of drought, heavy rainfall in short span of time and above normal temperatures in the main soybean belt has affected the soybean yield along with abiotic stresses. However, during the *kharif* 2016, the production of soybean is expected at 13.79 million tons from an area of 11.4 million hectares with the productivity of above 1.2 t/ha. However, area under soybean has declined slightly during *kharif* 2017 to 10.56 million ha and as per first advance estimates, total production is estimated to be 12.22 million tons during 2017-18 (Table 2). Madhya Pradesh, Maharashtra and Rajasthan contributes about 92-93% of area and production of soybean in India, however, cultivation of soybean is fast expanding in the states of Telangana, Karnataka and Gujarat.

Area under soybean is estimated to decline during *kharif* 2017 by 6.7% from previous year mainly due to price concerns and high inter-year yield variability on account of weather woes. Due to uneven distribution of rainfall and drought conditions at critical stages of crop growth in major soybean growing districts, yield is expected to decline (by 5% over the previous year) and thus, the total production (by 11.4%) of soybean for *kharif* 2017 crop. The declines in area under soybean during *kharif* 2017 season was observed in all the major soybean growing states and was mainly associated with erratic rainfall during sowing and lower price realization from *kharif* 2016. In Madhya Pradesh, the soybean area is diverted to other crops such as urad, moong, maize, etc.

All these abiotic and biotic factors not only has reduced soybean production but has also affected our seed production programme. Breeder seed production of soybean has been just 40% of the target putting pressure on the availability of quality seeds. Though, the contingencies plans have been initiated such as production of soybean seed during off season so that seed problem of soybean is minimized, but there is a need to strengthen seed production programme. The infrastructure in terms of farm implements, BBF planters, irrigation facilities need to develop at all our breeder seed production centres.

On account of low domestic production coupled with higher global production led to the slump in international prices and higher domestic demand, export of soybean de-oiled cake (DOC) from India declined drastically during 2014-15 and 2015-16. But with the jump in soybean production in India during 2016-17, the export of DOC has picked up and reached to 12.76 lakh tons during 2016-17 valued at Rs. 3731.69 Crores (US$ 554.89 million) as compared to 4.13 lakh tons valued at Rs. 1520.2 Crores (US$ 233.34 million) in the year 2015-16. In the current financial year, the export of soybean meal was to the tune of 8.89 lakh tons during April-Oct 2017-18 valued at Rs. 2432.15 Crores (US$ 377.49 million). The price parity of Indian soybean DOC with international prices is improving as higher production of soybean and import influx of cheap edible oils put pressure on domestic prices. Thus, this year again soybean farmers were facing typical problem of prices ruling below MSP after harvest period. Against the MSP of Rs. 3050/- soybean prices traded in the range of Rs. 2000 to 3200/q during 2017-18, particularly just after harvest.

The climate change is apparent and challenge to soybean production. We need to evolve varieties which can withstand the climatic variability such as delayed monsoon, drought conditions, water logged conditions and high temperature. Also, the management of crop from biotic stresses such as stem fly, girdle beetle, white fly and YMV should be our priority. For this we need to explore untapped research areas and usher in novel research methodologies. There is need to strengthen extension activity and the front line demonstration programme so that our technologies go to the farmers. Soybean is going to remain as leading oilseed crop in India and improvement in its productivity would not only lead to self sufficiency in edible oil but would also help millions of small and marginal farmers who depend for their lively hood on this crop.

Table 1: World Area, Production & Productivity of Soybean

A = Area (m ha), P = Production (m t), Y = Yield (kg/ha)

Country	2014-15 [A]			2015-16 [A]			2016-17 [B]			2017-18 [B]		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y
USA	33.42	106.88	3198	33.12	106.95	3229	33.47	116.92	3493	36.22	119.52	3300
Brazil	30.27	86.76	2866	32.18	97.46	3029	33.91	114.08	3364	34.98	110.44	3158
Argentina	19.25	53.40	2774	19.33	61.40	3176	17.75	56.00	3155	17.70	53.00	2994
China	6.80	12.16	1787	6.51	11.79	1811	7.20	12.94	1797	8.19	14.61	1782
India	11.09	10.37	936	11.67	8.57	734	11.50	10.50	913	10.60	8.50	802
World	117.64	306.37	2604	120.79	323.20	2676	121.10	348.85	2881	126.64	346.31	2735

Source: A. FAO Database, B. AMIS, FAO February, 2018.

Table 2: State wise Area, Production & Yield of Soybean in India during Kharif 2014-2017

A = Area (m ha), P = Production (m t), Y = Yield (kg/ha)

Name of State	2014 Kharif[1]			2015 Kharif[1]			2016 Kharif [2]			2017 Kharif [2]		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Madhya Pradesh	5.58	6.35	1139	5.91	4.91	831	5.40	5.72	1059	5.01	4.20	838
Maharashtra	3.64	2.38	655	3.70	2.06	557	3.58	3.95	1102	3.45	2.90	841
Rajasthan	0.92	0.96	1036	1.20	1.00	829	0.98	0.95	968	0.92	0.75	811
Karnataka	0.26	0.19	738	0.26	0.14	543	0.32	0.25	785	0.27	0.17	639
AP/ Telangana	0.24	0.26	1086	0.24	0.25	1041	0.30	0.24	815	0.17	0.11	639
Chattisgarh	0.11	0.08	753	0.12	0.07	576	0.13	0.13	975	0.13	0.09	654
India	10.91	10.37	951	11.60	8.57	738	11.40[1]	13.79[1]	1210[1]	10.56[1]	12.22[1]	1153[1]

Sources: 1. DAC&FW, GoI, 2. State-wise area, production and yield data from SOPA, Indore estimates.

3. Accomplishment of the year 2017-18

3.1 Breeding and Genetics

The data on yield and other characters of test entries in different breeding trials conducted in *Kharif* 2017 are presented in Table 1.1.1 to 1.6.5.

3.1.1 Initial Evaluation Trial

Forty two entries were evaluated at 33 AICRP centres of six AICRP zones. The promising entries showing yield advantage over highest yielding check are presented in Table 3. No entry could out yield check variety VLS 63 in Northern Hill Zone. In Northern Plain Zone five entries surpassed the best check. In North Eastern Hill Zone fifteen entries out yielded the best check JS 335 and yield of top ten entries is shown in Table 3. In Eastern Zone fourteen entries and in Central zone 1 entry could out yield the best check. In Central Zone two entries NRC 130 and NRC 131 out yielded the best earliest maturing check JS 20-34 and had the equivalent maturity duration (Table 1.5.1 and 1.5.3). Thirteen test entries could out yield the best check in Southern Zone. Four entries possessed special traits *viz.* lipoxygenase2 free (NRC 132), KTI free (NRC 133) and drought tolerant (NRC 136 & NRC 137).

Table 3: Promising entries for different zones in IVT

S. No	Entry	Northern Plain Zone		North Eastern Hill Zone		Eastern Zone		Central Zone		Southern Zone	
		Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank
1.	**NRC 128**	3371	I	1667	II	1981.50	II				
2.	**PS 1611**	2675	II								
3.	**PS 1613**	2362	III	1531	IV						
4.	**NRC 134**	2222	IV								
5.	**NRCSL 1**	2115	V	1494	VIII	1938.25	III			2471.57	VIII
6.	**CSB 10084**			1679	I						
7.	**SL 1068**			1556	III						
8.	**SL 1123**			1556	III						
9.	**NRC 137**			1530	V	1765.75	VII				
10.	**CSB 10112**			1507	VI						
11.	**DS 3108**			1506	VII						
12.	**VLS 95**			1469	IX						
13.	**RSC 11-07**					2129.75	I			2649.14	II
14.	**AMS 2014-1**					1882.50	IV			2548.86	V
15.	**NRC 132**					1802.25	V			2479.00	VII
16.	**RSC 11-03**					1783.75	VI				
17.	**MACS 1493**					1765.25	VIII			2702.71	I
18.	**NRC 136**					1740.75	IX				
19.	**VLS 94**					1740.50	X				
20.	**AMS 100-39**							2164	I	2579.86	IV
21.	**KDS 992**									2617.00	III
22.	**DSb 34**									2545.86	VI
23.	**BAUS 102**									2466.86	IX
24.	**SKF-SPS-11**									2456.00	X
25.	**SL 958 (c)**	1983	VI								
26.	**JS 335 (c)**			1297	XIV	1580.25	XIX				
27.	**NRC 86 (c)**							2023	V		
28.	**RKS 18 (c)**									2291.00	XVIII

3.1.2 Advanced Varietal Trial – I

The results of mean performance of AVT-I entries over two years are presented in summary report of plant breeding trials. Table 4 shows performance of superior AVT-I entries in different zones. In Northern Plain

Zone SL 1104 and DS 3106 were better than the best check. In North Eastern Hill Zone two entries out yielded the best check. In Eastern Zone two entries and in Central Zone three entries out yielded the best check. In Central Zone NRC 127 is a essentially derived entry of JS 97-52 for null KTI trait and has out yielded JS 97-52 by 4%.

Table 4: Promising entries for different zones in AVT-I

S. No.	Entry	Northern Plain Zone		North Eastern Hill Zone		Eastern Zone		Central Zone	
		Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank
1.	**SL 1104**	2367	I						
2.	**DS 3106**	2219	II						
3.	**KDS 921**			1855	I				
4.	**RSC 10-71**			1726	II	1820	II		
5.	**RSC 10-52**					1853	I	2183	III
6.	**MACS 1520**							2372	I
7.	**AMS-MB 5-18**							2203	II
8.	**NRC 127***							1807	VIII
9.	**PS 1347 (C)**	2064	IV						
10.	**JS 97-52* (C)**			1593	V	1624	III	1733	IX
11.	**NRC 86 (C)**							1976	V

* NRC 127 an EDV of JS 97-52

Advanced Varietal Trial-II

Final stages of evaluation involved 10 entries in all the zones except Southern Zone. Table 5 shows promising entries with their yields. In Northern Hill Zone, VLS 89 was the repeat entry and has been evaluated twice in AVT II. VLS 89 has surpassed the best check. In Northern Plain Zone, both of the tested entries could out yield the best check variety. SL 1028 was the repeat entry in AVT II and has out yielded the best check in the average of four years of its evaluation. In North Eastern Hill Zone, JS 20-116 was the only entry and it has surpassed the best check. In NEHZ, PS 1556 has been evaluated for four years due to its being a repeat entry in AVT I and it has out yielded the best check. In Eastern and Central Zones, there were two entries in each zone and both of them have out yielded the best check.

Table 5: Promising entries for different zones in AVT II

S. No.	Entry	Northern Hill Zone		Northern Plain Zone		North Eastern Hill Zone		Eastern Zone		Central Zone	
		Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank	Yield	Rank
1.	**VLS 89***	2292	I								
2.	**PS 1572**			1926	I						
3.	**SL 1074**			1915	II						
4.	**SL 1028***			2267	I						
5.	**JS 20-116**					1928	I	2129	II	2236	I
6.	**PS 1556***					1822	I				
7.	**RVS 2010-1**							2163	I		
8.	**JS 20-94**									2055	II
9.	**RVS 2007-6***									2068	I
10.	**RSC 10-46***									1947	II
11.	**VLS 59 (c)**	2058	II								
12.	**PS 1347 (c)**			1664	III						
13.	**PS 1347** (c)**			1881	II						
14.	**JS 97-52 (c)**					1736	II	1876	III		
15.	**RKS 18** (c)**					1644	II				
16.	**NRC 86**									1847	III
17.	**JS 93-05****									1593	III

*Repeat Entry ** Check for repeat entry

3.1.3 National Hybridization Programme:

A total of 178 crosses were attempted during Kharif 2017 and F_1s sent for identification of true hybrids and off-season generation advancement to Bangaluru. Parents of these crosses included exotic parents, photoinsensitive lines, drought tolerant lines, long juvenile lines, very early maturing lines, disease resistant lines.

During 2017, IISR received 47 crosses from off season nursery for further generation advancement and hybridity confirmation. Hybridity was confirmed in 38 crosses and a large number of F_2 (80-5920) were produced. Bulks of these crosses would be distributed to all the centres for strengthening the hybridization programme and increasing diversity in Indian soybean varieties.

3.1.4 Multilocation Germplasm Evaluation

ICAR-IISR has developed a core collection and in a bid to share this core with AICRP centres and evaluate it in different zones, a part of the core collection (125 lines) was distributed to eight centres and evaluated for 7 characters. Early maturing, high yielding, high 100 SW, disease resistant lines were identified and would be used in National Hybridization Programme for widening the genetic base of Indian soybean varieties.

3.2 Breeder seed production

The indent for soybean breeder seed for *Kharif* 2018, to be produced in 2017 was 21950.50 q. The indent comprised of 34 varieties. Out of the total indent given, 65% was for the five (5) major varieties namely JS 95-60 (14.8%), JS 93-05 (13.8%), JS 335 (12.8%), JS 20-29 (11.9%) and JS 20-34 (11.2%). The largest indent was **3258 q** for JS 95-60 comprising of 14.8% of total indent. Against these indents, a target of **21275** q was allotted to different centres. The variety and centre wise production figures are shown in table **6**. The production data shows a shortage of 51% over indent. The breeder seed production programme at major centres viz. JNKVV, Jabalpur; RVSKVV, Gwalior and UAS, Dharwad was affected due to adverse climatic conditions of long dry spell followed by rain causing incidence of Rhizoctonia aerial blight and Charcoal rot. The breeder seed indent of JS 95-60 was confined to RVSKVV and JS 20-29 was confined to JNKVV, Jabalpur. The failure of production of these two centres caused high level of shortage of these two important varieties. Shortage in production against indent in JS 20-29 was 80.5%, in JS 20-34 was 78.7%, in JS 95-60 was 66.4%, in JS 93-05 was 56.5% and in JS 335 it was 20.8%. The production of JS 335 was taken up at 8 centres of Maharashtra, Karnataka and Telangana. Though, production of JS 335 and JS 93-05 failed by 50% at UAS Dharwad, there was lesser shortage (22%) in production of JS 335 due to better productions at Maharashtra and Adilabad centres.

Off season breeder seed production was taken up during *Rabi* 2016-17 to compensate the shortage of *Kharif* 2016 production. A total of 969.5 q breeder seed was produced during off season against a target of 1365 q. The production data in given in Table 7.

The contingency plan was formulated to makeup the shortage of soybean breeder seed production during *Kharif* 2017. About 110 ha area has been planned with a production target of 817 q of soybean breeder seed of JS 93-05, JS 335, JS 20-29, JS 95-60, JS 20-34, JS 20-69, NRC 37 and NRC 86 at JNKVV, Jabalpur; UAS, Dharwad; VNMKV, Parbhani; MPKV, Rahuri; PDKV RRS, Amravati and IISR, Indore.

Table 6: Breeder seed production *Kharif* 2017

Sl. No.	Variety	DAC Indent (q)	Centre	Allocation (q)	Production (q)
1.	**JS 335**	**2808**	UAS, Dharwad	1500	500
			PJTSAU, Adilabad	300	180
			UAS, Bangalore	200	100
			MPKV, Rahuri	500	500
			PDKV, Amravati	500	500
			ARI, Pune	50	50
			UAS, Raichur	200	220
			RVSKVV, Gwalior	200	173
			Total	**3450**	**2223**
2.	**JS 93-05**	**3024**	RVSKVV, Gwalior	500	172
			UAS, Dharwad	1200	600
			AU, Kota	200	193
			VNMKV, Parbhani	300	33
			IGKVV, Raipur	300	52
			ICARDA, Amlaha	200	200
			PDKV Amravati	200	65
			Total	**2900**	**1315**
3.	**JS 95-60**	**3258**	JNKVV, Jabalpur	100	0
			RVSKVV, Gwalior	2500	741
			AU, Kota	120	54
			HIL	200	200
			UAS, Banglore	100	50
			ICARDA, Amlaha	50	50
			Total	**3070**	**1095**
4.	**JS 97-52**	**590**	JNKVV, Jabalpur	300	1.40
			IGKVV, Raipur	300	57.40
			BAU, Ranchi	10	8
			Total	**610**	**66.8**
5.	**JS 20-29**	**2612**	JNKVV, Jabalpur	3000	402
			RVSKV, Gwalior	200	40
			AU, Kota	50	35
			Lokbharti, Gujrat	20	20
			IISR, Indore	20	12
			Total	**3290**	**509**
6.	**JS 20-34**	**2459**	JNKVV, Jabalpur	700	325.70
			AU, Kota	200	192
			IISR, Indore	15	6
			Total	**915**	**523.7**
7.	**JS 20-69**	**600**	JNKVV, Jabalpur	1000	354
8.	**NRC 86**	**223.5**	IISR, Indore	225	38
9.	**NRC 7**	**20**	IISR, Indore	20	2
10.	**NRC 37**	**40**	IISR, Indore	40	1.6
11.	**RVS 2001-4**	**951**	RVSKVV, Gwalior	1000	740
12.	**MAUS 71**	**651**	VNMKV, Parbhani	660	790
13.	**MAUS 158**	**663**	VNMKV, Parbhani	665	617
14.	**MAUS 162**	**650**	VNMKV, Parbhani	650	276
15.	**Pratap Soya 2(RKS 18)**	**0.50**	AU, Kota	1	0
16.	**Pratap Soya-45**	**510**	AU, Kota	510	97

17.	**RKS 24**	**320**	AU, Kota	320	290
18.	**CG Soya 1**	**20**	IGKVV, Raipur	20	9.80
19.	**MACS 1188**	**224**	ARI, Pune	225	225
20.	**PhuleKalyani (DS-228)**	**349**	MPKV, Rahuri	350	350
21.	**PhuleAgrani (KDS 344)**	**377**	MPKV, Rahuri	380	380
22.	**DSb 21**	**624.5**	UAS, Dharwad	625	300
23.	**DSb 1**	**10**	UAS, Dharwad	10	0
24.	**Pant Soya 1042**	**0.6**	GBPUAT Pantnagar	1	0.5
25.	**Pant Soya 1225**	**23**	GBPUAT, Pantnagar	23	42
26.	**Pant Soya 1347**	**12**	GBPUAT Pantnagar	12	16
27.	**SL 958**	**0.35**	PAU, Ludhiana	1	4
28.	**VLS 65**	**6**	VPKAS, Almora	6	5.5
29.	**VLS 63**	**4**	VPKAS, Almora	4	4
30.	**Hara Soya**	**2**	HPKVV, Palampur	2	2
31.	**MAUS 612**	**8**		200	272
32.	**Basara ***	**200**		90	89
33.	**RKS 113***	**150**			
34.	**DSb 23-2***	**560**			
	Total	**21950.5**		**20985**	**10637.9**

Table 7: Off-season breeder seed production Rabi 2016-17

Variety	Centre	Target(q)	Production (q)
JS 93-05	UAS, Dharwad	400	320
	Parbhani	100	70
	PDKV, Amravati	35	30
	Total	**535**	**420**
JS 335	UAS, Bangalore	**50**	**50**
JS 20-29	JNKVV	320	261
	Parbhani	100	-
	Total	**420**	**261**
JS 95-60	UAS, Bangalore	**50**	**12**
JS 20-34	JNKVV, Jabalpur	**160**	**60**
JS 20-69	JNKVV, Jabalpur	**130**	**160**
NRC 86	IISR, Indore	**20**	**6.5**
	Total	**1365**	**969.5**

3.3 Production technology and Front Line Demonstrations (FLDs)

All the trials were conducted as per technical programme during *kharif* 2017 at 20 Centres representing 6 zones of the country. The experiment-wise salient findings are given as under

3.3.1 Evaluation of AVT II entries under different sowing dates

Soybean new entry VL 89 yielded more as compared to check VLS 63 (6.69%) and VLS 59 (27.46%) in Northern Hill Zone. All the three new entries SL 1074, SL 1028 and PS 1558 produced more yield (101.89, 110.54 and 96.31%) as compared to check SL 688 in North Plain Zone. New entry JS 20-116 and RVS 2010-1 produced negligibly higher yield as compared to check (JS 97-52) in North Eastern Zone. None of the new entry performed better than check JS 97-52 in North Eastern Hill zone. JS 20-226 (45.16%), RSC10-46 (30.53%), RVS 2007-06 (30.11%), JS 20-94 (11.94%) and NRC 127 (11.02%) yielded more than check (JS 97-52) in Central Zone.

Invariably timely planted soybean yielded higher than 20 days later planting in all the zones.

3.3.2 Sustainable soybean production through crop rotation and tillage systems

The maximum system productivity was recorded when soybean rotate alternate year with maize. The conventional tillage produced the higher yield than minimum tillage in the initial year (second year of trial).

3.3.3 Effect of foliar nutrition on soybean

The foliar nutrition application (Urea, DAP, MOP, NPK, Mo, B and Zn) at pod initiation stage along with RDF significantly enhanced the soybean yield by 1.6 to 41.85% in all the zones.

3.3.4 Effect of fertigation on soybean productivity

Under fertigation and irrigation system, fertigation at seed filling produced maximum yield at Raipur. At Devgadbaria, fertigation system produced 3.3% higher yield than irrigation system (averaged over treatments). When comparing the fertigation and irrigation system, fertigation at flowering (32.26%) produced maximum yield.

3.3.5 Refinement of soybean production technology for problematic soil (Acidic) in North eastern hill zone

Application of lime @ 600 kg/ha with FYM @ 2.5 t/ha were found to be effective to reclaim the soil and produced highest yield.

3.3.6 Evaluation of new molecules of herbicides for controlling of weeds in soybean

The new herbicides i.e. F 8072 and PIH 485 were found more effective than check herbicide-pendimethalin.

3.3.7. Bridging yield gap of soybean through site specific nutrient management (SSNM)

The maximum yield gap was recorded when P was omitted from the nutritional schedule through SSNM (nutrient expert system) followed by N and K.

3.3.8 Frontline demonstrations (FLDs)

During the year, 26 centers have conducted a total of 1142 FLDs on farmer's fields against the target of 1100 FLDs in plot of 0.4 ha each. Directors of Agriculture of respective states were requested to visit these FLDs. Many of these trials were monitored and generally found to be satisfactory. Yield as high as 27.30 q/ha could be obtained in some farmers' fields under the improved technology.

Of the 1121 FLDs, 74.46 and 25.55% were represented by man and farm women. While the representation of category wise beneficiaries was 12.04% by SC, 11.33% by ST, 44.07% by OBC and 32.56% by general.

Data accrued from 1132 FLDs on full package revealed that the adoption of research emanated improved soybean production technology led to an increase in yield and net returns to the tune of 27.61 and 43.17% over farmers practice which was achieved by the additional expenditure of only Rs. 3450/ha. The difference in gross returns due to improved technology and farmer's practice was 32.52%. The estimated yield gap II was 384 kg/ha.

A summary of FLDs over 29 years (Table 8) consistently shows the benefits of improved technology.

Table 8: Soybean yield (kg/ha) and yield gap II in Front Line Demonstrations

Sl. no.	Year	Improved technology	Farmers' practice	Yield gap II
1	1989-90	1951	901	1050
2	1990-91	1959	1280	679
3	1991-92	1991	1446	545
4	1992-93	1933	1427	506
5	1993-94	1899	1407	492
6	1994-95	1810	1360	450
7	1995-96	1839	1385	454
8	1996-97	1824	1501	323
9	1997-98	1852	1409	443
10	1998-99	1736	1245	491
11	1999-2000	1736	1292	444
12	2000-01	1540	1191	349
13	2001-02	1769	1420	349
14	2002-03	1646	1299	347
15	2003-04	1724	1444	280
16	2004-05	1743	1415	328
17	2005-06	1693	1344	349
18	2006-07	1755	1365	390
19	2007-08	1794	1439	355
20	2008-09	1702	1302	400
21	2009-10	1744	1320	424
22	2010-11	1688	1307	381
23	2011-12	1813	1438	375
24	2012-13	1881	1469	412
25	2013-14	1648	1335	313
26	2014-15	1778	1359	419
27	2015-16	1484	1061	423
28	2016-17	1848	1470	378
29	2017-18	1722	1388	384

3.4 Entomology

Total six field/laboratory trials were conducted during *kharif* 2017 by the coordinating centres. Twenty five different insect species were reported to infest soybean crop. Infestation of stem fly was observed at all the centers. Maximum stem tunnelling (38.8 %) due to stem fly maggots was reported from Pantnagar. White fly as a major pest was confined to Northern region only recorded 5.7 flies / leaf transmitting YMV rating of 8.0 (in 1-9 scale) at Delhi center. In Central zone incidence of defoliators, girdle beetle and stem fly were also severe. Girdle beetle infestation was highest at Sehore (30.5%) while 44.5% pod damage due to *Cydiaptychora* was observed at Dharwad center. High incidence of aphids (31.6/plant) and Bihar Hairy caterpillar (150 larvae/m) reported from Imphal also call for greater attention. Among natural bio-control agents, entomopathogenic fungi viz. *Beauveriabassiana* and *Nomurearileyi* caused severe infection of muscardine disease in lepidopteran defoliators during August-September. The larval mortality ranged from 7.5 to 30 %.

Soybean genotypes belonging to IVT, AVT-I, AVT-II of different zones were evaluated for insect resistance. Considering three years' data, genotypes found to be promising with respect to resistance against stem fly, defoliators, girdle beetle and pod borer were identified.

To confirm the type of resistance, AVT-II entries were subjected to novel approaches, involving food consumption and utilization indices viz. Approximate Digestibility (AD), Efficiency of Conversion Index (ECI) and Efficiency of conversion of Digested food (ECD). At Pantnagar, among 11 genotypes tested, PS 1572 exhibited good level of antibiosis with least ECD (9.44), ECI (16.11) and AD (65.67) as compared to other genotypes. It has also shown slight antixenosis (C=0.49) against *S. litura.* At Bengaluru centre, entry DSb 28-03 performed better than all other entries showing least values for all the digestibility indices and Preference Index (C). All the Breeders should send their AVT-II entries to PI, Entomology for this trial.

On the recommendations of the ICAR, a new formulation of *Bacillus thuringiensis* – Bt 127 SC developed by ICAR-IIOR, Hyderabad was evaluated for the second year for its efficacy against lepidopteran insects of soybean. The product, Bt 127 SC appears to be promising for managing lepidopteran defoliators including *Spodoptera litura*. The trial should be conducted for one more year to validate the results.

A new trial on effect of polymer coating on efficacy of seed treatment pesticides was initiated. The results show that seed treatment with insecticides and fungicides followed by polymer coating helps in retaining the efficacy of pesticides and facilitates the operation much before the sowing time, thereby managing the sowing in narrow sowing-window. It would be interesting to see if the dosage of pesticides can be reduced without compromising with their efficacy.

3.5 Pathology

Nine Pathology field trials were conducted during *kharif* 2017 at 15 co-ordinatedcentres spread over six zones to generate information on prevalence of diseases & their severity, sources of resistance to single and multiple diseases, screening of released varieties against charcoal rot, management strategies in pod blight complex, bioefficacy of zillon against YMV disease and assessment of polymer coating on efficacy of seed treating chemicals and inoculants. As reported by various centres, although a total 20 diseases appeared across the country on soybean but only seven of them were wide spread occurring in 3 or more zones and five were zone specific. Except FLS at Almora and Palampur, YMV at Pantnagar, Ludhiana, Dholi and Delhi, Coll R and PB (Ct) at Medziphema and Biswanath Chariali, PB (Ct) and IBB at Raipur, Coll R, CR and PB (Ct) at Jabalpur and Amaravati, rust and PB (Ct) at Ugarkhurd, Dharwad, K. Digraj. RRR at Sehore which appeared in moderate to severe form, severity of other diseases was mild to moderate at most of the locations. Two disease viz., PB (Ct) and YMV were found in all the five zones which are the key diseases across the locations. RRR and SCV confined to only at Sehore while BND appeared only at Delhi and IBB at Raipur in moderate to severe form. The other hemibiotrphic foliar fungal diseases at different locations appeared in mild to moderate form. In general, the disease pressure differed at different locations across zones which is mainly due to variation in congenial weather prevalent across the locations.

Soybean genotypes belonging to IVT, AVT-I, AVT-II of different zones were evaluated for disease resistance. Considering the disease severity, genotypes found to be promising with respect to resistance against FLS, PB(Ct), RAB,YMV, Rust, TLS, Coll.R and CR were identified. DSb 34 showed HR reaction to rust at Ugarkhurd, Dharwad and K. Digraj. However, TS 53 and KDS 992 showed HR reaction to rust only at K. Digraj. In NHZ, at Palampur JS 20-116 recorded AR reaction and PS 1572 showed HR reaction against FLS. None of entries showed AR/HR reaction at Almora. In NPZ, SL 1074 showed HR reaction at Dholi, Ludhiana and Delhi centers against YMV.

Disease specific resistant entries/varieties of past years were further evaluated to select those which are showing durable resistance status at various identified locations. In NPZ, at Pantnagar out of 32 previous entries, PS 1517 maintained AR status and 9 maintained HR status to RAB. In NHZ, at Almora, out of 51 entries tested none of entries maintained AR/ HR reaction. Only 20 maintained and MR status. In CZ at Amravati, out of 21 entries, 13 maintained AR status to CR. At Jabalpur, out of 31 entries tested, 26 maintain HR reaction for CR. At Sehore, out of 10 entries tested six entries showed AR reaction to CR, none of the

entries showed AR/HR to TLS. At Dharwad out of 24 entries tested, DSb 23-2, DSb 28-3 DSb 30-2, DSb 32 and KDS 753 maintained HR reaction to rust, EC 391336, EC 379152, EC 242104 are the new sources of resistance identified maintained HR recation to rust in the third year of experimentation. At Ugarkhurd, 8 entries maintained HR reaction to rust and 6 entries MR reaction to PB (Ct). The variety DSb 21 maintained HR reaction to rust for the last eight years both at Ugarkhurd and Dharwad.

Fifty germplasms evaluated at Palampur, Jabalpur Dharwad and Ludhiana centres for identification of multiple disease resistance. At Palampur, CAT 1328, CAT 1878 and PS 1347 entries were AR and 16 HR to FLS. At Dharwad, no germplasm line was observed as resistant for rust, five lines MR to rust, and 14 lines MR to PB(Ct). The lines CAT 1328 showed AR reaction to FLS and CR, MR reaction to rust and HR reaction to PSS. At Ludhiana, only three entries viz. Cat 1483, PS 1347 and Cat 2090 were resistant to YMV.Twenty two varieties each were evaluated at Jabalpur, Amravati and Sehore centres for assessing the reaction to charcoal rot disease. The variety JS 20-69 showed AR reaction at Jabalpur and Amravati. The varieties JS 20-69, JS 20-34 and MAUS 162 showed AR reaction at Jabalpur while, JS 20-69 and RVS 2001-4 showed AR reaction at Amravati.

Field investigation on integrated management pod blight complex of soybean in the third year of experimentation revealed that Seed treatment (Carboxin + Thiram) (3g/kg) followed by spraying of Thiophanate methyl@0.1% has reduced pod blight complex incidence and increased germination & seed yield.

In the bioefficacy of Zillon against Yellow Mosaic Virus Disease trial, among the different treatments tested across the zones, spraying with Zillon at 4 to 6 ml/L at 15, 30 and 45 DAS was found effective in management of Yellow Mosaic Virus disease and enhancement of yield in soybean. Assessment of polymer coating on efficacy of seed treating chemicals and inoculants revealed significant reduction in severity of location specific diseases at Indore, Sehore and Dharwad.

3.6 Microbiology

3.6.1 Isolation and screening of rhizobacteria capable of producing ACC deaminase activity, antioxidant potential and phytohormones for developing inoculants to mitigate abiotic stress in soybean

This experiment was initiated at various centers to generate rhizobacterial germplasm which can be potential candidates for mitigating abiotic stress in soybean crop cultivation. During the years, of the total 14 isolates from Delhi center, 07 were found to be moisture tolerant; 12 from Indore centre,03 strains (characterized based on FAME and 16SrRNA gene sequencing) belonging to rhizobia were found to be tolerant; 26 isolates from Pantnagar which were mainly belonging to fluorescent pseudomonads and from Ludhiana centre 08 isolates were identified as moisture tolerant that were mainly belonging to pseudomonads have been purified and are being used for further evaluation under in vitro for stress tolerance parameters.

3.6.2 Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination

For the past three years field evaluation of different combinations of bacterial strains along with AMF was tested at the farmer's field and work out the economics of the same. Accordingly the centres were conducted trial with the combination of *P. polymyxa* + AMF and compared its performance with the farmers practice. At Delhi centre, it was observed that, the microbial consortium performed at par with the application of 20, 40 and 60Kg/ha (N,P,K respectively). At Sehore and Ludhiana centres, the microbial consortium performed better than the farmers practice. At Pantanagr and Indore centres, the results were similar to Delhi. Overall, the microbial consortium performed better than the farmer's practice, however the result were non-significant. Benefit cost ratio with microbial consortium was from 2.30- 3.6 whereas, with farmer's practice treatment it was 2.01 to 2.5.
It is observed that using the eco-friendly technology of biofertilizer (*P. polymyxa* HKA 15 +AMF) not only improves the yield and plant growth of soybean crop but also saves the farmer on use of chemical fertilizer and ultimately improves and sustains the soil fertility.

3.6.3 Rhizosphere competence/ potentiality of AVT-II entries of respective centres

At Delhi, entry, SL 1028 did not form nodules. Entry PS 1572 showed maximum number of nodules (16.2/plant). The percent N content in the shoot at 50% flowering stage of all the three AVT-II entries was higher compared to the checks, except PS 1347 which had 3.6% N content at par with the entries. Nodule number and dry mass of check SL 688 was the highest, 17/plant and 77.8mg/plant respectively. At Ludhiana center line SL 1074 gave highest number of 50 nodules/plant. Nodule dry mass as well as leghaemoglobin content of this line was the highest among the entries as well as among the checks. At Pantnagar center, PS 1572 gave the highest nodule number per plant (33/plant). Nodule dry mass of this line was almost at par with the check SL 688 (274mg/plant & 288mg/plant) respectively. The leghaemoglobin content of entry PS 1572 was better than other two entries but was found almost at par with checks, PS 1347. In the central zone, at Indore centre, JS 20-116 showed highest nodule number of 145/plant and nodule dry mass followed by RVS 2007-6. However, leghaemoglobin content was highest in RSC 10-46 (7.38 mg/g nodule). JS 20-116 followed by RVS 2007-6 gave the second and third highest value of leghaemoglobin then RSC 10-46. At Sehore center RVS 2007-6 showed the highest nodules (33/plant), dry mass and leghaemoglobin content when compared to other entries

4.0 Human Resource Development in Plant Breeding

Success of breeding programme depends on creating large F2 population but hybridization in soybean is very difficult and success is very limited. This limits the soybean improvement programme. We have improved hybridization skills at ICAR-IISR and in a bid to improve the skills of AICRP breeders, we have been organizing “Hands on Training Programme on Soybean Hybridization” since 2016. This year also we organized this programme from 17-19 August, 2017 and trainees found this very programme very useful.

For improving the knowledge base and for getting soybean breeders abreast of latest developments in soybean genetic improvement our institute organized a training programme on “Conventional and Molecular Breeding Approaches for Increasing Soybean Productivity under Changing Climatic Situations in India” from 16-25 January, 2018. New AICRPS breeders from 4 centres and soybean researchers from different parts of India participated in the programme.

परीक्षणों की सारांश – तालिकाएँ
Summary Tables of Experiments

पादप प्रजनन
Plant Breeding

Principal Investigator	**Dr. Sanjay Gupta, IISR, Indore**
Northern Hill Zone	
Palampur (Himachal Pradesh)	Dr. (Mrs.) Vedna Kumari
Bajaura (Himachal Pradesh)	Dr. Naval Kishore
Almora (Uttarakhand)	Dr. Anuradha Bhartiya
Majhera (Uttarakhand)	Dr. Anjuli Agarwal Dr. J.P. Purwar
Northern Plain Zone	
Pantnagar (Uttarakhand)	Dr. Pushpendra / Dr.P.S.Shukla Dr. Kamendra Singh
New Delhi	Dr. S.K. Lal
Ludhiana (Punjab)	Dr. B.S. Gill
North Eastern Hill Zone	
Biswanath Chariali (Assam)	Dr. J. Bhuyan
Imphal (Manipur)	Dr. Heisnam Nanita Devi
Umiam (Meghalaya)	Dr. Amit kumar
Eastern Zone	
Ranchi (Jharkhand)	Dr. Nutan Verma
Raipur (Chattisgarh)	Dr. S.K. Nag
Bhawanipatna (Orissa)	Dr. Susanta Kumar Mohanty
Dholi (Bihar)	Dr. Anil Pandey
Central Zone	
Indore (Madhya Pradesh)	Dr. Rajkumar Ramteke Dr. Yogendra Mohan
Sehore (Madhya Pradesh)	Dr. S.R. Ramgiri
Nagpur (Maharashtra)	Shri S.K.Dhapke
Kota (Rajasthan)	Dr. B.L. Meena
Jabalpur (Madhya Pradesh)	Dr. Manoj Kumar Shrivastava
Jalna (Maharashtra)	Dr. George Thomas
Amravati (Maharashtra)	Dr. G.D.Chandankar
Morena (Madhya Pradesh)	Dr. V.K. Tiwari
Parbhani (Maharashtra)	Dr. S.P. Mehtre
Amreli (Gujarat)	Dr. Viren Akbari
Lokbharti (Gujarat)	Dr. C. P. Singh
Anand (Gujarat)	Prof. D. B. Parmar
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Dharwad (Karnataka)	Dr. G.T. Basavaraja
Bidar (Karnataka)	Dr. Sidramappa
Pune (Maharashtra)	Dr. Philips Verghese
Bangalore (Karnataka)	Dr. Jayarame Gowda
Coimbatore (Tamil Nadu)	Dr. P.Sudhagar
K. Digraj (Maharashtra)	Dr. M.P. Deshmukh
Adilabad (Telangana)	Dr. M. Rajendar Reddy

Table 1.1.1

Trial : Initial Varietal Trial- IVT
Zone : Northern Hill Zone (NHZ)
Character : Yield (kg/ha)

S.No.	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**NRC 128**	963	1827	2642	1531	1740.75	XIII
2	**RVS 2011-3**	988	1556	1654	2025	1555.75	XXII
3	**DSb 34**	1383	1901	1358	1210	1463.00	XXVI
4	**MAUS 725**	1506	2049	1728	790	1518.25	XXIII
5	**SL 1068**	2148	2543	1926	1580	2049.25	III
6	**JS 21-15**	1309	1827	1630	1136	1475.50	XXV
7	**AUKS 174**	1802	2420	1506	1852	1895.00	VI
8	**NRC 137**	1284	1852	2000	1704	1710.00	XV
9	**VLS 95**	1802	2247	2198	1630	1969.25	IV
10	**CSB 10084**	815	1506	1062	1457	1210.00	XXXVI
11	**MACS 1493**	1753	1728	2272	1556	1827.25	X
12	**JS 21-17**	1185	2494	2148	1333	1790.00	XII
13	**NRC 130**	1136	963	1062	691	963.00	XXXVIII
14	**TS 53**	1185	2889	1580	1630	1821.00	XI
15	**RVS 2011-4**	-	-	-	-	-	
16	**SL 1123**	1580	741	2222	1407	1487.50	XXIV
17	**BAUS 102**	914	1704	2198	716	1383.00	XXX
18	**MACSNRC 1575**	642	963	1556	914	1018.75	XXXVII
19	**MAUS 731**	1210	1901	2617	1136	1716.00	XIV
20	**NRC 132**	1358	1481	1432	1802	1518.25	XXIII
21	**VLS 94**	1951	2988	2840	1062	2210.25	I
22	**AMS 2014-1**	1037	1704	1877	667	1321.25	XXXII
23	**KDS 1095**	1284	1531	1654	1210	1419.75	XXVIII
24	**NRC 133**	1235	1704	2123	1753	1703.75	XVII
25	**DS 3108**	1086	1778	2889	1086	1709.75	XVI
26	**AMS 100-39**	1407	1160	2198	889	1413.5	XXIX
27	**NRC 136**	938	2543	1580	1407	1617.00	XX
28	**RVS 2011-1**	346	2099	2025	741	1302.75	XXXIII
29	**CSB 10112**	938	494	938	1235	901.25	XXXIX
30	**PS 1613**	1185	568	1975	1432	1290.00	XXXIV
31	**NRC 131**	889	667	1062	741	839.75	XL
32	**KDS 992**	1111	988	2025	1383	1376.75	XXXI
33	**RSC 11-07**	963	1185	1926	840	1228.50	XXXV
34	**NRCSL 1**	1901	1284	2469	938	1648.00	XIX
35	**PS 1611**	1432	1630	2494	815	1592.75	XXI
36	**RSC 11-03**	1062	2593	2123	914	1673.00	XVIII
37	**NRC 134**	1259	2914	2296	864	1833.25	IX
38	**NRC 129**	395	568	1432	815	802.50	XLI
39	**RVS 2011-2**	988	1704	1901	1111	1426.00	XXVII
40	**SKF-SPS-11**	1556	2247	1951	1580	1833.50	VIII
41	**SKF 1050**	173	444	420	741	444.50	XLIII
42	**Shalimar Soybean-1**	889	716	519	691	703.75	XLII
43	**PS 1092(C)**	1728	2222	2790	741	1870.25	VII
44	**VLS 59(C)**	1827	2148	2272	1481	1932.00	V
45	**VLS 63(C)**	1580	3037	2642	1580	2209.75	II
	Mean	1230.07	1716.09	1891.18	1200.39		
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	**22/06/2017**	**04/07/17**	**22/06/2017**	**16/06/2017**		
	CD	246.91	296.3	469.14	197.53		
	CV (5%)	13.11	11.07	15.25	10.12		

Table 1.1.2

Trial : Initial Varietal Trial- IVT
Zone : Northern Hill Zone (NHZ)
Character : Days to Flower

S.No.	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**NRC 128**	60	55	62	76	63.25	XXXII
2	**RVS 2011-3**	56	49	61	63	57.25	XVII
3	**DSb 34**	53	48	58	62	55.25	XIII
4	**MAUS 725**	52	49	59	58	54.5	XII
5	**SL 1068**	57	53	60	65	58.75	XXII
6	**JS 21-15**	55	52	59	62	57.00	XVI
7	**AUKS 174**	62	57	63	76	64.50	XXXV
8	**NRC 137**	58	50	60	64	58.00	XX
9	**VLS 95**	49	47	49	53	49.50	VII
10	**CSB 10084**	63	56	63	75	64.25	XXXIV
11	**MACS 1493**	61	56	60	65	60.50	XXV
12	**JS 21-17**	54	50	56	64	56.00	XIV
13	**NRC 130**	45	48	47	46	46.50	II
14	**TS 53**	62	57	63	65	61.75	XXVIII
15	**RVS 2011-4**	-	56	-	-	56.00	XIV
16	**SL 1123**	60	51	61	67	59.75	XXIV
17	**BAUS 102**	61	57	60	72	62.50	XXXI
18	**MACSNRC 1575**	45	47	48	49	47.25	V
19	**MAUS 731**	56	52	60	63	57.75	XIX
20	**NRC 132**	60	57	58	74	62.25	XXX
21	**VLS 94**	55	48	52	61	54.00	XI
22	**AMS 2014-1**	62	56	60	67	61.25	XXVII
23	**KDS 1095**	57	51	59	62	57.25	XVII
24	**NRC 133**	60	57	59	68	61.00	XXVI
25	**DS 3108**	56	48	61	64	57.25	XVII
26	**AMS 100-39**	58	51	57	63	57.25	XVII
27	**NRC 136**	60	57	61	64	60.50	XXV
28	**RVS 2011-1**	55	58	60	62	58.75	XXII
29	**CSB 10112**	63	57	61	75	64.00	XXXIII
30	**PS 1613**	58	57	60	62	59.25	XXIII
31	**NRC 131**	45	45	48	46	46.00	I
32	**KDS 992**	60	56	61	71	62.00	XXIX
33	**RSC 11-07**	56	58	58	65	59.25	XXIII
34	**NRCSL 1**	54	52	57	62	56.25	XV
35	**PS 1611**	56	47	61	61	56.25	XV
36	**RSC 11-03**	60	57	59	71	61.75	XXVIII
37	**NRC 134**	59	48	59	67	58.25	XXI
38	**NRC 129**	44	50	47	46	46.75	III
39	**RVS 2011-2**	53	48	51	55	51.75	IX
40	**SKF-SPS-11**	54	56	60	62	58.00	XX
41	**SKF 1050**	43	45	52	57	49.25	VI
42	**Shalimar Soybean-1**	44	46	51	47	47.00	IV
43	**PS 1092(C)**	50	47	49	58	51.00	VIII
44	**VLS 59(C)**	51	48	54	62	53.75	X
45	**VLS 63(C)**	51	57	60	62	57.50	XVIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	**22/06/2017**	**04/07/17**	**22/06/2017**	**16/06/2017**		

Table 1.1.3

Trial : Initial Varietal Trial- IVT
Zone : Northern Hill Zone (NHZ)
Character : Days to Maturity

S.No.	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**NRC 128**	121	103	118	125	116.75	XXIII
2	**RVS 2011-3**	109	104	103	121	109.25	VI
3	**DSb 34**	111	105	107	120	110.75	X
4	**MAUS 725**	108	106	104	121	109.75	VII
5	**SL 1068**	120	101	115	126	115.50	XXI
6	**JS 21-15**	113	102	112	120	111.75	XIII
7	**AUKS 174**	119	101	118	125	115.75	XXII
8	**NRC 137**	118	102	114	126	115.00	XIX
9	**VLS 95**	110	100	109	122	110.25	IX
10	**CSB 10084**	121	103	122	127	118.25	XXVI
11	**MACS 1493**	116	106	116	124	115.50	XXI
12	**JS 21-17**	109	102	105	119	108.75	IV
13	**NRC 130**	104	105	107	125	110.25	IX
14	**TS 53**	120	105	122	120	116.75	XXIII
15	**RVS 2011-4**	-	106	-	-	106.00	II
16	**SL 1123**	121	106	120	124	117.75	XXV
17	**BAUS 102**	122	106	123	131	120.50	XXVIII
18	**MACSNRC 1575**	105	106	105	121	109.25	VI
19	**MAUS 731**	113	105	114	121	113.25	XV
20	**NRC 132**	115	103	118	123	114.75	XVIII
21	**VLS 94**	115	102	117	121	113.75	XVII
22	**AMS 2014-1**	118	104	119	122	115.75	XXII
23	**KDS 1095**	115	105	117	123	115.00	XIX
24	**NRC 133**	118	104	114	125	115.25	XX
25	**DS 3108**	115	104	118	123	115.00	XIX
26	**AMS 100-39**	108	102	107	119	109.00	V
27	**NRC 136**	120	101	122	120	115.75	XXII
28	**RVS 2011-1**	109	103	107	121	110.00	VIII
29	**CSB 10112**	118	103	121	127	117.25	XXIV
30	**PS 1613**	120	103	122	124	117.25	XXIV
31	**NRC 131**	104	103	106	130	110.75	X
32	**KDS 992**	118	105	113	127	115.75	XXII
33	**RSC 11-07**	107	103	111	123	111.00	XI
34	**NRCSL 1**	111	106	114	120	112.75	XIV
35	**PS 1611**	118	103	118	121	115.00	XIX
36	**RSC 11-03**	114	103	118	125	115.00	XIX
37	**NRC 134**	119	102	120	126	116.75	XXIII
38	**NRC 129**	105	104	112	124	111.25	XII
39	**RVS 2011-2**	105	104	108	120	109.25	VI
40	**SKF-SPS-11**	112	103	114	124	113.25	XV
41	**SKF 1050**	94	104	109	122	107.25	III
42	**Shalimar Soybean-1**	94	103	105	121	105.75	I
43	**PS 1092(C)**	114	105	117	145	120.25	XXVII
44	**VLS 59(C)**	113	102	115	124	113.50	XVI
45	**VLS 63(C)**	113	103	119	125	115.00	XIX
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	**22/06/2017**	**04/07/17**	**22/06/2017**	**16/06/2017**		

Table 1.1.4

Trial : Initial Varietal Trial- IVT
Zone : Northern Hill Zone (NHZ)
Character : Plant Height (cm)

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**NRC 128**	61	127	85	91	91.00	VII
2	**RVS 2011-3**	49	88	65	88	72.50	XXVI
3	**DSb 34**	50	102	61	69	70.50	XXIX
4	**MAUS 725**	64	101	57	60	70.50	XXIX
5	**SL 1068**	72	105	72	80	82.25	XI
6	**JS 21-15**	64	121	77	77	84.75	IX
7	**AUKS 174**	84	100	79	87	87.50	VIII
8	**NRC 137**	78	128	101	93	100.00	IV
9	**VLS 95**	56	92	63	80	72.75	XXV
10	**CSB 10084**	90	171	129	108	124.50	II
11	**MACS 1493**	66	100	66	77	77.25	XV
12	**JS 21-17**	53	110	73	87	80.75	XIII
13	**NRC 130**	49	70	54	59	58.00	XXXVIII
14	**TS 53**	87	108	114	80	97.25	V
15	**RVS 2011-4**	-	-	-	-	-	
16	**SL 1123**	61	95	70	80	76.50	XVI
17	**BAUS 102**	71	127	87	89	93.50	VI
18	**MACSNRC 1575**	48	83	67	56	63.50	XXXVI
19	**MAUS 731**	45	109	60	65	69.75	XXXI
20	**NRC 132**	67	98	76	81	80.50	XIV
21	**VLS 94**	63	76	56	63	64.50	XXXV
22	**AMS 2014-1**	78	110	79	70	84.25	X
23	**KDS 1095**	63	94	76	63	74.00	XXII
24	**NRC 133**	68	112	113	81	93.50	VI
25	**DS 3108**	43	73	65	66	61.75	XXXVII
26	**AMS 100-39**	66	93	68	71	74.50	XX
27	**NRC 136**	89	128	121	97	108.75	III
28	**RVS 2011-1**	42	91	78	90	75.25	XIX
29	**CSB 10112**	94	151	153	109	126.75	I
30	**PS 1613**	55	74	60	77	66.50	XXXIII
31	**NRC 131**	59	72	65	58	63.50	XXXVI
32	**KDS 992**	55	102	68	67	73.00	XXIV
33	**RSC 11-07**	61	108	64	60	73.25	XXIII
34	**NRCSL 1**	66	113	74	73	81.50	XII
35	**PS 1611**	46	97	63	57	65.75	XXXIV
36	**RSC 11-03**	58	104	65	75	75.50	XVIII
37	**NRC 134**	65	75	78	79	74.25	XXI
38	**NRC 129**	45	72	42	58	54.25	XL
39	**RVS 2011-2**	52	91	58	71	68.00	XXXII
40	**SKF-SPS-11**	53	97	61	69	70.00	XXX
41	**SKF 1050**	43	78	55	50	56.50	XXXIX
42	**Shalimar Soybean-1**	62	88	66	64	70.00	XXX
43	**PS 1092(C)**	51	93	68	76	72.00	XXVII
44	**VLS 59(C)**	59	93	59	73	71.00	XXVIII
45	**VLS 63(C)**	59	121	60	65	76.25	XVII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	**22/06/2017**	**04/07/17**	**22/06/2017**	**16/06/2017**		

Table 1.1.5

Trial : Initial Varietal Trial- IVT
Zone : Northern Hill Zone (NHZ)
Character : 100 Seed Weight (g)

S.No.	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**NRC 128**	13.40	12.75	14.27	12.96	13.35	XIX
2	**RVS 2011-3**	12.42	16.00	14.13	12.60	13.79	XVI
3	**DSb 34**	11.85	15.27	12.57	12.46	13.04	XXII
4	**MAUS 725**	12.10	16.56	11.50	13.65	13.45	XVII
5	**SL 1068**	12.95	13.79	14.60	11.95	13.32	XX
6	**JS 21-15**	9.22	12.03	9.53	10.86	10.41	XXXVII
7	**AUKS 174**	11.06	11.48	12.47	10.84	11.46	XXXVI
8	**NRC 137**	8.95	8.55	10.37	9.64	9.38	XLIII
9	**VLS 95**	14.08	19.45	15.83	17.34	16.68	VI
10	**CSB 10084**	11.61	9.04	9.60	10.57	10.21	XXXVIII
11	**MACS 1493**	12.91	12.21	12.43	11.27	12.21	XXXI
12	**JS 21-17**	11.25	13.93	12.50	12.46	12.54	XXVIII
13	**NRC 130**	16.50	19.71	18.03	18.03	18.07	II
14	**TS 53**	10.91	11.83	12.07	11.36	11.54	XXXV
15	**RVS 2011-4**	-	12.62	-	-	12.62	XXVII
16	**SL 1123**	18.79	17.47	17.97	16.65	17.72	III
17	**BAUS 102**	11.54	12.71	13.13	11.02	12.10	XXXII
18	**MACSNRC 1575**	14.53	17.73	14.80	16.47	15.88	X
19	**MAUS 731**	11.60	14.64	13.07	11.90	12.80	XXV
20	**NRC 132**	8.16	10.59	9.37	9.15	9.32	XLIV
21	**VLS 94**	14.35	16.51	16.53	14.20	15.40	XII
22	**AMS 2014-1**	9.30	9.07	10.77	9.22	9.59	XLII
23	**KDS 1095**	11.77	13.35	11.83	10.69	11.91	XXXIV
24	**NRC 133**	12.24	15.25	12.93	12.30	13.18	XXI
25	**DS 3108**	10.93	16.16	12.20	11.66	12.74	XXVI
26	**AMS 100-39**	10.06	13.64	13.30	10.85	11.96	XXXIII
27	**NRC 136**	9.05	7.47	9.90	10.77	9.30	XLV
28	**RVS 2011-1**	16.85	13.79	12.90	16.57	15.03	XIII
29	**CSB 10112**	9.51	8.76	11.17	10.35	9.95	XXXIX
30	**PS 1613**	13.89	11.85	16.77	12.99	13.88	XV
31	**NRC 131**	15.43	19.83	15.70	17.03	17.00	V
32	**KDS 992**	12.51	14.64	12.67	13.77	13.40	XVIII
33	**RSC 11-07**	7.20	10.89	12.47	9.03	9.90	XL
34	**NRCSL 1**	11.69	14.43	13.00	10.70	12.46	XXIX
35	**PS 1611**	14.21	15.15	14.50	11.91	13.94	XIV
36	**RSC 11-03**	8.31	11.27	10.70	9.11	9.85	XLI
37	**NRC 134**	11.53	16.95	12.47	10.91	12.97	XXIII
38	**NRC 129**	13.67	13.45	21.97	21.40	17.62	IV
39	**RVS 2011-2**	9.73	14.89	14.50	12.64	12.94	XXIV
40	**SKF-SPS-11**	11.29	14.55	12.80	10.72	12.34	XXX
41	**SKF 1050**	14.32	16.49	16.43	16.43	15.92	IX
42	**Shalimar Soybean-1**	18.95	17.51	17.80	20.73	18.75	I
43	**PS 1092(C)**	12.77	16.96	15.90	16.91	15.64	XI
44	**VLS 59(C)**	15.24	17.24	16.40	16.62	16.38	VII
45	**VLS 63(C)**	14.87	18.40	17.10	14.46	16.21	VIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	**22/06/2017**	**04/07/17**	**22/06/2017**	**16/06/2017**		

Table 1.1.6

Trial : Advanced Varietal Trial- II
Zone : Northern Hill Zone (NHZ)
Character : Yield (Kg/ha)

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**VLS 89***	2593	2907	2074	2292	2466.50	I
2	**PS 1092(C)**	2311	2245	2417	440	1853.25	IV
3	**VLS 59(C)**	1304	3111	2269	1769	2113.25	III
4	**VLS 63(C)**	2326	2421	2171	2074	2248.00	II
	Mean	2133.5	2671.00	2232.75	1643.75		
	N.P.S.(Sqm)	6.75	21.6	21.6	21.6		
	DOS	03/07/17	05/07/17	22/06/2017	15/06/2017		
	CD	192.59	412.04	287.04	240.74		
	CV (5%)	6.48	11.16	9.27	10.7		

*** Repeat Entry**

Table 1.1.7

Trial : Advanced Varietal Trial- II
Zone : Northern Hill Zone (NHZ)
Character : Days to Flower

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**VLS 89***	56	57	59	61	58.25	IV
2	**PS 1092(C)**	52	47	49	54	50.50	I
3	**VLS 59(C)**	53	48	56	62	54.75	II
4	**VLS 63(C)**	53	49	57	61	55.00	III
	N.P.S.(Sqm)	6.75	21.6	21.6	21.6		
	DOS	03/07/17	05/07/17	22/06/2017	15/06/2017		

*** Repeat Entry**

Table 1.1.8

Trial : Advanced Varietal Trial- II
Zone : Northern Hill Zone (NHZ)
Character : Days to Maturity

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**VLS 89***	111	104	120	125	115.00	III
2	**PS 1092(C)**	113	105	119	141	119.50	IV
3	**VLS 59(C)**	110	107	118	120	113.75	I
4	**VLS 63(C)**	110	106	121	122	114.75	II
	N.P.S.(Sqm)	6.75	21.6	21.6	21.6		
	DOS	03/07/17	05/07/17	22/06/2017	15/06/2017		

*** Repeat Entry**

Table 1.1.9

Trial : Advanced Varietal Trial- II
Zone : Northern Hill Zone (NHZ)
Character : Plant Height (cm)

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**VLS 89***	78	124	92	81	93.75	I
2	**PS 1092(C)**	66	94	60	79	74.75	II
3	**VLS 59(C)**	38	83	52	74	61.75	IV
4	**VLS 63(C)**	47	79	71	77	68.50	III
	N.P.S.(Sqm)	6.75	21.6	21.6	21.6		
	DOS	03/07/17	05/07/17	22/06/2017	15/06/2017		

*** Repeat Entry**

Table 1.1.10

Trial : Advanced Varietal Trial- II
Zone : Northern Hill Zone (NHZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Almora	Bajaura	Majhera	Palampur	Mean	Rank
1	**VLS 89***	14.94	16.57	14.84	17.56	15.98	IV
2	**PS 1092(C)**	16.89	16.76	15.40	15.09	16.04	III
3	**VLS 59(C)**	16.66	19.57	16.16	16.25	17.16	I
4	**VLS 63(C)**	15.16	17.03	16.92	17.55	16.67	II
	N.P.S.(Sqm)	6.75	21.6	21.6	21.6		
	DOS	03/07/17	07/05/17	22/06/2017	15/06/2017		

*** Repeat Entry**

Table 1.2.1

Trial : Initial Varietal Trial- IVT
Zone : Northern Plain Zone (NPZ)
Character : Yield (kg/ha)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**NRC 128**	4025	-	2716	3370.50	I
2	**RVS 2011-3**	-	-	1728	1728.00	XII
3	**DSb 34**	-	-	1235	1235.00	XXI
4	**MAUS 725**	-	-	691	691.00	XXXVI
5	**SL 1068**	1975	1778	1679	1810.67	X
6	**JS 21-15**	938	-	1728	1333.00	XVIII
7	**AUKS 174**	790	-	1852	1321.00	XIX
8	**NRC 137**	889	-	2346	1617.50	XIV
9	**VLS 95**	-	-	568	568.00	XXXVII
10	**CSB 10084**	370	-	1160	765.00	XXXIV
11	**MACS 1493**	321	-	1160	740.50	XXXV
12	**JS 21-17**	1506	1654	2272	1810.67	X
13	**NRC 130**	-	-	988	988.00	XXVIII
14	**TS 53**	-	-	1235	1235.00	XXI
15	**RVS 2011-4**	-	-	-	-	
16	**SL 1123**	1037	2074	1062	1391.00	XVII
17	**BAUS 102**	321	-	1778	1049.50	XXVI
18	**MACSNRC 1575**	-	-	815	815.00	XXXIII
19	**MAUS 731**	543	-	1309	926.00	XXX
20	**NRC 132**	988	-	2222	1605.00	XV
21	**VLS 94**	543	-	1481	1012.00	XXVII
22	**AMS 2014-1**	494	-	1802	1148.00	XXIII
23	**KDS 1095**	-	-	1235	1235.00	XXI
24	**NRC 133**	543	-	1679	1111.00	XXV
25	**DS 3108**	2395	1086	1556	1679.00	XIII
26	**AMS 100-39**	568	296	1654	839.33	XXXII
27	**NRC 136**	790	-	1728	1259.00	XX
28	**RVS 2011-1**	-	99	1802	950.50	XXIX
29	**CSB 10112**	1037	-	1284	1160.50	XXII
30	**PS 1613**	3210	988	2889	2362.33	III
31	**NRC 131**	-	-	864	864.00	XXXI
32	**KDS 992**	-	-	988	988.00	XXVIII
33	**RSC 11-07**	568	-	1679	1123.50	XXIV
34	**NRCSL 1**	2568	1975	1802	2115.00	V
35	**PS 1611**	3827	1407	2790	2674.67	II
36	**RSC 11-03**	765	-	2765	1765.00	XI
37	**NRC 134**	-	-	2222	2222.00	IV
38	**NRC 129**	-	-	1728	1728.00	XII
39	**RVS 2011-2**	-	-	1975	1975.00	VII
40	**SKF-SPS-11**	-	-	1481	1481.00	XVI
41	**SKF 1050**	-	-	420	420.00	XXXVIII
42	**Shalimar Soybean-1**	-	-	568	568.00	XXXVII
43	**Pusa 97-12(C)**	2173	2000	1284	1819.00	IX
44	**PS 1347(C)**	2642	1309	1802	1917.67	VIII
45	**SL 958(C)**	2543	1679	1728	1983.33	VI
	Mean	1421.07	1362.08	1585.23		
	N.P.S.(Sqm)	4.05	4.05	4.05		
	DOS	07/07/17	23/06/2017	17/07/2017		
	CD	222.22	148.15	370.37		
	CV (5%)	15.56	24.05	14.65		

Table 1.2.2

Trial : Initial Varietal Trial- IVT
Zone : Northern Plain Zone (NPZ)
Character : Days to Flower

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**NRC 128**	50	64	49	54.33	XXVI
2	**RVS 2011-3**	44	56	47	49.00	XII
3	**DSb 34**	45	57	44	48.67	XI
4	**MAUS 725**	-	58	45	51.50	XX
5	**SL 1068**	47	57	45	49.67	XIV
6	**JS 21-15**	48	59	46	51.00	XVIII
7	**AUKS 174**	47	64	45	52.00	XXII
8	**NRC 137**	43	52	45	46.67	IX
9	**VLS 95**	-	43	39	41.00	V
10	**CSB 10084**	51	65	50	55.33	XXVIII
11	**MACS 1493**	49	63	48	53.33	XXV
12	**JS 21-17**	45	58	45	49.33	XIII
13	**NRC 130**	34	42	35	37.00	III
14	**TS 53**	53	65	50	56.00	XXX
15	**RVS 2011-4**	-	-	-	-	
16	**SL 1123**	47	63	46	52.00	XXII
17	**BAUS 102**	49	65	49	54.33	XXVI
18	**MACSNRC 1575**	-	-	46	46.00	VIII
19	**MAUS 731**	46	66	47	53.00	XXIV
20	**NRC 132**	48	66	46	53.33	XXV
21	**VLS 94**	46	57	49	50.67	XVII
22	**AMS 2014-1**	48	64	45	52.33	XXIII
23	**KDS 1095**	45	63	47	51.67	XXI
24	**NRC 133**	48	58	44	50.00	XV
25	**DS 3108**	47	58	46	50.33	XVI
26	**AMS 100-39**	46	57	37	46.67	IX
27	**NRC 136**	46	57	45	49.33	XIII
28	**RVS 2011-1**	45	64	45	51.33	XIX
29	**CSB 10112**	52	66	49	55.67	XXIX
30	**PS 1613**	46	57	49	50.67	XVII
31	**NRC 131**	-	41	45	43.00	VI
32	**KDS 992**	-	-	48	48.00	X
33	**RSC 11-07**	46	61	47	51.33	XIX
34	**NRCSL 1**	46	58	47	50.33	XVI
35	**PS 1611**	44	57	46	49.00	XII
36	**RSC 11-03**	51	65	49	55.00	XXVII
37	**NRC 134**	47	62	50	53.00	XXIV
38	**NRC 129**	32	56	45	44.33	VII
39	**RVS 2011-2**	39	52	42	44.33	VII
40	**SKF-SPS-11**	46	66	42	51.33	XIX
41	**SKF 1050**	32	-	46	39.00	IV
42	**Shalimar Soybean-1**	32	41	36	36.33	II
43	**Pusa 97-12(C)**	46	61	39	48.67	XI
44	**PS 1347(C)**	55	64	48	55.67	XXIX
45	**SL 958(C)**	49	60	47	52.00	XXII
	N.P.S.(Sqm)	4.05	4.05	4.05		
	DOS	07/07/17	23/06/2017	17/07/2017		

Table 1.2.3

Trial : Initial Varietal Trial- IVT
Zone : Northern Plain Zone (NPZ)
Character : Days to Maturity

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	NRC 128	116	-	105	110.50	XVIII
2	RVS 2011-3	110	-	97	103.50	VIII
3	DSb 34	105	-	97	101.00	V
4	MAUS 725	-	-	102	102.00	VII
5	SL 1068	126	130	106	120.67	XXIX
6	JS 21-15	109	-	98	103.50	VIII
7	AUKS 174	115	-	102	108.50	XIII
8	NRC 137	119	-	106	112.50	XXII
9	VLS 95	-	-	98	98.00	III
10	CSB 10084	113	-	106	109.50	XV
11	MACS 1493	113	-	105	109.00	XIV
12	JS 21-17	105	127	97	109.67	XVI
13	NRC 130	103	-	100	101.50	VI
14	TS 53	-	-	105	105.00	IX
15	RVS 2011-4	-	-	-	-	
16	SL 1123	125	130	99	118.00	XXVI
17	BAUS 102	120	-	101	110.50	XVIII
18	MACSNRC 1575	-	-	99	99.00	IV
19	MAUS 731	113	-	105	109.00	XIV
20	NRC 132	112	-	105	108.50	XIII
21	VLS 94	113	-	103	108.00	XII
22	AMS 2014-1	120	-	103	111.50	XIX
23	KDS 1095	120	-	104	112.00	XXI
24	NRC 133	111	-	107	109.00	XIV
25	DS 3108	121	121	106	116.00	XXV
26	AMS 100-39	105	127	98	110.00	XVII
27	NRC 136	116	-	98	107.00	XI
28	RVS 2011-1	105	125	105	111.67	XX
29	CSB 10112	113	-	106	109.50	XV
30	PS 1613	127	130	108	121.67	XXX
31	NRC 131	-	-	99	99.00	IV
32	KDS 992	-	-	101	101.00	V
33	RSC 11-07	111	-	99	105.00	IX
34	NRCSL 1	116	125	106	115.67	XXIV
35	PS 1611	115	125	105	115.00	XXIII
36	RSC 11-03	119	-	106	112.50	XXII
37	NRC 134	113	-	101	107.00	XI
38	NRC 129	112	-	105	108.50	XIII
39	RVS 2011-2	103	-	108	105.50	X
40	SKF-SPS-11	116	-	105	110.50	XVIII
41	SKF 1050	-	-	99	99.00	IV
42	Shalimar Soybean-1	-	-	97	97.00	II
43	Pusa 97-12(C)	122	130	104	118.67	XXVII
44	PS 1347(C)	124	127	106	119.00	XXVIII
45	SL 958(C)	127	128	107	120.67	XXIX
	N.P.S.(Sqm)	4.05	4.05	4.05		
	DOS	07/07/17	23/06/2017	17/07/2017		

Table 1.2.4

Trial : Initial Varietal Trial- IVT
Zone : Northern Plain Zone (NPZ)
Character : Plant Height (cm)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**NRC 128**	71	-	83	77.00	V
2	**RVS 2011-3**	-	-	64	64.00	XV
3	**DSb 34**	-	-	74	74.00	VI
4	**MAUS 725**	-	-	59	59.00	XXIII
5	**SL 1068**	68	65	62	65.00	XIV
6	**JS 21-15**	64	-	79	71.50	VII
7	**AUKS 174**	45	-	64	54.50	XXVII
8	**NRC 137**	57	-	81	69.00	X
9	**VLS 95**	-	-	57	57.00	XXVI
10	**CSB 10084**	68	-	97	82.50	II
11	**MACS 1493**	52	-	70	61.00	XX
12	**JS 21-17**	53	58	63	58.00	XXV
13	**NRC 130**	-	-	51	51.00	XXXI
14	**TS 53**	-	-	84	84.00	I
15	**RVS 2011-4**	-	-	-	-	
16	**SL 1123**	66	75	56	65.67	XIII
17	**BAUS 102**	70	-	88	79.00	IV
18	**MACSNRC 1575**	-	-	61	61.00	XX
19	**MAUS 731**	50	-	74	62.00	XVIII
20	**NRC 132**	53	-	73	63.00	XVI
21	**VLS 94**	31	-	47	39.00	XXXII
22	**AMS 2014-1**	27	-	78	52.50	XXIX
23	**KDS 1095**	-	-	67	67.00	XII
24	**NRC 133**	50	-	70	60.00	XXI
25	**DS 3108**	54	60	74	62.67	XVII
26	**AMS 100-39**	60	60	68	62.67	XVII
27	**NRC 136**	66	-	73	69.50	IX
28	**RVS 2011-1**	-	54	69	61.50	XIX
29	**CSB 10112**	82	-	78	80.00	III
30	**PS 1613**	54	61	65	60.00	XXI
31	**NRC 131**	-	-	57	57.00	XXVI
32	**KDS 992**	-	-	61	61.00	XX
33	**RSC 11-07**	44	-	73	58.50	XXIV
34	**NRCSL 1**	60	66	71	65.67	XIII
35	**PS 1611**	60	52	66	59.33	XXII
36	**RSC 11-03**	44	-	72	58.00	XXV
37	**NRC 134**	-	-	70	70.00	VIII
38	**NRC 129**	-	-	54	54.00	XXVIII
39	**RVS 2011-2**	-	-	65	65.00	XIV
40	**SKF-SPS-11**	-	-	69	69.00	X
41	**SKF 1050**	-	-	60	60.00	XXI
42	**Shalimar Soybean-1**	-	-	63	63.00	XVI
43	**Pusa 97-12(C)**	59	83	64	68.67	XI
44	**PS 1347(C)**	51	59	47	52.33	XXX
45	**SL 958(C)**	96	71	70	79.00	IV
	N.P.S.(Sqm)	4.05	4.05	4.05		
	DOS	07/07/17	23/06/2017	17/07/2017		

Table 1.2.5

Trial : Initial Varietal Trial- IVT
Zone : Northern Plain Zone (NPZ)
Character : 100 Seed Weight (g)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**NRC 128**	10.20	-	10.09	10.15	IX
2	**RVS 2011-3**	-	-	10.76	10.76	IV
3	**DSb 34**	-	-	8.62	8.62	XXII
4	**MAUS 725**	-	-	9.23	9.23	XV
5	**SL 1068**	8.20	8.33	8.74	8.42	XXVII
6	**JS 21-15**	5.33	-	8.59	6.96	XXXVI
7	**AUKS 174**	6.37	-	8.69	7.53	XXXIII
8	**NRC 137**	5.37	-	8.03	6.70	XXXIX
9	**VLS 95**	-	-	8.90	8.90	XVIII
10	**CSB 10084**	5.33	-	7.64	6.49	XLIII
11	**MACS 1493**	6.83	-	8.39	7.61	XXXII
12	**JS 21-17**	10.43	8.63	7.76	8.94	XVII
13	**NRC 130**	-	-	10.38	10.38	VI
14	**TS 53**	-	-	8.03	8.03	XXX
15	**RVS 2011-4**	-	-	-	-	
16	**SL 1123**	5.47	9.50	10.99	8.65	XXI
17	**BAUS 102**	5.30	-	8.88	7.09	XXXV
18	**MACSNRC 1575**	-	-	10.43	10.43	V
19	**MAUS 731**	5.57	-	7.42	6.50	XLII
20	**NRC 132**	5.63	-	7.71	6.67	XL
21	**VLS 94**	6.67	-	8.91	7.79	XXXI
22	**AMS 2014-1**	5.37	-	7.86	6.62	XLI
23	**KDS 1095**	-	-	8.86	8.86	XIX
24	**NRC 133**	7.83	-	10.46	9.15	XVI
25	**DS 3108**	7.87	7.67	8.63	8.06	XXIX
26	**AMS 100-39**	7.87	7.50	10.44	8.60	XXIII
27	**NRC 136**	5.67	-	7.92	6.80	XXXVIII
28	**RVS 2011-1**	-	7.73	10.98	9.36	XIII
29	**CSB 10112**	6.37	-	7.39	6.88	XXXVII
30	**PS 1613**	9.43	9.13	10.58	9.71	XII
31	**NRC 131**	-	-	11.62	11.62	II
32	**KDS 992**	-	-	11.26	11.26	III
33	**RSC 11-07**	6.23	-	8.64	7.44	XXXIV
34	**NRCSL 1**	8.20	8.50	8.80	8.50	XXV
35	**PS 1611**	10.37	8.37	11.87	10.20	VIII
36	**RSC 11-03**	5.13	-	7.71	6.42	XLIV
37	**NRC 134**	-	-	8.12	8.12	XXVIII
38	**NRC 129**	-	-	9.75	9.75	XI
39	**RVS 2011-2**	-	-	12.64	12.64	I
40	**SKF-SPS-11**	-	-	10.32	10.32	VII
41	**SKF 1050**	-	-	8.56	8.56	XXIV
42	**Shalimar Soybean-1**	-	-	9.86	9.86	X
43	**Pusa 97-12(C)**	8.67	9.73	7.96	8.79	XX
44	**PS 1347(C)**	9.57	9.07	9.36	9.33	XIV
45	**SL 958(C)**	9.47	8.17	7.81	8.48	XXVI
	N.P.S.(Sqm)	4.05	4.05	4.05		
	DOS	07/07/17	23/06/2017	17/07/2017		

Table 1.2.6

Trial : Advanced Varietal Trial- I
Zone : Northern Plain Zone (NPZ)
Character : Yield (Kg/ha)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**SL 1104**	2694	2438	1775	2302.33	I
2	**RVS 2009-9**	594	-	1991	1292.50	VIII
3	**NRC 126**	1128	123	2145	1132.00	XI
4	**RSC 10-70**	361	-	2485	1423.00	VI
5	**NRC 125**	428	-	1968	1198.00	X
6	**RSC 10-71**	328	-	2276	1302.00	VII
7	**NRC 127**	1300	131	2199	1210.00	IX
8	**DS 3106**	3300	1636	1674	2203.33	II
9	**Pusa 97-12(C)**	2300	1559	1350	1736.33	V
10	**PS 1347(C)**	2367	1898	2006	2090.33	III
11	**SL 688(C)**	1917	1705	1721	1781.00	IV
	Mean	1519.73	1355.71	1962.73		
	N.P.S.(Sqm)	18	12.96	12.96		
	DOS	07/07/17	01/07/17	17/07/2017		
	CD	122.22	162.04	169.75		
	CV (5%)	5.6	13.02	5.87		

Table 1.2.7

Trial : Advanced Varietal Trial- I
Zone : Northern Plain Zone (NPZ)
Character : Days to Flower

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**SL 1104**	48	60	47	51.67	IV
2	**RVS 2009-9**	50	67	48	55.00	VIII
3	**NRC 126**	49	61	49	53.00	V
4	**RSC 10-70**	51	64	48	54.33	VII
5	**NRC 125**	45	58	45	49.33	II
6	**RSC 10-71**	50	65	48	54.33	VII
7	**NRC 127**	49	62	49	53.33	VI
8	**DS 3106**	49	63	48	53.33	VI
9	**Pusa 97-12(C)**	46	57	46	49.67	III
10	**PS 1347(C)**	54	65	49	56.00	IX
11	**SL 688(C)**	46	51	47	48.00	I
	N.P.S.(Sqm)	18	12.96	12.96		
	DOS	07/07/17	01/07/17	17/07/2017		

Table 1.2.8

Trial : Advanced Varietal Trial- I
Zone : Northern Plain Zone (NPZ)
Character : Days to Maturity

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**SL 1104**	124	121	107	117.33	IX
2	**RVS 2009-9**	117	-	99	108.00	I
3	**NRC 126**	119	124	101	114.67	V
4	**RSC 10-70**	118	-	106	112.00	III
5	**NRC 125**	118	-	101	109.50	II
6	**RSC 10-71**	118	-	106	112.00	III
7	**NRC 127**	118	122	101	113.67	IV
8	**DS 3106**	123	124	109	118.67	X
9	**Pusa 97-12(C)**	124	119	103	115.33	VI
10	**PS 1347(C)**	124	119	107	116.67	VIII
11	**SL 688(C)**	124	118	105	115.67	VII
	N.P.S.(Sqm)	18	12.96	12.96		
	DOS	07/07/17	01/07/17	17/07/2017		

Table 1.2.9

Trial : Advanced Varietal Trial- I
Zone : Northern Plain Zone (NPZ)
Character : Plant Height (cm)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**SL 1104**	67	65	69	67.00	III
2	**RVS 2009-9**	61	-	71	66.00	IV
3	**NRC 126**	68	45	68	60.33	VIII
4	**RSC 10-70**	52	-	74	63.00	VI
5	**NRC 125**	73	-	64	68.50	II
6	**RSC 10-71**	70	-	76	73.00	I
7	**NRC 127**	61	46	65	57.33	IX
8	**DS 3106**	67	61	68	65.33	V
9	**Pusa 97-12(C)**	60	62	63	61.67	VII
10	**PS 1347(C)**	56	55	49	53.33	X
11	**SL 688(C)**	63	57	69	63.00	VI
	N.P.S.(Sqm)	18	12.96	12.96		
	DOS	07/07/17	01/07/17	17/07/2017		

Table 1.2.10

Trial : Advanced Varietal Trial- I
Zone : Northern Plain Zone (NPZ)
Character : 100 Seed Weight (g)

S.No.	Varieties	Delhi	Ludhiana	Pantnagar	Mean	Rank
1	**SL 1104**	9.93	9.55	10.18	9.89	I
2	**RVS 2009-9**	6.03	-	7.83	6.93	IX
3	**NRC 126**	5.55	5.92	7.54	6.34	XI
4	**RSC 10-70**	5.90	-	10.17	8.04	VII
5	**NRC 125**	7.00	-	10.46	8.73	IV
6	**RSC 10-71**	6.70	-	10.12	8.41	V
7	**NRC 127**	5.50	6.30	8.10	6.63	X
8	**DS 3106**	8.93	8.55	8.98	8.82	III
9	**Pusa 97-12(C)**	8.17	7.60	7.32	7.70	VIII
10	**PS 1347(C)**	8.82	8.82	9.00	8.88	II
11	**SL 688(C)**	8.22	8.25	8.29	8.25	VI
	N.P.S.(Sqm)	18	12.96	12.96		
	DOS	07/07/17	01/07/17	17/07/2017		

Table 1.2.11

Trial : Advanced Varietal Trial- II
Zone : Northern Plain Zone (NPZ)
Character : Yield (Kg/ha)

S.No	Varieties	Delhi	Ludhiana	Pantnagar	Dholi	Mean	Rank
1	**SL 1074**	3271	2259	1458	943	1982.82	III
2	**PS 1572**	2644	2102	2153	1406	2076.31	II
3	**SL 1028***	3218	2324	1806	1244	2148.05	I
4	**PS 1092(C)**	1471	1380	1356	1238	1361.36	VIII
5	**PS 1347(C)**	2813	1671	1750	891	1781.30	IV
6	**SL 688(C)**	2280	1523	1542	949	1573.52	VI
7	**Pusa 97-12(C)**	2427	1255	1120	920	1430.53	VII
	Mean	2589.14	1787.71	1597.86	1084.43	1764.84	V
	N.P.S.(Sqm)	22.5	21.6	21.6	21.6		
	DOS	07/07/17	01/07/17	18/07/2017	19/07/17		
	CD	382.22	365.74	226.85	180.31		
	CV (5%)	14.19	19.51	13.61	11.104		

*** Repeat Entry**

Table 1.2.12

Trial : Advanced Varietal Trial- II
Zone : Northern Plain Zone (NPZ)
Character : Days to Flower

S.No	Varieties	Delhi	Ludhiana	Pantnagar	Dholi	Mean	Rank
1	**SL 1074**	56	64	50	48	54.38	VII
2	**PS 1572**	50	63	49	38	50.00	IV
3	**SL 1028***	56	65	49	38	51.88	VI
4	**PS 1092(C)**	44	50	43	41	44.44	I
5	**PS 1347(C)**	54	65	47	36	50.56	V
6	**SL 688(C)**	45	52	47	37	45.25	III
7	**Pusa 97-12(C)**	44	54	46	36	44.94	II
	N.P.S.(Sqm)	22.5	21.6	21.6	21.6		
	DOS	07/07/17	01/07/17	18/07/2017	19/07/17		

*** Repeat Entry**

Table 1.2.13

Trial : Advanced Varietal Trial- II
Zone : Northern Plain Zone (NPZ)
Character : Days to Maturity

S.No	Varieties	Delhi	Ludhiana	Pantnagar	Dholi	Mean	Rank
1	SL 1074	125	123	106	111	116.25	V
2	PS 1572	126	123	107	113	117.13	VII
3	SL 1028*	125	124	107	112	117.06	VI
4	PS 1092(C)	125	119	109	111	115.88	IV
5	PS 1347(C)	126	120	107	107	115.00	III
6	SL 688(C)	125	116	107	109	114.19	II
7	Pusa 97-12(C)	125	116	103	108	113.06	I
	N.P.S.(Sqm)	22.5	21.6	21.6	21.6		
	DOS	07/07/17	01/07/17	18/07/2017	19/07/17		

*** Repeat Entry**

Table 1.2.14

Trial : Advanced Varietal Trial- II
Zone : Northern Plain Zone (NPZ)
Character : Plant Height (cm)

S.No	Varieties	Delhi	Ludhiana	Pantnagar	Dholi	Mean	Rank
1	SL 1074	74	71	73	87	72.67	I
2	PS 1572	69	66	71	60	68.67	III
3	SL 1028*	73	66	73	60	70.67	II
4	PS 1092(C)	51	56	62	53	56.33	VII
5	PS 1347(C)	55	55	64	64	58.00	VI
6	SL 688(C)	57	54	71	54	60.67	V
7	Pusa 97-12(C)	57	66	65	65	62.67	IV
	N.P.S.(Sqm)	22.5	21.6	21.6	21.6		
	DOS	07/07/17	01/07/17	18/07/2017	19/07/17		

*** Repeat Entry**

Table 1.2.15

Trial : Advanced Varietal Trial- II
Zone : Northern Plain Zone (NPZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Delhi	Ludhiana	Pantnagar	Dholi	Mean	Rank
1	SL 1074	7.77	7.75	7.49	9.23	7.67	VII
2	PS 1572	8.52	7.8	7.75	12.74	8.02	V
3	SL 1028*	7.9	7.93	7.84	12.12	7.89	VI
4	PS 1092(C)	8.43	8.13	9.12	11.15	8.56	II
5	PS 1347(C)	9.08	8.28	8.99	10.07	8.78	I
6	SL 688(C)	8.47	7.85	9.19	13.52	8.50	III
7	Pusa 97-12(C)	8.4	7.33	8.68	10.99	8.14	IV
	N.P.S.(Sqm)	22.5	21.6	21.6	21.6		
	DOS	07/07/17	01/07/17	18/07/2017	19/07/17		

*** Repeat Entry**

Table 1.3.1

Trial : Initial Varietal Trial- IVT
Zone : North Eastern Hill Zone (NEHZ)
Character : Yield (kg/ha)

S.No.	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	**NRC 128**	1210	2123	3937	1666.50	II
2	**RVS 2011-3**	1062	1556	3524	1309.00	XIII
3	**DSb 34**	963	1284	3206	1123.50	XXV
4	**MAUS 725**	1062	1506	2825	1284.00	XVI
5	**SL 1068**	1160	1951	2698	1555.50	III
6	**JS 21-15**	1111	1309	2762	1210.00	XXI
7	**AUKS 174**	963	1926	1556	1444.50	X
8	**NRC 137**	1086	1975	1619	1530.50	V
9	**VLS 95**	889	2049	1810	1469.00	IX
10	**CSB 10084**	938	2420	1492	1679.00	I
11	**MACS 1493**	1037	1358	1651	1197.50	XXII
12	**JS 21-17**	1235	1037	3048	1136.00	XXIV
13	**NRC 130**	1012	1062	2667	1037.00	XXIX
14	**TS 53**	741	1753	2984	1247.00	XVII
15	**RVS 2011-4**	-	-	-	-	
16	**SL 1123**	889	2222	1873	1555.50	III
17	**BAUS 102**	1086	1802	2984	1444.00	XI
18	**MACSNRC 1575**	938	815	1968	876.50	XXXII
19	**MAUS 731**	1037	1432	1873	1234.50	XIX
20	**NRC 132**	1136	1753	6857	1444.50	X
21	**VLS 94**	741	1407	2857	1074.00	XXVII
22	**AMS 2014-1**	914	1679	1841	1296.50	XIV
23	**KDS 1095**	889	1284	2127	1086.50	XXVI
24	**NRC 133**	815	1753	1937	1284.00	XVI
25	**DS 3108**	1407	1605	1016	1506.00	VII
26	**AMS 100-39**	1185	1210	603	1197.50	XXII
27	**NRC 136**	1086	1309	2381	1197.50	XXII
28	**RVS 2011-1**	1185	1111	1714	1148.00	XXIII
29	**CSB 10112**	988	2025	2159	1506.50	VI
30	**PS 1613**	1309	1753	984	1531.00	IV
31	**NRC 131**	691	1086	1873	888.50	XXXI
32	**KDS 992**	840	1580	1079	1210.00	XXI
33	**RSC 11-07**	840	1259	1778	1049.50	XXVIII
34	**NRCSL 1**	1136	1852	2159	1494.00	VIII
35	**PS 1611**	864	1926	508	1395.00	XII
36	**RSC 11-03**	1259	1185	2762	1222.00	XX
37	**NRC 134**	790	1802	1746	1296.00	XV
38	**NRC 129**	815	1210	1238	1012.50	XXX
39	**RVS 2011-2**	938	1531	1079	1234.50	XIX
40	**SKF-SPS-11**	1284	1605	3333	1444.50	X
41	**SKF 1050**	1037	296	2127	666.50	XXXIV
42	**Shalimar Soybean-1**	716	963	-	839.50	XXXIII
43	**JS 335(C)**	1136	1457	1492	1296.50	XIV
44	**JS 97-52(C)**	1185	1309	3016	1247.00	XVII
45	**RKS 18(C)**	1235	1235	4698	1235.00	XVIII
	Mean	1019.09	1517.39	2275.37		
	N.P.S.(Sqm)	4.05	4.05	3.15		
	DOS	17/07/2017	03/07/17	27/06/2017		
	CD	172.84	370.37	2126.98		
	CV (5%)	10.25	15.41	72.66		

Table 1.3.2

Trial : Initial Varietal Trial- IVT
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Flower

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**NRC 128**	43	50	46.50	XX
2	**RVS 2011-3**	37	46	41.50	XII
3	**DSb 34**	38	45	41.50	XII
4	**MAUS 725**	37	45	41.00	XI
5	**SL 1068**	38	48	43.00	XV
6	**JS 21-15**	39	46	42.50	XIV
7	**AUKS 174**	41	50	45.50	XVIII
8	**NRC 137**	38	48	43.00	XV
9	**VLS 95**	33	40	36.50	VI
10	**CSB 10084**	43	55	49.00	XXIII
11	**MACS 1493**	44	49	46.50	XX
12	**JS 21-17**	37	42	39.50	IX
13	**NRC 130**	33	41	37.00	VII
14	**TS 53**	43	51	47.00	XXI
15	**RVS 2011-4**	-	-	-	
16	**SL 1123**	38	45	41.50	XII
17	**BAUS 102**	42	49	45.50	XVIII
18	**MACSNRC 1575**	32	36	34.00	V
19	**MAUS 731**	39	47	43.00	XV
20	**NRC 132**	43	46	44.50	XVII
21	**VLS 94**	36	47	41.50	XII
22	**AMS 2014-1**	39	47	43.00	XV
23	**KDS 1095**	37	46	41.50	XII
24	**NRC 133**	43	49	46.00	XIX
25	**DS 3108**	39	45	42.00	XIII
26	**AMS 100-39**	39	46	42.50	XIV
27	**NRC 136**	39	47	43.00	XV
28	**RVS 2011-1**	38	42	40.00	X
29	**CSB 10112**	43	55	49.00	XXIII
30	**PS 1613**	39	47	43.00	XV
31	**NRC 131**	32	42	37.00	VII
32	**KDS 992**	43	50	46.50	XX
33	**RSC 11-07**	40	46	43.00	XV
34	**NRCSL 1**	40	45	42.50	XIV
35	**PS 1611**	39	46	42.50	XIV
36	**RSC 11-03**	44	50	47.00	XXI
37	**NRC 134**	41	46	43.50	XVI
38	**NRC 129**	30	33	31.50	III
39	**RVS 2011-2**	33	42	37.50	VIII
40	**SKF-SPS-11**	40	43	41.50	XII
41	**SKF 1050**	30	34	32.00	IV
42	**Shalimar Soybean-1**	30	32	31.00	II
43	**JS 335(C)**	41	45	43.00	XV
44	**JS 97-52(C)**	45	52	48.50	XXII
45	**RKS 18(C)**	39	46	42.50	XIV
	N.P.S.(Sqm)	4.05	4.05		
	DOS	17/07/17	03/07/17		

Table 1.3.3

Trial : Initial Varietal Trial- IVT
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Maturity

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**NRC 128**	98	112	105.00	XVII
2	**RVS 2011-3**	89	99	94.00	VI
3	**DSb 34**	88	97	92.50	IV
4	**MAUS 725**	99	104	101.50	XIII
5	**SL 1068**	105	115	110.00	XXII
6	**JS 21-15**	98	105	101.50	XIII
7	**AUKS 174**	99	111	105.00	XVII
8	**NRC 137**	99	113	106.00	XVIII
9	**VLS 95**	92	107	99.50	X
10	**CSB 10084**	99	113	106.00	XVIII
11	**MACS 1493**	105	107	106.00	XVIII
12	**JS 21-17**	95	103	99.00	IX
13	**NRC 130**	87	100	93.50	V
14	**TS 53**	105	118	111.50	XXV
15	**RVS 2011-4**	-	-	-	
16	**SL 1123**	104	117	110.50	XXIII
17	**BAUS 102**	105	117	111.00	XXIV
18	**MACSNRC 1575**	87	94	90.50	III
19	**MAUS 731**	99	100	99.50	X
20	**NRC 132**	100	105	102.50	XIV
21	**VLS 94**	105	105	105.00	XVII
22	**AMS 2014-1**	104	113	108.50	XX
23	**KDS 1095**	97	109	103.00	XV
24	**NRC 133**	99	110	104.50	XVI
25	**DS 3108**	105	107	106.00	XVIII
26	**AMS 100-39**	94	106	100.00	XI
27	**NRC 136**	106	113	109.50	XXI
28	**RVS 2011-1**	103	102	102.50	XIV
29	**CSB 10112**	107	116	111.50	XXV
30	**PS 1613**	104	115	109.50	XXI
31	**NRC 131**	87	105	96.00	VIII
32	**KDS 992**	100	109	104.50	XVI
33	**RSC 11-07**	94	105	99.50	X
34	**NRCSL 1**	99	106	102.50	XIV
35	**PS 1611**	100	105	102.50	XIV
36	**RSC 11-03**	105	112	108.50	XX
37	**NRC 134**	99	111	105.00	XVII
38	**NRC 129**	94	96	95.00	VII
39	**RVS 2011-2**	89	101	95.00	VII
40	**SKF-SPS-11**	99	103	101.00	XII
41	**SKF 1050**	94	96	95.00	VII
42	**Shalimar Soybean-1**	82	92	87.00	II
43	**JS 335(C)**	99	100	99.50	X
44	**JS 97-52(C)**	101	113	107.00	XIX
45	**RKS 18(C)**	98	100	99.00	IX
	N.P.S.(Sqm)	4.05	4.05		
	DOS	17/07/2017	03/07/17		

Table 1.3.4

Trial : Initial Varietal Trial- IVT
Zone : North Eastern Hill Zone (NEHZ)
Character : Plant Height (cm)

S.No	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	NRC 128	94	42	38	58.00	X
2	RVS 2011-3	76	37	32	48.33	XXII
3	DSb 34	62	44	35	47.00	XXV
4	MAUS 725	58	35	32	41.67	XXXIV
5	SL 1068	76	37	40	51.00	XVII
6	JS 21-15	79	39	31	49.67	XVIII
7	AUKS 174	109	49	43	67.00	II
8	NRC 137	51	51	52	51.33	XVI
9	VLS 95	58	39	30	42.33	XXXIII
10	CSB 10084	112	74	50	78.67	I
11	MACS 1493	98	49	38	61.67	VII
12	JS 21-17	69	36	30	45.00	XXIX
13	NRC 130	50	34	38	40.67	XXXV
14	TS 53	93	54	43	63.33	IV
15	RVS 2011-4	-	-	-	-	
16	SL 1123	92	45	36	57.67	XI
17	BAUS 102	101	53	39	64.33	III
18	MACSNRC 1575	61	34	22	39.00	XXXVII
19	MAUS 731	71	36	32	46.33	XXVI
20	NRC 132	83	38	40	53.67	XIV
21	VLS 94	63	28	25	38.67	XXXVIII
22	AMS 2014-1	61	48	34	47.67	XXIV
23	KDS 1095	94	40	31	55.00	XIII
24	NRC 133	88	49	39	58.67	IX
25	DS 3108	69	31	25	41.67	XXXIV
26	AMS 100-39	85	37	36	52.67	XV
27	NRC 136	98	57	31	62.00	VI
28	RVS 2011-1	60	40	29	43.00	XXXII
29	CSB 10112	82	77	42	67.00	II
30	PS 1613	81	39	27	49.00	XX
31	NRC 131	67	39	27	44.33	XXX
32	KDS 992	89	51	37	59.00	VIII
33	RSC 11-07	60	34	26	40.00	XXXVI
34	NRCSL 1	115	41	32	62.67	V
35	PS 1611	100	35	31	55.33	XII
36	RSC 11-03	66	36	35	45.67	XXVIII
37	NRC 134	98	37	41	58.67	IX
38	NRC 129	91	30	23	48.00	XXIII
39	RVS 2011-2	70	33	30	44.33	XXX
40	SKF-SPS-11	99	36	30	55.00	XIII
41	SKF 1050	77	41	20	46.00	XXVII
42	Shalimar Soybean-1	60	39	-	49.50	XIX
43	JS 335(C)	74	32	24	43.33	XXXI
44	JS 97-52(C)	81	41	24	48.67	XXI
45	RKS 18(C)	87	33	25	48.33	XXII
	N.P.S.(Sqm)	4.05	4.05	3.15		
	DOS	17/07/2017	03/07/17	27/06/2017		

Table 1.3.5

Trial : Initial Varietal Trial- IVT
Zone : North Eastern Hill Zone (NEHZ)
Character : 100 Seed Weight (g)

S.No	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	NRC 128	9.47	15.38	13.23	12.69	X
2	RVS 2011-3	12.12	14.34	11.36	12.61	XI
3	DSb 34	8.34	13.08	11.42	10.95	XXVIII
4	MAUS 725	10.62	13.44	11.99	12.02	XV
5	SL 1068	9.34	15.94	10.12	11.80	XIX
6	JS 21-15	9.96	12.69	8.86	10.50	XXXII
7	AUKS 174	9.06	13.45	9.03	10.51	XXXI
8	NRC 137	8.88	10.91	7.90	9.23	XL
9	VLS 95	9.21	20.07	12.68	13.99	V
10	CSB 10084	9.30	13.81	7.33	10.15	XXXV
11	MACS 1493	9.62	12.15	10.02	10.60	XXX
12	JS 21-17	10.34	12.31	13.20	11.95	XVI
13	NRC 130	9.79	16.29	14.34	13.47	VII
14	TS 53	9.33	15.33	9.86	11.51	XXI
15	RVS 2011-4	-	-	-	-	
16	SL 1123	13.18	21.13	13.69	16.00	II
17	BAUS 102	10.19	15.31	9.15	11.55	XX
18	MACSNRC 1575	8.80	13.92	15.82	12.85	VIII
19	MAUS 731	10.38	13.00	10.08	11.15	XXVI
20	NRC 132	9.07	12.15	9.09	10.10	XXXVI
21	VLS 94	10.24	17.26	13.04	13.51	VI
22	AMS 2014-1	9.74	11.48	8.06	9.76	XXXVIII
23	KDS 1095	10.55	11.60	9.83	10.66	XXIX
24	NRC 133	9.22	14.53	9.88	11.21	XXV
25	DS 3108	8.84	13.36	12.11	11.44	XXII
26	AMS 100-39	9.53	13.50	11.04	11.36	XXIV
27	NRC 136	9.40	10.88	6.41	8.90	XLII
28	RVS 2011-1	10.15	18.06	17.08	15.10	IV
29	CSB 10112	9.42	13.73	6.63	9.93	XXXVII
30	PS 1613	10.09	15.67	11.45	12.40	XIV
31	NRC 131	9.22	16.86	12.48	12.85	VIII
32	KDS 992	9.85	15.55	12.08	12.49	XIII
33	RSC 11-07	7.48	10.83	9.02	9.11	XLI
34	NRCSL 1	8.97	13.94	8.58	10.50	XXXII
35	PS 1611	9.07	15.60	13.00	12.56	XII
36	RSC 11-03	9.49	10.08	9.06	9.54	XXXIX
37	NRC 134	9.35	13.31	11.57	11.41	XXIII
38	NRC 129	12.74	22.34	10.72	15.27	III
39	RVS 2011-2	10.67	13.52	11.31	11.83	XVIII
40	SKF-SPS-11	10.30	12.50	10.16	10.99	XXVII
41	SKF 1050	10.62	15.39	12.37	12.79	IX
42	Shalimar Soybean-1	11.34	21.27	-	16.31	I
43	JS 335(C)	10.61	13.96	11.19	11.92	XVII
44	JS 97-52(C)	8.75	12.95	9.11	10.27	XXXIV
45	RKS 18(C)	10.16	11.90	9.22	10.43	XXXIII
	N.P.S.(Sqm)	4.05	4.05	3.15		
	DOS	17/07/2017	03/07/17	27/06/2017		

Table 1.3.6

Trial : Advanced Varietal Trial- I
Zone : North Eastern Hill Zone (NEHZ)
Character : Yield (Kg/ha)

S.No	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	**RSC 10-71**	1065	1378	816	1221.50	VII
2	**DSb 32**	640	1622	265	1131.00	VIII
3	**KDS 921**	1358	2161	265	1759.50	I
4	**KDS 1045**	1343	1339	1347	1341.00	VI
5	**DS 3105**	1242	1478	1102	1360.00	V
6	**JS 335(C)**	1366	1389	306	1377.50	IV
7	**JS 97-52(C)**	1613	1350	531	1481.50	III
8	**RKS 18(C)**	1744	1572	776	1658.00	II
	Mean	1296.38	1536.13	676.00		
	N.P.S.(Sqm)	12.96	18	4.9		
	DOS	21/07/2017	09/06/17	08/07/17		
	CD	223.77	338.89	755.1		
	CV (5%)	11.8	15.11	101.85		

Table 1.3.7

Trial : Advanced Varietal Trial- I
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Flower

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**RSC 10-71**	44	54	49.00	V
2	**DSb 32**	40	50	45.00	I
3	**KDS 921**	41	62	51.50	VI
4	**KDS 1045**	41	55	48.00	III
5	**DS 3105**	42	55	48.50	IV
6	**JS 335(C)**	39	51	45.00	I
7	**JS 97-52(C)**	43	60	51.50	VI
8	**RKS 18(C)**	40	51	45.50	II
	N.P.S.(Sqm)	12.96	18		
	DOS	21/07/2017	09/06/17		

Table 1.3.8

Trial : Advanced Varietal Trial- I
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Maturity

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**RSC 10-71**	104	121	112.50	VI
2	**DSb 32**	97	114	105.50	III
3	**KDS 921**	102	134	118.00	VII
4	**KDS 1045**	93	117	105.00	II
5	**DS 3105**	99	121	110.00	IV
6	**JS 335(C)**	97	111	104.00	I
7	**JS 97-52(C)**	102	120	111.00	V
8	**RKS 18(C)**	99	111	105.00	II
	N.P.S.(Sqm)	12.96	18		
	DOS	21/07/2017	09/06/17		

Table 1.3.9

Trial : Advanced Varietal Trial- I
Zone : North Eastern Hill Zone (NEHZ)
Character : Plant Height (cm)

S.No	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	**RSC 10-71**	79	51	46	58.67	I
2	**DSb 32**	63	44	36	47.67	VI
3	**KDS 921**	58	56	36	50.00	V
4	**KDS 1045**	75	41	37	51.00	IV
5	**DS 3105**	68	38	32	46.00	VII
6	**JS 335(C)**	72	40	38	50.00	V
7	**JS 97-52(C)**	76	51	33	53.33	II
8	**RKS 18(C)**	79	45	35	53.00	III
	N.P.S.(Sqm)	12.96	18	4.9		
	DOS	21/07/2017	09/06/17	08/07/17		

Table 1.3.10

Trial : Advanced Varietal Trial- I
Zone : North Eastern Hill Zone (NEHZ)
Character : 100 Seed weight (g)

S.No	Varieties	B Chari Ali	Imphal	Umiam	Mean	Rank
1	**RSC 10-71**	9.44	13.67	20.51	14.54	I
2	**DSb 32**	8.55	10.84	21.50	13.63	II
3	**KDS 921**	8.99	13.98	13.26	12.08	IV
4	**KDS 1045**	8.90	10.94	13.28	11.04	VII
5	**DS 3105**	10.38	12.94	13.59	12.30	III
6	**JS 335(C)**	10.96	11.35	11.61	11.31	V
7	**JS 97-52(C)**	8.61	10.88	10.67	10.05	VIII
8	**RKS 18(C)**	11.44	11.31	11.11	11.29	VI
	N.P.S.(Sqm)	12.96	18	4.9		
	DOS	21/07/2017	09/06/17	08/07/17		

Table 1.3.11

Trial : Advanced Varietal Trial- II
Zone : North Eastern Hill Zone (NEHZ)
Character : Yield (Kg/ha)

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**JS 20-116**	1435	1330	1382.50	IV
2	**PS 1556***	1523	1404	1463.50	III
3	**JS 335(C)**	1255	1441	1348.00	V
4	**RKS 18(C)**	1444	1700	1572.00	I
5	**JS 97-52(C)**	1361	1622	1491.50	II
	Mean	1403.60	1499.40		
	N.P.S.(Sqm)	21.6	27		
	DOS	25/07/2017	08/06/17		
	CD	300.93	285.19		
	CV (5%)	19.96	17.81		

*** Repeat Entry**

Table 1.3.12

Trial : Advanced Varietal Trial- II
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Flower

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**JS 20-116**	38	50	44.00	I
2	**PS 1556***	37	52	44.50	II
3	**JS 335(C)**	38	50	44.00	I
4	**RKS 18(C)**	39	50	44.50	II
5	**JS 97-52(C)**	41	57	49.00	III
	N.P.S.(Sqm)	21.6	27		
	DOS	25/07/2017	08/06/17		

*** Repeat Entry**

Table 1.3.13

Trial : Advanced Varietal Trial- II
Zone : North Eastern Hill Zone (NEHZ)
Character : Days to Maturity

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**JS 20-116**	95	104	99.50	I
2	**PS 1556***	98	138	118.00	V
3	**JS 335(C)**	96	107	101.50	II
4	**RKS 18(C)**	97	108	102.50	III
5	**JS 97-52(C)**	101	119	110.00	IV
	N.P.S.(Sqm)	21.6	27		
	DOS	25/07/2017	08/06/17		

*** Repeat Entry**

Table 1.3.14

Trial : Advanced Varietal Trial- II
Zone : North Eastern Hill Zone (NEHZ)
Character : Plant Height (cm)

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**JS 20-116**	66	50	58.00	II
2	**PS 1556***	63	36	49.50	V
3	**JS 335(C)**	70	45	57.50	III
4	**RKS 18(C)**	75	39	57.00	IV
5	**JS 97-52(C)**	75	53	64.00	I
	N.P.S.(Sqm)	21.6	27		
	DOS	25/07/2017	08/06/17		

*** Repeat Entry**

Table 1.3.15

Trial : Advanced Varietal Trial- II
Zone : North Eastern Hill Zone (NEHZ)
Character : 100 Seed Weight (g)

S.No	Varieties	B Chari Ali	Imphal	Mean	Rank
1	**JS 20-116**	8.22	10.19	9.21	V
2	**PS 1556***	10.29	12.50	11.40	I
3	**JS 335(C)**	10.48	11.38	10.93	III
4	**RKS 18(C)**	11.37	11.24	11.31	II
5	**JS 97-52(C)**	8.36	12.03	10.20	IV
	N.P.S.(Sqm)	21.6	27		
	DOS	25/07/2017	08/06/17		

*** Repeat Entry**

Table 1.4.1

Trial : Initial Varietal Trial- IVT
Zone : Eastern Zone (EZ)
Character : Yield (kg/ha)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	NRC 128	1284	1235	2617	2790	1981.50	II
2	RVS 2011-3	864	864	2025	1457	1302.50	XXX
3	DSb 34	1333	963	2099	1827	1555.50	XX
4	MAUS 725	1333	765	1679	1852	1407.25	XXVIII
5	SL 1068	1679	1259	1185	2395	1629.50	XVI
6	JS 21-15	840	963	1481	2444	1432.00	XXVII
7	AUKS 174	1852	1111	1333	2346	1660.50	XIV
8	NRC 137	1753	840	1877	2593	1765.75	VII
9	VLS 95	1037	1012	247	1481	944.25	XXXIX
10	CSB 10084	1802	1062	1012	2617	1623.25	XVII
11	MACS 1493	1901	1284	1086	2790	1765.25	VIII
12	JS 21-17	1457	1383	1827	1951	1654.50	XV
13	NRC 130	1160	938	716	1506	1080.00	XXXVI
14	TS 53	1481	1062	321	2988	1463.00	XXV
15	RVS 2011-4	-	-	-	-	-	
16	SL 1123	938	1605	617	2691	1462.75	XXVI
17	BAUS 102	1728	1037	247	3086	1524.50	XXII
18	MACSNRC 1575	716	741	642	1580	919.75	XL
19	MAUS 731	1679	963	1012	2469	1530.75	XXI
20	NRC 132	1407	1086	1926	2790	1802.25	V
21	VLS 94	1728	938	1333	2963	1740.50	X
22	AMS 2014-1	1802	1111	1605	3012	1882.50	IV
23	KDS 1095	1679	815	840	1802	1284.00	XXXI
24	NRC 133	864	963	1383	1753	1240.75	XXXII
25	DS 3108	1284	1926	1284	2272	1691.50	XII
26	AMS 100-39	1358	716	1630	2296	1500.00	XXIV
27	NRC 136	716	963	2198	3086	1740.75	IX
28	RVS 2011-1	1407	864	864	1728	1215.75	XXXIII
29	CSB 10112	1531	1012	815	3012	1592.50	XVIII
30	PS 1613	1259	914	938	2025	1284.00	XXXI
31	NRC 131	963	815	469	1432	919.75	XL
32	KDS 992	1358	741	568	1728	1098.75	XXXV
33	RSC 11-07	1753	1580	2519	2667	2129.75	I
34	NRCSL 1	1654	2198	1654	2247	1938.25	III
35	PS 1611	1556	1778	1975	1531	1710.00	XI
36	RSC 11-03	1802	1407	1926	2000	1783.75	VI
37	NRC 134	1580	963	1630	2543	1679.00	XIII
38	NRC 129	914	840	1259	1531	1136.00	XXXIV
39	RVS 2011-2	1333	963	1704	2222	1555.50	XX
40	SKF-SPS-11	1827	889	1383	1753	1463.00	XXV
41	SKF 1050	765	765	370	2099	999.75	XXXVIII
42	Shalimar Soybean-1	914	1383	247	1704	1062.00	XXXVII
43	JS 335(C)	1457	1358	1111	2395	1580.25	XIX
44	JS 97-52(C)	1012	1086	1605	1802	1376.25	XXIX
45	RKS 18(C)	1506	1235	1235	2049	1506.25	XXIII
	Mean	1369.68	1099.91	1283.95	2211.48		
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	22/07/2017	18/07/2017	26/06/2017	28/06/2017		
	CD	271.6	271.6	197.53	518.52		
	CV (5%)	12.97	15.72	10.15	14.79		

Table 1.4.2

Trial : Initial Varietal Trial- IVT
Zone : Eastern Zone (EZ)
Character : Days to Flower

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	NRC 128	36	46	47	45	43.50	XXVI
2	RVS 2011-3	39	47	46	45	44.25	XXVII
3	DSb 34	34	41	44	42	40.25	XIX
4	MAUS 725	34	40	44	38	39.00	XV
5	SL 1068	35	30	46	40	37.75	XI
6	JS 21-15	39	33	46	40	39.50	XVI
7	AUKS 174	40	28	47	44	39.75	XVII
8	NRC 137	35	32	46	42	38.75	XIV
9	VLS 95	31	33	34	36	33.50	III
10	CSB 10084	41	49	49	53	48.00	XXXI
11	MACS 1493	39	48	47	46	45.00	XXIX
12	JS 21-17	32	34	46	40	38.00	XII
13	NRC 130	33	28	34	36	32.75	II
14	TS 53	40	48	48	46	45.50	XXX
15	RVS 2011-4	-	-	-	-	-	
16	SL 1123	33	28	48	41	37.50	X
17	BAUS 102	35	48	47	44	43.50	XXVI
18	MACSNRC 1575	33	32	34	36	33.75	IV
19	MAUS 731	34	32	45	39	37.50	X
20	NRC 132	37	28	47	46	39.50	XVI
21	VLS 94	31	28	40	41	35.00	VI
22	AMS 2014-1	34	43	47	44	42.00	XXIV
23	KDS 1095	33	48	46	43	42.50	XXV
24	NRC 133	40	48	46	46	45.00	XXIX
25	DS 3108	36	32	46	39	38.25	XIII
26	AMS 100-39	40	36	45	45	41.50	XXIII
27	NRC 136	39	27	48	46	40.00	XVIII
28	RVS 2011-1	38	35	40	40	38.25	XIII
29	CSB 10112	41	29	46	54	42.50	XXV
30	PS 1613	39	41	47	43	42.50	XXV
31	NRC 131	35	41	34	37	36.75	VIII
32	KDS 992	39	48	45	47	44.75	XXVIII
33	RSC 11-07	33	47	46	40	41.50	XXIII
34	NRCSL 1	33	44	46	41	41.00	XXII
35	PS 1611	37	28	46	41	38.00	XII
36	RSC 11-03	40	28	47	45	40.00	XVIII
37	NRC 134	37	31	48	46	40.50	XX
38	NRC 129	37	32	35	40	36.00	VII
39	RVS 2011-2	34	45	38	36	38.25	XIII
40	SKF-SPS-11	33	28	46	42	37.25	IX
41	SKF 1050	33	28	38	39	34.50	V
42	Shalimar Soybean-1	32	48	39	40	39.75	XVII
43	JS 335(C)	36	29	46	40	37.75	XI
44	JS 97-52(C)	42	35	49	48	43.50	XXVI
45	RKS 18(C)	38	39	45	41	40.75	XXI
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	22/07/2017	18/07/2017	26/06/2017	28/06/2017		

Table 1.4.3

Trial : Initial Varietal Trial- IVT
Zone : Eastern Zone (EZ)
Character : Days to Maturity

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**NRC 128**	103	111	103	109	106.50	XXII
2	**RVS 2011-3**	95	110	83	102	97.50	II
3	**DSb 34**	100	111	87	101	99.75	V
4	**MAUS 725**	100	112	100	102	103.50	XII
5	**SL 1068**	105	112	103	115	108.75	XXVIII
6	**JS 21-15**	102	113	100	102	104.25	XIV
7	**AUKS 174**	104	114	87	106	102.75	X
8	**NRC 137**	106	115	104	104	107.25	XXV
9	**VLS 95**	103	110	100	109	105.50	XVIII
10	**CSB 10084**	98	109	87	111	101.25	VII
11	**MACS 1493**	103	109	105	104	105.25	XVII
12	**JS 21-17**	97	113	85	108	100.75	VI
13	**NRC 130**	96	110	85	102	98.25	III
14	**TS 53**	109	109	100	104	105.50	XVIII
15	**RVS 2011-4**	-	-	-	-	-	
16	**SL 1123**	109	113	100	111	108.25	XXVII
17	**BAUS 102**	108	111	105	111	108.75	XXVIII
18	**MACSNRC 1575**	101	109	85	102	99.25	IV
19	**MAUS 731**	103	111	103	100	104.25	XIV
20	**NRC 132**	103	114	100	102	104.75	XVI
21	**VLS 94**	97	109	97	108	102.75	X
22	**AMS 2014-1**	105	114	100	105	106.00	XX
23	**KDS 1095**	100	111	95	107	103.25	XI
24	**NRC 133**	107	108	100	106	105.25	XVII
25	**DS 3108**	107	111	105	104	106.75	XXIII
26	**AMS 100-39**	103	111	93	103	102.50	IX
27	**NRC 136**	109	112	104	108	108.25	XXVII
28	**RVS 2011-1**	95	109	93	110	101.75	VIII
29	**CSB 10112**	98	114	92	110	103.50	XII
30	**PS 1613**	108	114	106	115	110.75	XXXI
31	**NRC 131**	101	112	95	103	102.75	X
32	**KDS 992**	104	111	100	108	105.75	XIX
33	**RSC 11-07**	96	111	100	104	102.75	X
34	**NRCSL 1**	104	113	105	115	109.25	XXIX
35	**PS 1611**	102	113	106	111	108.00	XXVI
36	**RSC 11-03**	108	113	105	111	109.25	XXIX
37	**NRC 134**	98	111	105	104	104.50	XV
38	**NRC 129**	105	111	100	101	104.25	XIV
39	**RVS 2011-2**	101	111	100	102	103.50	XII
40	**SKF-SPS-11**	101	110	105	109	106.25	XXI
41	**SKF 1050**	99	114	95	107	103.75	XIII
42	**Shalimar Soybean-1**	99	108	93	103	100.75	VI
43	**JS 335(C)**	106	112	105	109	108.00	XXVI
44	**JS 97-52(C)**	109	112	106	115	110.5	XXX
45	**RKS 18(C)**	104	115	100	109	107.00	XXIV
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	22/07/2017	18/07/2017	26/06/2017	28/06/2017		

Table 1.4.4

Trial : Initial Varietal Trial- IVT
Zone : Eastern Zone (EZ)
Character : Plant Height (cm)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	NRC 128	55	62	84	55	64.00	X
2	RVS 2011-3	47	92	70	47	64.00	X
3	DSb 34	50	65	71	50	59.00	XIX
4	MAUS 725	42	53	67	44	51.50	XXXII
5	SL 1068	48	71	75	52	61.50	XIII
6	JS 21-15	53	73	70	43	59.75	XVIII
7	AUKS 174	59	68	77	51	63.75	XI
8	NRC 137	68	84	85	57	73.50	IV
9	VLS 95	54	66	69	46	58.75	XX
10	CSB 10084	86	83	110	62	85.25	I
11	MACS 1493	60	73	81	52	66.50	VII
12	JS 21-17	50	67	67	52	59.00	XIX
13	NRC 130	48	58	44	41	47.75	XXXIV
14	TS 53	54	61	89	50	63.50	XII
15	RVS 2011-4	-	-	-	-	-	
16	SL 1123	45	74	69	48	59.00	XIX
17	BAUS 102	75	82	87	61	76.25	III
18	MACSNRC 1575	54	72	50	42	54.50	XXVI
19	MAUS 731	50	64	64	48	56.50	XXII
20	NRC 132	54	82	77	51	66.00	VIII
21	VLS 94	42	58	36	41	44.25	XXXVII
22	AMS 2014-1	69	78	73	49	67.25	VI
23	KDS 1095	55	64	73	50	60.50	XV
24	NRC 133	48	76	81	53	64.50	IX
25	DS 3108	42	66	58	42	52.00	XXXI
26	AMS 100-39	50	54	70	49	55.75	XXV
27	NRC 136	56	76	93	64	72.25	V
28	RVS 2011-1	47	76	58	44	56.25	XXIII
29	CSB 10112	86	85	99	68	84.50	II
30	PS 1613	40	50	56	41	46.75	XXXV
31	NRC 131	44	51	85	45	56.25	XXIII
32	KDS 992	54	65	66	42	56.75	XXI
33	RSC 11-07	59	68	74	43	61.00	XIV
34	NRCSL 1	53	76	63	48	60.00	XVII
35	PS 1611	43	54	59	44	50.00	XXXIII
36	RSC 11-03	61	63	73	44	60.25	XVI
37	NRC 134	67	67	62	40	59.00	XIX
38	NRC 129	58	54	36	37	46.25	XXXVI
39	RVS 2011-2	45	76	51	44	54.00	XXVII
40	SKF-SPS-11	55	56	60	40	52.75	XXIX
41	SKF 1050	38	50	47	37	43.00	XXXVIII
42	Shalimar Soybean-1	52	64	59	39	53.50	XXVIII
43	JS 335(C)	50	76	77	53	64.00	X
44	JS 97-52(C)	44	52	73	55	56.00	XXIV
45	RKS 18(C)	42	50	62	56	52.50	XXX
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	22/07/2017	18/07/2017	26/06/2017	28/06/2017		

Table 1.4.5

Trial : Initial Varietal Trial- IVT
Zone : Eastern Zone (EZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	NRC 128	14.53	11.61	10.26	11.95	12.09	XXI
2	RVS 2011-3	15.30	11.76	12.59	12.37	13.01	XIII
3	DSb 34	14.02	8.61	12.87	12.83	12.08	XXII
4	MAUS 725	14.60	8.52	12.55	13.00	12.17	XX
5	SL 1068	14.77	10.57	9.77	11.88	11.75	XXVIII
6	JS 21-15	11.67	9.85	10.46	9.60	10.40	XXXIV
7	AUKS 174	12.75	9.57	10.24	10.32	10.72	XXXII
8	NRC 137	10.31	7.88	7.36	12.84	9.60	XXXIX
9	VLS 95	20.69	13.40	12.25	15.53	15.47	III
10	CSB 10084	13.14	10.83	7.96	10.53	10.62	XXXIII
11	MACS 1493	14.91	10.71	9.78	11.83	11.81	XXVI
12	JS 21-17	15.19	12.81	11.24	11.83	12.77	XVI
13	NRC 130	15.87	10.01	13.17	15.91	13.74	XI
14	TS 53	15.03	11.65	9.17	11.44	11.82	XXV
15	RVS 2011-4	-	-	-	-	-	
16	SL 1123	19.99	13.25	12.20	14.73	15.04	IV
17	BAUS 102	14.37	10.52	9.39	13.01	11.82	XXV
18	MACSNRC 1575	17.59	11.45	16.33	13.96	14.83	V
19	MAUS 731	15.81	11.74	10.73	17.71	14.00	VIII
20	NRC 132	11.82	10.40	7.96	8.78	9.74	XXXVIII
21	VLS 94	18.50	13.01	12.87	13.85	14.56	VI
22	AMS 2014-1	13.26	10.09	8.90	8.96	10.30	XXXVI
23	KDS 1095	13.08	11.90	12.01	9.52	11.63	XXIX
24	NRC 133	14.94	11.11	10.52	10.50	11.77	XXVII
25	DS 3108	14.18	10.74	10.45	11.88	11.81	XXVI
26	AMS 100-39	14.97	10.11	11.58	12.26	12.23	XIX
27	NRC 136	10.74	8.19	7.44	8.53	8.73	XLI
28	RVS 2011-1	14.34	11.96	13.46	16.13	13.97	IX
29	CSB 10112	12.65	9.43	8.03	11.26	10.34	XXXV
30	PS 1613	15.80	11.37	11.29	13.48	12.99	XIV
31	NRC 131	13.94	13.47	10.40	14.21	13.01	XIII
32	KDS 992	17.06	11.61	13.15	14.25	14.02	VII
33	RSC 11-07	13.07	12.79	10.97	10.73	11.89	XXIV
34	NRCSL 1	14.97	12.15	10.50	12.84	12.62	XVII
35	PS 1611	15.94	11.35	12.26	15.51	13.77	X
36	RSC 11-03	12.10	8.94	8.05	8.78	9.47	XL
37	NRC 134	13.41	9.88	10.33	12.35	11.49	XXXI
38	NRC 129	15.87	11.41	16.63	18.52	15.61	II
39	RVS 2011-2	14.07	12.19	12.87	12.52	12.91	XV
40	SKF-SPS-11	13.88	10.04	11.25	12.44	11.9	XXIII
41	SKF 1050	15.13	9.98	13.36	13.73	13.05	XII
42	Shalimar Soybean-1	25.57	10.78	11.20	19.86	16.85	I
43	JS 335(C)	14.58	8.97	11.20	11.73	11.62	XXX
44	JS 97-52(C)	11.31	10.55	8.33	10.54	10.18	XXXVII
45	RKS 18(C)	14.68	13.02	11.37	10.25	12.33	XVIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05		
	DOS	22/07/2017	18/07/2017	26/06/2017	28/06/2017		

Table 1.4.6

Trial : Advanced Varietal Trial- I
Zone : Eastern Zone (EZ)
Character : Yield (Kg/ha)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**RSC 10-71**	1199	1176	2130	1856	1590.25	III
2	**RSC 10-52**	1435	838	2278	1532	1520.75	IV
3	**JS 20-116****	1866	1065	2215	1565	1677.75	II
4	**RVS 2010-1****	1681	1032	2311	1954	1744.50	I
5	**JS 335(C)**	1227	1130	974	1769	1275.00	VII
6	**RKS 18(C)**	1440	1250	1515	1514	1429.75	V
7	**JS 97-52(C)**	1102	1296	1470	1454	1330.50	VI
	Mean	1421.43	1112.43	1841.86	1663.43		
	N.P.S.(Sqm)	21.6	21.6	27	21.6		
	DOS	21/07/2017	20/07/2017	24/06/2017	24/06/2017		
	CD	212.96	189.81	181.48	254.63		
	CV (5%)	10.18	11.62	6.65	10.25		

** AVT II entry

Table 1.4.7

Trial : Advanced Varietal Trial- I
Zone : Eastern Zone (EZ)
Character : Days to Flower

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**RSC 10-71**	43	42	48	46	44.75	IV
2	**RSC 10-52**	42	44	48	47	45.25	V
3	**JS 20-116****	42	37	43	44	41.50	I
4	**RVS 2010-1****	42	49	47	44	45.50	VI
5	**JS 335(C)**	42	39	46	41	42.00	II
6	**RKS 18(C)**	41	39	47	42	42.25	III
7	**JS 97-52(C)**	47	46	51	46	47.50	VII
	N.P.S.(Sqm)	21.6	21.6	27	21.6		
	DOS	21/07/2017	20/07/2017	24/06/2017	24/06/2017		

** AVT II entry

Table 1.4.8

Trial : Advanced Varietal Trial- I
Zone : Eastern Zone (EZ)
Character : Days to Maturity

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**RSC 10-71**	108	117	102	115	110.50	VI
2	**RSC 10-52**	107	113	100	117	109.25	IV
3	**JS 20-116****	102	112	98	112	106.00	I
4	**RVS 2010-1****	102	114	102	114	108.00	III
5	**JS 335(C)**	106	112	98	112	107.00	II
6	**RKS 18(C)**	108	116	102	113	109.75	V
7	**JS 97-52(C)**	111	116	105	115	111.75	VII
	N.P.S.(Sqm)	21.6	21.6	27	21.6		
	DOS	21/07/2017	20/07/2017	24/06/2017	24/06/2017		

** AVT II entry

Table 1.4.9

Trial : Advanced Varietal Trial- I
Zone : Eastern Zone (EZ)
Character : Plant Height (cm)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**RSC 10-71**	64	70	72	67	68.25	III
2	**RSC 10-52**	50	60	83	58	62.75	V
3	**JS 20-116****	68	81	73	69	72.75	I
4	**RVS 2010-1****	74	49	84	63	67.50	IV
5	**JS 335(C)**	45	56	75	58	58.50	VII
6	**RKS 18(C)**	48	49	82	64	60.75	VI
7	**JS 97-52(C)**	53	68	86	67	68.50	II
	N.P.S.(Sqm)	21.6	21.6	27	21.6		
	DOS	21/07/2017	20/07/2017	24/06/2017	24/06/2017		

** AVT II entry

Table 1.4.10

Trial : Advanced Varietal Trial- I
Zone : Eastern Zone (EZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Bhawanipatna	Dholi	Raipur	Ranchi	Mean	Rank
1	**RSC 10-71**	12.16	10.09	10.78	12.98	11.50	IV
2	**RSC 10-52**	14.5	10.01	12.08	11.1	11.92	II
3	**JS 20-116****	12.08	10.42	11.54	9.52	10.89	VI
4	**RVS 2010-1****	12.45	12.93	10.81	10.17	11.59	III
5	**JS 335(C)**	11.99	11.47	10.22	11.85	11.38	V
6	**RKS 18(C)**	13.69	14.28	11.01	10.93	12.48	I
7	**JS 97-52(C)**	8.56	13.53	7.79	9.72	9.90	VII
	N.P.S.(Sqm)	21.6	21.6	27	21.6		
	DOS	21/07/2017	20/07/2017	24/06/2017	24/06/2017		

** AVT II entry

Table 1.5.1

Trial : Initial Varietal Trial- IVT
Zone : Central Zone (CZ)
Character : Yield (kg/ha)

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**NRC 128**	741	2510	1069	2642	-	513	2790	1012	2306	815	2420	2296	1706.63	X
2	**RVS 2011-3**	1556	3066	764	1704	667	1766	1531	1531	1556	741	1654	543	1423.25	XXX
3	**DSb 34**	2000	3086	861	395	-	1937	2222	1827	1250	1235	2519	2198	1993.5	VI
4	**MAUS 725**	2000	2840	1069	420	-	1624	543	1333	806	1160	2247	1753	1618.13	XIV
5	**SL 1068**	-	2593	1125	123	-	1197	815	1333	1333	395	1383	716	1194.29	XXXIX
6	**JS 21-15**	1654	2634	986	2296	-	1795	2173	1160	2389	1185	1630	1383	1600.63	XV
7	**AUKS 174**	1580	2695	1222	617	1679	1396	1481	1160	1583	2543	1852	1309	1730.25	VIII
8	**NRC 137**	914	2305	1250	1531	469	456	1679	938	1806	1333	1679	2025	1515.38	XXIII
9	**VLS 95**	-	3210	1028	99	-	1766	346	1259	667	-	1605	-	1489.6	XXVI
10	**CSB 10084**	-	2037	944	296	-	883	593	1185	1306	519	1210	272	965.71	XLIV
11	**MACS 1493**	395	2675	1111	247	222	2479	617	2173	1222	765	2099	790	1328.13	XXXV
12	**JS 21-17**	2049	3066	1222	2074	2420	1766	2296	1506	1500	1877	2420	1802	2029.75	IV
13	**NRC 130**	1605	3086	958	2148	691	1795	1309	1728	694	1235	1432	2346	1712.38	IX
14	**TS 53**	-	2798	1153	74	-	940	617	2025	1972	-	1333	-	1585.2	XVII
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	**SL 1123**	-	2716	1028	49	-	969	815	1407	2667	346	1309	642	1180.43	XL
17	**BAUS 102**	-	2778	1139	222	173	855	198	1506	917	469	1457	568	1159.29	XLI
18	**MACSNRC 1575**	1185	2366	875	469	-	1197	593	988	2861	790	1753	1235	1223.13	XXXVII
19	**MAUS 731**	494	3333	1000	444	642	2279	815	2074	2500	914	1309	1136	1384.38	XXXIII
20	**NRC 132**	1654	2531	1153	2469	247	1168	2395	1111	2417	840	1975	1827	1685.75	XI
21	**VLS 94**	741	3745	1208	148	247	3048	1111	1556	2139	346	1753	-	1494.29	XXV
22	**AMS 2014-1**	938	1996	1278	494	593	2764	864	1333	917	2370	1827	1753	1544.88	XX
23	**KDS 1095**	-	3128	931	198	-	2308	543	1580	1083	444	1432	1802	1408.57	XXXI
24	**NRC 133**	1259	2860	986	2000	-	570	1358	1235	1639	543	2370	1037	1456	XXVII
25	**DS 3108**	-	3066	1028	370	-	2080	914	1160	694	494	1556	1605	1403.29	XXXII
26	**AMS 100-39**	2469	3189	1181	1210	2148	2877	2148	1877	1444	2198	2395	1852	2163.63	I
27	**NRC 136**	1407	1996	1139	1580	321	826	1926	1580	1583	1012	1827	1802	1586.13	XVI
28	**RVS 2011-1**	1704	3169	750	1753	2025	1624	617	765	944	815	1630	247	1212.13	XXXVIII
29	**CSB 10112**	-	2284	806	123	-	684	543	1481	1639	420	1679	296	1072.71	XLII
30	**PS 1613**	-	2798	889	593	370	1396	1185	1432	1222	642	1704	1407	1436.71	XXIX
31	**NRC 131**	1407	2963	861	2123	-	1026	1309	938	1167	1235	1506	2222	1555.13	XIX
32	**KDS 992**	1802	3272	847	444	-	1738	123	1926	1028	1827	2173	1926	1737	VII
33	**RSC 11-07**	1605	3169	917	716	1481	1595	1951	1852	1861	2222	2420	2321	2057.13	III
34	**NRCSL 1**	1037	3395	889	444	617	1823	1037	2049	1556	790	2123	914	1529.25	XXI

Table 1.5.1 Contd..

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
35	**PS 1611**	617	2449	1236	667	815	1738	1556	1160	1583	1136	2222	2099	1559.38	XVIII
36	**RSC 11-03**	1160	2305	1319	1259	444	1966	2593	1753	1694	1136	2074	642	1622.75	XII
37	**NRC 134**	938	2798	958	1062	642	997	1284	1827	1167	716	1802	1309	1454.00	XXVIII
38	**NRC 129**	1383	2716	1097	2123	321	1595	988	1333	528	1185	1383	2049	1516.75	XXII
39	**RVS 2011-2**	2420	2654	806	2420	-	1652	1605	1333	1472	3136	2543	2346	2105.38	II
40	**SKF-SPS-11**	543	3374	1083	494	938	2279	1062	1877	2167	963	2222	963	1510.88	XXIV
41	**SKF 1050**	247	2305	1014	395	-	1197	568	543	1444	444	1605	123	856.13	XLV
42	**Shalimar Soybean-1**	-	2366	792	123	-	370	790	963	1083	321	914	-	1024.33	XLIII
43	**NRC 86(C)**	1506	3004	1306	667	642	1880	1728	2025	1778	2420	2025	2173	2023.38	V
44	**JS 20-34(C)**	691	2140	944	1457	938	1282	1432	1728	2056	642	1556	1309	1305.25	XXXVI
45	**JS 97-52(C)**	741	2305	1083	1136	-	228	1654	1728	1250	568	1802	938	1352.38	XXXIV
46	**JS 335(C)**	519	3395	1014	914	765	2279	1481	1827	1861	1185	1778	1778	1622.13	XIII
	Mean	1263.56	2781.47	1029.31	960.71	820.68	1524.51	1248.84	1469.27	1527.80	1078.42	1813.49	1408.63	-	-
	N.P.S.(Sqm)	4.05	4.86	7.2	4.05	4.05	3.51	4.05	4.05	3.6	4.05	4.05	4.05	-	-
	DOS	28/06/17	18/07/17	07/07/17	26/06/17	29/06/17	05/07/17	05/07/17	01/07/17	03/07/17	03/07/17	29/06/17	24/06/17	-	-
	CD	197.53	555.56	180.56	370.37	74.07	683.76	271.6	419.75	666.67	172.84	296.3	320.99	-	-
	CV (5%)	13.76	12.76	10.62	24.17	9.95	28.19	13.79	17.49	27.17	11.03	10.22	16.25	-	-

Table 1.5.2

Trial : Initial Varietal Trial- IVT
Zone : Central Zone (CZ)
Character : Days to Flower

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**NRC 128**	51	43	43	42	46	41	51	44	47	47	41	47	45.25	XXXV
2	**RVS 2011-3**	49	38	41	41	44	40	46	41	46	40	40	44	42.50	XX
3	**DSb 34**	46	41	46	41	44	41	39	41	46	40	37	44	42.17	XV
4	**MAUS 725**	46	35	47	39	43	39	45	39	46	34	37	43	41.08	XII
5	**SL 1068**	-	43	55	39	43	37	49	41	48	39	35	43	42.91	XXIV
6	**JS 21-15**	47	39	52	38	43	38	47	42	46	43	37	43	42.92	XXV
7	**AUKS 174**	49	43	50	42	47	42	47	44	47	43	40	45	44.92	XXXIV
8	**NRC 137**	47	40	42	42	45	40	51	40	47	44	40	44	43.50	XXVIII
9	**VLS 95**	-	34	45	37	39	36	45	37	41	38	35	40	38.82	IX
10	**CSB 10084**	-	43	42	46	51	42	49	49	47	47	45	52	46.64	XXXIX
11	**MACS 1493**	51	44	48	45	48	44	51	46	47	48	40	50	46.83	XLI
12	**JS 21-17**	47	34	45	41	41	36	45	39	47	39	38	41	41.08	XII
13	**NRC 130**	38	34	47	32	38	37	39	37	44	37	34	40	38.08	VIII
14	**TS 53**	-	43	47	43	49	42	49	48	48	-	41	52	46.20	XXXVIII

Table 1.5.2 Contd..

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	**SL 1123**	-	37	48	39	42	36	50	43	47	45	33	43	42.09	XIV
17	**BAUS 102**	-	43	43	46	46	41	50	42	48	38	41	50	44.36	XXX
18	**MACSNRC 1575**	37	33	46	30	35	35	42	34	43	38	33	36	36.83	V
19	**MAUS 731**	48	35	48	40	43	39	49	41	47	41	37	44	42.67	XXI
20	**NRC 132**	48	42	46	42	46	41	47	43	45	44	40	46	44.17	XXIX
21	**VLS 94**	45	35	47	36	40	37	46	35	47	39	38	44	40.75	XI
22	**AMS 2014-1**	48	37	47	41	45	37	50	42	44	40	39	49	43.25	XXVII
23	**KDS 1095**	-	34	47	40	44	41	46	41	43	41	40	45	42.00	XIII
24	**NRC 133**	49	41	44	47	48	45	47	48	45	44	46	50	46.17	XXXVII
25	**DS 3108**	-	38	50	39	43	39	50	45	49	41	37	42	43.00	XXVI
26	**AMS 100-39**	46	43	53	45	45	41	46	42	47	42	42	46	44.83	XXXIII
27	**NRC 136**	48	43	46	43	46	42	50	41	48	42	40	44	44.42	XXXI
28	**RVS 2011-1**	48	35	48	41	42	37	46	40	47	43	39	44	42.50	XX
29	**CSB 10112**	-	43	49	49	51	46	47	50	49	48	47	51	48.18	XLIII
30	**PS 1613**	-	37	46	41	44	38	49	42	45	40	37	45	42.18	XVI
31	**NRC 131**	37	30	47	32	37	36	41	38	45	37	34	34	37.33	VI
32	**KDS 992**	49	44	49	47	46	44	42	43	46	43	42	49	45.33	XXXVI
33	**RSC 11-07**	46	38	47	42	45	38	46	43	47	40	40	47	43.25	XXVII
34	**NRCSL 1**	45	37	51	40	43	38	48	42	46	42	37	45	42.83	XXIII
35	**PS 1611**	44	36	53	40	43	37	45	41	47	40	36	45	42.25	XVII
36	**RSC 11-03**	51	43	49	46	49	44	48	51	47	45	43	50	47.17	XLII
37	**NRC 134**	47	44	49	43	45	42	47	43	45	42	40	47	44.50	XXXII
38	**NRC 129**	48	28	46	30	34	34	45	29	44	37	29	35	36.58	IV
39	**RVS 2011-2**	43	33	42	37	40	37	43	37	46	38	36	39	39.25	X
40	**SKF-SPS-11**	45	36	49	40	43	39	48	41	45	40	39	44	42.42	XIX
41	**SKF 1050**	36	25	51	30	36	55	43	29	42	37	31	36	37.58	VII
42	**Shalimar Soybean-1**	-	24	49	28	35	34	38	29	43	36	31	40	35.18	II
43	**NRC 86(C)**	46	42	47	41	43	38	44	41	46	42	38	45	42.75	XXII
44	**JS 20-34(C)**	48	27	43	26	34	34	36	29	45	37	31	33	35.25	III
45	**JS 97-52(C)**	51	40	49	45	51	44	49	43	45	47	46	50	46.67	XL
46	**JS 335(C)**	47	37	49	42	43	38	46	43	43	40	37	43	42.33	XVIII
	N.P.S.(Sqm)	4.05	4.26	7.2	4.05	4.05	3.51	4.05	4.05	3.6	4.05	4.05	4.05		
	DOS	28/06/17	18/07/17	07/07/17	26/06/17	29/06/17	05/07/17	05/07/17	01/07/17	03/07/17	03/07/17	29/06/17	24/06/17		

Table 1.5.3

Trial : Initial Varietal Trial- IVT
Zone : Central Zone (CZ)
Character : Days to Maturity

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**NRC 128**	103	91	88	106	-	102	111	111	104	99	109	105	102.64	XXXIX
2	**RVS 2011-3**	101	80	82	92	94	89	93	94	94	88	105	98	92.50	VIII
3	**DSb 34**	98	83	90	94	-	91	88	96	99	89	96	99	93.00	X
4	**MAUS 725**	98	83	93	96	101	92	104	98	99	89	97	100	95.83	XV
5	**SL 1068**	-	90	107	100	-	113	109	124	108	99	95	102	104.70	XLIV
6	**JS 21-15**	100	85	106	94	104	96	106	105	105	92	95	101	99.08	XXII
7	**AUKS 174**	102	87	94	93	101	101	108	108	105	98	101	102	100.00	XXVII
8	**NRC 137**	100	90	93	104	102	101	111	109	104	99	103	105	101.75	XXXV
9	**VLS 95**	-	89	89	91	-	96	106	97	93	86	91	101	93.90	XIII
10	**CSB 10084**	-	90	98	97	-	101	106	107	101	99	111	98	100.80	XXXII
11	**MACS 1493**	103	85	99	100	105	102	111	108	107	101	102	102	102.08	XXXVIII
12	**JS 21-17**	99	82	89	94	92	86	101	102	93	90	95	102	93.75	XII
13	**NRC 130**	72	83	95	88	88	89	86	87	98	88	93	95	88.50	II
14	**TS 53**	-	86	96	90	-	115	108	125	106	-	101	101	103.11	XL
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	**SL 1123**	-	91	94	103	-	112	111	128	103	99	90	103	103.40	XLI
17	**BAUS 102**	-	89	98	106	99	115	112	110	102	101	102	105	103.55	XLIII
18	**MACSNRC 1575**	72	75	99	88	-	84	102	128	103	82	88	92	92.09	VII
19	**MAUS 731**	100	88	97	100	104	102	106	107	100	99	97	103	100.25	XXIX
20	**NRC 132**	101	86	93	103	103	99	104	109	99	99	104	101	100.08	XXVIII
21	**VLS 94**	96	90	97	100	104	94	106	107	102	99	95	105	99.58	XXIV
22	**AMS 2014-1**	101	91	94	98	102	99	109	110	96	99	102	106	100.58	XXX
23	**KDS 1095**	-	86	91	96	-	102	104	107	103	99	105	101	99.40	XXIII
24	**NRC 133**	101	87	92	99	104	102	104	105	105	98	111	102	100.83	XXXIII
25	**DS 3108**	-	87	103	97	-	94	108	126	97	89	94	103	99.80	XXVI
26	**AMS 100-39**	98	83	107	93	94	96	102	97	95	90	105	101	96.75	XVI
27	**NRC 136**	101	90	90	104	101	114	111	109	105	90	101	106	101.83	XXXVI
28	**RVS 2011-1**	99	83	88	90	91	85	102	97	93	90	103	99	93.33	XI
29	**CSB 10112**	-	87	91	94	-	111	104	106	103	90	113	101	100.00	XXVII
30	**PS 1613**	-	86	89	101	104	101	112	125	105	98	96	105	102.00	XXXVII
31	**NRC 131**	81	83	91	89	-	95	91	94	99	87	93	94	90.64	VI
32	**KDS 992**	101	86	93	94	101	100	101	105	103	90	103	101	98.17	XVIII
33	**RSC 11-07**	99	86	90	96	95	92	104	105	105	89	101	101	96.92	XVII
34	**NRCSL 1**	97	88	100	95	96	96	106	108	99	95	100	103	98.58	XXI
35	**PS 1611**	95	89	104	105	103	94	104	110	105	98	98	104	100.75	XXXI
36	**RSC 11-03**	103	85	93	96	103	100	108	107	105	100	106	106	101.00	XXXIV

Table 1.5.3 Contd..

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
37	**NRC 134**	101	90	89	103	95	105	106	110	103	90	101	104	99.75	XXV
38	**NRC 129**	101	89	84	96	98	85	104	99	93	99	89	101	94.83	XIV
39	**RVS 2011-2**	96	84	85	93	-	91	96	95	99	90	97	95	92.82	IX
40	**SKF-SPS-11**	97	85	97	102	102	96	109	106	106	99	102	102	100.25	XXIX
41	**SKF 1050**	70	76	104	79	98	85	98	91	101	87	86	93	89.00	IV
42	**Shalimar Soybean-1**	-	83	93	82	-	86	88	90	99	89	86	96	89.20	V
43	**NRC 86(C)**	96	85	95	97	94	102	104	107	104	98	97	100	98.25	XIX
44	**JS 20-34(C)**	99	74	83	89	93	81	88	93	101	90	86	88	88.75	III
45	**JS 97-52(C)**	104	90	102	102	104	116	109	100	98	99	112	105	103.42	XLII
46	**JS 335(C)**	99	86	95	102	101	101	106	105	99	89	97	101	98.42	XX
	N.P.S.(Sqm)	4.05	4.26	7.2	4.05	4.05	3.51	4.05	4.05	3.6	4.05	4.05	4.05		
	DOS	28/06/17	18/07/17	07/07/17	26/06/17	29/06/17	05/07/17	05/07/17	01/07/17	03/07/17	03/07/17	29/06/17	24/06/17		

Table 1.5.4

Trial : Initial Varietal Trial- IVT
Zone : Central Zone (CZ)
Character : Plant Height (cm)

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Mean	Rank
1	**NRC 128**	66	60	63	78	-	75	52	60	58	61	57	63.00	VIII
2	**RVS 2011-3**	57	38	51	67	49	60	53	50	47	42	56	51.82	XXIX
3	**DSb 34**	59	39	50	65	-	67	47	41	47	48	53	51.60	XXX
4	**MAUS 725**	52	35	44	66	46	57	46	37	42	42	55	47.45	XXXIX
5	**SL 1068**	-	48	62	66	-	59	44	44	35	45	50	50.33	XXXIV
6	**JS 21-15**	60	53	52	72	46	68	49	59	52	54	57	56.55	XVII
7	**AUKS 174**	68	56	50	79	52	70	37	57	65	56	60	59.09	XII
8	**NRC 137**	69	66	45	87	44	107	43	76	59	59	81	66.91	VII
9	**VLS 95**	-	40	43	70	-	58	49	47	44	51	54	50.67	XXXIII
10	**CSB 10084**	-	96	51	90	-	92	44	95	64	47	77	72.89	II
11	**MACS 1493**	68	52	54	79	53	70	42	58	53	49	59	57.91	XV
12	**JS 21-17**	57	38	44	66	45	48	43	47	44	47	55	48.55	XXXVI
13	**NRC 130**	59	31	49	62	49	60	40	42	49	46	60	49.73	XXXV
14	**TS 53**	-	66	61	82	-	81	42	74	54	-	78	67.25	V
15	**RVS 2011-4**	-	-	69	-	-	-	-	-	-	-	-	69.00	III
16	**SL 1123**	-	37	46	65	-	45	44	42	41	45	49	46.00	XLII

Table 1.5.4 Contd..

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Mean	Rank
17	**BAUS 102**	-	55	47	90	50	74	38	69	61	53	74	61.10	IX
18	**MACSNRC 1575**	53	45	51	60	-	58	43	52	63	53	57	53.50	XXV
19	**MAUS 731**	57	41	47	75	56	67	36	45	42	42	54	51.09	XXXII
20	**NRC 132**	60	42	47	68	49	64	51	58	49	48	60	54.18	XXI
21	**VLS 94**	40	26	195	48	52	48	36	35	35	38	42	54.09	XXII
22	**AMS 2014-1**	70	51	47	84	54	67	46	66	62	61	51	59.91	X
23	**KDS 1095**	-	48	55	77	-	57	38	62	45	43	65	54.44	XIX
24	**NRC 133**	75	78	40	96	49	68	45	74	62	57	95	67.18	VI
25	**DS 3108**	-	37	50	60	-	51	43	33	48	42	52	46.22	XLI
26	**AMS 100-39**	66	49	53	77	52	65	43	56	47	62	57	57.00	XVI
27	**NRC 136**	83	66	42	99	52	85	40	83	63	63	79	68.64	IV
28	**RVS 2011-1**	58	42	57	64	54	67	36	47	45	43	50	51.18	XXXI
29	**CSB 10112**	-	87	50	115	-	113	36	88	69	68	85	79.00	I
30	**PS 1613**	-	38	54	61	51	58	44	42	30	42	50	47.00	XL
31	**NRC 131**	50	52	42	71	-	68	47	54	36	53	61	53.40	XXVI
32	**KDS 992**	63	50	54	84	52	65	38	59	64	48	65	58.36	XIV
33	**RSC 11-07**	63	41	46	77	51	64	36	50	39	47	65	52.64	XXVII
34	**NRCSL 1**	56	41	58	74	50	67	51	46	64	48	60	55.91	XVIII
35	**PS 1611**	54	34	58	68	54	52	34	32	46	42	53	47.91	XXXVIII
36	**RSC 11-03**	72	42	40	73	52	68	39	49	54	53	54	54.18	XXI
37	**NRC 134**	70	56	48	79	52	60	43	73	56	47	59	58.45	XIII
38	**NRC 129**	42	22	37	55	48	39	41	34	24	40	45	38.82	XLIV
39	**RVS 2011-2**	62	40	55	66	-	65	50	46	43	52	63	54.20	XX
40	**SKF-SPS-11**	56	38	51	62	46	64	44	45	30	47	47	48.18	XXXVII
41	**SKF 1050**	44	37	58	52	48	52	50	35	27	41	50	44.91	XLIII
42	**Shalimar Soybean-1**	-	55	49	62	-	55	63	51	48	36	64	53.67	XXIV
43	**NRC 86(C)**	61	38	51	76	51	73	45	50	42	51	53	53.73	XXIII
44	**JS 20-34(C)**	34	22	51	44	39	18	34	25	23	30	39	32.64	XLV
45	**JS 97-52(C)**	59	57	56	78	55	68	56	57	55	48	69	59.82	XI
46	**JS 335(C)**	57	33	61	69	51	57	46	48	53	45	52	52.00	XXVIII
	N.P.S.(Sqm)	4.05	4.26	7.2	4.05	4.05	3.51	4.05	4.05	3.6	4.05	4.05		
	DOS	28/06/17	18/07/17	07/07/17	26/06/17	29/06/17	05/07/17	05/07/17	01/07/17	03/07/17	03/07/17	29/06/17		

Table 1.5.5

Trial : Initial Varietal Trial- IVT
Zone : Central Zone (CZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**NRC 128**	8.33	7.50	9.00	9.77	-	12.57	13.54	6.83	11.09	7.33	13.69	9.37	9.91	XXII
2	**RVS 2011-3**	10.67	12.54	8.97	12.97	8.46	13.77	13.58	9.67	8.42	10.33	10.42	12.33	11.01	XII
3	**DSb 34**	12.00	10.06	8.03	8.63	-	12.62	10.14	9.83	10.16	9.67	14.01	9.60	10.43	XIX
4	**MAUS 725**	10.67	9.57	7.97	8.20	-	12.93	10.20	8.33	10.56	12.00	13.97	10.60	10.45	XVIII
5	**SL 1068**	-	8.87	7.83	6.43	-	12.70	9.82	7.50	12.70	6.33	11.91	8.80	9.29	XXXI
6	**JS 21-15**	8.67	8.32	7.47	9.50	-	9.67	10.41	5.83	8.48	9.67	12.57	10.07	9.15	XXXIV
7	**AUKS 174**	9.33	7.07	7.70	6.00	8.17	11.20	11.43	6.83	9.51	9.67	10.98	8.30	8.85	XXXVI
8	**NRC 137**	6.67	5.72	8.20	6.90	8.51	8.51	8.90	4.67	8.23	6.33	8.53	8.93	7.51	XLIV
9	**VLS 95**	-	14.97	8.78	8.53	-	16.40	12.68	12.00	13.56	-	13.31	7.63	11.98	VII
10	**CSB 10084**	-	7.39	7.73	5.53	-	11.89	9.28	6.83	8.57	7.00	8.64	6.83	7.97	XLI
11	**MACS 1493**	7.00	8.44	8.27	7.03	8.88	13.29	9.89	6.83	10.56	11.00	13.20	7.27	9.31	XXX
12	**JS 21-17**	9.00	10.94	8.77	12.27	10.69	11.42	14.39	7.17	10.21	8.00	14.52	12.80	10.85	XV
13	**NRC 130**	8.67	13.17	7.23	15.50	8.88	16.58	13.31	10.33	10.52	12.33	17.23	14.27	12.34	VI
14	**TS 53**	-	7.23	9.27	7.23	-	11.95	9.6	7.17	9.24	-	10.70	10.20	9.18	XXXIII
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	**SL 1123**	-	12.26	8.47	7.93	-	17.41	11.46	9.67	13.12	7.67	12.47	9.13	10.96	XIII
17	**BAUS 102**	-	8.14	8.23	7.20	7.74	13.16	10.54	6.83	10.12	5.67	9.46	7.20	8.57	XXXVII
18	**MACSNRC 1575**	12.00	11.02	9.23	8.67	-	15.45	9.87	9.83	10.51	10.33	15.53	12.53	11.36	IX
19	**MAUS 731**	7.67	10.09	8.80	7.13	8.68	13.85	9.75	7.33	10.55	11.33	13.82	8.37	9.78	XXIII
20	**NRC 132**	7.33	6.48	6.90	8.37	6.70	12.12	10.30	4.83	8.33	9.00	10.35	9.87	8.38	XXXVIII
21	**VLS 94**	8.33	13.53	10.00	7.50	8.15	16.72	11.62	9.17	8.86	9.00	14.89	-	10.71	XVI
22	**AMS 2014-1**	7.00	6.04	7.87	5.70	8.29	11.00	10.76	5.00	9.29	6.00	8.99	7.53	7.79	XLII
23	**KDS 1095**	-	9.80	7.70	6.53	-	13.97	10.74	8.00	10.26	6.00	11.37	8.87	9.32	XXIX
24	**NRC 133**	8.67	8.14	7.50	10.27	-	12.58	13.53	7.33	10.98	9.33	11.97	40.50	12.80	V
25	**DS 3108**	-	9.30	8.43	6.60	-	12.59	9.65	7.67	11.02	7.00	12.67	9.47	9.44	XXVII
26	**AMS 100-39**	11.33	9.98	8.23	8.77	9.79	14.02	12.93	9.50	11.52	12.67	13.60	8.80	10.93	XIV
27	**NRC 136**	7.33	5.94	7.10	6.90	7.50	8.79	9.86	4.67	9.66	13.67	8.97	7.93	8.19	XXXIX
28	**RVS 2011-1**	12.67	14.44	8.40	14.43	13.01	14.72	16.65	12.00	10.89	14.33	16.77	10.93	13.27	III
29	**CSB 10112**	-	7.64	7.37	5.70	-	11.34	8.62	6.67	9.80	19.67	8.43	9.00	9.42	XXVIII
30	**PS 1613**	-	9.19	7.33	8.53	8.85	13.42	13.51	6.83	10.35	6.67	11.61	10.80	9.74	XXV
31	**NRC 131**	13.00	13.54	7.43	14.27	-	15.24	13.58	11.67	9.70	13.33	16.98	15.27	13.09	IV
32	**KDS 992**	12.33	9.95	9.20	8.67	-	15.32	9.61	9.83	12.42	16.00	13.51	10.67	11.59	VIII
33	**RSC 11-07**	9.33	7.48	7.23	6.90	8.92	11.93	11.34	6.83	10.77	6.00	11.71	8.73	8.93	XXXV
34	**NRCSL 1**	7.33	9.94	7.40	6.93	8.01	13.26	8.85	7.83	11.64	10.00	13.35	9.60	9.51	XXVI
35	**PS 1611**	8.00	10.17	9.83	10.10	8.97	13.92	11.85	7.67	11.95	7.67	12.81	12.67	10.47	XVII
36	**RSC 11-03**	7.00	5.16	7.80	6.90	6.93	10.56	10.67	4.67	11.10	7.00	9.12	9.27	8.02	XL

Table 1.5.5 Contd..

S.No	Varieties	Amravati	Amreli	Anand	Indore	Jabalpur	Jalna	Kota	Lok Bharti	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
37	**NRC 134**	8.33	6.79	7.87	8.37	8.47	13.17	11.59	6.67	12.22	12.00	11.84	9.93	9.77	XXIV
38	**NRC 129**	19.33	16.04	8.17	20.40	9.67	19.19	17.33	13.67	13.39	16.33	21.64	17.40	16.05	I
39	**RVS 2011-2**	12.33	10.49	7.83	13.60	-	13.16	11.53	8.17	10.73	12.00	13.85	10.93	11.33	X
40	**SKF-SPS-11**	8.33	9.56	8.43	7.27	8.42	13.66	10.19	8.17	10.77	10.33	13.98	10.23	9.95	XXI
41	**SKF 1050**	9.00	11.33	8.53	8.97	-	13.87	13.07	9.67	10.84	10.33	14.82	11.93	11.12	XI
42	**Shalimar Soybean-1**	-	16.19	8.57	13.63	-	17.78	15.14	12.67	11.09	-	17.50	11.8	13.82	II
43	**NRC 86(C)**	9.00	8.20	7.73	7.30	8.20	12.64	11.25	7.17	10.12	8.00	12.41	8.93	9.25	XXXII
44	**JS 20-34(C)**	10.00	11.15	7.93	11.10	9.51	13.86	11.78	8.67	11.85	6.33	14.79	11.50	10.71	XVI
45	**JS 97-52(C)**	6.67	5.37	8.87	6.83	-	9.32	8.95	4.33	10.94	5.33	8.95	8.10	7.61	XLIII
46	**JS 335(C)**	7.67	10.06	10.27	8.60	9.51	14.54	11.44	7.67	8.28	12.67	14.02	10.27	10.42	XX
	N.P.S.(Sqm)	4.05	4.26	7.20	4.05	4.05	3.51	4.05	4.05	3.6	4.05	4.05	4.05		
	DOS	28/06/17	18/07/17	7/07/17	26/06/17	29/06/17	05/07/17	05/07/17	01/07/17	03/07/17	03/07/17	29/06/17	24/06/17		

Table 1.5.6

Trial : Advanced Varietal Trial- I
Zone : Central Zone (CZ)
Character : Yield (Kg/ha)

S.No	Varieties	Amravati	Anand	Indore	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**RSC 10-70**	1759	1292	1578	-	370	1582	2214	610	1860	1163	1497.14	VI
2	**RSC 10-71**	1752	1097	1833	-	531	1705	1432	471	1790	1681	1418.29	IX
3	**RSC 10-52**	2377	917	500	895	403	1821	2049	1975	1644	1341	1732.00	III
4	**MACS 1520**	1813	1069	472	1474	789	2230	2257	2346	2353	630	1814.00	II
5	**AMS-MB 5-18**	2593	1042	394	1389	548	2037	1823	2639	1906	1407	1921.00	I
6	**KDS 980**	2392	1014	139	123	934	1065	1042	1142	2052	1304	1430.14	VII
7	**NRC 127**	1651	1111	1367	-	403	2377	1424	440	1906	1022	1418.71	VIII
8	**NRC 86(C)**	2323	1278	489	1620	958	1852	686	1929	2106	1148	1617.43	IV
9	**JS 20-34(C)**	1767	1153	1644	1343	1498	1489	2335	1049	1775	1178	1535.14	V
10	**JS 97-52(C)**	1258	1194	1217	85	290	1775	1788	502	1914	1104	1362.14	X
11	**JS 335(C)**	833	1153	378	733	1240	1651	1918	1080	1528	1252	1345.00	XI
	Mean	1865.27	1120	910.09	957.75	724	1780.36	1724.36	1289.36	1894	1202.73		
	N.P.S.(Sqm)	12.96	7.2	18	12.96	12.42	12.96	11.52	12.96	12.96	13.5		
	DOS	30/06/2017	13/07/2017	26/06/2017	28/06/2017	13/07/2017	05/07/17	03/07/17	04/07/17	26/06/2017	25/06/2017		
	CD	455.25	166.67	211.11	131.17	450.89	254.63	529.51	285.49	316.36	148.15		
	CV (5%)	16.8	10.32	16.08	13.04	43.16	9.85	21.26	15.48	11.53	8.59		

Table 1.5.7

Trial : Advanced Varietal Trial- I
Zone : Central Zone (CZ)
Character : Days To Flower

S.No	Varieties	Amravati	Anand	Indore	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**RSC 10-70**	48	48	41	48	39	45	49	46	42	49	45.50	VII
2	**RSC 10-71**	50	47	43	48	41	46	49	43	45	47	45.90	IX
3	**RSC 10-52**	47	48	44	48	39	45	49	42	44	51	45.70	VIII
4	**MACS 1520**	49	46	43	46	38	47	49	40	40	47	44.50	IV
5	**AMS-MB 5-18**	48	49	42	46	37	44	50	40	41	51	44.80	V
6	**KDS 980**	49	46	43	48	39	43	50	43	45	47	45.30	VI
7	**NRC 127**	48	50	44	48	42	45	50	43	41	49	46.00	X
8	**NRC 86(C)**	46	48	40	45	37	45	48	41	37	44	43.10	II
9	**JS 20-34(C)**	45	42	28	35	34	36	49	37	30	32	36.80	I
10	**JS 97-52(C)**	50	47	45	50	43	49	49	42	43	49	46.70	XI
11	**JS 335(C)**	48	50	41	45	36	46	49	39	38	45	43.70	III
	N.P.S.(Sqm)	12.96	7.2	18	12.96	12.42	12.96	11.52	12.96	12.96	13.5		
	DOS	30/06/2017	13/07/2017	26/06/2017	28/06/2017	13/07/2017	05/07/17	03/07/17	04/07/17	26/06/2017	25/06/2017		

Table 1.5.8

Trial : Advanced Varietal Trial- I
Zone : Central Zone (CZ)
Character : Days To Maturity

S.No	Varieties	Amravati	Anand	Indore	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**RSC 10-70**	98	93	110	-	109	105	102	99	106	107	103.22	IX
2	**RSC 10-71**	100	85	112	-	106	107	98	100	117	107	103.56	X
3	**RSC 10-52**	98	91	106	107	96	105	102	99	114	102	102.00	VIII
4	**MACS 1520**	99	93	97	101	100	106	98	97	100	102	99.30	IV
5	**AMS-MB 5-18**	98	97	97	102	95	104	102	97	103	94	98.90	II
6	**KDS 980**	99	92	96	103	92	102	104	99	109	99	99.50	V
7	**NRC 127**	98	98	98	-	99	104	103	96	104	103	100.33	VI
8	**NRC 86(C)**	98	94	97	102	99	104	100	98	100	99	99.10	III
9	**JS 20-34(C)**	98	86	89	87	77	88	99	96	82	89	89.10	I
10	**JS 97-52(C)**	101	89	104	106	113	106	103	100	110	105	103.70	XI
11	**JS 335(C)**	98	101	106	101	107	103	101	100	99	100	101.60	VII
	N.P.S.(Sqm)	12.96	7.2	18	12.96	12.42	12.96	11.52	12.96	12.96	13.5		
	DOS	30/06/2017	13/07/2017	26/06/2017	28/06/2017	13/07/2017	05/07/17	03/07/17	04/07/17	26/06/2017	25/06/2017		

Table 1.5.9

Trial : Advanced Varietal Trial- I
Zone : Central Zone (CZ)
Character : Plant Height (cm)

S.No	Varieties	Amravati	Anand	Indore	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Mean	Rank
1	**RSC 10-70**	65	53	81	-	86	54	56	48	54	62.13	IV
2	**RSC 10-71**	75	52	86	-	73	55	41	59	61	62.75	III
3	**RSC 10-52**	74	48	82	67	80	55	61	56	66	65.44	I
4	**MACS 1520**	61	43	75	53	70	56	58	56	67	59.89	VI
5	**AMS-MB 5-18**	65	49	81	49	76	50	61	61	61	61.44	V
6	**KDS 980**	63	59	78	49	76	54	59	61	66	62.78	II
7	**NRC 127**	65	47	75	-	70	53	59	53	49	58.88	VII
8	**NRC 86(C)**	56	54	74	50	68	49	25	50	56	53.56	IX
9	**JS 20-34(C)**	35	49	51	39	31	34	59	48	32	42.00	X
10	**JS 97-52(C)**	66	54	78	51	76	55	60	59	66	62.78	II
11	**JS 335(C)**	58	55	71	48	71	47	57	54	57	57.56	VIII
	N.P.S.(Sqm)	12.96	7.2	18	12.96	12.42	12.96	11.52	12.96	12.96		
	DOS	30/06/2017	13/07/2017	26/06/2017	28/06/2017	13/07/2017	05/07/17	03/07/17	04/07/17	26/06/2017		

Table 1.5.10

Trial : Advanced Varietal Trial- I
Zone : Central Zone (CZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Amravati	Anand	Indore	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**RSC 10-70**	7.50	9.20	10.55	-	11.54	10.55	9.29	6.75	13.07	10.25	9.86	VI
2	**RSC 10-71**	8.25	8.85	11.20	-	11.50	11.53	9.62	5.25	14.92	9.00	10.01	V
3	**RSC 10-52**	10.50	7.80	8.47	11.27	11.60	12.04	11.71	13.25	15.05	10.43	11.21	II
4	**MACS 1520**	9.00	8.35	8.10	8.18	10.88	10.72	9.46	11.25	13.97	7.90	9.78	VII
5	**AMS-MB 5-18**	9.75	8.70	6.65	8.64	11.11	10.70	9.47	11.00	13.31	7.30	9.44	IX
6	**KDS 980**	11.25	9.02	10.45	11.38	13.60	12.11	9.66	9.50	16.33	9.80	11.31	I
7	**NRC 127**	7.50	9.50	8.28	-	8.44	9.10	8.37	10.25	11.59	8.25	9.03	X
8	**NRC 86(C)**	9.25	8.75	8.78	8.94	10.91	11.06	6.71	8.50	13.19	8.65	9.47	VIII
9	**JS 20-34(C)**	11.30	8.35	11.6	10.49	14.29	12.24	9.46	8.75	12.80	10.80	11.01	III
10	**JS 97-52(C)**	6.50	7.98	8.00	6.38	8.97	8.88	10.43	9.75	11.92	8.25	8.71	XI
11	**JS 335(C)**	9.50	9.88	9.43	9.13	11.86	11.43	9.91	12.00	14.61	10.80	10.86	IV
	N.P.S.(Sqm)	12.96	7.2	18	12.96	12.42	12.96	11.52	12.96	12.96	13.5		
	DOS	30/06/2017	13/07/2017	26/06/2017	28/06/2017	13/07/2017	05/07/17	03/07/17	04/07/17	26/06/2017	25/06/2017		

Table 1.5.11

Trial : Advanced Varietal Trial- II
Zone : Central Zone (CZ)
Character : Yield (Kg/ha)

S.No	Varieties	Amravati	Anand	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**JS 20-116**	1634	1208	-	560	2111	1964	1505	2204	1529	1771.00	I
2	**JS 20-94**	1662	1000	-	556	1986	1323	1546	1843	1893	1560.00	III
3	**RSC 10-46***	1102	1139	-	92	1644	2146	671	1926	1560	1438.00	VI
4	**RVS 2007-6***	1648	1083	236	-	1713	2474	1065	1741	2111	1620.67	II
5	**JS 335(C)**	491	1083	523	787	1583	2193	1051	1528	1520	1321.50	VIII
6	**JS 97-52(C)**	815	1000	69	333	1685	1828	514	1815	1249	1276.17	IX
7	**NRC 86(C)**	1449	1167	1944	691	1694	1094	1472	2185	1107	1510.17	IV
8	**JS 20-34(C)**	653	1125	2000	1072	1537	1349	824	1894	1529	1230.33	X
9	**JS 95-60(C)**	1597	1111	134	1357	1111	1703	1296	2023	1733	1473.50	V
10	**JS 93-05(C)**	1505	1000	102	628	1245	1688	1227	1907	1289	1428.67	VII
	Mean	1255.60	1091.60	715.43	675.11	1630.90	1776.20	1117.10	1906.60	1552.00		
	N.P.S.(Sqm)	21.6	7.2	21.6	20.7	21.6	19.2	21.6	21.6	22.5		
	DOS	04/07/17	13/07/2017	27/06/17	26/07/2017	05/07/17	03/07/17	03/07/17	27/06/2017	25/06/2017		
	CD	324.07	111.11	458.33	323.67	250	364.58	273.15	287.04	595.56		
	CV (5%)	25	8.3	89.04	51.8	14.91	20.01	23.75	14.58	37.43		

***Repeat entry**

Table 1.5.12

Trial : Advanced Varietal Trial- II
Zone : Central Zone (CZ)
Character : Days to Flower

S.No	Varieties	Amravati	Anand	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**JS 20-116**	46	46	48	39	45	50	40	40	46	44.44	VIII
2	**JS 20-94**	46	48	46	39	44	50	42	39	45	44.33	VI
3	**RSC 10-46***	47	49	49	40	47	48	44	43	46	45.89	IX
4	**RVS 2007-6***	44	44	47	-	46	49	41	42	42	44.38	VII
5	**JS 335(C)**	46	51	45	37	45	49	39	37	43	43.56	IV
6	**JS 97-52(C)**	49	49	50	42	47	49	44	42	49	46.78	X
7	**NRC 86(C)**	44	48	45	39	44	48	42	39	45	43.78	V
8	**JS 20-34(C)**	33	42	34	32	36	49	35	30	33	36.00	I
9	**JS 95-60(C)**	34	48	34	31	34	49	37	35	32	37.11	II
10	**JS 93-05(C)**	45	46	42	37	42	50	39	37	41	42.11	III
	N.P.S.(Sqm)	21.6	7.2	27	20.7	21.6	19.2	21.6	21.6	22.5		
	DOS	04/07/17	13/07/2017	27/06/2017	26/07/2017	05/07/17	03/07/17	03/07/17	27/06/2017	25/06/2017		

***Repeat entry**

Table 1.5.13

Trial : Advanced Varietal Trial- II
Zone : Central Zone (CZ)
Character : Days to Maturity

S.No	Varieties	Amravati	Anand	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**JS 20-116**	98	91	-	95	102	100	90	103	98	97.13	IV
2	**JS 20-94**	98	94	-	93	100	110	89	100	99	97.88	V
3	**RSC 10-46***	98	97	107	104	108	112	103	107	102	104.22	IX
4	**RVS 2007-6***	99	86	107	-	105	100	102	106	103	101.00	VII
5	**JS 335(C)**	99	104	103	98	102	108	103	99	101	101.89	VIII
6	**JS 97-52(C)**	102	98	106	108	106	108	101	108	104	104.56	X
7	**NRC 86(C)**	98	95	106	93	105	98	99	100	101	99.44	VI
8	**JS 20-34(C)**	84	85	87	73	89	101	89	84	88	86.67	I
9	**JS 95-60(C)**	86	94	88	74	86	99	86	88	89	87.78	II
10	**JS 93-05(C)**	97	93	98	93	96	109	86	95	95	95.78	III
	N.P.S.(Sqm)	21.6	7.2	27	20.7	21.6	19.2	21.6	21.6	22.5		
	DOS	04/07/17	13/07/2017	27/06/2017	26/07/2017	05/07/17	03/07/17	03/07/17	27/06/2017	25/06/2017		

***Repeat entry**

Table 1.5.14

Trial : Advanced Varietal Trial- II
Zone : Central Zone (CZ)
Character : Plant Height (cm)

S.No	Varieties	Amravati	Anand	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Mean	Rank
1	**JS 20-116**	59	55	-	71	54	61	61	66	61.00	II
2	**JS 20-94**	49	50	-	66	58	62	61	62	58.29	V
3	**RSC 10-46***	63	55	54	75	58	57	44	62	58.50	IV
4	**RVS 2007-6***	102	43	59	-	64	62	96	99	75.00	I
5	**JS 335(C)**	41	56	48	58	59	60	52	55	53.63	VI
6	**JS 97-52(C)**	56	51	56	69	61	51	59	67	58.75	III
7	**NRC 86(C)**	46	56	51	53	49	33	56	57	50.13	VIII
8	**JS 20-34(C)**	31	53	41	36	34	34	50	32	38.88	X
9	**JS 95-60(C)**	35	49	45	46	40	65	41	34	44.38	IX
10	**JS 93-05(C)**	47	55	53	60	48	55	51	57	53.25	VII
	N.P.S.(Sqm)	21.6	7.2	27	20.7	21.6	19.2	21.6	21.6		
	DOS	04/07/17	13/07/2017	27/06/2017	26/07/2017	05/07/17	03/07/17	03/07/17	27/06/2017		

***Repeat entry**

Table 1.5.15

Trial : Advanced Varietal Trial- II
Zone : Central Zone (CZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Amravati	Anand	Jabalpur	Jalna	Kota	Morena	Nagpur	Parbhani	Sehore	Mean	Rank
1	**JS 20-116**	8.5	8.76	-	10.97	8.96	8.34	6.25	12.93	8	9.09	IX
2	**JS 20-94**	11.19	8.6	-	11.87	11.62	8.22	13.25	14.59	11.2	11.32	II
3	**RSC 10-46***	7.5	8.96	-	13.09	9.82	7.63	9.5	13.68	9.4	9.95	VII
4	**RVS 2007-6***	8.88	8.48	6.95	-	12.12	8.64	6.5	13.93	10.63	9.52	VIII
5	**JS 335(C)**	8	9.6	8.25	12.66	11.25	7.41	10.25	14.71	10.35	10.28	VI
6	**JS 97-52(C)**	6.44	8.48	6.37	10.29	8.68	13.04	8.25	11.17	8.05	8.97	X
7	**NRC 86(C)**	8.88	8.88	8.73	12.09	10.74	12.74	9.25	13.03	9.15	10.39	V
8	**JS 20-34(C)**	9.38	8.52	10.19	13.15	11.76	11.21	10.25	13.24	10.9	10.96	III
9	**JS 95-60(C)**	14.13	8.92	12.9	13.84	11.85	8.49	11.75	13.21	13.65	12.08	I
10	**JS 93-05(C)**	11.38	8.56	10.82	13.55	10.99	7.43	8.5	15.24	10.4	10.76	IV
	N.P.S.(Sqm)	21.6	7.2	27	20.7	21.6	19.2	21.6	21.6	22.5		
	DOS	04/07/17	13/07/2017	27/06/2017	26/07/2017	05/07/17	03/07/17	03/07/17	27/06/2017	25/06/2017		

***Repeat entry**

Table 1.6.1

Trial : Initial Varietal Trial- IVT
Zone : Southern Zone (SZ)
Character : Yield (kg/ha)

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
1	**NRC 128**	1012	3210	2198	2346	2646	1778	3951	2448.71	XI
2	**RVS 2011-3**	1704	2123	2346	1309	2196	1802	3111	2084.43	XXXIII
3	**DSb 34**	1654	3333	2790	1086	2884	2321	3753	2545.86	VI
4	**MAUS 725**	1160	3358	1926	1235	2116	2346	2988	2161.29	XXVII
5	**SL 1068**	1037	1852	2444	963	1720	1852	3037	1843.57	XL
6	**JS 21-15**	1284	2889	2617	2247	1799	2272	3481	2369.86	XV
7	**AUKS 174**	1333	2988	3012	1012	2354	1877	3210	2255.14	XXII
8	**NRC 137**	1259	3012	2123	1136	1931	1827	3383	2095.86	XXXI
9	**VLS 95**	914	2370	2815	988	2460	1654	3210	2058.71	XXXIV
10	**CSB 10084**	1062	2938	2074	2444	1746	1654	3333	2178.71	XXV
11	**MACS 1493**	1012	3605	3457	1753	2672	2148	4272	2702.71	I
12	**JS 21-17**	2222	1679	2667	1062	1640	1926	2815	2001.57	XXXV
13	**NRC 130**	1136	2247	2346	1333	1878	2568	3111	2088.43	XXXII
14	**TS 53**	1037	2667	3062	1111	1931	2420	3654	2268.86	XXI
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	
16	**SL 1123**	864	2321	2395	1210	1508	1877	2543	1816.86	XLI
17	**BAUS 102**	1284	3407	2593	1802	1984	2321	3877	2466.86	IX
18	**MACSNRC 1575**	1457	2296	1580	1210	1772	2370	3185	1981.43	XXXVI
19	**MAUS 731**	1210	3457	2469	1210	2487	2469	3827	2447.00	XII
20	**NRC 132**	1951	3136	2691	1605	2143	1778	4049	2479.00	VII
21	**VLS 94**	1556	1136	2123	1235	1931	2346	3185	1930.29	XXXVIII
22	**AMS 2014-1**	1259	3284	2914	1975	2460	2148	3802	2548.86	V
23	**KDS 1095**	1086	3407	1852	2247	1587	2593	2938	2244.29	XXIII
24	**NRC 133**	988	2716	1901	1605	2196	1802	3901	2158.43	XXVIII
25	**DS 3108**	1062	3062	2148	988	1958	2321	3432	2138.71	XXIX
26	**AMS 100-39**	2049	3259	2370	2469	2751	1778	3383	2579.86	IV
27	**NRC 136**	1111	3630	1951	1235	2169	2296	3704	2299.43	XVII
28	**RVS 2011-1**	1926	1284	1901	1185	1587	1877	2617	1768.14	XLII
29	**CSB 10112**	1160	3062	1284	2716	1746	1605	3654	2175.29	XXVI
30	**PS 1613**	1037	2420	2321	1728	1799	1877	3728	2130.00	XXX
31	**NRC 131**	1704	2494	1901	1160	1296	1679	3136	1910.00	XXXIX
32	**KDS 992**	1309	3877	2222	2667	1799	2420	4025	2617.00	III
33	**RSC 11-07**	2889	2914	2568	2173	2222	2395	3383	2649.14	II
34	**NRCSL 1**	1333	3111	2543	1827	2857	2346	3284	2471.57	VIII
35	**PS 1611**	2864	2074	2074	1210	1852	2148	3704	2275.14	XIX
36	**RSC 11-03**	1778	2741	2593	1852	1905	2370	3457	2385.14	XIV
37	**NRC 134**	1481	2963	2568	1481	2275	1679	3728	2310.71	XVI

Table 1.6.1 Contd..

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
38	**NRC 129**	1778	1037	2148	938	1323	2296	2148	1666.86	XLIII
39	**RVS 2011-2**	2815	2815	2494	1728	2116	2099	2938	2429.29	XIII
40	**SKF-SPS-11**	1975	3580	2593	1333	2328	2247	3136	2456.00	X
41	**SKF 1050**	1160	1235	2815	988	1667	1654	1926	1635.00	XLIV
42	**Shalimar Soybean-1**	1975	914	1086	1037	2090	1827	2049	1568.29	XLV
43	**JS 93-05(C)**	2099	2741	1901	1210	2011	1407	2321	1955.71	XXXVII
44	**RKS 18(C)**	1728	3654	2321	1210	2063	1802	3259	2291.00	XVIII
45	**JS 335(C)**	2444	2469	2494	1259	2354	1556	3111	2241.00	XXIV
46	**DSb 21(C)**	1753	2346	2765	1407	2831	1926	2864	2270.29	XX
	Mean	1531.36	2691.40	2343.47	1509.44	2067.56	2038.98	3280.07		
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05	3.78	4.05	4.05		
	DOS	07/07/17	07/06/17	21/06/2017	18/07/2017	17/07/2017	22/07/2017	08/07/17		
	CD	197.53	395.06	320.99	24.69	343.92	444.44	419.75		
	CV (5%)	7.9	9.06	8.55	0.97	10.86	14.09	8.19		

Table 1.6.2

Trial : Initial Varietal Trial- IVT
Zone : Southern Zone (SZ)
Character : Days to Flower

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
1	**NRC 128**	37	43	40	35	38	42	37	38.86	XXIV
2	**RVS 2011-3**	39	45	39	32	41	39	40	39.29	XXV
3	**DSb 34**	37	42	38	35	39	39	39	38.43	XXII
4	**MAUS 725**	38	43	39	35	34	39	35	37.57	XIX
5	**SL 1068**	40	34	37	34	31	36	35	35.29	VIII
6	**JS 21-15**	38	39	37	34	34	39	35	36.57	XV
7	**AUKS 174**	42	43	41	32	38	35	39	38.57	XXIII
8	**NRC 137**	37	46	44	36	39	38	39	39.86	XXVII
9	**VLS 95**	33	36	37	32	33	33	34	34.00	III
10	**CSB 10084**	37	51	48	41	40	39	46	43.14	XXXI
11	**MACS 1493**	37	42	41	36	38	35	36	37.86	XX
12	**JS 21-17**	37	37	37	34	34	36	35	35.71	XI
13	**NRC 130**	35	38	36	35	35	37	34	35.71	XI
14	**TS 53**	39	43	42	37	39	38	37	39.29	XXV
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	
16	**SL 1123**	39	36	36	31	31	34	34	34.43	V
17	**BAUS 102**	38	43	41	34	38	39	36	38.43	XXII

Table 1.6.2 Contd..

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
18	**MACSNRC 1575**	33	35	36	32	34	35	33	34.00	III
19	**MAUS 731**	34	38	39	34	35	37	34	35.86	XII
20	**NRC 132**	40	44	40	33	33	40	38	38.29	XXI
21	**VLS 94**	38	36	35	29	31	37	33	34.14	IV
22	**AMS 2014-1**	39	35	39	30	34	38	34	35.57	X
23	**KDS 1095**	38	45	39	38	39	39	38	39.43	XXVI
24	**NRC 133**	42	48	46	44	41	38	43	43.14	XXXI
25	**DS 3108**	34	37	36	36	34	37	34	35.43	IX
26	**AMS 100-39**	37	45	41	39	38	39	40	39.86	XXVII
27	**NRC 136**	42	44	40	35	39	39	37	39.43	XXVI
28	**RVS 2011-1**	39	35	36	32	34	35	35	35.14	VII
29	**CSB 10112**	42	54	48	42	43	40	45	44.86	XXXII
30	**PS 1613**	42	39	41	35	34	39	35	37.86	XX
31	**NRC 131**	33	39	39	34	33	40	34	36.00	XIII
32	**KDS 992**	41	48	46	39	40	45	40	42.71	XXX
33	**RSC 11-07**	39	39	40	36	35	41	38	38.29	XXI
34	**NRCSL 1**	37	37	39	38	34	42	34	37.29	XVIII
35	**PS 1611**	37	36	39	38	34	35	34	36.14	XIV
36	**RSC 11-03**	42	45	43	42	41	41	40	42.00	XXIX
37	**NRC 134**	40	43	41	36	35	40	37	38.86	XXIV
38	**NRC 129**	36	36	34	32	35	34	30	33.86	II
39	**RVS 2011-2**	37	39	39	34	35	39	36	37	XVII
40	**SKF-SPS-11**	39	36	39	35	33	41	35	36.86	XVI
41	**SKF 1050**	36	39	35	34	31	32	30	33.86	II
42	**Shalimar Soybean-1**	37	36	43	37	30	31	30	34.86	VI
43	**JS 93-05(C)**	35	38	38	36	33	34	34	35.43	IX
44	**RKS 18(C)**	39	35	39	38	34	38	35	36.86	XVI
45	**JS 335(C)**	39	36	39	36	34	38	34	36.57	XV
46	**DSb 21(C)**	41	36	42	41	39	43	40	40.29	XXVIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05	3.78	4.05	4.05		
	DOS	07/07/17	07/06/17	21/06/2017	18/07/2017	17/07/2017	22/07/2017	07/08/17		

Table 1.6.3

Trial : Initial Varietal Trial- IVT
Zone : Southern Zone (SZ)
Character : Days to Maturity

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
1	**NRC 128**	103	112	116	89	89	106	103	102.57	XXXV
2	**RVS 2011-3**	103	103	100	80	90	97	94	95.29	XV
3	**DSb 34**	97	103	89	82	86	98	95	92.86	VIII
4	**MAUS 725**	101	103	95	80	86	97	93	93.57	XI
5	**SL 1068**	103	103	116	80	85	109	104	100.00	XXVII
6	**JS 21-15**	101	103	116	92	85	103	99	99.86	XXVI
7	**AUKS 174**	106	111	116	79	87	109	106	102.00	XXXIII
8	**NRC 137**	100	103	113	82	89	110	106	100.43	XXIX
9	**VLS 95**	102	98	95	82	88	106	103	96.29	XVIII
10	**CSB 10084**	100	111	112	83	92	108	104	101.43	XXXI
11	**MACS 1493**	101	98	116	80	89	88	95	95.29	XV
12	**JS 21-17**	98	113	90	83	85	96	92	93.86	XII
13	**NRC 130**	93	101	88	81	82	94	90	89.86	III
14	**TS 53**	102	103	116	82	89	109	105	100.86	XXX
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	
16	**SL 1123**	103	111	116	80	83	114	110	102.43	XXXIV
17	**BAUS 102**	103	110	116	81	90	110	107	102.43	XXXIV
18	**MACSNRC 1575**	90	98	86	82	89	84	82	87.29	II
19	**MAUS 731**	92	98	116	83	85	107	103	97.71	XXI
20	**NRC 132**	105	111	102	82	88	104	100	98.86	XXIV
21	**VLS 94**	99	102	96	78	85	97	94	93.00	IX
22	**AMS 2014-1**	102	98	114	86	89	102	98	98.43	XXIII
23	**KDS 1095**	100	112	114	89	90	105	102	101.71	XXXII
24	**NRC 133**	107	111	117	83	94	113	110	105.00	XXXIX
25	**DS 3108**	90	102	93	82	89	101	98	93.57	XI
26	**AMS 100-39**	99	103	97	96	90	98	95	96.86	XIX
27	**NRC 136**	107	112	117	83	91	104	104	102.57	XXXV
28	**RVS 2011-1**	100	98	87	84	89	92	88	91.14	VI
29	**CSB 10112**	108	103	116	95	94	111	107	104.86	XXXVIII
30	**PS 1613**	107	112	113	85	89	109	104	102.71	XXXVI
31	**NRC 131**	93	103	95	80	86	99	95	93.00	IX
32	**KDS 992**	103	116	100	101	91	107	105	103.29	XXXVII
33	**RSC 11-07**	102	98	95	88	90	103	95	95.86	XVI
34	**NRCSL 1**	102	98	112	87	89	105	103	99.43	XXV
35	**PS 1611**	98	103	112	82	89	104	99	98.14	XXII
36	**RSC 11-03**	106	111	115	86	93	105	103	102.71	XXXVI

Table 1.6.3 Contd..

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
37	**NRC 134**	106	112	116	86	90	105	103	102.57	XXXV
38	**NRC 129**	98	111	95	78	88	96	92	94.00	XIII
39	**RVS 2011-2**	96	104	95	79	90	96	92	93.14	X
40	**SKF-SPS-11**	101	98	110	81	88	104	101	97.57	XX
41	**SKF 1050**	100	98	85	78	85	94	92	90.29	IV
42	**Shalimar Soybean-1**	101	98	92	85	83	94	92	92.14	VII
43	**JS 93-05(C)**	94	98	93	80	85	94	89	90.43	V
44	**RKS 18(C)**	103	98	102	83	87	98	95	95.14	XIV
45	**JS 335(C)**	104	98	102	79	89	107	94	96.14	XVII
46	**DSb 21(C)**	106	103	106	82	90	112	102	100.14	XXVIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05	3.78	4.05	4.05		
	DOS	07/07/17	07/06/17	21/06/2017	18/07/2017	17/07/2017	22/07/2017	08/07/17		

Table 1.6.4

Trial : Initial Varietal Trial- IVT
Zone : Southern Zone (SZ)
Character : Plant Height (cm)

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
1	**NRC 128**	70	53	47	25	39	46	54	47.71	IX
2	**RVS 2011-3**	54	48	49	27	43	44	44	44.14	XIV
3	**DSb 34**	50	59	49	19	47	38	47	44.14	XIV
4	**MAUS 725**	39	50	40	21	44	45	37	39.43	XXIII
5	**SL 1068**	42	33	41	26	36	29	30	33.86	XXXVII
6	**JS 21-15**	56	42	52	25	31	39	38	40.43	XX
7	**AUKS 174**	74	70	68	21	43	36	52	52.00	VII
8	**NRC 137**	77	71	78	28	59	47	60	60.00	IV
9	**VLS 95**	45	33	51	20	36	34	39	36.86	XXX
10	**CSB 10084**	94	84	103	50	73	46	97	78.14	I
11	**MACS 1493**	56	36	58	27	42	39	45	43.29	XV
12	**JS 21-17**	50	29	50	21	27	28	37	34.57	XXXV
13	**NRC 130**	44	32	54	27	36	39	35	38.14	XXV
14	**TS 53**	69	70	62	22	61	35	53	53.14	VI
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	
16	**SL 1123**	40	27	34	25	32	32	31	31.57	XL
17	**BAUS 102**	39	42	61	27	45	29	47	41.43	XVII

Table 1.6.5 Contd..

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
18	**MACSNRC 1575**	53	49	54	30	35	29	45	42.14	XVI
19	**MAUS 731**	40	33	35	24	31	29	39	33.00	XXXVIII
20	**NRC 132**	56	43	51	22	34	31	42	39.86	XXII
21	**VLS 94**	41	26	27	34	24	37	26	30.71	XLI
22	**AMS 2014-1**	48	46	54	33	32	38	44	42.14	XVI
23	**KDS 1095**	51	48	54	37	44	50	46	47.14	X
24	**NRC 133**	76	55	81	40	55	47	102	65.14	III
25	**DS 3108**	50	27	35	34	35	29	31	34.43	XXXVI
26	**AMS 100-39**	52	48	57	30	44	55	48	47.71	IX
27	**NRC 136**	71	67	77	22	63	58	58	59.43	V
28	**RVS 2011-1**	45	34	40	44	31	34	33	37.29	XXVIII
29	**CSB 10112**	80	83	83	46	66	52	93	71.86	II
30	**PS 1613**	42	41	41	34	31	31	35	36.43	XXXII
31	**NRC 131**	55	75	40	33	43	32	50	46.86	XI
32	**KDS 992**	55	48	55	29	46	33	47	44.71	XII
33	**RSC 11-07**	51	44	45	25	42	33	44	40.57	XIX
34	**NRCSL 1**	43	43	38	23	38	30	42	36.71	XXXI
35	**PS 1611**	42	32	31	22	33	33	29	31.71	XXXIX
36	**RSC 11-03**	56	44	55	24	42	32	33	40.86	XVIII
37	**NRC 134**	64	60	40	26	42	33	47	44.57	XIII
38	**NRC 129**	36	22	31	22	33	32	25	28.71	XLII
39	**RVS 2011-2**	51	37	49	28	34	37	45	40.14	XXI
40	**SKF-SPS-11**	48	42	37	37	34	32	35	37.86	XXVI
41	**SKF 1050**	42	34	40	33	32	32	35	35.43	XXXIII
42	**Shalimar Soybean-1**	51	39	33	35	36	33	37	37.71	XXVII
43	**JS 93-05(C)**	46	35	33	27	39	32	32	34.86	XXXIV
44	**RKS 18(C)**	39	41	41	36	40	34	39	38.57	XXIV
45	**JS 335(C)**	46	32	48	22	41	37	34	37.14	XXIX
46	**DSb 21(C)**	59	41	56	36	62	45	48	49.57	VIII
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05	3.78	4.05	4.05		
	DOS	07/07/17	07/06/17	21/06/2017	18/07/2017	17/07/2017	22/07/2017	08/07/17		

Table 1.6.5

Trial : Initial Varietal Trial- IVT
Zone : Southern Zone (SZ)
Character : 100 Seed Weight (g)

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
1	**NRC 128**	13.90	18.33	15.87	11.00	15.20	14.84	15.03	14.88	XVII
2	**RVS 2011-3**	13.93	21.02	16.00	12.63	16.20	12.21	14.57	15.22	XIV
3	**DSb 34**	12.67	18.67	14.80	11.3	14.47	15.91	13.73	14.51	XX
4	**MAUS 725**	11.90	19.60	15.47	11.93	14.57	15.38	12.73	14.51	XX
5	**SL 1068**	10.90	22.67	15.47	13.90	15.13	13.75	15.07	15.27	XII
6	**JS 21-15**	11.37	15.27	15.13	12.43	13.20	13.89	10.80	13.16	XXXVI
7	**AUKS 174**	10.13	16.20	13.83	12.07	12.17	12.61	13.53	12.93	XXXVII
8	**NRC 137**	11.87	14.57	10.43	9.07	10.80	9.60	9.50	10.83	XLIV
9	**VLS 95**	9.67	23.33	18.17	15.63	19.87	16.75	16.37	17.11	VI
10	**CSB 10084**	10.20	14.04	14.23	11.97	13.30	11.16	11.47	12.34	XXXVIII
11	**MACS 1493**	10.83	17.77	15.93	12.23	13.53	11.29	13.10	13.53	XXXIV
12	**JS 21-17**	11.93	21.93	14.87	13.83	14.33	14.55	12.90	14.91	XVI
13	**NRC 130**	13.90	22.80	19.20	12.97	19.77	16.42	17.30	17.48	IV
14	**TS 53**	9.33	19.03	15.50	12.17	13.57	15.61	13.90	14.16	XXV
15	**RVS 2011-4**	-	-	-	-	-	-	-	-	
16	**SL 1123**	14.00	24.23	18.17	14.07	19.93	17.80	20.60	18.40	II
17	**BAUS 102**	10.70	18.45	15.07	13.07	14.40	12.06	14.43	14.03	XXVII
18	**MACSNRC 1575**	13.40	20.40	15.33	14.07	16.67	13.93	13.33	15.30	XI
19	**MAUS 731**	10.43	18.57	16.03	12.47	15.40	13.14	13.00	14.15	XXVI
20	**NRC 132**	9.67	16.03	11.20	9.33	12.83	10.71	10.77	11.51	XL
21	**VLS 94**	11.20	24.45	17.47	13.93	18.10	13.54	17.00	16.53	IX
22	**AMS 2014-1**	9.43	13.53	13.50	9.33	11.93	11.16	10.50	11.34	XLII
23	**KDS 1095**	10.60	19.20	15.93	12.30	14.30	15.12	13.63	14.44	XXI
24	**NRC 133**	12.93	18.53	16.97	12.87	15.33	15.27	15.53	15.35	X
25	**DS 3108**	10.20	17.97	13.37	12.93	14.70	18.01	12.53	14.24	XXIII
26	**AMS 100-39**	11.73	19.27	17.00	12.20	15.23	13.37	14.37	14.74	XIX
27	**NRC 136**	10.50	14.73	11.90	9.33	10.73	10.98	9.97	11.16	XLIII
28	**RVS 2011-1**	12.50	25.00	18.07	13.97	18.60	15.71	15.97	17.12	V
29	**CSB 10112**	8.67	14.70	13.50	9.30	12.30	13.02	11.87	11.91	XXXIX
30	**PS 1613**	10.50	22.33	14.57	12.90	16.37	12.98	14.8	14.92	XV
31	**NRC 131**	13.73	20.80	16.07	14.07	17.03	18.20	16.20	16.59	VIII
32	**KDS 992**	13.50	19.87	17.10	13.23	16.20	20.32	16.87	16.73	VII
33	**RSC 11-07**	10.77	15.28	12.47	11.43	11.60	21.21	10.60	13.34	XXXV
34	**NRCSL 1**	10.57	18.6	14.27	12.17	15.03	11.85	12.57	13.58	XXXIII
35	**PS 1611**	12.00	21.93	16.9	12.33	17.17	11.85	14.43	15.23	XIII
36	**RSC 11-03**	10.03	16.29	12.73	8.37	12.10	10.02	10.47	11.43	XLI

Table 1.6.5 Contd..

S.No	Varieties	Adilabad	Bangalore	Bidar	Coimbatore	Dharwad	K. Digraj	Pune	Mean	Rank
37	**NRC 134**	13.57	16.57	15.03	13.00	13.67	14.09	14.13	14.29	XXII
38	**NRC 129**	14.17	26.59	23.50	14.67	20.97	16.04	20.63	19.51	I
39	**RVS 2011-2**	10.47	19.73	15.33	12.87	14.17	13.76	11.83	14.02	XXVIII
40	**SKF-SPS-11**	11.80	19.93	15.37	13.77	14.40	11.65	12.6	14.22	XXIV
41	**SKF 1050**	12.47	19.36	15.83	14.97	14.77	12.61	14.07	14.87	XVIII
42	**Shalimar Soybean-1**	11.80	28.29	14.90	11.57	22.10	13.84	20.57	17.58	III
43	**JS 93-05(C)**	11.57	16.07	15.53	11.83	15.03	16.08	11.67	13.97	XXIX
44	**RKS 18(C)**	11.43	19.45	15.37	13.03	13.90	12.48	12.03	13.96	XXX
45	**JS 335(C)**	11.80	17.07	15.37	11.73	14.13	12.88	12.40	13.63	XXXII
46	**DSb 21(C)**	9.83	18.80	14.93	10.90	13.50	14.57	14.00	13.79	XXXI
	N.P.S.(Sqm)	4.05	4.05	4.05	4.05	3.78	4.05	4.05		
	DOS	07/07/17	07/06/17	21/06/2017	18/07/2017	17/07/2017	22/07/2017	08/07/17		

सस्य विज्ञान
Agronomy

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Northern Plain Zone	
Pantnagar (Uttarakhand)	Dr. S. C. Saxena / Dr. Ajay Shrivastava
Ludhiana (Punjab)	Dr. Harpreet Kaur/ Dr. Guriqbal Singh
New Delhi	Dr. Anchal Das
North Eastern Hill Zone	
Imphal (Manipur)	Dr. (Mrs.) Toijam Sunanda Devi
Medziphema (Nagaland)	Dr. Engrala Ao
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Ranchi (Jharkhand)	Dr. Arvind Kumar Singh
Raipur (Chattisgarh)	Dr. R. Lakpale
Bhawanipatna (Orissa)	Dr. S.K. Mohanty
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Indore (Madhya Pradesh)	Dr. S.D. Billore, Dr. Rakesh Kumar Verma
Sehore (Madhya Pradesh)	Dr. M.D. Vyas
Kota (Rajasthan)	Dr. D.S. Meena
Amravati (Maharashtra)	Dr. M.S. Dandghe
Devgadh baria (Gujarat)	Dr. G. J. Patel
Southern Zone	
Dharwad (Karnataka)	Dr. V.V Angadi/ Dr. Sangshetty Balkunde
Pune (Maharashtra)	Dr. S.A. Jaybhay
Bangalore (Karnataka)	Dr. M. Chandrappa
Coimbatore (Tamil Nadu)	Dr. S.Sanbagavalli
Adilabad (Telangna)	Dr.Sreedhar Chauhan

Table 2.1.1.

ASP-1/15. Evaluation of AVT II entries under different sowing dates

Zone: North Hill **Design:** Split plot **Replications:** Three

Character: Seed yield (kg/ha)

Treatment	Almora			Palampur			Zonal mean		
	Sowing date								
Entry	**Normal**	**Late***	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**
VLS 59 (check)	2245	759	1502	1009	332	671	1627	546	1087
VLS 63 (check)	2045	1498	1772	1110	330	720	1578	914	1246
VLS 89	2506	1140	1823	1201	392	797	1854	766	1310
Mean	2265	1132	-	1107	351	-	1686	742	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Date of sowing	-	-	199	-	-	128	-	-	-
Entries	-	-	184	-	-	60	-	-	-
Interaction	-	-	261	-	-	196	-	-	-

Table 2.1.2.

ASP 1/17. Evaluation of AVT II entries under different sowing dates

Zone: North Hill **Centre:** ICAR-VPKAS, Almora

Character: Pods/plant, seed index, straw yield, harvest index and oil yield

Treatment	Branches/ plant	Pods/ Plant	Seed Index (g)	Dry weight/plant (g)			CGR		RGR		Straw yield (kg/ha)	HI (%)	Grain production efficiency (kg/ha/ day)	RUE (kg/ha /mm)
				30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS				
Sowing date														
Normal	4.89	64.82	13.23	1.49	4.51	11.04	6.04	13.07	0.07	0.06	2351	49.10	19.89	3.66
Late	3.78	37.89	14.11	1.16	3.63	8.13	4.94	9.00	0.08	0.05	1106	50.59	10.78	2.62
Mean	4.33	51.36	13.67	1.33	4.07	9.59	5.49	11.04	0.08	0.06	1728	49.85	15.34	3.14
SEm	0.06	2.85	0.51	0.03	0.09	0.19	0.20	0.45	0.003	0.002	48	0.43	0.27	0.06
CD (P=0.05)	0.34	17.35	NS	0.19	0.57	1.18	NS	2.72	NS	NS	295	NS	1.62	0.35
Entry														
VLS 89	4.80	51.70	13.91	1.40	4.36	10.40	5.93	12.07	0.08	0.06	1857	49.98	16.23	3.35
VLS 59 (c)	4.40	51.67	13.31	1.25	3.72	8.43	4.93	9.43	0.07	0.05	1517	49.98	13.72	2.69
VLS 63 (c)	3.80	50.70	13.78	1.33	4.13	9.94	5.60	11.61	0.08	0.06	1812	49.59	16.05	3.38
Mean	4.33	51.36	13.67	1.33	4.07	9.59	5.49	11.04	0.08	0.06	1728	49.85	15.34	3.14
SEm	0.49	2.03	0.16	0.07	0.16	0.31	0.43	0.69	0.006	0.003	66	0.28	0.52	0.11
CD (P=0.05)	NS	NS	NS	NS	0.51	1.00	NS	NS	NS	NS	214	NS	1.71	0.37

Late-20 days after normal sowing

Table 2.1.3.

ASP 1/17. Evaluation of AVT II entries under different sowing dates
Zone: North Hill Centre: ICAR-VPKAS, Almora
Character: Seed yield, Straw yield, Cost of cultivation, Gross returns, Net returns and B:C ratio

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	BC ratio
Dates of Sowing						
Normal	2265	2351	43387	76149	32762	1.75
Late	1132	1106	37790	37847	57	1.00
Mean	1699	1728	40589	56998	16409	1.38
SEm	33	48	-	1123	1123	0.03
CD (P=0.05)	199	295	-	6834	6834	0.16
Entry						
VLS 89	1823	1857	40870	61178	20308	1.46
VLS 59 (c)	1502	1517	40144	50351	10207	1.21
VLS 63 (c)	1772	1812	40754	59466	18712	1.45
Mean	1699	1728	40589	56998	16409	1.38
SEm	56	66	-	1911	1911	0.05
CD (P=0.05)	184	214	-	6231	6231	0.15

Normal sowing- onset of monsoon), Late sowing- 20 days after normal sowing

Table 2.1.4.

ASP-1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: Northern plain **Design:** Split plot **Replications:** Three
Character: Yield attributes straw yield, harvest index and economics

Treatment	Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Grain production index	RUE (kg/ha/mm)
Date of sowing							
Normal sowing	5.84	75.25	9.04	5131	29.56	17.20	4.19
20 days after Normal sowing	2.96	48.95	9.33	3211	30.78	13.83	4.16
Entry							
SL 1074	3.97	59.20	8.80	4127	30.54	15.47	4.19
SL 1028	4.40	64.65	8.86	4434	29.78	16.06	4.31
PS 1572	4.52	64.50	8.86	4082	30.17	15.03	3.92
SL 958 (c)	3.77	68.9	11.04	4735	38.2	21.8	7.83
SL 688 (c)	5.5	51.3	9	3349	22.37	8.99	0.75

Table 2.1.5.

ASP 1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: Northern plain **Design:** Split plot **Replications:** Three

Character: Dry matter, mean CGR and RGR

Treatment	Dry matter (g/plant)			Mean CGR ($g/m^2/day$)		Mean RGR (g/g/day)	
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS
Date of sowing							
Normal sowing	2.47	8.56	20.98	13.03	25.72	0.136	0.043
20 days after Normal sowing	1.34	4.43	15.25	7.32	22.71	0.139	0.061
Entry							
SL 1074	1.96	6.17	17.88	9.71	23.94	0.133	0.054
SL 1028	1.96	6.77	18.98	10.51	25.27	0.142	0.053
PS 1572	1.71	6.47	16.92	10.23	22.11	0.148	0.049
SL 958 (c)	2.07	4.75	14.55	7.95	29.03	0.0241	0.0324
SL 688 (c)	1.93	8.38	22.77	12.56	22.06	0.25	0.069

Table 2.1.6.

ASP-1/15. Evaluation of AVT II entries under different sowing dates

Zone: North Eastern **Design:** Split plot **Replications:** Three
Character: Seed yield (kg/ha)

Treatment	Raipur			Ranchi			Bhawanipatana			Zonal mean		
	Sowing date											
Entry	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**
JS 20-116	2131	1051	1591	1963	0	1963	1633	1467	1550	1909	1259	1584
RVS 2010-1	2376	1168	1772	2370	0	2370	1500	1233	1367	2082	1201	1641
PS 1556	1396	514	955	2111	0	2111	1367	1167	1267	1625	841	1233
JS 97-52 (c)	2572	882	1727	1926	0	1926	1167	933	1050	1888	908	1398
Mean	2119	904		2093	0		1417	1200		1876	1052	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-	-	-	-
Date of sowing	-	-	288.5	-	-	-	-	-	199.6	-	-	-
Entries	-	-	112.5	-	-	-	-	-	207.0	-	-	-
Interaction	-	-	88.08	-	-	-	-	-	NS	-	-	-

*20 days after normal planting date

Table 2.1.7.

ASP-1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: North Eastern **Design:** Split plot **Replications:** Three
Character: Yield attributes, straw yield, harvest index and economics

Treatment	Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Grain production index	RUE (kg/ha/mm)
Date of sowing							
Normal sowing	4.93	46.90	11.63	2769	39.41	19.06	2.97
20 days after Normal sowing	3.42	34.75	9.90	1936	36.27	12.01	2.80
Entry							
JS 20-116	4.72	44.00	10.93	2654	38.12	18.09	3.26
RVS 2010-1	4.37	45.85	11.32	2468	39.59	17.09	3.17
PS 1556	3.68	31.50	11.16	1888	36.91	11.99	2.34
JS 97-52 (c)	3.93	41.95	9.64	2400	36.75	14.97	2.76

Table 2.1.8.

ASP 1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: North Eastern **Design:** Split plot **Replications:** Three
Character: Dry matter, mean CGR and RGR

Treatment	Dry matter (g/plant)			Mean CGR ($g/m^2/day$)		Mean RGR (g/g/day)	
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS
Date of sowing							
Normal sowing	1.37	7.90	26.01	7.10	6.09	0.064	0.039
20 days after Normal sowing	0.96	5.37	18.88	2.98	4.86	0.067	0.040
Entry							
JS 20-116	1.27	7.45	24.13	4.06	6.03	0.066	0.039
RVS 2010-1	1.29	7.42	24.23	3.60	5.74	0.063	0.039
PS 1556	1.01	5.03	16.83	3.23	4.96	0.062	0.040
JS 97-52 (c)	1.09	7.13	24.59	2.89	5.16	0.069	0.044

Table 2.1.9

ASP-1/15. Evaluation of AVT II entries under different sowing dates

Zone: North Eastern Hill **Design:** Split plot **Replications:** Three
Character: Seed yield (kg/ha)

Treatment	Imphal			Medziphema			Zonal mean		
	Sowing date								
Entry	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**
JS-20-116	2469	2140	2304	1115	893	1004	1792	1517	1654
PS-1556	2523	2588	2555	942	687	814	1733	1637	1685
JS-97-52 (c)	2835	2375	2605	1521	941	1231	2178	1658	1918
Mean	2609	2368	-	1193	840	-	1901	1604	
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Date of sowing	-	-	239.98	-	-	349.35	-	-	-
Entries	-	-	NS	-	-	NS	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.1.10.

ASP-1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: North Eastern Hill **Design:** Split plot **Replications:** Three
Character: Yield attributes, straw yield, harvest index and economics

Treatment	Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Grain production index	RUE (kg/ha/mm)
Date of sowing							
Normal sowing	3.31	49.58	11.23	2511	42.58	16.22	1.66
20 days after Normal sowing	2.66	41.92	10.88	2234	40.47	15.19	1.54
Entry							
JS-20-116	2.88	41.87	9.52	2368	40.20	16.15	1.61
PS-1556	2.77	43.12	13.34	2216	41.98	13.78	1.46
JS-97-52 (c)	3.32	52.76	10.30	2534	42.41	16.18	1.74

Table 2.1.11.

ASP 1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: North Easter Hill **Design:** Split plot **Replications:** Three
Character: Dry matter, mean CGR and RGR

Treatment	Dry matter (g/plant)			Mean CGR ($g/m^2/day$)		Mean RGR (g/g/day)	
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS
Date of sowing							
Normal sowing	1.68	4.89	10.44	3.77	7.03	0.071	0.049
20 days after Normal sowing	1.43	4.07	8.65	3.68	6.09	0.066	0.051
Entry							
JS-20-116	1.61	4.50	9.82	3.80	5.99	0.066	0.054
PS-1556	1.51	4.49	9.18	3.54	7.51	0.071	0.041
JS-97-52 (c)	1.56	4.46	9.64	3.84	6.19	0.068	0.054

Table 2.1.12.

ASP-1/15. Evaluation of AVT II entries under different sowing dates
Zone: Central **Design:** Split plot **Replications:** Three
Character: Seed yield (kg/ha)

Treatment	Sehore			Amrawati			Kota			Zonal mean		
	Date of sowing											
Entry	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**	**Normal**	**Late**	**Mean**
JS 20-116	2148	1531	1840	1407	556	1963	1408	1343	1375	1654	1143	1726
JS 20-94	1333	506	920	1447	491	1938	1315	957	1136	1365	651	1331
RVS 2007-06	2519	459	1489	1456	598	2054	1300	895	1098	1758	651	1547
RSC 10-46	2123	272	1198	1593	830	2423	1130	941	1036	1615	681	1552
NRC 127	1309	370	840	1309	427	1736	1393	1373	1383	1337	723	1320
JS 97-52 (c)	1679	284	981	1074	210	1284	1501	1103	1302	1418	532	1189
Mean	1852	570	-	1381	519	-	1341	1102	-	1525	730	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-	-	-	-
Date of sowing	-	-	28.89	-	-	133.88	-	-	124.86	-	-	-
Entries	-	-	121.15	-	-	145.13	-	-	216.27	-	-	-
Interaction	-	-	171.33	-	-	NS	-	-	NS	-	-	-

Table 2.1.13.

ASP-1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)
Zone: Central **Design:** Split plot **Replications:** Three
Character: Yield attributes, straw yield and harvest index

Treatment	Branches /plant	Pods / plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Grain production index	RUE (kg/ha /mm)
Date of sowing							
Normal sowing	4.66	57.86	10.11	2266	40.48	15.08	2.22
20 days after Normal sowing	3.45	26.58	7.78	1210	40.28	7.51	1.26
Entry							
JS 20-116	4.02	42.43	8.98	1866	44.62	14.38	2.06
JS 20-94	3.85	41.86	9.73	1605	39.88	10.13	1.60
RVS 2007-06	4.20	41.57	9.68	1844	40.15	11.87	1.79
RSC 10-46	3.82	37.74	9.52	1696	39.21	11.48	1.78
NRC 127	4.07	46.31	8.32	1816	38.55	10.42	1.68
JS 97-52 (c)	4.36	42.40	7.43	1600	39.85	9.49	1.53

Table 2.1.14.

ASP 1/15. Evaluation of AVT II entries under different sowing dates (Zonal mean)

Zone: Central **Design:** Split plot **Replications:** Three
Character: Dry matter, mean CGR and RGR at 30, 45 and 60 DAS

Treatment	Dry matter (g/plant)			Mean CGR (g/m^2/day)		Mean RGR (g/g/day)	
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS
Date of sowing							
Normal sowing	2.18	6.88	15.15	15.05	22.64	0.068	0.036
20 days after Normal sowing	1.66	5.46	10.09	12.64	12.41	0.067	0.034
Entry							
JS 20-116	1.98	6.24	13.21	13.79	20.73	0.066	0.042
JS 20-94	1.92	6.25	12.29	14.06	17.53	0.069	0.035
RVS 2007-06	1.86	6.13	11.95	14.24	17.57	0.068	0.034
RSC 10-46	1.99	6.19	11.21	13.90	14.73	0.064	0.028
NRC 127	1.89	6.20	11.76	13.72	16.17	0.069	0.027
JS 97-52 (c)	1.90	6.04	12.30	13.33	18.39	0.067	0.038

Table 2.2.1.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: Northern plain **Design:** Strip plot **Replications:** Four
Character: Seed yield (kg/ha)

Crop rotation	Pantnagar			Ludhiana			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	1663	1691	1677	2519	2446	2483	2091	2069	2080
Soy-Maize-Soy-Maize	1382	1456	1419	6686	6557	6621	4034	4007	4020
Soy-Soy-Maize-Soy	4324	4386	4355	2479	2414	2447	3402	3400	3401
Soy-Soy-Soy-Maize	1520	1478	1499	2737	2358	2547	2129	1918	2023
Mean	1503	1642	-	3605	3444	-	2554	2543	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	NS	-	-	NS	-	-	-
Crop Rotation	-	-	534	-	-	464	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Mini[m] till – Minimum Tillage, Con[l] till- Conventional Tillage.

Table 2.2.2.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems
Zone: Northern plain **Design:** Strip plot **Replications:** Four
Character: Rabi Seed yield (kg/ha)

Crop rotation	Pantnagar			Ludhiana			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	5675	5142	5408	5090	5156	5123	5383	5149	5266
Soy-Maize-Soy-Maize	5505	5323	5414	5221	4913	5067	5363	5118	5241
Soy-Soy-Maize-Soy	5403	5550	5476	5143	5549	5346	5273	5550	5411
Soy-Soy-Soy-Maize	5369	5426	5397	5333	5235	5284	5351	5331	5341
Mean	5487	5360	-	5197	5213	-	5342	5287	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	NS	-	-	NS	-	-	-
Crop Rotation	-	-	NS	-	-	NS	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.3.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems
Zone: Northern plain **Design:** Strip plot **Replications:** Four
Character: Soybean Equivalent yield (kg/ha)

Crop rotation	Pantnagar			Ludhiana			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	1663	1691	1677	5500	5466	5483	3582	3579	3580
Soy-Maize-Soy-Maize	1382	1456	1419	6250	6008	6129	3816	3732	3774
Soy-Soy-Maize-Soy	2585	2435	2510	5491	5664	5577	4038	4050	4044
Soy-Soy-Soy-Maize	1520	1478	1499	5860	5423	5641	3690	3451	3570
Mean	1503	2334	-	5775	5640	-	3639	3987	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	207.4	-	-	NS	-	-	-
Crop Rotation	-	-	NS	-	-	341	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.4

ASP-2/15: Sustainable soybean production through diversification and tillage systems

Zone: Northern plain **Design:** Strip plot **Replications:** Four
Character: Yield and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kh/ha)	HI (%)	SEY (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
A. Tillage system								
Minimum tillage	2554	3678	33.64	3639	40704	103051	62347	2.32
Conventional tillage	2543	3686	33.50	3987	42967	103298	60331	2.23
B. Cropping system								
Soy-Soy-Soy-Soy	2080	3759	34.18	3580	41025	101648	60188	2.30
Soy-Maize-Soy-Maize	4020	3040	31.95	3774	41025	106678	60218	2.32
Soy-Soy-Maize-Soy	3401	4007	42.30	4044	40525	107871	66911	2.54
Soy-Soy-Soy-Maize	2023	3923	33.70	3570	41025	101136	59676	2.24

Table 2.2.5.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: North Eastern **Design:** Strip plot **Replications:** Four
Character: Soybean Seed yield (kg/ha)

Crop rotation	Raipur			Ranchi			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	2111	2067	2089	1632	1620	1626	1872	1844	1858
Soy-Maize-Soy-Maize	4204	5387	4795	1644	1644	1644	2924	3516	3220
Soy-Soy-Maize-Soy	1981	2196	2089	2477	2222	2350	2229	2209	2220
Soy-Soy-Soy-Maize	1943	2240	2092	1574	1644	1609	1759	1942	1851
Mean	2560	2973	-	1832	1783	-	2196	2378	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	284	-	-	NS	-	-	-
Crop Rotation	-	-	173	-	-	146.84	-	-	-
Interaction	-	-	303	-	-	NS	-	-	-

Table 2.2.6.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: North Eastern **Design:** Strip plot **Replications:** Four
Character: Rabi Seed yield (kg/ha)

Crop rotation	Raipur(Chickpea)			Ranchi(Wheat)			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	1306	1138	1222	2343	2294	2319	1825	1716	1771
Soy-Maize-Soy-Maize	1371	1179	1275	2126	2718	2422	1749	1949	1849
Soy-Soy-Maize-Soy	1366	1161	1263	2395	2539	2467	1881	1850	1865
Soy-Soy-Soy-Maize	1305	1136	1221	2280	2368	2324	1793	1752	1773
Mean	1337	1154	-	2286	2480	-	1812	1817	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	55.58	-	-	116.55	-	-	-
Crop Rotation	-	-	NS	-	-	NS	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.7.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: North Eastern **Design:** Strip plot **Replications:** Four
Character: Soybean Equivalent yield (kg/ha)

Crop rotation	Raipur			Ranchi			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	2111	2067	2089	1632	1620	1626	1872	1844	1858
Soy-Maize-Soy-Maize	2246	2608	2427	1644	1644	1644	1945	2126	2036
Soy-Soy-Maize-Soy	1981	2196	2089	1178	1056	1117	1580	1626	1603
Soy-Soy-Soy-Maize	1943	2240	2092	1574	1644	1609	1759	1942	1851
Mean	2070	2278	-	1507	1491	-	1789	1885	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	138	-	-	NS	-	-	-
Crop Rotation	-	-	153	-	-	126.34	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.8

ASP-2/15: Sustainable soybean production through diversification and tillage systems

Zone: Northern Eastern **Design:** Strip plot **Replications:** Four
Character: Yield and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kh/ha)	HI (%)	SEY (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
A. Tillage system								
Minimum tillage	2642	1662	44.79	2082	31651	90796	59145	1.69
Conventional tillage	2367	4975	38.90	1857	34439	91063	56625	1.48
B. Cropping system								
Soy-Soy-Soy-Soy	1837	3698	40.60	1837	32764	89334	56571	1.61
Soy-Maize-Soy-Maize	1920	3782	41.52	1920	32764	103027	70264	1.93
Soy-Soy-Maize-Soy	4444	8441	43.83	2303	33889	82228	48340	1.21
Soy-Soy-Soy-Maize	1818	3599	41.41	1818	32764	89128	56365	1.60

Table 2.2.9

ASP-02/15: Sustainable soybean production through diversification and tillage systems (2016-17)

Centre: Raipur **Character:** Soil parameters

Treatment	Bulk density	WHC	Porosity	Initial soil values (kg/ha)				OC at harvest (%)	Nutrient uptake (Chickpea) (kg/ha)		
				OC (%)	N	P	K		N	P	K
A. Tillage system											
Minimum tillage	1.32	43	54	0.53	219.2	13.45	362.7	0.49	102.8	19.64	7018
Conventional tillage	1.30	45	56	0.53	222.5	12.15	356.2	0.52	99.5	19.53	69.53
B. Cropping system											
Soy-Soy-Soy-Soy	1.31	44	55	0.53	221.6	13.05	364.2	0.48	89.4	18.54	65.50
Soy-Maize-Soy-Maize	1.31	44	55	0.53	215.5	11.15	351.2	0.47	97.5	18.85	67.24
Soy-Soy-Maize-Soy	1.31	44	55	0.53	220.6	13.75	362.2	0.49	102.9	20.41	72.64
Soy-Soy-Soy-Maize	1.31	44	55	0.53	225.7	13.25	360.2	0.50	91.6	18.76	66.38

Table 2.2.10.

ASP-02/15: Sustainable soybean production through diversification and tillage systems

Centre: Raipur **Character:** Balance sheet for Nitrogen (Soybean 2017)

Treatment	Initial Soil status (Kg/ha)	Nutrient added (Kg/ha)	Total nutrient uptake (Kg/ha)	Expected nutrient balance (Kg/ha)	Actual nutrient balance (Kg/ha)	Apparent gain/loss (Kg/ha)	Actual difference of initial and final (Kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
A. Tillage							
Minimum Tillage	219.2	25.0	155.0	89.2	210.55	121.35	-8.65
Conventional tillage	222.5	25.0	163.4	84.1	215.65	131.55	-6.85
B. Cropping System							
Soy-Soy-Soy-Soy	221.6	25.0	164.0	82.6	210.47	127.87	-11.13
Soy-Maize-Soy-Maize	220.5	25.0	174.7	70.8	215.66	144.86	-4.84
Soy-Soy-Maize-Soy	215.6	25.0	170.7	69.9	207.66	137.76	-7.94
Soy-Soy-Soy-Maize	225.7	25.0	160.8	89.9	212.47	122.57	-13.23

Table 2.2.11.

ASP-02/15: Sustainable soybean production through diversification and tillage systems

Centre: Raipur **Character:** Balance sheet for P (2017)

Treatment	Initial Soil status (Kg/ha)	Nutrient added (Kg/ha)	Total nutrient uptake (Kg/ha)	Expected nutrient balance (Kg/ha)	Actual nutrient balance (Kg/ha)	Apparent gain/loss (Kg/ha)	Actual difference of initial and final (Kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
A. Tillage							
Minimum Tillage	13.45	60	49.82	23.63	14.25	-9.38	0.80
Conventional tillage	12.15	60	50.79	21.36	13.88	-7.48	1.73
B. Cropping System							
Soy-Soy-Soy-Soy	13.05	60	35.95	37.10	14.65	-22.45	1.6
Soy-Maize-Soy-Maize	11.15	60	36.38	34.77	14.25	-20.52	3.1
Soy-Soy-Maize-Soy	13.75	60	94.07	-20.32	13.22	-33.54	-0.53
Soy-Soy-Soy-Maize	13.25	60	32.38	40.87	14.16	26.71	0.91

Table 2.2.12.

ASP-02/15: Sustainable soybean production through diversification and tillage systems

Centre: Raipur **Character:** Balance sheet for K (2017)

Treatment	Initial Soil status (Kg/ha)	Nutrient added (Kg/ha)	Total nutrient uptake (Kg/ha)	Expected nutrient balance (Kg/ha)	Actual nutrient balance (Kg/ha)	Apparent gain/loss (Kg/ha)	Actual difference of initial and final (Kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
A. Tillage							
Minimum Tillage	362.7	40	177.05	225.6	374.2	148.6	11.5
Conventional tillage	356.2	40	180.91	215.3	371.5	156.2	15.3
B. Cropping System							
Soy-Soy-Soy-Soy	364.2	40	127.41	276.8	370.8	94.0	6.6
Soy-Maize-Soy-Maize	351.2	40	128.49	262.7	376.2	113.5	25.0
Soy-Soy-Maize-Soy	362.2	40	340.13	62.07	368.5	306.4	6.3
Soy-Soy-Soy-Maize	360.2	40	113.80	286.4	375.9	89.5	15.7

Table 2.2.13.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: Central **Design:** Strip plot **Replications:** Four
Character: Seed yield (kg/ha)

Crop rotation	Kota			Amrawati			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	1116	1099	1107	1848	1998	1923	1482	1549	1516
Soy-Maize-Soy-Maize	1711	1688	1699	2474	2704	2589	2243	2196	2220
Soy-Soy-Maize-Soy	1190	1131	1161	1878	1968	1923	1534	1579	1557
Soy-Soy-Soy-Maize	1176	1110	1143	1635	1740	1687	1406	1458	1432
Mean	1298	1257	-	2600	2803	-	1949	2030	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	NS	-	-	-	104	-	-
Crop Rotation	-	-	116	-	-	-	175	-	-
Interaction	-	-	NS	-	-	-	NS	-	-

Table 2.2.14.

ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: Central **Design:** Strip plot **Replications:** Four
Character: *Rabi* Seed yield (kg/ha)

Crop rotation	Kota			Amrawati			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	2348	2513	2430	1472	1648	1560	1910	2081	1996
Soy-Maize-Soy-Maize	2470	2243	2356	1326	1378	1352	1898	1811	1855
Soy-Soy-Maize-Soy	2332	2226	2279	1402	1620	1511	1867	1923	1895
Soy-Soy-Soy-Maize	2480	2486	2483	1467	1633	1550	1974	2060	2017
Mean	2407	2367	-	1416	1569	-	1912	1968	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	NS	-	-	132.9	-	-	-
Crop Rotation	-	-	NS	-	-	78.25	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.15.
ASP-2/15. Sustainable soybean production through crop diversification and tillage systems

Zone: Central **Design:** Strip plot **Replications:** Four
Character: Soybean Equivalent Yield (kg/ha)

Crop rotation	Kota			Amrawati			Zonal mean		
	Tillage								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	4077	4268	4172	4311	4755	4533	4194	4512	4353
Soy-Maize-Soy-Maize	4826	4516	4671	4692	5009	4850	4759	4763	4761
Soy-Soy-Maize-Soy	4131	3939	4035	4223	4679	4451	4177	4309	4243
Soy-Soy-Soy-Maize	4304	4245	4274	4089	4473	4281	4197	4359	4278
Mean	4334	4242	-	4328	4729	-	4331	4486	-
CD (P=0.05)	-	-	-	-	-	-	-	-	-
Tillage	-	-	NS	-	-	215.60	-	-	-
Crop Rotation	-	-	312.03	-	-	218.56	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.2.16.

ASP-2/15: Sustainable soybean production through diversification and tillage systems

Zone: Central **Design:** Strip plot **Replications:** Four
Character: Yield and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kh/ha)	HI (%)	SEY (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
A. Tillage system								
Minimum tillage	1629	3210	39.30	4331	49603	124083	74480	2.55
Conventional tillage	1680	3324	39.35	4486	52221	128683	76462	2.49
B. Cropping system								
Soy-Soy-Soy-Soy	1515	1950	43.15	4353	50828	123145	72317	2.45
Soy-Maize-Soy-Maize	2144	7027	30.58	4761	50313	141000	89587	2.78
Soy-Soy-Maize-Soy	1542	2049	42.60	4243	50805	120173	69368	2.39
Soy-Soy-Soy-Maize	1416	2042	40.95	4278	50603	121213	70611	2.43

Table 2.2.17.

ASP-02/15: Sustainable soybean production through diversification and tillage systems (2016-17)

Centre: Kota **Character:** Soil parameters and nutrient uptake

Treatment	Bulk density	WHC	Porosity	Initial soil values (kg/ha)				OC at harvest (%)	Nutrient uptake(kg/ha)		
				OC (%)	N	P	K		N	P	K
A. Tillage system											
Minimum tillage	1.48	48.37	44.19	0.682	320.63	22.83	305.88	0.680	120.49	11.29	78.69
Conventional tillage	1.48	47.91	44.47	0.690	317.56	22.64	298.63	0.676	113.79	10.55	75.22
SEm+	0.003	0.17	0.10	0.001	2.04	0.37	3.48	0.002	3.35	0.32	2.447
CD (P=0.05)	NS	0.50	0.302	0.004	NS	NS	NS	NS	NS	NS	NS
B. Cropping system											
Soy-Soy-Soy-Soy	1.48	48.21	44.44	0.686	319.13	22.43	302.38	0.675	100.46	9.35	63.68
Soy-Maize-Soy-Maize	1.48	48.19	44.36	0.686	318.25	22.72	296.38	0.676	162.89	15.21	110.68
Soy-Soy-Maize-Soy	1.48	47.96	44.24	0.685	318.25	23.18	303.88	0.681	102.73	9.58	67.16
Soy-Soy-Soy-Maize	1.47	48.19	44.29	0.688	320.75	22.63	306.38	0.681	102.50	9.54	66.30
SEm+	0.003	0.17	0.10	0.001	2.04	0.37	3.48	0.002	3.35	0.32	2.44
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	10.17	0.98	7.39

Table 2.2.18.

ASP-02/15: Sustainable soybean production through diversification and tillage systems (2016-17)

Centre: Amravati **Character:** Soil parameters and nutrient uptake

Treatment	OC (%)	Initial soil values (kg/ha)			Bulk Density	Nutrient uptake (kg/ha)		
		N	P	K		N	P	K
A. Tillage system								
Minimum tillage	0.442	199.23	16.66	328.84	1.50	132.42	16.89	61.78
Conventional tillage	0.433	196.95	16.58	324.49	1.50	137.62	18.26	64.59
SE(m) +	0.002	0.95	0.10	4.14	0.01	1.17	0.40	1.13
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS
B. Cropping system								
Soy-Soy-Soy-Soy	0.438	197.08	17.10	331.76	1.50	125.46	11.60	34.16
Soy-Maize-Soy-Soy	0.436	188.30	16.05	313.55	1.51	175.61	36.24	149.69
Soy-Soy-Maize-Soy	0.438	202.09	16.63	332.94	1.50	126.09	11.74	34.93
Soy-Soy-Soy-Maize	0.440	204.88	16.68	328.42	1.49	112.92	10.73	33.96
SE(m) +	0.003	1.38	0.27	8.97	0.01	3.54	0.64	1.48
CD (P=0.05)	NS	4.10	NS	NS	NS	10.51	1.90	4.38
Interaction								
SE(m) +	0.005	1.95	0.38	12.69	0.01	5.00	0.90	2.09
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS

Table 2.2.19.

ASP-2/15: Sustainable soybean production through diversification and tillage systems (2016-17)

Centre: Bengaluru **Character:** Seed yield of Soybean and Maize (kg/ha) (**2nd year**)

Cropping system	*Kharif* Soybean yield (kg/ha)			*Kharif* Maize yield (kg/ha)			SEY (kg/ha)		
	Tillage system								
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-**Soy**-Soy-Soy	2501	2472	2487	-	-	-	2501	2472	2487
Soy-**Maize**-Soy-Maize	-	-	-	6573	6668	6620	2629	2667	2648
Soy-**Soy**-Maize-Soy	2558	2451	2505	-	-	-	2558	2451	2505
Soy-**Soy**-Soy-Maize	2480	2383	2432	-	-	-	2480	2383	2432
Mean	2513	2435	-	-	-	-	2542	2493	-
	-	-	-	-	SEm	CD (P=0.05)	-	SEm	CD (P=0.05)
Tillage system	-	-	-		75	NS	-	75	NS
Cropping system	-	-	-		61	183	-	61	NS
Interaction					87	NS	-	87	NS

Price: Soybean – Rs. 3500/q Maize – Rs. 1400/q

Table 2.2.20.

ASP-2/15: Sustainable soybean production through diversification and tillage systems (2017-18)

Centre: Bengaluru **Character:** Seed yield of Soybean and Maize (kg/ha) (**3rd year**)

Cropping system	*Kharif* Soybeanyield (kg/ha)			*Kharif* Maize yield (kg/ha)			SEY (kg/ha)		
	Tillage system								
	Minim till	Conl till	Mean	Minim till	Conl till	Mean	Minim till	Conl till	Mean
Soy-Soy-**Soy**-Soy	2483	2508	2495	-	-	-	2483	2508	2495
Soy-Maize-**Soy**-Maize	2126	2088	2107	-	-	-	2126	2088	2107
Soy-Soy-Maiz**e**-Soy				6939	7043	6991	3238	3287	3262
Soy-Soy-**Soy**-Maize	2534	2508	2521	-	-	-	2534	2508	2521
Mean	2381	2368	-	-	-	-	2595	2598	
	-	-	-	-	SEm	CD (P=0.05)	-	SEm	CD (P=0.05)
Tillage system	-	-	-	-	117	NS	-	117	NS
Cropping system	-	-	-	-	96	285	-	95	282
Interaction	-	-	-	-	135	NS	-	135	NS

Price: Soybean – Rs. 3000/q Maize – Rs. 1400/q

Table 2.2.21.

ASP-2/15: Sustainable soybean production through diversification and tillage systems (2017-18)

Centre: Bengaluru **Character:** Yield and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	HI (%)	SEY (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
A. Tillage system								
Minimum tillage	3520	6220	40.41	2595	31205	77855	46651	2.48
Conventional tillage	3537	6508	38.22	2598	32993	77931	44938	2.35
SEm	117	110	0.68	117	-	3501	3501	0.11
CD (P=0.05)	NS	NS	NS	NS	-	NS	NS	NS
B. Cropping system								
Soy-Soy-Soy-Soy	2495	3442	42.14	2495	31110	74861	43751	2.41
Soy-Maize-Soy-Maize	2107	3188	39.76	2107	31110	63212	32102	2.03
Soy-Soy-Maize-Soy	6991	15709	30.80	3262	35064	97875	62811	2.79
Soy-Soy-Soy-Maize	2521	3116	44.54	2521	31110	75625	44515	2.43
SEm	96	104	0.84	95	-	2863	2863	0.09
CD (P=0.05)	285	309	2.50	282	-	8506	8506	0.27

Table 2.2.22.

ASP-2/ 15. Sustainable soybean production through crop diversification and tillage systems

Zone: Southern **Design:** Split plot **Replications:** Three **Character:** Soybean yield (kg/ha)

Crop rotation	Pune			Dharwad			Coimbatore			Adilabad			Zonal mean		
	Tillage														
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	2695	2621	2658	2682	2506	2594	1165	1360	1263	2507	2744	2625	2262	2308	2285
Soy-Maize-Soy-Maize	4522	4495	4509	5495	6191	5843	5116	5510	5313	1901	2144	2022	4259	4585	4422
Soy-Soy-Maize-Soy	2555	2586	2571	2545	2626	2585	1151	1347	1249	2584	2834	2709	2209	2348	2279
Soy-Soy-Soy-Maize	2629	2668	2648	2757	2573	2665	1176	1370	1273	2426	2957	2691	2247	2392	2319
Mean	3100	3093		2661	2568		2152	2397		2354	2670	-	2567	2682	
CD (P=0.05)															
Tillage			NS			199			51.0			141			
Crop Rotation			353.9			NS			204			189			
Interaction			NS			NS			NS			NS			

Table 2.2.23.

ASP-2/ 15. Sustainable soybean production through crop diversification and tillage systems

Zone: Southern **Design:** Split plot **Replications:** Three **Character:** *Rabi* Seed yield (kg/ha)

Crop rotation	Pune(Wheat)			Dharwad			Coimbatore			adilabad			Zonal mean(Chickpea)		
	Tillage														
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
Soy-Soy-Soy-Soy	4579	4610	4594	1499	1417	1458	680	745	713	1765	2085	1925	1315	1416	1365
Soy-Maize-Soy-Maize	4745	4709	4727	905	1057	981	581	690	636	1862	2160	2011	1116	1302	1209
Soy-Soy-Maize-Soy	4617	4692	4654	1257	1341	1299	664	752	708	1679	2227	1953	1200	1440	1320
Soy-Soy-Soy-Maize	4630	4839	4734	1383	1384	1384	673	738	706	1928	2013	1970	1328	1378	1353
Mean	4642	4712		1261	1300	1280	650	731	690	1808	2121	-	1240	1384	
CD (P=0.05)															
Tillage			NS			152			66.0			192.0			-
Crop Rotation			NS			NS			61.3			NS			-
Interaction			NS			NS			NS			NS			-

Table 2.2.24.

ASP-2/ 15. Sustainable soybean production through crop diversification and tillage systems

Zone: Southern **Design:** Split plot **Replications:** Three **Character:** SEY (kg/ha)

Crop rotation	Pune			Dharwad			Coimbatore			Adilabad			Zonal mean		
	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean	Mini[m]	Con[l]	Mean
	Tillage														
Soy-Soy-Soy-Soy	2705	2631	2668	5040	4803	4921	2039	2318	2179	6331	7261	6796	4029	4253	4141
Soy-Maize-Soy-Maize	4532	4506	4519	5274	4832	4553	6859	7580	7220	5935	6825	6380	5650	5936	5668
Soy-Soy-Maize-Soy	2565	2596	2580	4645	4815	4730	2005	2314	2159	6223	7660	6941	3860	4346	4103
Soy-Soy-Soy-Maize	2639	2678	2668	5005	4822	4914	2041	2319	2180	6604	7319	6961	4072	4285	4181
Mean	3110	3103		4741	4818		3236	3633		6273	7266		4340	4705	
CD (P=0.05)															
Tillage			NS			370						395.9			-
Crop Rotation			353.60			NS						NS			-
Interaction			NS			NS						NS			-

Table 2.2.25.

ASP-2/15. Sustainable soybean production through diversification and tillage systems(2016-17)

Zone: Southern **Character:** Yield and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kh/ha)	HI (%)	SEY (kg/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
A. Tillage system								
Minimum tillage	2253	4343	33.18	4755	53694	133586	79892	2.00
Conventional tillage	2534	4668	34.48	5450	56324	153625	97301	2.25
B. Cropping system								
Soy-Soy-Soy-Soy	1944	3513	34.46	4488	54342	140071	85729	2.08
Soy-Maize-Soy-Maize	3668	7378	31.95	6800	57010	149858	92849	2.17
Soy-Soy-Maize-Soy	1979	3485	34.92	4551	54343	141917	87574	2.12
Soy-Soy-Soy-Maize	1982	3646	34.02	4571	54342	142576	88234	2.13

Table 2.2.26.

ASP-02/15: Sustainable soybean production through crop diversification and tillage systems (2017-18)
Zone: Southern **Centre:** Pune
Character: Soil physical and chemical properties (Balance sheet)

Treatment	Bulk density	WHC	Porosity	Initial Soil values (kg/ha)				OC at harvest (%)	Nutrient uptake(kg/ha)		
				OC (%)	N	P	K		N	P	K
A. Tillage system											
Minimum tillage	0.85	47.84	57.56	1.03	675.54	22.81	347.19	0.87	121.62	9.63	54.97
Conventional tillage	0.94	47.12	53.74	0.94	636.51	21.44	334.06	0.86	132.16	10.78	66.36
SEm	0.013	0.219	0.50	0.025	10.06	0.57	9.91	0.018	3.02	0.47	4.10
CD (P=0.05)	0.042	NS	1.60	NS	NS	NS	NS	NS	NS	NS	NS
B. Cropping system											
Soy-Soy-Soy-Soy	0.85	44.94	62.19	1.05	689.80	22.63	364.38	0.85	141.18	9.01	54.10
Soy-Maize-Soy-Maize	0.95	50.11	51.65	1.00	641.11	19.75	341.88	0.83	133.35	8.79	47.06
Soy-Soy-Maize-Soy	0.81	49.71	57.76	0.90	635.33	23.38	331.25	0.85	88.24	13.81	88.76
Soy-Soy-Soy-Maize	0.98	45.16	50.99	0.97	657.87	22.75	325.00	0.92	144.80	9.22	52.74
SEm	0.037	1.19	1.31	0.057	20.09	0.84	13.06	0.045	4.89	0.48	4.02
CD (P=0.05)	0.119	3.80	4.18	NS	NS	NS	NS	NS	15.63	1.52	12.83

Table 2.2.27.

ASP-02/15: Sustainable soybean production through diversification and tillage systems (2016-17)

Centre: Coimbatore **Character:** Soil parameters

Treatment	Bulk density	WHC	Porosity	Initial values (Soil)				Organic carbon at harvest (%)	Nutrient uptake		
				Organic Carbon (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)		N (kg/ha)	P (kg/ha)	K (kg/ha)
A. Tillage system											
Minimum tillage	1.200	28.9	44.3	0.514	197	10.68	397	0.506	190.8	28.4	124.3
Conventional tillage	1.220	20.1	46.0	0.510	194	10.31	380	0.510	210.0	31.0	137.1
B. Cropping system											
Soy-Soy-Soy-Soy	1.205	24.7	44.8	0.511	199	10.71	395	0.516	146.2	21.7	95.3
Soy-Maize-Soy-Maize	1.222	24.0	45.7	0.509	194	9.80	384	0.507	365.0	54.4	238.4
Soy-Soy-Maize-Soy	1.206	24.6	45.0	0.515	197	10.92	390	0.504	144.5	21.2	94.3
Soy-Soy-Soy-Maize	1.207	24.8	45.2	0.513	193	10.55	386	0.504	145.6	21.4	94.9

Table 2.2.28.

ASP-02/15: Sustainable soybean production through diversification and tillage systems (2016-17)
Zone: Southern **Centre:** Adilabad **Character:** Soil parameters

Treatment	Bulk density	WHC	Porosity	Initial Soil values (kg/ha)				OC at harvest (%)	Nutrient uptake(kg/ha)		
				OC (%)	N	P	K		N	P	K
A. Tillage system											
Minimum tillage	1.49	38.1	37.1	0.52	218.5	18.9	309.4	0.55	165.9	30.5	65.9
Conventional tillage	1.51	39.5	36.5	0.49	225.8	18.5	311.5	0.51	149.3	32.6	71.8
SEm	0.01	1.01	0.61	0.01	12.4	1.33	8.1	0.01	4.2	0.4	4.9
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B. Cropping system											
Soy-Soy-Soy-Soy	1.49	36.9	37.1	0.47	217.0	19.0	305.1	0.49	163.6	31.3	77.7
Soy-Maize-Soy-Maize	1.54	37.1	38.5	0.53	220.1	18.5	312.3	0.50	157.8	31.6	76.3
Soy-Soy-Maize-Soy	1.51	38.0	37.5	0.48	219.3	18.4	309.5	0.49	163.6	30.0	64.7
Soy-Soy-Soy-Maize	1.55	37.7	36.8	0.50	216.8	17.9	307.4	0.48	123.9	29.4	65.9
SEm	0.03	1.09	0.57	0.03	11.7	1.31	8.7	0.01	8.2	1.1	5.8
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	17.2

Table 2.3.1.

ASP 3/15. Effect of foliar nutrition on soybean productivity

Zone: Northern Plain **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Seed yield (kg/ha)				Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	HI (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Delhi	Pantnagar	Ludhiana	Mean	Zonal mean								
RDF + water spray at pod initiation	1883	1456	2854	2064	5.57	67.57	9.85	4443	21.58	30022	69608	39586	1.98
RDF + Urea 2% spray at pod initiation	2136	1393	3054	2194	5.44	64.80	10.21	4613	21.53	30081	74250	44169	2.12
RDF + DAP 2% spray at pod initiation	1998	1204	2879	2027	5.27	62.07	9.99	4368	21.11	30305	68771	38467	1.92
RDF + MOP 0.5% at pod initiation	1929	1157	3028	2038	5.20	58.20	10.03	4250	21.19	30051	68767	38715	1.94
RDF + 19:19:19 (NPK) 2% at pod initiation	2136	1471	2761	2123	5.57	66.93	9.90	4207	22.79	31380	71906	40526	1.95
RDF + Molybdenum 0.5% at pod initiation	1883	1362	2948	2064	5.20	62.13	9.83	4412	21.72	42122	69729	27607	1.30
RDF + Boron 0.5% at pod initiation	2159	1302	2935	2132	5.17	63.37	10.13	4438	20.82	33080	71982	38903	1.83
RDF +Zinc chillated 0.5% at pod initiation	2204	1316	3013	2178	5.03	62.57	10.24	4535	20.76	30850	73578	42727	2.04
RDF only	1860	1292	2837	1996	5.05	53.60	9.76	4522	20.37	29649	67549	37900	1.93
CD (P=0.05)	250.8	159.5	NS	-									

Table 2.3.2.

ASP 3/15. Effect of foliar nutrition on soybean productivity
Centre: Delhi **Character:** Plant dry matter, CGR and RGR and RUE

Treatment	Plant dry weight (g)			CGR		RGR		Produ-ction efficiency (kg grain/day)	WUE (kg/cm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS		
RDF + water spray at pod initiation	3.05	6.69	12.6	8.07	13.1	0.052	0.042	15.8	29.7
RDF + Urea 2% spray at pod initiation	3.13	7.04	13.5	8.69	14.4	0.054	0.044	17.9	33.7
RDF + DAP 2% spray at pod initiation	3.10	6.96	13.1	8.58	13.6	0.054	0.042	16.8	31.5
RDF + MOP 0.5% at pod initiation	3.05	6.87	12.9	8.47	13.5	0.054	0.042	16.2	30.4
RDF + 19:19:19 (NPK) 2% at pod initiation	3.07	6.71	13.4	8.10	14.9	0.052	0.046	17.9	33.7
RDF + Molybdenum 0.5% at pod initiation	3.08	6.66	13.0	7.95	14.1	0.051	0.045	15.8	29.7
RDF + Boron 0.5% at pod initiation	3.12	6.61	13.2	7.76	14.6	0.050	0.046	18.1	34.0
RDF +Zinc chillated 0.5% at pod initiation	3.11	7.04	13.4	8.72	14.1	0.054	0.043	18.5	34.7
RDF only	3.03	6.71	12.5	8.18	12.8	0.053	0.041	15.6	29.3
SEm	0.09	0.17	0.41	0.47	0.97	0.003	0.003	0.79	1.32
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	3.95

Table 2.3.3.

ASP 3/15. Effect of foliar nutrition on soybean productivity

Zone: North Eastern **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Seed yield (kg/ha)			Bran-ches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	HI (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Raipur	Ranchi	Mean	Zonal mean								
RDF + water spray at pod initiation	1676	2065	1871	3.17	46.55	9.98	3086	37.64	21515	58835	37320	1.74
RDF + Urea 2% spray at pod initiation	1822	2286	2054	3.54	51.70	10.26	3288	38.33	21615	64505	42890	1.99
RDF + DAP 2% spray at pod initiation	1982	2263	2123	3.69	54.42	10.39	3286	39.21	21880	66629	44749	2.07
RDF + MOP 0.5% at pod initiation	1866	2188	2027	3.48	54.32	10.29	3185	38.83	21583	63673	42091	1.97
RDF + 19:19:19 (NPK) 2% at pod initiation	1861	2399	2130	3.71	54.44	10.35	3283	39.22	24240	66813	42573	1.76
RDF + Molybdenum 0.5% at pod initiation	1772	2178	1975	3.22	52.39	10.17	3081	38.97	31390	61986	30596	1.01
RDF + Boron 0.5% at pod initiation	1831	2134	1983	3.13	48.75	10.21	3107	38.91	23535	62269	38734	1.67
RDF +Zinc chillated 0.5% at pod initiation	1836	2116	1976	3.09	48.62	10.14	3129	38.66	23188	62077	38889	1.69
RDF only	1614	2059	1837	3.06	45.30	9.92	2979	38.02	21171	57705	36534	1.73
CD (P=0.05)	36	193.58	-									

Table 2.3.4.

ASP 3/15. Effect of foliar nutrition on soybean productivity (Zonal mean)
Zone: North Eastern **Design:** RBD **Replications:** Three
Character: Dry matter, CGR and RGR

Treatment	Dry matter at (g/plant)			Mean CGR ($g/cm^2/day$)		Mean RGR (g/g/day)		RUE (kg/ha/mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
RDF + water spray at pod initiation	5.55	12.84	20.50	0.486	0.511	0.041	0.015	2.26
RDF + Urea 2% spray at pod initiation	5.92	13.47	21.86	0.503	0.560	0.040	0.016	2.47
RDF + DAP 2% spray at pod initiation	5.65	13.82	22.99	0.545	0.612	0.040	0.016	2.60
RDF + MOP 0.5% at pod initiation	5.65	13.53	22.64	0.525	0.608	0.040	0.016	2.47
RDF + 19:19:19 (NPK) 2% at pod initiation	5.98	14.25	22.40	0.552	0.544	0.041	0.015	2.56
RDF + Molybdenum 0.5% at pod initiation	5.94	13.25	20.98	0.487	0.515	0.039	0.015	2.39
RDF + Boron 0.5% at pod initiation	5.57	13.17	20.21	0.507	0.469	0.040	0.014	2.42
RDF +Zinc chillated 0.5% at pod initiation	5.98	13.13	20.40	0.477	0.485	0.039	0.015	2.42
RDF only	5.55	12.66	20.08	0.474	0.495	0.041	0.015	2.21

Table 2.3.5.

ASP 3/15. Effect of foliar nutrition on soybean productivity

Zone: North Eastern Hill **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Seed yield (kg/ha)			Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Imphal	Medziphema	Mean	Zonal mean								
RDF + water spray at pod initiation	1511	1244	1377	3.64	52.89	9.22	2215	40	33464	82655	48941	1.45
RDF + Urea 2% spray at pod initiation	1988	1017	1502	3.62	65.50	10.08	2648	36	33615	90132	56267	1.67
RDF + DAP 2% spray at pod initiation	1885	1309	1597	3.64	63.23	10.14	2375	40	33914	95829	61665	1.81
RDF + MOP 0.5% at pod initiation	2096	1422	1759	3.72	67.39	10.05	2343	44	33553	105542	71739	2.13
RDF + 19:19:19 (NPK) 2% at pod initiation	1964	1554	1759	3.46	58.72	9.95	2696	40	38314	105554	66990	1.79
RDF + Molybdenum 0.5% at pod initiation	1781	1233	1507	3.52	53.17	9.97	2271	40	41520	90438	48668	1.15
RDF + Boron 0.5% at pod initiation	1816	1487	1651	3.75	58.50	9.81	2764	38	34293	99069	64526	1.87
RDF +Zinc chillated 0.5% at pod initiation	1824	1007	1416	3.63	58.50	9.72	2289	38	35289	84947	49408	1.39
RDF only	1541	939	1240	3.31	50.11	9.50	2106	37	33328	74422	40844	1.22
CD (P=0.05)	319.5	378.15	-									

Table 2.3.6.

ASP 3/15. Effect of foliar nutrition on soybean productivity (Zonal mean)
Zone: North Eastern Hill **Design:** RBD **Replications:** Three **Character:** Dry matter, CGR and RGR

Treatment	Dry matter at (g/plant)			Mean CGR ($g/cm^2/day$)		Mean RGR (g/g/day)		RUE (kg/ha/mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
RDF + water spray at pod initiation	1.57	3.81	9.30	3.52	6.74	0.050	0.062	1.08
RDF + Urea 2% spray at pod initiation	1.54	4.23	8.72	3.51	6.49	0.064	0.046	1.21
RDF + DAP 2% spray at pod initiation	1.34	4.15	8.95	3.81	6.72	0.071	0.049	1.27
RDF + MOP 0.5% at pod initiation	1.48	3.92	8.65	3.72	6.35	0.057	0.057	1.40
RDF + 19:19:19 (NPK) 2% at pod initiation	1.66	3.90	10.07	3.37	7.35	0.051	0.071	1.38
RDF + Molybdenum 0.5% at pod initiation	1.46	4.28	9.79	3.75	7.18	0.070	0.058	1.20
RDF + Boron 0.5% at pod initiation	1.47	4.04	9.77	3.74	6.17	0.062	0.066	1.30
RDF +Zinc chillated 0.5% at pod initiation	1.46	4.12	8.73	3.60	5.85	0.067	0.050	1.13
RDF only	1.55	3.94	8.63	3.34	6.41	0.059	0.046	0.99

Table 2.3.7.

ASP 3/15. Effect of foliar nutrition on soybean productivity
Zone: Central **Design:** RBD **Replications:** Three **Character:** Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Seed yield (kg/ha)						Branches /plant	Pods/ plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Devgarh baria	Sehore	Kota	Amrawati	Indore	Mean	Zonal mean								
RDF + water spray at pod initiation	1024	1605	1296	1565	2067	1778	3.58	49.02	10.14	2125	42.15	22127	41708	19581	1.67
RDF + Urea 2% spray at pod initiation	1363	1687	1389	1576	2340	1945	3.81	55.23	10.26	2387	41.63	22217	45533	23316	1.87
RDF + DAP 2% spray at pod initiation	1202	1728	1481	2165	2487	2139	3.74	57.43	10.25	2484	42.19	22750	50110	27360	1.96
RDF + MOP 0.5% at pod initiation	1173	1646	1393	1852	2697	2164	3.66	53.27	10.19	2310	42.87	22499	46115	23616	1.83
RDF + 19:19:19 (NPK) 2% at pod initiation	1415	1955	1404	1898	2259	2006	3.75	57.77	10.59	2513	41.64	23097	50623	27527	1.99
RDF + Molybdenum 0.5% at pod initiation	1027	1626	1444	1846	2183	1911	3.57	50.41	10.13	2430	40.60	30061	45251	15189	1.26
RDF + Boron 0.5% at pod initiation	113	1667	1389	1951	2249	1959	3.71	53.55	10.08	2481	41.38	22966	46771	23805	1.80
RDF +Zinc chillated 0.5% at pod initiation	1103	1667	1467	1579	2631	2101	3.76	53.65	10.02	2357	43.09	24097	44133	20037	1.63
RDF only	959	1626	1111	1536	2499	1962	3.71	45.96	9.99	2197	42.09	21872	39795	17924	1.61
CD (P=0.05)	200.80	NS	191.99	352.56	207.65	-	-	-	-	-	-	-	-	-	-

Table 2.3.8.

ASP 3/15. Effect of foliar nutrition on soybean productivity (Zonal mean)

Zone: Central **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Dry matter at (g/plant)			Mean CGR (g/cm^2/day)		Mean RGR (g/g/day)		RUE (kg/ha/mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
RDF + water spray at pod initiation	8.01	13.64	20.90	11.48	13.59	0.309	0.316	1.92
RDF + Urea 2% spray at pod initiation	9.06	14.14	24.25	10.75	19.38	0.276	0.363	2.06
RDF + DAP 2% spray at pod initiation	9.00	14.59	25.99	11.92	21.92	0.286	0.373	2.33
RDF + MOP 0.5% at pod initiation	9.48	13.96	24.85	9.66	20.38	0.246	0.379	2.13
RDF + 19:19:19 (NPK) 2% at pod initiation	11.00	16.88	26.75	12.09	18.72	0.308	0.358	2.28
RDF + Molybdenum 0.5% at pod initiation	8.91	14.05	23.86	10.77	18.95	0.276	0.353	2.11
RDF + Boron 0.5% at pod initiation	8.34	13.61	23.26	10.61	18.95	0.294	0.347	2.16
RDF +Zinc chillated 0.5% at pod initiation	8.96	13.74	24.37	10.25	19.93	0.257	0.369	2.04
RDF only	11.13	16.20	22.69	11.09	10.48	0.359	0.454	1.67

Table 2.3.9.

ASP 3/15. Effect of foliar nutrition on soybean productivity
Zone: Southern **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Seed yield (kg/ha)						Branches /plant	Pods / plant	Seed index (g)	Straw yield (kg/ha)	Harvest index (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Dharwad	Pune	Bengluru	Coimbatore	Adilabad	Mean	Zonal mean								
RDF + water spray at pod initiation	1624	2857	2762	1281	2559	2217	3.82	46.77	12.65	3393	39.01	31052	67179	36127	1.63
RDF + Urea 2% spray at pod initiation	1660	3338	3488	1341	2803	2526	4.41	53.61	13.71	3670	39.96	31379	76514	45135	1.83
RDF + DAP 2% spray at pod initiation	1710	3274	3371	1420	2976	2550	4.58	56.25	13.66	3677	40.31	31738	77245	45506	1.85
RDF + MOP 0.5% at pod initiation	1731	3163	3116	1330	2612	2390	4.32	51.57	13.31	3636	39.12	31288	72354	41066	1.73
RDF + 19:19:19 (NPK) 2% at pod initiation	1730	3051	3287	1432	3132	2526	4.49	54.37	13.63	3758	39.54	32427	76628	44241	1.84
RDF + Molybdenum 0.5% at pod initiation	1748	3143	3066	1327	2553	2367	4.07	47.19	13.09	3536	39.51	32985	71660	38675	1.60
RDF + Boron 0.5% at pod initiation	1780	2907	3008	1290	2607	2318	3.85	47.58	13.41	3470	39.66	31985	70229	38243	1.67
RDF +Zinc chillated 0.5% at pod initiation	1757	3105	2892	1310	2752	2363	4.12	49.43	12.98	3520	39.76	32213	71603	39390	1.69
RDF only	1559	2875	2654	1260	2475	2165	3.56	45.73	12.43	3219	39.62	30375	65586	35211	1.64
CD (P=0.05)	140	285	259	70	360	-	-	-	-	-	-	-	-	-	-

Table 2.3.10.

ASP 3/15. Effect of foliar nutrition on soybean productivity (Zonal mean)

Zone: Southern **Design:** RBD **Replications:** Three
Character: Seed yield branches/plant, pods/plant, straw yield, harvest index, seed index and economics

Treatment	Dry matter at (g/plant)			Mean CGR ($g/cm^2/day$)		Mean RGR (g/g/day)		RUE (kg/ha/mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
RDF + water spray at pod initiation	4.11	9.78	16.97	10.55	10.89	0.113	0.028	4.41
RDF + Urea 2% spray at pod initiation	4.03	10.97	19.55	12.88	13.31	0.124	0.029	4.86
RDF + DAP 2% spray at pod initiation	4.23	10.76	19.42	12.04	14.12	0.120	0.031	4.81
RDF + MOP 0.5% at pod initiation	4.10	10.41	18.26	11.43	12.50	0.118	0.029	4.56
RDF + 19:19:19 (NPK) 2% at pod initiation	4.15	10.61	19.35	12.21	14.05	0.122	0.032	4.72
RDF + Molybdenum 0.5% at pod initiation	4.20	9.93	17.58	10.88	11.21	0.114	0.029	4.50
RDF + Boron 0.5% at pod initiation	4.01	10.15	17.22	11.31	10.82	0.116	0.029	4.34
RDF +Zinc chillated 0.5% at pod initiation	4.18	10.15	17.05	10.75	11.19	0.115	0.028	4.55
RDF only	3.94	9.47	16.20	10.51	9.39	0.142	0.029	4.23

Table 2.4.1.

ASP4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character:** Yield, yield attributes and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	HI (%)	Bran-ches /plant	Pods/ plant	Seed index (g)	Cost of cultivat -ion (Rs/ha)	Net returns (Rs/ha)	B:C ratio
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	2316	4152	35.80	4.1	62	10.8	19952	55746	2.79
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	2332	4094	36.23	4.4	64	10.9	19952	56150	2.81
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	2594	4483	36.65	4.6	71	11.2	19952	64603	3.24
Irrigation at flowering (RDF as basal)	2467	4261	36.67	4.1	71	11.0	19752	60640	3.07
Irrigation at pod initiation (RDF as basal)	2460	4175	37.07	4.2	67	10.8	19752	60301	3.05
Irrigation at seed filling (RDF as basal)	2438	4159	36.94	4.1	69	10.7	19752	59627	3.02
Flat sowing (RDF as basal)	2226	3854	36.62	3.8	65	10.7	18600	53971	2.90
SEm	63.32	60.66	0.53	0.27	0.41	0.22	-	1950	0.099
CD (P=0.05)	197	189	NS	NS	1.22	NS	-	6074	NS

Table 2.4.2.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character:** Yield, yield attributes and economical parameters

Treatment	Plant dry weight (g)			CGR		RGR		RUE (kg/ha/mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	0.98	8.92	35.21	0.529	1.753	0.0639	0.0397	3.90
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	1.04	9.96	36.21	0.595	1.750	0.0654	0.0373	3.93
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	1.16	10.69	39.24	0.635	1.903	0.0643	0.0376	4.37
Irrigation at flowering (RDF as basal)	1.12	10.65	37.45	0.635	1.787	0.0652	0.0364	4.16
Irrigation at pod initiation (RDF as basal)	0.96	9.85	35.47	0.593	1.708	0.0674	0.0371	4.15
Irrigation at seed filling (RDF as basal)	0.95	8.54	36.52	0.506	1.865	0.0635	0.0421	4.11
Flat sowing (RDF as basal)	0.92	8.05	32.12	0.475	1.605	0.0628	0.0401	3.75
SEm	-	-	-	-	-	-	-	0.11
CD (P=0.05)	-	-	-	-	-	-	-	0.33

Table 2.4.3.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character: N**utrient parameters

Treatment	Initial soil value (kg/ha)			Nutrient uptake (kg/ha)		
	N	P	K	N	P	K
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	220.5	12.56	304	178.7	29.82	118
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	219.6	12.85	304	179.5	29.15	117
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	220.7	12.62	305	199.3	30.16	129
Irrigation at flowering (RDF as basal)	220.5	12.45	306	189.5	31.22	123
Irrigation at pod initiation (RDF as basal)	220.4	12.15	307	188.6	29.34	121
Irrigation at seed filling (RDF as basal)	220.6	12.54	301	187.0	27.42	121
Flat sowing (RDF as basal)	220.5	12.65	302	171.1	27.74	111
SEm	-	-	-	4.5	0.84	2.05
CD (P=0.05)	-	-	-	13.9	NS	6.38

Table 2.4.4.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character:** Balance sheet for Nitrogen

Treatment	Initial Soil status (kg/ha)	Nutrient added (kg/ha)	Total nutrient uptake (kg/ha)	Expected nutrient balance (kg/ha)	Actual nutrient balance (kg/ha)	Apparent gain/loss (kg/ha)	Actual difference of initial and final (kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	220.5	25	178.7	66.8	230.4	163.6	9.9
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	219.6	25	179.5	65.1	231.5	166.4	11.9
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	220.7	25	199.3	46.4	235.6	189.2	14.9
Irrigation at flowering (RDF as basal)	220.5	25	189.5	56	234.5	178.5	14
Irrigation at pod initiation (RDF as basal)	220.4	25	188.6	56.8	234.2	177.4	13.8
Irrigation at seed filling (RDF as basal)	220.6	25	187.0	58.6	233.4	174.8	12.8
Flat sowing (RDF as basal)	220.5	25	171.1	74.4	232.6	158.2	12.1

Table 2.4.5.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character:** Balance sheet for P

Treatment	Initial Soil status (kg/ha)	Nutrient added (kg/ha)	Total nutrient uptake (kg/ha)	Expected nutrient balance (kg/ha)	Actual nutrient balance (kg/ha)	Apparent gain/loss (kg/ha)	Actual difference of initial and final (kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	12.56	60	29.82	42.74	13.74	-29	1.18
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	12.85	60	29.15	43.7	14.25	-29.45	1.4
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	12.62	60	30.16	42.46	14.56	-27.9	1.94
Irrigation at flowering (RDF as basal)	12.45	60	31.22	41.23	13.85	-27.38	1.4
Irrigation at pod initiation (RDF as basal)	12.15	60	29.34	42.81	13.25	-29.56	1.1
Irrigation at seed filling (RDF as basal)	12.54	60	27.42	45.12	13.85	-31.27	1.31
Flat sowing (RDF as basal)	12.65	60	27.74	44.91	13.55	-31.36	0.9

Table 2.4.6.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Raipur **Character:** Balance sheet for K

Treatment	Initial Soil status (Kg/ha)	Nutrient added (Kg/ha)	Total nutrient uptake (Kg/ha)	Expected nutrient balance (Kg/ha)	Actual nutrient balance (Kg/ha)	Apparent gain/loss (Kg/ha)	Actual difference of initial and final (Kg/ha)
	A	B	C	D=(A+B)-C	E	F=E-D	G=E-A
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	304	40	118	226	314	88	10.0
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	304	40	117	227	316	89	12.0
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	305	40	129	216	320	104	15.0
Irrigation at flowering (RDF as basal)	306	40	123	223	315	92	9.0
Irrigation at pod initiation (RDF as basal)	307	40	121	226	314	88	7.0
Irrigation at seed filling (RDF as basal)	301	40	121	220	312	92	11.0
Flat sowing (RDF as basal)	302	40	111	231	310	79	8.0

Table 2.4.7.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Devgadh Baria **Character:** Yield, yield attributes and economical parameters

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	HI (%)	Bran-ches /plant	Pods/ plant	Seed index (g)	Cost of cultivat-ion (Rs/ha)	Net returns (Rs/ha)	B:C ratio
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	1476	1899	43.7	4.2	109.7	11.9	19457	39852	2.05
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	1293	1672	43.6	4.1	95.2	10.9	19457	34911	1.79
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	1260	1602	44.0	4.1	88.4	10.7	19457	34020	1.75
Irrigation at flowering (RDF as basal)	1405	1867	42.9	4.0	101.0	11.6	19267	37935	1.97
Irrigation at pod initiation (RDF as basal)	1261	1621	43.8	4.2	82.0	10.5	19267	34047	1.77
Irrigation at seed filling (RDF as basal)	1234	1600	43.5	3.4	77.4	10.7	19267	33318	1.73
Flat sowing (RDF as basal)	1116	1492	42.8	3.3	75.0	10.4	17842	30132	1.69
S.Em	50.94	67.84	-	0.18	5.38	0.37	-	-	-
CD (P=0.05)	156.97	209.04	-	0.54	16.53	NS	-	-	-

Table 2.4.8.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Devgadh Baria **Character:** Yield, yield attributes and economical parameters

Treatment	Plant dry weight (g)			CGR		RGR		RUE (kg/ha/ mm)
	30 DAS	45 DAS	60 DAS	30-45 DAS	45-60 DAS	30-45 DAS	45-60 DAS	
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	17.1	22.9	32.42	8.35	13.71	0.65	0.83	1.39
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	15.1	19.6	25.40	6.48	8.35	0.56	0.65	1.21
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	14.8	18.9	24.09	5.90	7.47	0.52	0.61	1.18
Irrigation at flowering (RDF as basal)	16.0	21.4	28.58	7.78	10.34	0.62	0.73	1.32
Irrigation at pod initiation (RDF as basal)	14.7	19.0	24.43	6.19	7.82	0.54	0.62	1.18
Irrigation at seed filling (RDF as basal)	14.4	18.6	24.15	6.05	7.99	0.53	0.63	1.16
Flat sowing (RDF as basal)	12.8	16.1	20.56	4.75	6.42	0.44	0.55	1.05
SEm	0.55	0.98	1.73	-	-	-	-	-
CD (P=0.05)	1.70	3.03	5.32	-	-	-	-	-

Table 2.4.9.

ASP 4/15: Effect of fertigation on soybean productivity

Centre: Devgadh Baria **Character:** Yield, yield attributes and economical parameters

Treatment	Initial soil value (kg/ha)			Nutrient uptake (kg/ha)		
	N	P	K	N	P	K
Fertigation at flowering (50% RDF as basal + 50 % RDF through fertigation)	241.50	34.52	260.50	143.78	14.20	60.35
Fertigation at pod initiation (50% RDF as basal + 50 % RDF through fertigation)	241.50	34.52	260.50	132.11	13.05	55.45
Fertigation at seed filling (50% RDF as basal + 50 % RDF through fertigation)	241.50	34.52	260.50	130.33	12.87	54.71
Irrigation at flowering (RDF as basal)	241.50	34.52	260.50	139.08	13.74	58.38
Irrigation at pod initiation (RDF as basal)	241.50	34.52	260.50	116.56	11.51	48.93
Irrigation at seed filling (RDF as basal)	241.50	34.52	260.50	112.59	11.12	47.26
Flat sowing (RDF as basal)	241.50	34.52	260.50	103.76	10.25	43.55

Table 2.5.1.

ASP 5/13. Refinement of soybean production technology for problematic soils(acidic) in Northern Hill zone

Zone: North Eastern Hill **Character:** Seed yield (kg/ha)

Treatment	Organic manure								
	Imphal			Medziphema			Zonal mean		
Lime application	FYM@ 2.5 t/ha	Control	Mean	FYM@ 2.5 t/ha	Control	Mean	FYM@ 2.5 t/ha	Control	Mean
Lime@ 200kg/ha	1231	1133	1182	1289	1094	1192	1260	1114	1187
Lime@ 400kg/ha	1519	1170	1344	1805	1364	1584	1662	1267	1464
Lime@ 600kg/ha	1614	1435	1524	1913	1544	1729	1764	1490	1626
Lime@ 800kg/ha	1356	1284	1320	2334	1828	2081	1845	1556	1700
Control	962	928	945	1312	1014	1163	1137	971	1054
Mean	1336	1190	-	1731	1369	-	1533	1279	-
CD	-	-	-	-	-	-	-	-	-
Organic manure	-	-	137.4	-	-	343.8	-	-	-
Lime application	-	-	217.3	-	-	543.6	-	-	-
Interaction	-	-	NS	-	-	NS	-	-	-

Table 2.5.2.

ASP 5/13. Refinement of soybean production technology for problematic soils(acidic) in Northern Hill zone

Zone: North Eastern Hill **Character:** Seed yield (kg/ha)

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	HI (%)	Bran-ches /plant	Pods/ plant	Seed index (g)	Cost of cultivat-ion (Rs/ha)	Net returns (Rs/ha)	B:C ratio
Organic manure									
FYM @ 2.5 t/ha	1533	2192	40.95	3.99	41.50	11.56	42428	49573	1.21
Control	1279	1865	40.46	3.80	37.58	11.13	34928	41836	1.19
Lime application (kg/ha)									
200	1187	1841	39.34	3.81	38.50	11.23	36628	34573	0.99
400	1464	2026	41.87	3.73	39.20	11.41	38678	49189	1.31
600	1626	2196	42.41	4.04	43.64	11.40	40728	56861	1.44
800	1700	2439	40.75	3.89	42.56	11.81	42778	59237	1.46
Control	1054	1642	39.33	3.94	33.81	10.88	34578	28663	0.86

Table 2.6.1.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Pantnagar **Variety :** PS-1347 **Character:** Seed yield (kg/ha)

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	Branches/ Plant	Pods/ plant	Seed index	HI (%)
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	1430	3710	6.42	53.7	9.32	27.9
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	1201	4189	5.65	57.7	9.33	22.3
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	1339	4159	6.50	63.7	8.81	24.5
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	1196	3409	6.50	51.1	8.94	26.8
Pendimethalin30EC@ 1kgai/ha as pre-emergence	1224	3221	4.15	44.9	9.40	27.7
Control	682	2424	3.90	42.4	9.27	21.7
SEm	93.77	379.5	0.58	6.73	0.35	1.80
CD (P=0.05)	282.63	1143.9	1.77	NS	NS	NS

Table 2.6.2.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Pantnagar **Variety:** PS-1347 **Character:** Weed parameters at 30 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)	WCE (%)
	Mono	Dicot	Total	Total	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	3.78	1.0	3.78	4.49	80.27
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	4.59	4.19	6.17	7.18	53.24
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	4.50	2.08	5.06	7.32	51.49
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	4.50	1.59	5.69	5.70	70.12
Pendimethalin30EC@ 1kgai/ha as pre-emergence	5.50	4.47	6.65	4.73	79.31
Control	5.00	8.75	11.23	10.49	-
SEm	6.99	0.49	0.37	0.56	6.32
CD (P=0.05)	1.25	1.48	1.13	1.69	19.49

Table 2.6.3.

ASP 7/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Pantnagar **Variety:** PS-1347 **Character:** Weed parameters at 45 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)	WCE (%)
	Mono	Dicot	Total	Total	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	2.14	2.82	3.49	2.87	96.70
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	2.86	3.05	4.08	5.84	84.87
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	2.27	2.64	3.33	3.89	93.70
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	2.95	3.13	4.20	2.92	96.47
Pendimethalin30EC@ 1kgai/ha as pre-emergence	2.84	3.34	4.30	10.53	51.59
Control	5.49	5.89	8.01	15.19	-
SEm	0.47	0.41	0.55	0.59	3.57
CD (P=0.05)	1.42	1.23	1.64	1.78	11.00

Table 2.6.4.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Pantnagar **Variety:** PS-1347 **Character:** Weed parameters at 60 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)	WCE (%)
	Mono	Dicot	Total	Total	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	2.88	1.76	3.35	3.22	96.57
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	4.54	2.54	5.23	4.17	93.74
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	4.09	2.06	4.62	6.54	84.26
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	5.31	2.87	6.63	5.33	90.27
Pendimethalin30EC@ 1kgai/ha as pre-emergence	5.34	4.11	6.75	12.24	49.99
Control	8.08	5.48	9.86	17.41	-
SEm	0.72	0.76	0.81	1.07	4.62
CD (P=0.05)	2.19	2.29	2.40	3.22	14.26

Table 2.6.5.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Raipur **Variety:** JS 97 52 **Character:** Seed yield (kg/ha)

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	Branches/ plant	Pods/ plant	Seed index	HI (%)
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	1705	3163	3.8	66	10.8	35.02
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	1968	3712	4.3	72	11.1	34.63
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	1729	3387	4.1	71	11.0	33.81
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	1827	3587	4.2	72	10.9	33.74
Pendimethalin 30% EC @ 1kg ai/ha as pre-emergence	1352	2748	3.9	68	10.8	32.95
Weedy Check	1027	2073	3.1	65	10.8	32.99
SEm	63	105	0.14	0.17	0.26	0.49
CD (P=0.05)	203	334	0.42	0.52	NS	NS

Table 2.6.6.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Raipur **Variety: JS 97 52** **Character:** Weed parameters at 30 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE	1.8	-	1.8	2.41	-	2.41	83.64	-	83.64
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	1.4	-	0.4	1.02	-	1.02	93.08	-	93.08
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	1.3	1.4	1.7	1.78	1.85	3.63	87.44	77.28	84.34
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	1.3	1.2	1.5	1.22	1.65	2.87	91.72	80.67	87.62
Pendimethalin 30% EC @ 1kg ai/ha as PE	1.8	1.0	1.8	1.45	1.52	2.97	90.16	82.20	87.19
Weedy Check	6.8	8.6	15.4	14.74	8.45	23.19	-	-	-

Table 2.6.7.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Raipur **Variety:** JS 97 52 **Character:** Weed parameters at 45 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) PE	2.4	0.8	3 .6	3.2	1.24	4.44	78.94	88.30	79.25
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	2.2	1.2	3.4	2.4	2.47	4.87	80.70	76.69	77.24
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	2.8	1.4	4.2	3.4	3.10	6.50	75.43	70.75	69.62
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	2.5	1.2	3.7	3.3	3.00	6.30	78.07	71.69	70.56
Pendimethalin 30% EC @ 1kg ai/ha as PE	3.1	2.3	5.4	3.8	3.90	7.7	72.80	63.21	64.01
Weedy Check	11.4	12.8	24.2	10.8	10.6	21.4	-	-	-

Table 2.6.8.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Raipur **Variety:** JS 97 52 **Character:** Weed parameters at 60 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE	5.2	1.1	6.3	4.6	1.2	5.8	62.90	91.78	78.52
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	4.8	1.4	6.2	3.5	1.6	5.1	71.77	89.04	81.11
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	5.2	3.4	8.6	6.8	4.6	11.4	45.16	68.49	57.78
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	5.1	3.2	8.3	5.9	4.2	10.1	52.42	71.23	62.59
Pendimethalin 30% EC @ 1kg ai/ha as PE	5.8	3.5	9.3	5.4	5.1	10.5	56.45	65.07	61.11
Weedy Check	14.6	16.5	31.1	12.4	14.6	27.0	-	-	-

Table 2.6.9.

ASP 6/15. Evaluation of new molecules of herbicides for controlling of weeds in soybean (Zonal Mean)

Zone: Central **Design:** RBD **Replications:** Three **Character:** Yield and yield attributes

Treatment	Seed yield(kg/ha)			Straw yield (kg/ha)	Branches/plant	Pods/ plant	Seed index (g)	HI (%)
	Sehore	Kota	Mean					Kota
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	2519	1233	1876	2458	3.59	56.88	10.62	42.08
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	2148	1335	1742	2359	3.37	53.50	10.63	43.98
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	2204	1255	1730	2364	3.30	54.08	10.47	41.46
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	2444	1273	1859	2293	3.61	56.28	10.63	41.87
Pendimethalin30EC@ 1kgai/ha as PE	1981	1146	1564	2285	2.90	49.20	10.42	40.57
Control	1648	597	1123	1920	2.55	34.05	10.45	36.57
CD (P=0.05)	327	237	-	-	-	-	-	-

Table 2.6.10.

ASP 6/15. Evaluation of new molecules of herbicides for controlling of weeds in soybean (Zonal Mean)

Zone: Central **Design:** RBD **Replications:** Three
Character: Weed density and weed dry matter and weed control efficiency at 30 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	2.95	2.48	5.43	1.19	1.37	2.56	82.67	80.30	81.47
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	4.45	1.85	6.30	1.47	1.11	2.58	83.79	84.10	83.53
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	4.30	2.38	6.68	2.22	1.64	3.86	77.07	78.92	77.69
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	3.45	2.17	5.62	1.95	1.59	3.53	78.72	79.45	78.98
Pendimethalin30EC@ 1kgai/ha as pre-emergence	7.09	3.84	10.93	3.69	2.86	6.55	68.03	65.35	66.72
Control	20.12	11.82	31.93	12.43	8.79	21.21	0.00	0.00	0.00

Table 2.6.11.

ASP 6/15. Evaluation of new molecules of herbicides for controlling of weeds in soybean (Zonal Mean)

Zone: Central **Design:** RBD **Replications:** Three
Character: Weed density and weed dry matter and weed control efficiency at 45 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	6.77	3.73	10.49	4.54	2.96	7.50	60.13	73.23	71.86
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	7.38	2.94	10.32	5.42	3.43	8.85	62.12	73.23	72.36
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	8.93	3.32	12.24	7.43	5.63	12.43	53.27	62.28	63.55
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	7.94	2.75	10.69	5.91	5.11	11.02	58.82	64.59	67.01
Pendimethalin30EC@ 1kgai/ha as pre-emergence	10.97	5.82	16.78	9.98	8.17	18.15	47.66	47.02	51.01
Control	23.47	14.02	37.48	22.30	15.37	37.67	0.00	0.00	0.00

Table 2.6.12.

ASP 6/15. Evaluation of new molecules of herbicides for controlling of weeds in soybean (Zonal Mean)

Zone: Central **Design:** RBD **Replications:** Three
Character: Weed density and weed dry matter and weed control efficiency at 60 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE	8.67	4.64	13.30	8.82	7.92	16.73	68.03	69.84	70.38
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	7.43	3.62	11.04	9.01	10.33	19.34	70.61	62.52	66.66
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	8.98	4.99	13.97	12.02	12.96	24.98	61.59	53.46	57.76
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	8.14	4.70	12.84	10.50	11.26	21.75	65.29	59.70	62.48
Pendimethalin30EC@ 1kgai/ha PE	10.50	4.49	14.99	16.87	16.72	33.58	51.23	39.60	45.35
Control	24.75	16.05	40.80	36.78	28.92	65.70	0.00	0.00	0.00

Table 2.6.13.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Dharwad **Variety:** JS 93-05 **Character:** Seed yield (kg/ha)

Treatment	Seed yield (kg/ha)	Straw yield (kg/ha)	Branches/ plant	Pods/ plant	Seed index	HI (%)
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	1616	1809	4.00	26.6	13.6	44.60
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as pre-emergence	1621	1791	4.40	25.8	13.2	45.40
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	1618	1778	3.80	29.9	13.7	44.30
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	1663	1816	4.90	29.6	13.7	45.87
Pendimethalin 30% EC @ 1kg ai/ha as pre-emergence	1654	1812	4.80	36.3	13.4	47.68
Weedy Check	1228	1439	3.70	28.8	13.3	40.87
SEm	51	27.4	0.22	1.12	0.11	0.84
CD (P=0.05)	160.7	86.3	0.71	3.53	0.37	2.58

Table 2.6.14.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Dharwad **Variety:** JS 9305 **Character:** Weed parameters at 30 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as pre-emergence	1.7	0.0	1.7	1.3	0.0	1.3	23.61	100.0	61.81
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0
Pendimethalin 30% EC @ 1kg ai/ha as PE	0.0	1.7	1.7	0.0	0.9	0.9	100.0	81.39	90.69
Weedy Check	2.7	4.7	7.3	1.7	6.0	7.7	0.00	0.00	0.00
SEm	0.20	0.49	0.44	0.13	0.51	0.55	4.84	4.36	3.45
CD (P=0.05)	0.63	1.54	1.39	0.43	1.62	1.75	15.26	13.76	10.87

Table 2.6.15.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Dharwad **Variety:** JS 9305 **Character:** Weed parameters at 45 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE	1.7	3.0	4.7	0.6	1.3	1.8	81.23	64.55	72.89
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	3.0	3.7	6.7	1.2	1.5	2.7	61.85	57.39	59.62
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	2.0	4.3	6.3	0.9	2.0	2.9	72.56	46.00	59.28
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	2.0	2.7	4.7	1.2	1.2	2.4	63.21	67.64	65.43
Pendimethalin 30% EC @ 1kg ai/ha as PE	1.7	4.0	5.7	0.6	2.1	2.7	83.09	42.81	62.95
Weedy Check	6.3	7.7	14.0	3.2	3.7	6.9	0.00	0.00	0.00
SEm	0.61	0.62	1.12	0.24	0.36	0.52	6.61	9.43	7.39
CD (P=0.05)	1.92	1.98	3.54	0.77	1.14	1.66	20.83	29.72	23.31

Table 2.6.16.

ASP 6/15: Evaluation of new molecules of herbicides for controlling of weeds in soybean

Centre: Dharwad **Variety:** JS 93-05 **Character:** Weed parameters at 60 DAS

Treatment	Weed count (m^2)			Weed dry matter (g/m^2)			WCE (%)		
	Mono	Dicot	Total	Mono	Dicot	Total	Mono	Dicot	Total
F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE	4.0	6.3	10.3	1.6	3.4	5.0	77.98	59.77	68.87
Pendimethalin 30% EC + Imazethapyr 2% SL premix @ 960 g ai/ha (3000 ml/ha) as PE	3.7	8.0	11.7	1.3	3.8	5.1	81.79	54.67	68.23
PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI	4.0	7.0	11.0	2.2	2.8	5.0	67.38	67.76	67.57
PIH 485 85% WG @ 127.5 g ai/ha (150 g/ha) as PPI	4.7	8.3	13.0	2.6	3.4	6.0	59.90	60.18	60.04
Pendimethalin 30% EC @ 1kg ai/ha as PE	5.3	6.7	12.0	3.1	2.7	5.9	50.58	67.73	59.15
Weedy Check	13.7	18.0	31.7	7.0	8.5	15.5	0.00	0.00	0.00
SEm	0.68	0.78	1.09	1.02	0.36	1.18	15.69	3.83	8.53
CD (P=0.05)	2.14	2.47	3.44	3.24	1.13	3.72	49.45	12.07	26.87

Table 2.7.1.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North-Plain **Character:** Yield and economics

Treatment	Seed yield (kg/ha)				Straw yield (kg/ha)	HI (%)	Pods/ plant	Seed index (g)	Cost of cultiva-tion (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Delhi	Pantn-agar	Ludh-iana	Mean								
SSNM	2248	1783	3125	2385	4713	23.18	76.83	10.07	30747	92859	63141	2.56
T1 – N omission	1848	1665	2711	2075	4610	31.23	64.87	10.06	30373	83157	49983	2.15
T1 – P omission	1867	1373	2831	2024	4768	29.97	67.53	9.98	28570	84645	54038	2.41
T1 – K omission	2210	1508	3003	2240	4867	32.24	72.27	10.16	29725	95703	61892	2.59
RDF (NPKS)	2458	1710	3105	2424	5511	32.96	76.40	10.11	30939	97787	66884	2.67
Farmers practice	2057	1538	2644	2080	4626	31.04	65.87	9.96	28843	82458	54140	2.38
Absolute control	1581	1409	2607	1866	4365	28.94	58.00	9.32	27173	72192	45796	2.21
CD (P=0.05)	228	216	NS	-								

Table 2.7.2.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North-Plain **Character:** Yield and Yield gap

Treatment	Delhi			Ludhiana			Pantnagar		
	Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)	
		SSNM	RDF		SSNM	RDF		SSNM	RDF
SSNM	2248	-	210	3125	-	-20	1783	-	-73
T1 – N omission	1848	400	610	2711	415	395	1665	118	45
T1 – P omission	1867	381	591	2831	294	274	1373	410	337
T1 – K omission	2210	38	248	3003	122	102	1508	275	202
RDF (NPKS)	2458	-210	-	3105	20	-	1710	73	-
Farmers practice	2057	191	401	2644	481	461	1538	225	172
Absolute control	1581	667	877	2607	519	498	1409	374	301
SEm	105	-	-	124	129	122	-	-	-
CD (P=0.05)	228	-	-	NS	NS	NS	216.03	-	-

Table 2.7.3.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North Eastern **Character:** Yield and economics

Treatment	Seed yield (kg/ha)				Straw yield (kg/ha)	HI (%)	Pods/ plant	Seed index (g)	Cost of cultivat ion (Rs/ha)	Gross returns(Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Rai-pur	Ran-chi	Bhawani-patnam	Mean								
SSNM	2194	2443	1433	2023	2792	43.06	50.97	10.37	21836	62969	41133	2.33
T1 – N omission	1589	1944	1017	1517	2246	42.09	42.86	10.18	21486	47394	25908	1.63
T1 – P omission	1510	1550	1150	1403	2186	40.59	41.97	10.24	19705	43952	24247	1.68
T1 – K omission	1564	2050	1183	1599	2405	40.88	44.66	10.21	20791	49882	29091	1.83
RDF (NPKS)	1905	2186	1533	1875	2634	42.57	49.11	10.53	23935	58311	34376	1.95
Farmers practice	1669	1621	1233	1508	2309	40.40	44.18	10.29	19859	47112	27253	1.94
Absolute control	1097	1083	867	1016	1617	40.60	36.96	9.90	17689	31832	14144	1.24
CD (P=0.05)	132	238.3	191	-		-	-	-	-	-	-	-

Table 2.7.4.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North eastern **Character:** Yield and Yield gap

Treatment	Raipur			Ranchi			Bhawanipatnam		
	Yield (kg/ha)	Yield gap (kg/ha)	Yield gap (kg/ha)	Yield (kg/ha)	Yield gap (kg/ha)	Yield gap (kg/ha)	Yield (kg/ha)	Yield gap (kg/ha)	Yield gap (kg/ha)
SSNM	2194	-	-289	2443	--	-257	1433	-	100
T1 – N omission	1589	605	316	1944	500	242	1017	417	517
T1 – P omission	1510	684	395	1550	893	636	1150	283	383
T1 – K omission	1564	630	341	2050	393	136	1183	250	350
RDF (NPKS)	1905	289	-	2186	257	--	1533	-100	-
Farmers practice	1669	525	236	1621	823	565	1233	200	300
Absolute control	1097	1097	808	1083	1361	1103	867	567	667
SEm	42.4	-	-	77.31	-	-	**62.0**	-	-
CD (P=0.05)	132	-	-	238.25	-	-	**191.0**	-	-

Table 2.7.5.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North Eastern Hill **Character:** Yield and economics

Treatment	Seed yield (kg/ha)			Straw yield (kg/ha)	HI (%)	Pods/ plant	Seed index (g)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Imphal	Medzip hema	Mean								
SSNM	1797	790	1293	1670	42.05	47.78	10.55	31493	77608	46115	1.45
T1 – N omission	1215	687	951	1672	36.76	37.56	9.93	28180	57064	28884	0.99
T1 – P omission	1224	824	1024	1699	37.23	40.42	10.07	28701	61445	32744	1.14
T1 – K omission	1387	941	1164	1796	40.07	43.75	10.73	28326	69826	41500	1.45
RDF (NPKS)	1611	1190	1401	1840	43.21	47.50	10.25	33328	84042	50715	1.52
Farmers practice	1153	523	838	1516	33.49	32.67	10.20	23520	50287	26767	1.06
Absolute control	1133	610	872	1512	35.95	36.45	9.82	23573	52309	28736	1.17
CD (P=0.05)	242.99	220.07	-		-	-	-	-	-	-	-

Table 2.7.6.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: North eastern Hill **Character:** Yield and Yield gap

Treatment	Imphal			Medziphema		
	Yield (kg/ha)	Yield gap (kg/ha)	Yield gap (kg/ha)	Yield (kg/ha)	Yield gap (kg/ha)	Yield gap (kg/ha)
SSNM	1797	-	186	790	-	400.57
T1 – N omission	1215	582	396	687	102.86	503.43
T1 – P omission	1224	573	387	824	34.28	366.29
T1 – K omission	1387	410	224	941	150.85	249.72
RDF (NPKS)	1611	186	-	1190	400.57	-
Farmers practice	1153	644	458	523	266.27	666.84
Absolute control	1133	664	478	610	179.43	580
SEm	78.86	-	-	71.42	-	-
CD (P=0.05)	242.99	-	-	220.07	-	-

Table 2.7.7.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: Central **Character:** Yield and economics

Treatment	Seed yield (kg/ha)						Straw yield (kg/ha)	HI (%)	Pods/ plant	Seed index (g)	Cost of cultivate-on (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Devgarhbari	Sehore	Kota	Amrawati	Indore	Mean								
SSNM	1648	2181	1505	1692	2483	1902	2475	42.26	54.03	10.66	21302	53401	32099	1.36
T1 – N omission	1345	1975	1458	1849	2346	1795	2389	41.77	48.03	10.34	21430	50408	28978	0.98
T1 – P omission	1360	1914	1490	1307	2189	1652	2239	41.68	48.37	10.43	19825	45944	26120	1.06
T1 – K omission	1272	1955	1482	1811	2235	1751	2349	41.44	49.67	10.19	21011	49625	28614	0.90
RDF (NPKS)	1522	2119	1531	1974	2416	1912	2550	41.71	53.47	10.80	21935	54323	32388	1.23
Farmers practice	1385	1893	1240	1636	2115	1654	2338	40.68	46.96	10.17	20703	46703	26000	1.12
Absolute control	1011	1687	1159	977	1740	1315	2166	40.11	39.01	9.71	18226	36575	18349	0.74
CD (P=0.05)	178.6	187	184	319	259	-	-	-	-	-	-	-	-	-

Table 2.7.8.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: Central **Character:** Yield and Yield gap

Treatment	Indore			Devgarhbari			Sehore			Kota			Amrawati		
	Yield (kg/ha)	Yield gap (kg/ha		Yield (kg/ha)	Yield gap (kg/ha		Yield (kg/ha)	Yield gap (kg/ha		Yield (kg/ha)	Yield gap (kg/ha		Yield (kg/ha)	Yield gap (kg/ha)	
		SSNM	RDF		SSNM	RDF		SSNM	RDF		SSNM	RDF		SSNM	RDF
SSNM	2483	-	-67	1648	-	-126	2181	-	(-62)	1505	-	26	1692	-	282
T1 – N omission	2346	137	70	1345	303	177	1975	206	144	1458	47	73	1849	-157	125
T1 – P omission	2189	294	227	1360	288	162	1914	267	205	1490	15	41	1307	385	667
T1 – K omission	2235	248	181	1272	376	250	1955	226	164	1482	23	49	1811	-119	163
RDF (NPKS)	2416	67	-	1522	126	-	2119	62	-	1531	-26	-	1974	-282	-
Farmers practice	2115	368	301	1385	263	137	1893	288	226	1240	265	291	1636	56	338
Absolute control	1740	743	676	1011	637	511	1687	494	432	1159	34	372	977	715	997
SEm	84.10	-	-	57.96	-	-	61	-	-	59.81			103.67		
CD (P=0.05)	259.16	-	-	178.6	-	-	187	-	-	184.36			319.41		

Table 2.7.9.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: Southern **Character:** Yield and economics

Treatment	Seed yield (kg/ha)						Straw yield (kg/ha)	HI (%)	Pods/ plant	Seed index (g)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
	Adilabad	Dharwad	Bengluru	Pune	Coimbatore	Mean								
SSNM	2610	1556	3368	3295	1450	2456	3483	40.86	49.83	13.87	33493	74397	40904	1.57
T1 – N omission	1755	1481	2823	3052	1246	2071	3272	38.36	38.47	13.03	33090	62645	29555	1.28
T1 – P omission	1880	1485	2955	3076	1320	2143	3251	39.30	41.77	13.19	31468	67753	33417	1.43
T1 – K omission	2350	1487	3070	2939	1285	2226	3423	39.34	43.04	13.47	32822	70256	34603	1.45
RDF (NPKS)	2814	1692	3109	3188	1402	2441	3444	41.47	48.73	13.67	33789	69148	40176	1.53
Farmers practice	2024	1204	2771	3146	1357	2100	3240	38.84	41.22	13.13	30983	58614	32647	1.32
Absolute control	1202	999	2108	2697	1153	1632	2974	34.96	35.76	12.32	26231	49416	23187	1.22
CD (P=0.05)	378	61	117	274	79	-	-	-	-	-	-	-	-	-

Table 2.7.10.

ASP 7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Zone: Southern **Character:** Yield and Yield gap

Treatment	Dharwad			Pune			Bengluru			Adilabad			Coimbatore		
	Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)		Yield (kg/ha)	Yield gap (kg/ha)	
		SSNM	RDF		SSNM	RDF		SSNM	RDF		SSNM	RDF		SSNM	RDF
SSNM	1556	-	136	3295	-	-107	3368	-	-259	2610	-	204	1450	-	- 48
T1 – N omission	1481	75	211	3052	243	136	2823	545	286	1755	855	1059	1246	204	156
T1 – P omission	1485	71	207	3076	219	112	2955	413	154	1880	730	934	1320	130	82
T1 – K omission	1487	69	205	2939	356	249	3070	298	40	2350	260	464	1285	165	117
RDF (NPKS)	1692	-136	0	3188	107	-	3109	259	-	2814	-204	-	1402	48	-
Farmers practice	1204	352	488	3146	149	42	2771	597	338	2024	586	790	1357	93	45
Absolute control	999	557	693	2697	598	491	2108	1260	1001	1202	1408	1612	1153	297	249
SEm	19.86	-	-	89.07	-	-	38	-	-	172.9	-	-	37.0	-	-
CD (P=0.05)	61.22	-	-	274.32	-	-	117	-	-	376.7	-	-	79.1	-	-

अग्रिम पंक्ति प्रदर्शन
Frontline Demonstrations

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Northern Hill Zone	
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Almora (Uttarakhand)	Dr. Anuradha Bhartiya
Northern Plain Zone	
Ludhiana (Punjab)	Dr. Harpreet Kaur Dr. Guriqbal Singh
Pantnagar (Uttarakhand)	Dr. S. C. Saxena Dr. Ajay Shrivastava
North Eastern Hill Zone	
Imphal (Manipur)	Dr. (Mrs.) Toijam Sunanda Devi
Medziphema (Nagaland)	Dr. Engrala Ao
Eastern Zone	
Raipur (Chattisgarh)	Dr. R. Lakpale
Ranchi (Jharkhand)	Dr. A. K. Singh
Dholi (Bihar)	Dr. Anil Pandey
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Sehore (Madhya Pradesh)	Dr. M. D.Vyas
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Amravati (Maharashtra)	Dr. M.S. Dandge
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Karda (Maharashtra)	Dr. Ravindra Kale
Devgadh Baria (Gujarat)	Dr. G. J. Patel
Southern Zone	
Pune (Maharashtra)	Dr. S.A. Jaybhay
Adilabad (Andhra Pradesh)	Dr. C. Sreedhar
Bangalore (Karnataka)	Dr. M.Chandrappa
Dharwad (Karnataka)	Dr. V.V Angadi/ Dr. Sangshetty Balkunde
Coimbatore (Tamil Nadu)	Dr. S.Sanbagavalli
Ugarkhurd (Karnataka)	Mr. Jagadish S.Patwardhan
Sangli (Maharastra)	Dr. Dilip Kathmale

Soybean Frontline Demonstration

Table 2.8.1

Final Progress Report of Frontline Demonstrations (FLDs) of SOYBEAN crop

Name and Postal address of the ICAR Crop Improvement Project with Pin code	**ICAR-Indian Institute of Soybean Research**, Khandwa Road, Indore-452 001, Madhya Pradesh 452001
For the Year	2017-18

S. No.	Name of implementing centre	Physical				Financial
		Allocation		Achievement		Allocation (Gross)
		Number of FLDs	Area in ha	Number of FLDs	Area in ha	
1	Almora	05	2.00	123	2.40	12000
2	Palampur	10	4.00	34	3.52	24000
3	Ludhiana	10	4.00	9	4.00	24000
4	Pantnagar	10	4.00	11	6.40	24000
5	Sehore	10	4.00	10	4.00	24000
6	Indore	50	20.00	50	20.00	120000
7	Kota	20	8.00	20	8.00	48000
8	Parbhani	25	10.00	25	10.00	60000
9	Amravati	20	8.00	20	8.00	48000
10	Pune	20	8.00	20	8.00	48000
11	Sangli	25	10.00	27	10.80	60000
12	Adilabad	10	4.00	10	4.00	24000
13	Bangaluru	10	4.00	10	4.00	24000
14	Dharwad	10	4.00	10	4.00	24000
15	Coimbatore	10	4.00	10	4.00	24000
16	Raipur	10	4.00	10	Fail	24000
17	Ranchi	10	4.00	20	8.00	24000
18	Imphal	15	6.00	15	6.00	36000
19	Medziphema	10	4.00	10	4.00	24000
20	Dholi (RAU)	15	6.00	15	6.00	36000
21	KVK, Karda	125	50.00	125	50.00	300000
22	Bharuch, Gujrat	15	6.00	13	6.00	36000
23	Devgarhbaria	10	4.00	10	4.00	24000
24	Bhawaniptna	10	4.00	00	NC	24000
25	Ugarkhurd	100	40.00	00	NC	240000
26	SOPA, Indore	275	110.00	275	110.00	660000
27	Soliddaridad, Bhopal	150	60.00	150	60.00	360000
28	Srijan, Rajasthan	110	44.00	110	44.00	264000
	Total	**1100**	**436.00**	**1142**	**399.12**	**2640000**

NC-Not conducted

Table 2.8.2
Details of category wise beneficiaries of frontline demonstrations (FLDs)

Name and Postal address of the ICAR Crop Improvement Project with Pin code	**ICAR-Indian Institute of Soybean Research**, Khandwa Road, Indore-452 001, Madhya Pradesh
For the Year	2017-18

S. no.	Centre	Man					Women					Total
		SC	ST	OBC	Gen.	Total	SC	ST	OBC	Gen.	Total	
1	Almora	6	-	-	25	**31**	25	-	-	67	**92**	**123**
2	Palampur	6	-	7	13	**26**	1	-	-	7	**8**	34
3	Ludhiana	-	-	-	9	**9**	-	-	-	-	**-**	9
4	Pantnagar	-	-	-	-	**11**	-	-	-	-	**-**	11
5	Sehore	-	1	7	1	**9**	-	-	1	-	**1**	10
6	Indore	5	3	35	6	**49**			1		**1**	50
7	Kota	1	4	15	-	**20**	-	-	-	-	**-**	20
8	Parbhani	1	1	2	16	**20**	-	2	3	-	**5**	25
9	Amravati	3		12	1	**16**	1	-	-	3	**4**	20
10	Pune	3	2	5	7	**17**	-	-	-	3	**3**	20
11	Sangli	2	3	4	18	**27**	-	-	-	-	**-**	27
12	Adilabad	1	-	3	4	**8**	2	-	-	-	**2**	10
13	Bangaluru	-	-	-	8	**8**	-	-	-	2	**2**	10
14	Dharwad	-	-	-	9	**9**	-	-	-	1	**1**	10
15	Coimbatore	-	-	5	-	**5**	-	-	5	-	**5**	10
16	Raipur	-	-	-	-	**-**	-	-	-	-	**-**	10
17	Ranchi	-	11	1	3	**15**	-	5	-	-	**5**	20
18	Imphal	4	9	-	-	**13**	2	-	-	-	**2**	15
19	Medziphema	-	7	-	-	**7**	2	1	-	-	**3**	10
20	Dholi (RAU)	-	-	-	15	**15**	-	-	-	-	**-**	15
21	KVK, Karda	2	8	83	26	**119**	-	2	4	-	**6**	125
22	Bharuch, Gujrat	-	12	-	-	**12**	-	1	-	-	**1**	13
23	Devgarhbaria	-	-	-	-	**0**	-	1	9	-	**10**	10
24	Bhawaniptna					**0**						0
25	Ugarkhurd					**0**					**0**	0
26	SOPA, Indore	10	20	148	72	**250**	-	1	19	5	**25**	275
27	Soliddaridad, Bhopal	19	1	85	42	**147**	1	-	1	1	**3**	150
28	Srijan, Rajasthan	-	-	-	-	**-**	38	32	39	1	**110**	110
	Total	63	82	412	275	**843**	72	45	82	90	**289**	**1132**
	Percentage	7.57	9.86	49.52	33.05	**74.46**	24.91	15.57	28.37	31.14	**25.55**	
	Total (men +women)	**135**	**127**	**494**	**365**							
	Percentage	**12.04**	**11.33**	**44.07**	**32.56**							

Table 2.8.3

Results of Frontline Demonstrations (FLDs) on WHOLE PACKAGE in SOYBEAN conducted at various locations on farmers fields

Name and Postal address of the ICAR Crop Improvement Project with Pin code	**ICAR-Indian Institute of Soybean Research**, Khandwa Road, Indore-452 001, Madhya Pradesh
For the Year	2017-18

S. No.	Implementing centre	No. of trial (1132)	Area (ha) (395.12)	Grain yield (kg/ha)		Gross Returns (Rs/ha)		Cost of cultivation (Rs/ha)		Net returns (Rs/ha)	
				IP*	FP**	IP	FP	IP	FP	IP	FP
1	Almora	123	2.40	1711	1211	82950	60519	44808	44808	31542	15711
2	Palampur	34	3.52	1404	1107	70199	55331	34350	29960	35849	25371
3	Ludhiana	09	4.00	1971	-	60116	-	29703	-	30413	-
4	Pantnagar	11	6.40	1383	1194	42173	36406	28000	25500	14173	10906
5	Sehore	10	4.00	1459	931	43758	27936	18164	16017	25594	11919
6	Indore	44	17.60	1785	1467	54456	44731	22600	21200	31856	23531
7	Kota	20	8.00	1656	1461	45940	40555	21069	18817	24871	21738
8	Parbhani	24	9.60	1733	1465	52857	44759	29717	28570	23140	16189
9	Amravati	20	8.00	1554	1460	47100	44246	27694	26473	19406	17773
10	Pune	20	8.00	2535	2053	72262	58500	32165	29894	40097	28606
11	Sangli	27	10.80	2730	2025	92987	39025	42143	39025	50844	29882
12	Adilabad	10	4.00	2269	1970	69192	60085	34411	30668	34781	29417
13	Bangaluru	10	4.00	2452	2093	73548	62802	28249	24811	45299	37991
14	Dharwad	08	3.20	1606	1158	48188	34734	34222	26788	13966	7946
15	Coimbatore	10	4.00	1412	1128	49410	39477	29908	26740	19502	12737
16	Ranchi	20	8.00	1551	1128	47312	34415	23398	19298	23914	15117
17	Imphal	13	5.20	1978	1177	118704	70611	33545	20450	85159	50161
18	Medziphema	10	4.00	1399	962	83946	57717	30599	22542	53347	35175
19	Dholi (RAU)	5	2.00	1694	1354	67760	54168	25963	24243	41797	29925
20	KVK, Karda	125	50.00	1836	1561	53920	45844	33386	32126	20533	13718
21	Bharuch, Gujrat	13	6.00	1695	1495	41537	36628	18938	17794	22598	18834
22	Devgarhbaria	10	4.00	1468	947	44040	28410	21930	16770	22110	16640
23	SOPA, Indore	275	110.00	1373	1045	41868	31886	16500	12000	25368	19886
24	Soliddaridad, Bhopal	150	60.00	1568	1368	47757	41726	19992	18174	27765	23552
25	Srijan, Rajasthan	110	44.00	2072	1550	58022	43387	21564	19440	36458	23947
	Mean			**1772**	**1388**	**60400**	**45579**	**28121**	**24671**	**32015**	**22361**
	T value			1.378E-10		5.71736E-06		5.88285E-06		1.16494E-06	

*IT= Improved technology, **FP= Farmer's practice, *** Significant at 0.05 probability level,

Table 2.8.4
Performance of SOYBEAN varieties under whole package in FLDs conducted at various locations on farmers fields

Name and Postal address of the ICAR Crop Improvement Project with Pin code	**ICAR-Indian Institute of Soybean Research**, Khandwa Road, Indore-452 001, Madhya Pradesh
For the Year	2017-18

S.No.	No. of trial	Variety	Grain yield (kg/ha)		Gross Returns (Rs/ha)		Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		BC Ratio	
			(IP)	(FP)	IP	FP	IP	FP	IP	FP	IP	FP
1	499	JS 95 60	1695	1373	49812	40391	20365	18007	29447	22384	2.06	1.89
2	105	MAUS 162	1774	1486	53123	44517	31477	30254	20503	13280	1.70	1.48
3	48	VL Soya 63	1936	1378	79391	56495	44058	43308	35333	13187	1.80	1.30
4	47	VL Soya 65	1280	816	90850	66110	46308	47808	24740	18302	1.96	1.38
5	46	JS 93 05	1985	1698	58538	50164	23949	21948	34589	28216	2.19	2.03
6	44	MAUS 158	1795	1542	53653	46086	31627	30442	22027	15644	1.70	1.52
7	42	JS 20 34	1347	1065	41067	32469	21140	18769	19928	13670	1.93	1.72
8	34	Harasoya	1404	1107	70199	55331	34350	29960	35849	25371	1.04	0.85
9	28	VL Soya 47	1917	1438	78610	58952	44058	43308	34552	15644	1.78	1.36
10	24	JS 20 29	1781	1465	54326	44683	22600	21200	31726	23483	2.40	2.11
11	15	RKS 18	2080	1527	88110	61503	31543	24252	56566	37276	2.30	2.14
12	15	KDS 344	2805	2068	95370	39025	42143	39025	53227	31270	2.26	1.80
13	14	JS 335	2313	1813	82980	62314	30653	24227	52327	38088	2.34	2.31
14	13	GJS 3	1695	1495	41537	36628	18938	17794	22598	18834	2.19	2.06
15	12	KDS 736	2637	1972	90023	39025	42143	39025	47880	28154	2.14	1.72
16	10	CO3	1412	1128	49410	39477	29908	26740	19502	12737	1.65	1.48
17	10	MACS 1188	2530	2025	72105	57712	31865	29865	40240	27847	2.26	1.93
18	10	NRC 37	1468	947	44040	28410	21930	16770	22110	16640	2.00	1.69
19	9	SL 958	1971	-	60116	-	29703	-	30403	-	2.02	-
20	8	DSb 21	1606	1158	48188	34734	34222	26788	13966	7946	1.41	1.30
21	8	MACS 1281	2563	2109	73031	59780	32348	29933	40683	30184	2.26	2.01
22	6	RVS2001-4	1410	879	42305	25973	18164	16017	24141	9956	2.33	1.62
23	5	MAUS 2	2503	2139	75096	64164	28373	24920	46723	39245	2.65	2.58
24	5	Bsara	2503	2164	76329	66008	35211	32065	41119	33943	2.17	2.06
25	5	Pusa 97 12	1694	1354	67760	54168	25963	24243	41797	29925	2.61	2.23
26	4	PS 1225	1310	1100	39955	33550	28000	25500	11955	8050	1.43	1.32
27	4	RVS 24	1531	1009	45938	30278	18164	16017	27774	14261	2.53	1.89
28	3	PS 1347	1383	1223	42191	37311	28000	25500	14191	11811	1.51	1.46
29	3	JS 97 52	1165	813	69920	48800	30406	21827	39514	26973	1.30	1.20
30	2	PS 1477	1410	1213	43005	36981	28500	25500	14505	11481	1.51	1.45
31	2	NRC 86	1316	957	40145	29193	20005	17229	20141	11964	2.01	1.70
32	1	PS 1042	1425	1225	43463	37363	28000	25500	15463	11863	1.55	1.47
33	1	PS 1368	1185	1100	36143	33550	28000	25500	8143	8050	1.29	1.32
34	1	MACS 1460	2100	1185	126000	71100	33545	19175	92455	51925	2.76	2.71

Table 2.8.5
Details of soybean cultivation cost under improved technology and farmers practice 2016-17

Centre		Land preparation	Seed & Sowing	ST & Ino'n	Fertili. & appli'n	Herb'e & appli'n	Bird watching	Hand weeding/ Iner-Culti'n	Insec'e & appli'n	Fungi'e &s appli'n	Harv-esting	Thres-hing	Any other	Total
Palampur	IT	4500	8880	45	4350	3435	960	-	-	-	3360	2880	5940	34350
	FP	4500	8000	-	-	-	-	4800	-	-	3360	2880	5940	29960
Ludhiana	IT	2925	4500	50	2639	2020	-	-	669	-	8320	8320	260	29703
Indore	IT	4200	4150	100	4750	1500	-	-	1700	-	4000	2200	-	22600
	FP	3600	4500	-	3200	2000	-	-	1700	-	4000	2200	-	21200
Kota	IT	3900	3940	213	2164	2054	-	-	1954	-	4824	2000	-	21069
	FP	3900	3900	-	-	2054	-	-	1954	-	4824	2000	-	18817
Parbhani	IT	4655	6700	626	4107	2190	-	990	3320	-	4135	2751	-	29717
	FP	4655	7500	-	2743	2190	-	990	4180	-	4135	2177	-	28570
Adilabad	IT	2350	5837	50	5135	4575	1500	3350	5050	1150	3100	2750	375-	36122
	FP	2350	6020	50	5218	2575	-	6750	4400	950	3100	2750	550	32413
Sangli	IT	5681	7781	618	6069	2470	-	2470	2964	-	4940	7410	1235	41637
	FP	5681	4841	371	5187	2470	-	2470	2964	2964	4940	5434	1235	38557
Pune	IT	8761	6669	183	4337	1704	-	3468	1252	-	3450	6261	726	32166
	FP	8788	6434	-	4567	1704	-	3540	899	-	3643	5054	726	11958
Bangaluru	IT	2500	4900	775	8275	2150	-	3000	1200	-	3000	2000	1000	28850
	FP	2500	4500	450	5900	2150	-	3000	1200	-	3000	2000	800	25500
Dharwad	IT	6780	4938	595	7075	1818	2544	4430	3040	-	1500	1500	-	34222
	FP	6780	5545	-	3450	-	2000	4800	668	800	1250	1250	-	26788
Coimbatore	IT	4500	6550	894	4994	1357	-	5000	565	-	3000	2000	1000	29908
	FP	4400	6050	-	2950	-	-	7000	740	800	2400	1400	1000	26740
Ranchi	IT	3000	5908	558	6368	1220	-	2196	488	-	1708	1952	-	23398
	FP	2400	5420	120	5228	-	-	2684	488	-	1220	1708	-	19298
Imphal	IT	3200	7950	300	6995	-	-	4500	450	450	1800	2700	5200	33545
	FP	2400	7450	-	2635	-	-	3375	225	-	1800	2700	1000	21585
Medziphema	IT	2500	5800	1291	7518	-	220	4400	440	-	1760	3300	5880	33109
	FP	2500	6260	-	-	-	-	3520	-	-	2640	2200	2500	20060
Bharuch	IT	5250	4825	359	2100	2075	-	-	400	-	3750		150	18909
	FP	5250	5375	-	1860	1600	-	-	-	-	3750		-	17835
Devgarhbaria	IT	7200	6550	420	3391	2080	-	-	670	-	1200	1200		22041
	FP	7200	1400	-	4716	-	-	1200	540	-	1200	1200		17456
Dholi	IT	2594	5958	541	4568	-	-	939	469	-	618	1015	-	25763
	FP	2594	6946	-	3619	-	-	939	469	-	618	1015	-	23843
Amravati	IT	4200	5500	240	4385	2250	-	2900	1824	-	3500	1710		26584
	FP	4200	5850	-	3275	2250	-	1800	1890	-	3500	1425		24961
Solidridad	IT	3582	4580	203	4805	1131	358	2717	882	-	3342	1650	-	23248
	FP	2470	7101	200	4310	1363	-	-	1324	-	3332	1618	-	20233
Mean	**IT**	**4330**	**5890**	**424**	**4949**	**1791**	**294**	**2124**	**1439**	**84**	**3227**	**2978**	**1146**	**28786**
Percentage		**15.04**	**20.46**	**1.47**	**17.19**	**6.22**	**1.02**	**7.38**	**5.00**	**0.003**	**11.21**	**10.35**	**3.98**	
Mean	**FP**	**4232**	**5727**	**66**	**3270**	**1131**	**111**	**2604**	**1313**	**306**	**2928**	**2167**	**764**	**23654**
Percentage		**17.89**	**24.21**	**0.003**	**13.82**	**4.78**	**0.005**	**11.01**	**5.55**	**1.29**	**12.38**	**9.16**	**3.23**	

Table 2.8.6
Productivity potentials and profitability of whole package technologies (2016-17)

State	Centre	No of Demon (1132)	Mean yield (kg/ha)		Increase in yield (%)	Gross Returns (Rs/ha)		Cost of cultivation (Rs/ha)		Additi-onal net returns (Rs/ha)	B:C ratio	
			IT	FP		IT	FP	IT	FP		IT	FP
Uttarakhand	Almora	123	1711	1211	43.63	82950	60519	44808	44808	22431	1.85	1.35
HP	Palampur	34	1404	1107	26.87	70199	55331	34350	29960	10478	1.04	0.85
Punjab	Ludhiana	9	1971	-	-	60116	-	29703	-	-	2.02	-
Uttarakhand	Pantnagar	11	1383	1194	15.30	42173	36406	28000	25500	5767	1.51	1.43
MP	Sehore	10	1459	931	36.36	43758	27936	18164	16017	13916	2.41	1.74
MP	Indore	44	1785	1467	22.73	54456	44731	22600	21200	9725	2.41	2.11
Rajasthan	Kota	20	1656	1461	13.28	45940	40555	21069	18817	5385	1.18	1.16
Maharashtra	Parbhani	24	1733	1465	18.10	52857	44759	29717	28570	8098	1.78	1.57
Maharashtra	Amravati	20	1540	1460	6.13	47100	44246	27694	26473	1633	1.70	1.67
Maharashtra	Pune	20	2535	2053	23.48	72262	58500	32165	29894	11491	2.25	1.95
Telengana	Adilabad	10	2269	1970	15.10	69192	60085	34411	30668	5364	2.01	1.96
Karnataka	Bangaluru	10	2452	2093	17.10	73548	62802	28249	24811	7308	2.61	2.53
Karnataka	Dharwad	8	1606	1158	38.00	48188	34734	34222	26788	13453	1.41	1.30
Tamilnadu	Coimbatore	10	1412	1128	25.20	49410	39477	29908	26740	9940	1.65	1.48
Maharashtra	Sangli	27	2730	2025	35.19	92987	39025	42143	39025	24080	2.21	1.77
Jharkhand	Ranchi	20	1551	1128	37.60	47312	34415	23398	19298	12896	1.02	0.78
Manipur	Imphal	13	1978	1177	69.02	118704	70611	33545	20450	3216	2.54	2.46
Meghalaya	Medziphema	10	1399	962	45.15	83946	57717	30599	22542	20424	1.75	1.55
MP	SOPA, Indore	275	1337	1045	31.39	41868	31886	16500	12000	9982	2.54	2.66
Rajasthan	Srijan	110	2072	1550	34.79	58022	43387	21564	19440	14635	1.73	1.28
Gujrat	Bharuch	13	1695	1495	13.40	41537	36628	18938	17794	3765	2.19	2.06
Maharashtra	KVK, Karda	125	1836	1561	17.80	53920	45844	33386	32126	8076	1.61	1.43
Bihar	Dholi	5	1694	1354	25.02	67760	54168	25963	24243	11872	2.61	2.23
MP	Soliddaridad,	150	1568	1368	16.55	47757	41726	19992	18174	6002	2.39	2.29
Gujrat	Devgarhbaria	10	1468	947	35.49	44040	28410	21930	16770	16770	2.0	1.69
	Mean		**1772**	**1388**	**27.61**	**60400**	**45579**	**28121**	**24671**	**10696**	**1.94**	**1.72**

कीट विज्ञान
Entomology

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Table 3.1 : Ent. 1 a. Seasonal incidence of insect-pests and their bio-control agents

SMW	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**
DELHI (Var. JS 335)																
YMV	YMV rating 8.00 on a scale of 1 – 9															
White fly	Infestation started right from its seedling stage (July end, 1.9 to 5.7 /leaf) and continued up to November (0.7 to 1.6 /leaf)															
PANTNAGAR (Var. Bragg)																
White fly / 3 leaf	--	--	--	0.3	0.6	0.6	3.4	3.9	1.4	2.8	1.5	0.2	0.8	0.2	0.1	0.1
Stem fly % Infest.	--	--	--	13.3	46.6	76.6	90.0	100	100	100	100	96.6	100	100	100	100
Stem fly % Stem tunnelling	--	--	--	3.7	11.1	21.0	19.5	20.3	22.5	22.8	31.4	16.1	35.2	33.0	37.7	38.8
Aphids / 3 leaf	--	--	--	0.0	0.0	0.2	0.0	8.3	11.3	14.4	10.7	2.7	1.3	0.5	3.6	2.8
Semilooper/m				0.0	0.6	2.6	2.3	3.0	1.3	9.2	3.7	0.4	0.0	0.2	0.0	0.0
% Defoliation	15.5 % at Flowering and 29.0 % at peak incidence															
Minor insect pests	Girdle beetle, *S. litura*, *S. obliqua*, bugs															
SEHORE (Var. JS 335)																
Blue beetle/m	1.3	2.3	0.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-
G. gemma/m	-	-	-	-	1.3	2.3	4.0	5.4	8.7	9.7	5.2	1.9	-	-	-	-
C. acuta/m	-	-	-	-	0.6	1.0	1.6	3.6	6.5	7.4	5.0	0.0	-	-	-	-
Defoliation (%)	15.5 % at flowering and 28.5 % at peak incidence															
Stem fly % Infest.	-	-	-	20.0	30.0	50.0	50.0	50.0	70.0	70.0	70.0	80.0	80.0	-	-	-
Stem fly % ST	-	-	-	13.60	20.71	26.08	29.66	27.11	33.27	26.75	28.62	27.52	22.25	-	-	-
Girdle beetle %	-	-	-	8.70	16.0	18.3	20.2	22.6	26.9	27.8	28.2	30.5	-	-	-	-
Minor insect pests	Gray weevil *(Myllocerus sp.*), Field crickets ,Tobacco caterpillar , Jassid and whitefly															
PARBHANI (Var. MAUS 2)																
O. brevis % Infestation		0.00	0.00	0.00	3.86	7.81	7.81	8.81	8.81	12.81	**13.81**					
Green semilooper larvae/mrl		0.00	0.00	0.00	0.00	0.80	0.80	1.20	0.60	**2.80**	1.00					
Defoliation (%)	At flowering -2.93 %, at Peak larval incidence – 7.69%.															
M. sojae	36.70 % stem tunnelling at physiological maturity															
Minor insect pests	*H. armigera, Condica illecta, Spodoptera litura*, Jassids, White fly, Grey Weevil															
AMARAWATI (Var. JS 335)																
Girdle beetle %	--	--	0.0	0.0	4.8	5.2	6.5	5.8	0.0	0.2	0.2	2.6	--	--	--	--
Stem fly % Infest.	--	--	0.0	0.0	30	30	30	60	60	60	60	60	70	--	--	--
Minor insect pests	Semilooper, *S. litura*, Girdle beetle, White fly, Jassids															

SMW	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**
KOTA (Var. JS 335)																
Girdle beetle (%)	-	-	3.33	6.67	6.67	10.00	13.33	16.67	20.00	23.33	23.33	-	-	-	-	-
C. acuta / m	-	-	-	1.67	2.00	3.0	3.67	4.33	3.00	1.33	0.33	-	-	-	-	-
S. litura / m	-	-	-	0.33	0.67	1.00	2.33	2.33	2.00	0.33	-	-	-	-	-	-
White fly/plant	-	-	2.33	3.00	3.33	3.67	3.33	3.67	3.67	2.33	2.00	-	-	-	-	-
Jassids/plant	-	-	2.33	2.67	3.00	4.00	3.33	4.00	3.00	2.00	1.33	-	-	-	-	-
Defoliation (%)	5.0 % foliage damage was observed at flowering whereas, 25.0% foliage damage at 36 (SMW).															
Minor insects	Grass hoppers, Field cricket, Hairy caterpillars & Grey weevil															
DHARWAD (Var. JS 335)																
S. litura /m	-	-	-	-	0.65	1.45	2.30	3.40	4.20	3.90	3.85	3.40	2.90	1.75	-	--
T. orichalcea/m	-	-	-	-	0.20	0.45	0.90	1.10	1.35	1.05	0.85	0.70	-	-	-	--
H. indicata Infestation (%)	-	-	-	-	8.55	11.50	15.75	18.90	22.15	24.60	20.17	18.75	17.20	-	-	--
O. brevis Infestation (%)	-	-	-	-	-	-	3.45	3.60	3.85	4.20	4.30	5.25	5.17	-	-	--
M. sojae Stem tunneling (%)	-	-	-	-	-	-	2.30	3.15	4.20	4.40	4.90	4.50	-	-	-	--
C. ptychora Pod damage (%)	-	-	-	-	-	-	-	-	-	30.15	33.25	37.50	40.20	44.50	43.75	--
% Defoliation	12.50% at Flowering and 27.50% at peak incidence of larvae															
Minor insect pests	*Spilarctia obliqua*, *H. armigera*, *N. viridula*, Myllocerous,															
BANGALORE (Var. Hardee)																
White fly /plant	--	--	--	--	--	4.21	5.36	1.14	0.12	--	--	--	--	--	--	--
A. modicella / m	--	--	--	--	--	--	--	1.87	4.62	8.28	3.14	1.54	0.17	--	--	--
S. litura/m	--	--	--	--	--	--	--	4.14	14.12	4.24	2.05	1.82	0.84	0.14	--	--
H. armigera/m	--	--	--	--	--	--	--	2.12	8.17	6.40	3.18	2.20	1.32	--	--	--
Stem fly (% Seedling mortality)	--	--	--	--	--	--	--	1.43	11.13	6.20	3.14	2.52	1.05	0.82	--	--
Termite damage %	--	--	--	--	--	--	--	--	--	--	2.13	1.16	2.82	3.02	1.10	--
Minor insects	*H. indicata*, Myllocerous weevil, Hairy caterpillar, Grass hoppers, Plant bug															
IMPHAL (Var. JS 335)																
S. obliqua/m	--	66.67	112.67	**150.00**	98.67	106.67	83.33	0.00	0.00	66.67	0.00	0.00	0.00	--	--	--
Leaf Weber /m	--	2.00	2.33	6.33	1.33	**7.33**	6.67	2.00	5.33	2.00	3.33	3.33	1.33	--	--	--
S. litura/m	--	0.00	0.00	4.00	4.67	4.00	**7.00**	4.00	4.67	5.67	5.33	5.00	0.00	--	--	--
Aphids / plant	--	0.00	0.00	18.20	12.40	19.20	30.40	**31.60**	28.80	14.00	6.20	0.00	0.00	--	--	--
Stem fly	16.67 % seedling mortality; 3.78 % stem tunnelling at physiological maturity															
% Defoliation	12.16 % at Flowering and 15.90 % at peak incidence															
Minor insect pests	*H.* armigera, white fly, t HRips, Bean bug															

PALAMPUR (Him Soya)																
Bean bug (no. of bugs/m row)	3.4	5.3	5.0	7.5	8.2	7.4	10.5	10.0	8.5	8.0	6.0	6.2	4.0	2.2	2.0	0
Girdle beetle (%)	0	0	0	4.2	4.6	4.5	5.8	8.2	8.3	10.4	7.5	7.2	6.0	0	0	0
Jassids (no. on 3 leaves /plant)	0	0	0	0	10.0	14.5	20	24.5	23.0	19.2	12.4	8.7	5.8	0	0	0
White flies (no. 3 leaves/plant)	0	0	0	5.8	12.3	12.5	16.4	28.0	25.4	20.0	19.5	14.5	8.4	4.5	0	0
Minor insect-pests	Heavy infestation (85-90%) of defoliators (mainly cabbage semilooper) was noticed during the last week of July, however, the infestation was not wide spread and it was restricted only in two fields (about 200sq. m area). Blister beetles, *Epicauta* species were also observed to feed on the flowering parts during first week of September															

Table 3.2 : Ent. 1 b. Seasonal incidence of bio- control agents

SMW	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
SEHORE																
Apanteles cocoons/m	1.3 cocoons /m during September 1st week															
B. bassiana infec.	40 % larval mortality during September 2nd week															
PARBHANI																
Lady bird beetle/m	--	0.00	0.20	0.00	0.00	0.00	0.00	0.20	0.40	0.40	0.00	--	--	--	--	--
AMRAVATI																
Lady bird beetle	--	--	0.0	0.0	2.0	2.0	1.0	2.0	0.0	2.0	--	--	--	--	--	--
KOTA	7.00% Parasitization of *Cotesia* was observed under laboratory condition, whereas maximum predatory bug (*Cantheconidia*) was observed on 36 SMW.															
DHARWAD																
Coccinelid beetle/mrl	--	--	--	--	--	0.70	1.10	1.30	1.00	0.60	0.50	--	--	--	--	--
C. carnea /mrl	--	--	--	--	--	0.55	0.70	0.80	0.70	0.65	0.40	--	--	--	--	--
Spiders/plant	--	--	--	--	--	--	0.30	0.40	0.60	0.50	0.30	--	--	--	--	--
Spined soldier bug/plant (*Podisus maculiventris*)	--	--	--	--	--	--	0.50	0.80	1.10	0.70	0.40	--	--	--	--	--
Apanteles sp. Parasitization (%)	--	--	--	--	--	--	5.00	4.50	6.50	7.00	4.75	--	--	--	--	--
N. rileyi Infection (%)	--	--	--	--	--	6.40	6.85	7.10	8.50	9.50	10.40	11.90	--	--	--	--
M. anisopliae Infection (%)	--	--	--	--	--	--	5.05	5.62	6.73	7.40	8.20	--	--	--	--	--
BANGALORE	Larval mortality due to *B. bassiana* and NPV infection 8 to 17 % under field conditions; and 6 to 10 % under laboratory conditions															
IMPHAL																
Spiders/plant	--	0.5	0.7	0.6	0.3	0.3	0.2	0.6	0.5	0.8	0.2	0.3	0.2	--	--	--
Coccinelids/plant	--	0.8	0.6	0.7	0.9	1.1	1.3	0.5	0.6	1.2	1.0	1.0	0.5	--	--	--
Larval mortality %	10 to 30 % larval mortality due to *N. rileyi* and *B. bassiana* infection during late July to mid September															
PALAMPUR	*Coccinellid* beetles 3-4 beetles per sq m															

Table 3.3 : Ent. 2 a. Field screening of AVT entries (Central Zone) for resistance to major insect-pests (Defoliators)

S. No.	Entry	Defoliators larvae / m			Reaction to Insect-Pest complex			Semiloopers		*S. litura* (larvae/m)
		Amrawati	Kota	Sehore	Amrawati	Kota	Sehore	Sehore	Indore	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.	**AMS-MB 5-18**	0.17 (0.79) **HR**	1.38 (1.37) **HR**	23.00 (28.68) S	**R-HY**	S-LY	**S-HY(T)**	1.66 (1.46) MR	-	-
2.	**DSb-32**	1.67 (1.78) LR	1.13 (1.27) **HR**	6.25 (14.36) **R**	S-LY	R-LY	S-LY	1.66 (1.45) MR	-	-
3.	**DS 3105**	0.67 (1.32) MR	-	11.25 (19.59)MR	**S-HY(T)**	-	S-LY	1.83 (1.50) MR	4.34 (2.08) MR	1.67 (1.29) MR
4.	**DS 3106**	1.17 (1.58) MR	-	11.75 (19.60)MR	R-LY	-	S-LY	3.16 (1.90) LR	4.67 (2.16) LR	3.00 (1.73) LR
5.	**JS 20-94**	1.17 (1.58) MR	1.75 (1.50) MR	17.00 (24.35)LR	S-LY	**R-HY**	R-LY	1.33 (1.34) MR	5.17 (2.24) LR	1.33 (1.15) MR
6.	**JS 20-116**	1.83 (1.85) LR	2.13 (1.62) MR	11.5 (19.82)MR	S-LY	**S-HY(T)**	**R-HY**	0.66 (1.07) **HR**	5.34 (2.31) LR	4.17 (2.01) S
7.	**KDS 921**	1.50 (1.72) LR	-	9.5 (17.90) MR	S-LY	-	S-LY	3.33 (1.95) LR	-	-
8.	**KDS 980**	1.17 (1.58) MR	2.75 (1.80) LR	23.00 (28.66)S	**S-HY(T)**	S-LY	S-LY	3.44 (1.99) LR	-	-
9.	**KDS 1045**	1.17 (1.58) MR	-	9.25 (17.71) MR	S-LY	-	S-LY	3.99 (2.11) LR	-	-
10.	**MACS 1520**	1.17 (1.58) MR	2.75 (1.80) LR	8.00 (16.43) MR	**S-HY(T)**	**S-HY(T)**	S-LY	2.66 (1.78)LR	4.17 (2.03) MR	0.00 (0.29) **HR**
11.	**NRC125**	1.50 (1.72) LR	-	16.0 (23.58)LR	S-LY	-	S-LY	0.99 (1.19) **R**	-	-
12.	**NRC126**	1.00 (1.50) MR	-	7.75 (16.16) MR	R-LY	-	S-LY	1.33 (1.34) MR	-	-
13.	**NRC- 127**	1.50 (1.72) LR	1.88 (1.54) MR	6.50 (14.55) **R**	S-LY	**R-HY**	R-LY	1.66 (1.45) MR	-	-
14.	**PS 1556**	1.50 (1.72) LR	-	7.75 (16.15) MR	S-LY	-	S-LY	0.99 (1.19) **R**	-	-
15.	**PS 1572**	1.50 (1.71) LR	-	8.75 (17.19) MR	R-LY	-	S-LY	0.33 (0.98) **HR**	-	-
16.	**RSC 10-46**	2.00 (1.91) LR	1.88 (1.54) MR	9.50 (18.44) MR	S-LY	S-LY	S-LY	1.83 (1.52) MR	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
17.	**RSC 10-52**	1.00 (1.49) MR	2.50 (1.73) LR	16.50 (23.96) LR	**S-HY(T)**	S-LY	**R-HY**	4.16 (2.15) S	-	-
18.	**RSC 10-70**	2.00 (1.91) LR	3.88 (2.09) HS	21.25 (26.95) S	S-LY	R-LY	R-LY	5.33 (2.41) HS	-	-
19.	**RSC 10-71**	1.50 (1.72) LR	2.88 (1.84) LR	8.75 (17.13) MR	S-LY	S-LY	R-LY	3.00 (1.87)LR	-	-
20.	**RVS 2007-6**	1.00 (1.49) MR	2.38 (1.70) MR	7.75 (16.16) MR	S-LY	S-LY	**R-HY**	3.66 (2.02)LR	-	-
21.	**RVS 2009-9**	1.17 (1.58) MR	1.88 (1.54) MR	8.20 (16.54) MR	S-LY	S-LY	R-LY	1.66 (1.46)MR	-	-
22.	**RVS 2010-1**	1.33 (1.65) LR	2.25 (1.66) MR	9.00 (17.71) MR	R-LY	**S-HY(T)**	**S-HY(T)**	1.00 (1.22) **R**	-	-
23.	**SL 1028**	2.00 (1.91) LR	-	7.50 (15.89) MR	**S-HY(T)**	-	S-LY	0.99 (1.21) **R**	-	-
24.	**SL 1974**	1.50 (1.72) LR	-	6.15 (14.14) **R**	-	-	R-LY	1.33 (1.35)MR	-	-
25.	**SL 1104**	1.33 (1.65) LR	-	7.75 (16.16) MR	S-LY	-	S-LY	1.33 (1.35)MR	-	-
26.	**VL Soya 59**	-	2.88 (1.84) LR	-	-	S-LY	-	-	3.83 (1.95) MR	1.67 (1.26) MR
27.	**VL Soya 63**	-	2.13 (1.62) MR	-	-	S-LY	-	-	4.17 (2.04) MR	1.84 (1.35) LR
28.	**VL Soya 89**	-	4.75 (2.29) HS	8.50 (18.45) MR	-	S-LY	S-LY	0.83 (1.13) **R**	4.67 (2.15) LR	0.67 (0.79) MR
29.	**VLS - 8**	1.67 (1.78) LR	-	-	-	-	-	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
30.	**JS 335 (C)**	2.50 (2.08) LR	3.25 (1.94) S	20.50 (26.92) S	S-LY	**S-HY(T)**	R-LY	4.83 (2.29) S	5.00 (2.24) LR	4.50 (2.12) S
31.	**JS 20-29 (C)**	-	-	-	-	-	-	-	-	-
32.	**JS 20-34 (C)**	1.83 (1.85) LR	1.88 (1.54) MR	9.25 (17.71) MR	S-LY	R-LY	**S-HY(T)**	3.49 (1.99) LR	-	-
33.	**JS 20-98 (C)**	-	-	11.00 (19.60) MR	-	-	**S-HY(T)**	2.83 (1.81) LR	-	-
34.	**JS 93-05 (C)**	1.17 (1.58) MR	2.88 (1.84) LR	23.00 (28.66) S	R-HY	S-LY	S-LY	2.33 (1.44) LR	-	-
35.	**JS 95-60(C)**	0.83 (1.15) **R**	2.38 (1.70) MR	21.25 (26.95) S	S-LY	S-LY	S-LY	4.83 (2.29) S	-	-
36.	**JS 97-52 (C)**	-	3.75 (2.06) HS	25.20 (29.45) HS	-	R-HY	S-LY	4.83 (2.29) S	-	-
37.	**NRC 86 (C)**	0.83 (1.41) MR	2.13 (1.62) MR	18.00 (25.11) LR	**S-HY(T)**	S-LY	S-LY	1.99 (1.56) MR	-	-
38.	**RKS-45 (C)**	-	2.38 (1.69) MR	-	-	S-LY	-	-	-	-
39.	**RVS 2001-4(C)**	-	-	11.00 (19.60) MR	-	-	R-LY	1.83 (1.52) MR	-	-
40.	**SL 688 (C)**	-	-	16.50 (23.97) LR	-	-	**S-HY(T)**	1.66 (1.45) MR	-	-
41.	**VLS 63 (C)**	1.33 (1.65) LR	-	7.75 (16.14) MR	-	-	R-LY	2.33 (1.48) LR	-	-
42.	**VLS 59 (C)**	1.50 (1.71) LR	-	19.00 (25.84) S	S-LY	-	S-LY	1.33 (1.34) MR	-	-
	SE ±	**(0.16)**	**(0.05)**	**(1.72)**	**-**	**-**	**-**	**(0.16)**	**(0.20)**	**(0.20)**
	CD at 5 %	**(0.46)**	**(0.22)**	**(4.93)**	**-**	**-**	**-**	**(0.50)**	**(0.65)**	**(0.67)**

Table 3.4 : Ent. 2 b. Field screening of AVT entries (Central Zone) for resistance to major insect-pests (STEM BORERS)

S. No.	Entry	% Stem tunnelling due to stem fly				Girdle beetle infestation (%)					Girdle beetle damage (%)
		Amrawati	Parbhani	Sehore	Indore	Amrawati	Parbhani	Kota	Sehore	Indore	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1.	AMS-MB 5-18	2.50 (0.11) **HR**	34.33 (35.84)*HS	8.17 (16.58) **R**	-	1.50 (1.20) **HR**	9.89 (18.31)MR	5.38 (13.40) **HR**	6.13 (14.24)MR	-	-
2.	DSb-32	35.00 (0.63) MR	23.42 (28.93) **R**	27.72 (31.68) MR	-	9.51 (3.08) HS	5.81 (13.90) MR	5.25 (13.24) **HR**	2.17 (5.99) **HR**	-	-
3.	DS 3105	65.00 (0.94) HS	35.49 (36.56) HS	22.54 (28.31) MR	37.12 (37.49) HS	6.58 (2.56) S	5.87 (14.00) MR	-	4.88 (12.72)MR	0.59 (4.35) MR	0.20 (3.05) MR
4.	DS 3106	25.00 (0.52) MR	36.90 (37.39) HS	10.77 (19.03) **R**	41.92 (40.34) HS	7.28 (2.70) S	7.77 (15.99) MR	-	4.55 (12.25)MR	0.19 (3.36) **R**	0.00 (1.22) MR
5.	JS 20-94	45.00 (0.74) LR	26.84 (31.19) MR	19.18 (22.95) MR	46.30 (42.87) HS	2.66 (1.63) MR	7.69 (16.00) MR	6.25 (14.47) **HR**	4.08 (11.53)MR	1.08 (4.86) MR	0.54 (3.42) MR
6.	JS 20-116	55.00 (0.84) S	26.86 (31.20) MR	25.06 (29.94) MR	22.67 (28.41) LR	2.73 (1.65) MR	15.96 (23.54) LR	8.63 (17.07) **HR**	4.16 (11.70)MR	2.67 (9.97) LR	0.83 (5.23) LR
7.	KDS 921	45.00 (0.74) LR	28.81 (32.45)LR	37.54 (37.45) LR	-	5.75 (2.40) LR	9.34 (17.52) MR	-	37.54 (37.45) LR	-	-
8.	KDS 980	40.00 (0.68) LR	26.41 (30.92)MR	45.48 (42.39)LR	-	5.87 (2.42)LR	13.17 (21.25)LR	10.13 (18.55) **R**	2.27 (6.13) **HR**	-	-
9.	KDS 1045	35.00 (0.63) MR	24.50 (29.66) MR	36.03 (36.62)LR	-	1.79 (1.33) **R**	5.83 (13.94) MR	-	3.83 (11.22)MR	-	-
10.	MACS 1520	25.00 (0.52) MR	26.51 (30.98) MR	19.60 (26.12)MR	43.56 (41.30) HS	3.93 (1.98)MR	9.84 (18.20) MR	9.88 (18.31) **R**	4.88 (12.72)MR	3.86 (13.06) HS	1.45 (9.36) S
11.	NRC125	45.00 (0.74) LR	31.08 (33.87) LR	6.90 (14.89) **R**	-	1.82 (1.34) **R**	5.90 (14.01) MR	-	2.50 (6.46) **R**	-	-
12.	NRC126	10.00 (0.32) **HR**	24.85 (29.89) MR	15.91 (22.58)MR	-	2.58 (1.60) MR	12.63 (20.79) LR	-	7.04 (15.21)LR	-	-
13.	NRC- 127	25.00 (0.52) MR	24.40 (29.58) MR	8.17 (16.58) **R**	-	7.61 (2.76) HS	8.51 (16.92) MR	5.13 (13.08) **HR**	9.10 (17.50)LR	-	-
14.	PS 1556	60.00 (0.89) HS	24.43 (29.60) MR	19.01 (25.74)MR	-	2.75 (1.66) MR	12.55 (20.72) LR	-	2.17 (5.99) **HR**	-	-
15.	PS 1572	45.00 (0.74) LR	47.95 (43.81) HS	9.50 (17.73) **R**	-	1.94 (1.38) **R**	7.43 (15.80) MR	-	3.96 (11.33)MR	-	-
16.	RSC 10-46	25.00 (0.52) MR	15.16 (22.90) **HR**	22.54 (28.31)MR	-	2.63 (1.62) MR	7.21 (15.56) MR	5.63 (13.72) **HR**	7.26 (15.44)LR	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
17.	**RSC 10-52**	35.00 (0.63) MR	20.11 (26.63) **HR**	-	-	2.58 (1.60)MR	11.35 (19.29) LR	10.88 (19.25) MR	-	-	-
18.	**RSC 10-70**	15.00 (0.39) **HR**	16.32 (23.75) **HR**	17.93 (24.70)MR	-	2.75 (1.66) MR	5.65 (13.18) MR	11.88 (20.16) LR	6.71 (14.72)LR	-	-
19.	**RSC 10-71**	25.00 (0.52) MR	20.72 (27.07) **HR**	27.47 (31.52)MR	-	4.31 (2.07) LR	14.57 (22.43) LR	14.88 (22.69) HS	7.27 (12.39)MR	-	-
20.	**RVS 2007-6**	25.00 (0.52) MR	14.07 (22.02) **HR**	13.53 (21.35)MR	-	1.82 (1.34) **R**	9.34 (17.76) MR	15.75 (23.38) HS	2.17 (5.99) **HR**	-	-
21.	**RVS 2009-9**	35.00 (0.63) MR	20.69 (26.98) **HR**	24.51 (29.62)MR	-	4.08 (2.02) MR	11.16 (19.24) LR	15.75 (23.38) HS	8.88 (17.46)LR	-	-
22.	**RVS 2010-1**	55.00 (0.84) S	15.11 (22.77) **HR**	8.17 (16.58) **R**	-	2.40 (1.55) MR	13.18 (21.04) LR	15.50 (23.18) HS	2.38 (6.26) **R**	-	-
23.	**SL 1028**	35.00 (0.63) MR	35.50 (36.55) HS	19.18 (22.95)MR	-	0.44 (0.47) **HR**	8.97 (17.42) MR	-	4.88 (12.72)MR	-	-
24.	**SL 1104**	55.00 (0.84) S	34.39 (35.89) HS	19.18 (22.95)MR	-	4.49 (2.12) LR	21.70 (27.61)S	-	4.76 (8.98)MR	-	-
25.	**SL 1074**	-	33.83 (35.55) HS	23.46 (28.33)MR	-	3.17 (1.78) MR	8.27 (16.62) MR	-	4.44 (11.97)MR	-	-
26.	**VLS 8**	-	-	-	-	2.38 (1.54) MR	-	-	-	-	-
27.	**VLS 59**	-	-	-	51.11 (45.64) HS	-	-	13.25 (21.35) HS	-	2.07 (6.45) MR	2.07 (6.45) LR
28.	**VLS 63**	-	-	-	45.21 (42.25) HS	-	-	14.13 (22.08) HS	-	2.80 (8.32) LR	1.40 (6.27) LR
29.	**VLS 89**	-	38.72 (38.45) HS	24.50 (29.33)MR	50.64 (45.37) HS	-	16.78 (24.17) LR	16.13 (23.68) HS	4.76 (12.45)MR	1.00 (5.87) MR	0.67 (5.34) LR

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
30.	**AMS-MB 5-19 (C)**	-	29.99 (33.20) LR	-	-	-	9.65 (18.05) MR	-	-	-	-
31.	**JS 335 (C)**	75.00 (1.05) HS	41.23 (39.94) HS	33.43 (35.22)LR	51.44 (45.83) HS	15.76 (3.96) HS	11.30 (19.59) LR	14.00 (21.97) HS	14.65 (12.39) LR	3.70 (10.30) LR	1.06 (5.08) LR
32.	**JS 20-34 (C)**	65.00 (0.94) HS	40.66 (39.60) HS	35.05 (36.17)LR	-	12.99 (3.60) HS	4.38 (11.59) MR	15.50 (23.18) HS	4.77 (12.59)MR	-	-
33.	**JS 20-53 (C)**	-	23.76 (29.65) MR	-	-	-	16.28 (23.60) LR	-	-	-	-
34.	**JS 20-71 (C)**	-	22.03 (27.98) **HR**	-	-	-	21.14 (27.36)S	-	-	-	-
35.	**JS 20-89 (C)**	-	22.66 (28.42) **R**	-	-	-	9.84 (18.17) LR	-	-	-	-
36.	**JS 20-96 (C)**		22.76 (28.49) **R**		-		17.27 (24.34.) LR	-	-	-	-
37.	**JS 20-98 (C)**	-	22.77 (28.49) **R**	25.16 (29.98) MR	-	-	12.96 (21.05) LR	-	7.38 (15.48) LR	-	-
38.	**JS 2003-8 (C)**	-	26.85 (31.20) MR	-	-	-	13.07 (20.95) LR	-	-	-	-
39.	**JS 93-05 (C)**	35.00 (0.63) MR	23.54 (29.01) **R**	51.93 (46.09)S	-	2.34 (1.50) **R**	8.84 (17.23) MR	13.38 (21.45) HS	19.17 (25.92) S	-	-
40.	**JS 95-60(C)**	40.00 (0.68) LR	38.93 (38.59) HS	32.37 (34.54) LR	-	9.73 (3.12) HS	6.61 (14.45) MR	16.38 (23.87) HS	12.17 (20.13) LR	-	-
41.	**JS 97-52 (C)**	-	26.38 (30.89) MR	59.22 (50.33) HS	-	-	5.28 (13.27) MR	10.88 (19.25) MR	17.14 (24.74) S	-	-
42.	**KDS 753(C)**	-	21.09 (27.33) **HR**	-	-	-	4.69 (12.47) MR	-	-	-	-
43.	**KDS 869 (C)**	-	22.93 (28.56) **R**	-	-	-	11.22 (19.45) LR	-	-	-	-
44.	**MACS 1201 (C)**	-	31.53 (34.15) LR	-	-	-	9.04 (17.25) MR	-	-	-	-
45.	**MACS 1340 (C)**	-	22.59 (28.37) **R**	-	-	-	9.78 (16.30) MR	-	-	-	-
46.	**MACS 1410 (C)**	-	25.48 (30.29) MR	-	-	-	4.88 (12.75) MR	-	-	-	-
47.	**MACS 1460 (C)**	-	28.31 (32.13) LR	-	-	-	7.26 (15.18) MR	-	-	-	-
48.	**MAUS 2 (C)**	-	35.04 (36.29) HS	-	-	-	21.98 (27.78) S	-	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
49.	**MAUS 158 (C)**	-	31.87 (34.36)LR	-	-	-	10.19 (18.56) MR	-	-	-	-
50.	**NRC 86 (C)**	20.00 (0.45) **R**	27.79 (31.80) MR	26.22 (30.64) MR	-	3.87 (1.96) MR	8.08 (16.51) MR	9.75 (18.19) **HR**	8.88 (17.26) LR	-	-
51.	**NRC 94 (C)**	-	14.77 (22.59) **HR**	-	-	-	18.69 (25.50) LR	-	-	-	-
52.	**NRC 117 (C)**	-	26.66 (31.08) MR	-	-	-	15.78 (23.12) LR	-	-	-	-
53.	**PS1092 (C)**	-	34.41 (35.91) HS	-	-	-	18.02 (24.95) LR	-	-	-	-
54.	**PS 1347 (C)**	-	31.85 (34.34) LR	-	-	-	8.55 (16.53) MR	-	-	-	-
55.	**RKS-45 (c)**	-	-	-	-	-	-	10.13 (18.55) **R**	-	-	-
56.	**RKS 18 (C)**	-	35.46 (36.54) HS	-	-	-	7.22 (15.55) MR	-	-	-	-
57.	**RVS 2001-4(C)**	-	-	15.37 (22.92) MR	-	-	-	-	4.76 (12.45) MR	-	-
58.	**RVS 2001-18 (C)**	-	31.38 (34.05) LR	-	-	-	3.89 (11.25) **R**	-	-	-	-
59.	**RVS 2008-24 (C)**	-	30.82 (33.70) LR	-	-	-	-	-	-	-	-
60.	**SL 688 (C)**	-	-	24.05 (29.24) MR	-	-	-	-	7.03 (15.10) LR	-	-
61.	**VLS 63 (C)**	-	40.39 (39.45) HS	23.46 (28.33) MR	-	5.48 (2.30) LR	8.79 (17.24) MR	-	10.34 (18.66) LR	-	-
62.	**VLS 59 (C)**	55.00 (0.84) S	48.59 (44.18) HS	22.17 (27.81) MR	-	8.72 (2.95) HS	6.81 (15.07) MR	-	6.51 (14.51) MR	-	-
63.	**DSb 28-3 (C)**	-	20.69 (27.04) **HR**	-	-	-	14.39 (22.17) LR	-	-	-	-
	SEm ±	**(0.056)**	**(0.96)**	**(4.98)**	**(1.84)**	**(0.17)**	**(2.63)**	**(0.22)**	**(2.99)**	**(1.15)**	**(1.27)**
	CD (P=0.05)	**(0.16)**	**(2.67)**	**(13.84)**	**(5.99)**	**(0.51)**	**(7.28)**	**(0.92)**	**(6.52)**	**(3.75)**	**(4.15)**

Table 3.5 : Ent. 2 c. Field screening of AVT entries (Northern Plain Zone) for resistance to major insect-pests

S.No.	Entry	Stem tunnelling due to Stem fly (%)		Defoliators larvae / m	Bugs / plant	White fly / 3 leaves	Aphids	Defoliators /m	White fly	YMV (1-9 Scale)	Reaction to Pest Complex	
		Pantnagar	Delhi	Pantnagar					Ludhiana	Delhi		Pantnagar
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1.	AMS-MB5-18	38.54 (38.37)HS	-	8.25 (16.57) **R**	0.50 (0.71) MR	2.67 (1.63) **HR**	4.17 (2.04) **HR**	3.00 (1.73) **HR**	-	-	-	R-LY
2.	DS 3105	40.57 (39.56)HS	-	22.69 (28.44)MR	0.75 (0.85) LR	7.50 (2.74) LR	11.19 (3.34) LR	8.25 (2.87) LR	1.10 (1.44)	-	-	R-LY
3.	DS3106	45.96 (42.68)HS	36.75 (30.52)	33.60 (35.44)MR	1.00 (1.00) S	7.02 (2.65) LR	39.66 (6.29) S	10.25 (3.23) S	5.80 (2.60)	1	S-LY	**S-HY(T)**
4.	DSb32	45.06 (39.24)HS	46.99 (43.27)	19.03 (25.86)MR	1.25 (1.11) S	3.00 (1.73) **HR**	7.35 (2.71) MR	7.25 (2.69) LR	-	7	S-LY	**S-HY(T)**
5.	JS 20-94	43.78 (41.43)HS	49.14 (44.50)	28.28 (32.12)MR	0.75 (0.85) LR	5.85 (2.42) MR	8.85 (2.98) MR	10.50 (3.24) S	0.33 (1.14)	7	S-LY	**S-HY(T)**
6.	JS 20-116	22.24 (28.12)MR	17.5 (23.89)	17.55 (24.76)MR	0.00 (0.00) **HR**	5.67 (2.38) MR	7.35 (2.71) MR	6.25 (2.50) MR	-	7	R-LY	**R-HY**
7.	MACS 1520	47.06 (43.31)HS	44.41 (41.63)	20.96 (27.24)MR	0.75 (0.85) LR	5.85 (2.42) MR	3.84 (2.37)R	7.25 (2.69) LR	-	9	R-LY	R-LY
8.	NRC 125	36.65 (37.25)HS	21.10 (21.27)	23.54 (29.02)MR	0.75 (0.85) LR	6.69 (2.58) LR	3.66 (1.91) **HR**	9.25 (3.04) S	-	7	S-LY	R-LY
9.	NRC 126	58.41 (49.84)HS	21.59 (21.55)	26.77 (31.15)MR	1.25 (1.11) S	4.50 (2.12) HR	12.51 (3.54) LR	10.0 (3.16) S	0.30 (1.13)	7	S-LY	S-LY
10.	NRC 127	48.39 (44.08)HS	53.02 (46.82)	29.28 (32.75)MR	0.75 (0.85) LR	6.00 (2.45) MR	28.35 (5.32) S	10.50 (3.24) S	2.55 (1.90)	7	S-LY	**R-HY**
11.	PS 1556	69.58 (56.53)HS	-	18.04 (25.12)MR	0.25 (0.50) **R**	5.34 (2.31) **R**	9.69 (3.11) LR	5.50 (2.34) MR	-	-	-	S-LY
12.	PS 1572	50.85 (45.49)HS	24.46 (23.20)	15.62 (23.27)MR	0.25 (0.50) **R**	5.34 (2.31) **R**	6.66 (2.58) MR	5.25 (2.29) MR	4.87 (2.42)	3	S-LY	R-LY
13.	RSC 10-46	41.28 (39.98)HS	-	27.84 (31.85)MR	0.25 (0.50) **R**	5.52 (2.35) MR	2.49 (1.58) **HR**	11.00 (3.31) S	-	-	-	S-LY
14.	RSC 10-52	41.84 (40.30)HS	-	17.87 (25.00)MR	0.75 (0.85) LR	6.18 (2.49) MR	5.16 (2.27) R	7.00 (2.64) LR	-	-	-	S-LY
15.	RSC 10-70	48.69 (44.25)HS	22.67 (22.17)	5.31 (13.31) **R**	0.25 (0.50) **R**	7.17 (2.68) LR	14.01 (2.53) MR	2.00 (1.41) **HR**	-	7	S-LY	S-LY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
16.	**RSC 10-71**	40.03 (39.25)HS	-	18.79 (25.63)MR	0.25 (0.50) **R**	9.69 (3.11) S	6.69 (2.59) MR	6.75 (2.59) LR	-	-	-	R-LY
17.	**RVS 2007-6**	24.42 (29.61)HS	21.7 (21.61)	24.28 (29.46)MR	0.00 (0.00) **HR**	5.52 (2.35) MR	0.51 (0.71) **HR**	9.00 (2.99) S	-	9	S-LY	**S-HY(T)**
18.	**RVS 2009-9**	38.94 (38.61)HS	15.01 (17.62)	16.18 (23.71)MR	0.00 (0.00) **HR**	5.49 (2.34) MR	2.67 (1.63) **HR**	5.50 (2.34) MR	-	7	S-LY	S-LY
19.	**RVS 2010-1**	32.45 (34.72)HS	22.65 (22.16)	6.02 (14.19) **R**	0.00 (0.00) **HR**	6.99 (2.64) LR	3.66 (1.91) **HR**	2.25 (1.50) **HR**	-	9	S-LY	S-LY
20.	**SL 1028**	41.83 (40.30)HS	20.87 (26.61)	10.97 (19.34) **R**	0.00 (0.00) **HR**	9.84 (3.14) S	10.50 (3.24) LR	4.25 (2.06) **HR**	1.45 (1.54)	1	**R-HY**	S-LY
21.	**SL 1074**	43.86 (41.47)HS	67.16 (55.04)	10.01 (18.43) **R**	0.00 (0.00) **HR**	6.69 (2.58) LR	15.18 (3.90) S	4.00 (2.00) **HR**	1.05 (1.43)	1	**R-HY**	R-LY
22.	**SL 1104**	40.12 (39.30)HS	27.81 (31.18)	32.50 (34.75)MR	0.00 (0.00) **HR**	4.50 (2.11) **HR**	18.84 (4.34) S	11.25 (3.35) S	3.10 (2.01)	1	S-LY	S-LY
23.	**VLS 89**	43.04 (41.00)HS	52.83 (46.67)	10.71 (18.98)**R**	0.00 (0.00) **HR**	8.16 (2.86) S	13.68 (3.70) S	4.50 (2.11) **R**	-	7	S-LY	S-LY
24.	**JS 20-34 (c)**	53.10 (46.78)HS	-	17.60 (24.79)MR	0.75 (0.85) LR	7.68 (2.77) LR	20.01 (4.47) S	6.50 (2.55) LR	-	-	-	S-LY
25.	**JS 335 (c)**	49.17 (44.52)HS	-	9.89 (18.32) **R**	0.00 (0.00) **HR**	6.51 (2.55) MR	4.17 (2.04) **R**	4.00 (2.00) **HR**	-	-	-	R-LY
26.	**JS 93-05 (c)**	35.04 (36.29)HS	-	21.01 (27.28)MR	0.00 (0.00) **HR**	6.00 (2.45) MR	9.89 (3.15) LR	7.50 (2.74) LR	-	-	-	R-LY
27.	**JS 97-52 (c)**	50.35 (45.20)HS	-	11.48 (19.77) **R**	0.00 (0.00) **HR**	7.02 (2.65) LR	17.52 (4.18) S	4.75 (2.17) **R**	-	-	-	R-LY
28.	**PS 1092 (c)**	56.51 (48.74)HS	0 (2.02)	16.66 (24.07)MR	0.00 (0.00) **HR**	7.68 (2.77) LR	21.69 (4.66) S	6.00 (2.45) MR	4.45 (2.33)	-	-	R-LY
29.	**PS 1347 (c)**	51.92 (46.09)HS	40.81 (33.32)	13.84 (21.84)MR	0.25 (0.50) **R**	7.50 (2.74) LR	15.99 (4.00) S	4.75 (2.18) **R**	2.87 (1.97)	1	S-LY	R-LY
30.	**PUSA 97-12 (c)**	45.03 (43.21)HS	19.24 (20.18)	18.97 (25.82)MR	0.00 (0.00) **HR**	6.84 (2.62) LR	18.66 (4.32) S	6.50 (2.55) LR	2.54 (1.88)	3	S-LY	S-LY
31.	**RKS 18 (c)**	42.42 (40.63)HS	-	22.88 (28.57)MR	0.00 (0.00) **HR**	7.17 (2.67) LR	6.15 (2.48) MR	8.00 (2.82) LR	4.60 (2.36)	-	-	S-LY
32.	**SL 688 (c)**	53.78 (47.16)HS	38.68 (38.30)	22.60 (28.36)MR	0.50 (0.71) MR	6.33 (2.52) MR	11.34 (3.37) LR	7.75 (2.78) LR	1.95 (1.70)	3	S-LY	S-LY
33.	**VLS 59 (c)**	43.27 (41.12)HS	39.43 (38.89)	15.55 (23.21)MR	0.00 (0.00) **HR**	6.84 (2.62) LR	11.52 (3.39) LR	5.25 (2.29) MR	-	5	S-LY	S-LY
34.	**VLS 63 (c)**	67.01 (54.94)HS	68.89 (56.10)	14.04 (21.99)MR	0.00 (0.00) **HR**	5.01 (2.24) MR	10.68 (3.27) LR	5.00 (2.23) MR	-	-	-	S-LY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
35.	**JS 20-69 (c)**	59.51 (50.48)HS	-	16.34 (23.83)MR	1.00 (1.00) S	9.18 (3.03) S	3.18 (1.78) **HR**	5.50 (2.34) MR	-	-	-	**S-HY(T)**
36.	**JS 20-71 (c)**	62.00 (51.94)HS	-	15.90 (23.50)MR	0.75 (0.85) LR	10.17 (3.19) S	12.36 (3.52) LR	5.25 (2.29) MR	-	-	-	**R-HY**
37.	**JS 20-87 (c)**	52.70 (46.54)HS	-	15.23 (22.97)MR	0.00 (0.00) **HR**	7.68 (2.77) LR	6.99 (2.64) MR	5.25 (2.29) MR	-	-	-	**S-HY(T)**
38.	**JS 20-89 (c)**	55.91 (48.39)HS	-	19.85 (26.45)MR	0.00 (0.00) **HR**	8.01 (2.83) S	11.34 (3.36) LR	6.75 (2.59) LR	-	-	-	**R-HY**
39.	**JS 20-98 (c)**	49.02 (44.43)HS	-	27.37 (31.54)MR	0.00 (0.00) **HR**	10.02 (3.17) S	9.84 (3.14) LR	9.00 (3.00) S	-	-	-	**R-HY**
40.	**JS 95-60 (c)**	-	-	-	-	-	-	-	3.29 (2.05)	-	-	-
41.	**KDS 726 (c)**	44.36 (41.76)HS	-	18.85 (25.73)MR	0.25 (0.50) **R**	6.84 (2.62) LR	3.00 (1.73) **HR**	6.25 (2.50) MR	-	-	-	**R-HY**
42.	**KDS 921 (c)**	-	66.37 (54.75)	-	-	-	-	-	-	-	-	-
43.	**KDS 980 (c)**	-	0 (2.02)	-	-	-	-	-	-	-	-	-
44.	**KDS- 1045 (c)**	-	70.9 (57.37)	-	-	-	-	-	-	-	-	-
45.	**PS 1543 (c)**	43.59 (41.31)HS	-	20.29 (26.77)MR	0.00 (0.00) **HR**	6.84 (2.62) LR	4.17 (2.04) **HR**	6.75 (2.60) LR	-	-	-	R-LY
46.	**PS 1550 (c)**	50.88 (45.50)HS	-	28.48 (32.25)MR	0.25 (0.50) **R**	7.02 (2.65) LR	11.01 (3.32) LR	10.00 (3.16) S	-	-	-	S-LY
47.	**SL 955 (c)**	54.78 (47.74)HS	-	19.15 (25.95)MR	0.25 (0.50) **R**	5.52 (2.35) MR	3.18 (1.78) **HR**	6.75 (2.59) LR	-	-	-	**R-HY**
48.	**SL 958 (c)**	-	-	-	-	-	-	-	3.30 (2.07)	-	-	-
	CD at 5 %	**(2.53)**	**NS**	**(2.52)**	**(0.19)**	**(0.27)**	**(0.62)**	**(0.36)**	**(0.70)**	-	-	-
	CV%	**(2.92)**	**--**	**(4.94)**	**(23.62)**	**(4.41)**	**(10.21)**	**(7.01)**	-	-	-	-
	SEm±	**(0.89)**	**--**	**(0.88)**	**(0.07)**	**(0.08)**	**(0.22)**	**(0.13)**	-	-	-	-

Table 3.6 : Ent. 2 d. Field screening of AVT entries (Southern Zone) for resistance to major insect-pests (DEFOLIATORS, STEM BORERS, POD BORER AND PEST COMPLEX)

S. No.	Entry	Defoliator larvae / m	Pod borer damage (%)	Stem fly (% stem tunneling)	Defoliation (%)	Girdle Beetle % infest.	Reaction to Insect-Pest Complex
		Dharwad					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	**AMS–MB 5-18**	4.25 (2.18)LR	34.85 (36.16)S	31.30 (34.01)HS	44.50 (41.84)LR	12.57 (20.74)LR	S-LY
2.	**DSb 32**	1.95 (1.57)**R**	20.64 (27.02)MR	5.54 (13.61)**R**	18.50 (25.47)MR	6.38 (14.62)MR	**R-HY**
3.	**DS 3105**	5.00 (2.35)LR	32.23 (34.58)LR	22.13 (28.05)S	42.00 (40.40)MR	8.35 (16.78)MR	S-LY
4.	**DS 3106**	4.90 (2.32)LR	31.18 (33.93)LR	27.44 (31.58)HS	37.50 (37.76)MR	6.92 (15.24)MR	S-LY
5.	**KDS 921**	3.75 (2.06)MR	28.48 (32.24)LR	7.89 (16.31)MR	30.00 (33.21)MR	7.39 (15.77)MR	S-LY
6.	**KDS 980**	3.80 (2.07)MR	25.45 (30.28)MR	8.58 (17.03)MR	32.50 (34.76)MR	7.02 (15.35)MR	S-LY
7.	**KDS 1045**	3.60 (2.02)MR	24.76 (29.83)MR	5.67 (13.77)**R**	28.00 (31.95)MR	8.01 (16.44)MR	S-LY
8.	**MACS 1520**	3.25 (1.94)MR	24.15 (29.42)MR	14.56 (22.42)LR	27.50 (31.63)MR	10.05 (18.47)LR	**S-HY(T)**
9.	**NRC 125**	2.80 (1.82)MR	23.14 (28.74)MR	10.56 (18.96)MR	26.50 (30.98)MR	8.89 (17.34)LR	**S-HY(T)**
10.	**NRC 126**	2.25 (1.66)**R**	19.48 (26.18)**R**	5.49 (13.55)**R**	24.00 (29.33)MR	9.24 (17.69)LR	**R-HY**
11.	**NRC 127**	2.00 (1.58)**R**	18.20 (25.24)**R**	8.62 (17.07)MR	10.50 (18.90)**R**	7.39 (15.76)MR	**R-HY**
12.	**RSC 10-52**	5.15 (2.38)LR	27.88 (31.86)LR	10.68 (19.07)MR	52.00 (46.15)LR	13.48 (21.52)LR	S-LY
13.	**RSC 10-70**	4.75 (2.29)LR	31.47 (34.11)LR	11.28 (19.62)MR	44.50 (41.84)LR	12.57 (20.75)LR	S-LY
14.	**RSC 10-71**	5.10 (2.37)LR	27.75 (31.78)LR	10.19 (18.61)MR	48.00 (43.85)LR	8.97 (17.41)LR	S-LY
15.	**RVS 2009-9**	3.12 (1.90)MR	20.15 (26.66)MR	7.37 (15.75)MR	30.00 (33.21)MR	14.15 (22.08)LR	**R-HY**
16.	**SL 1104**	5.80 (2.51)LR	32.16 (34.53)LR	18.94 (25.79)LR	52.50 (46.23)LR	10.82 (19.20)LR	S-LY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
17.	**JS 20-94**	3.40 (1.97)MR	24.78 (29.84)MR	22.34 (28.20)S	24.00 (29.33)MR	4.78 (12.61)MR	**S-HY(T)**
18.	**JS 20-116**	3.05 (1.88)MR	23.41 (28.92)MR	21.75 (27.79)S	19.50 (26.21)MR	6.87 (15.19)MR	**R-HY**
19.	**PS 1556**	6.50 (2.65)S	35.48 (36.54)HS	15.87 (23.47)LR	68.00 (55.55)LR	18.15 (25.21)HS	S-LY
20.	**PS 1572**	6.15 (2.58)S	33.47 (35.33)S	16.15 (23.69)LR	65.50 (54.03)LR	17.42 (24.65)HS	S-LY
21.	**RSC 10-46**	5.90 (2.53)LR	28.45 (32.22)LR	12.13 (20.37)MR	62.00 (51.94)LR	5.39 (13.41)MR	S-LY
22.	**RVS 2007-6**	4.50 (2.24)LR	25.39 (30.25)MR	7.17 (15.53)MR	30.00 (33.21)MR	5.85 (13.98)MR	R-LY
23.	**RVS 2010-1**	4.00 (2.12)MR	24.21 (29.46)MR	4.12 (11.71) **HR**	32.50 (34.76)MR	6.14 (14.34)MR	S-LY
24.	**SL 1028**	5.30 (2.41)LR	35.36 (36.47)HS	21.34 (27.50)S	62.00 (51.94)LR	11.35 (19.68)LR	S-LY
25.	**SL 1074**	5.60 (2.47)LR	33.17 (35.15)S	17.57 (24.77)LR	63.50 (52.83)LR	8.37 (16.81)MR	S-LY
26.	**VLS 89**	3.75 (2.06)MR	23.38 (28.90)MR	18.96 (25.80)LR	42.50 (40.69)LR	9.47 (17.92)LR	S-LY
27.	**Shivalik (C)**	4.00 (2.12)MR	27.46 (31.59)LR	18.87 (25.74)LR	44.00 (41.55)LR	10.28 (18.69)LR	S-LY
28.	**JS 335 (C)**	3.50 (2.00)MR	24.97 (29.97)MR	14.54 (22.41)LR	28.00 (31.95)MR	14.52 (22.39)LR	**S-HY(T)**
29.	**JS 93-05 (C)**	3.25 (1.94)MR	21.50 (27.61)MR	8.56 (17.01)MR	9.50 (17.94)**R**	7.86 (16.27)MR	**R-HY**
30.	**Punjab 1 (C)**	6.57 (2.66)S	32.15 (34.53)LR	14.58 (22.44)LR	65.00 (53.73)LR	16.43 (23.90)S	S-LY
31.	**JS 75-46 (C)**	3.45 (1.99)**R**	23.97 (29.30)MR	19.34 (26.08)LR	32.00 (34.45)MR	5.16 (13.11)MR	**S-HY(T)**
32.	**JS 72-44 (C)**	3.40 (1.97)**R**	23.04 (28.67)MR	22.56 (28.35)S	38.00 (38.06)MR	7.18 (15.53)MR	S-LY
33.	**Bragg (C)**	4.50 (2.24)LR	21.25 (27.44)MR	14.29 (22.20)LR	46.50 (42.99)LR	11.35 (19.68)LR	S-LY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
34.	**NRC 37 (C)**	3.00 (1.87)MR	17.25 (24.53)**R**	10.18 (18.60)MR	24.00 (29.33)MR	7.34 (15.71)MR	**S-HY(T)**
35.	**VLS 58 (C)**	3.50 (2.00)MR	24.29 (29.52)MR	17.84 (24.97)LR	35.00 (36.27)MR	7.45 (15.83)MR	S-LY
36.	**VLS 63 (C)**	4.15 (2.16)LR	24.87 (29.90)MR	19.17 (25.96)LR	42.00 (40.40)LR	7.63 (16.02)MR	R-LY
37.	**DSb 21 (C)**	3.70 (2.05)MR	22.41 (28.24)MR	5.03 (12.96)**R**	26.50 (30.98)MR	5.46 (13.51)MR	**S-HY(T)**
38.	**JS 97-52 (C)**	3.25 (1.94)MR	23.84 (29.21)MR	12.76 (20.92)MR	30.00 (33.21)MR	5.13 (13.07)MR	S-LY
39.	**JS 95-60 (C)**	3.75 (2.06)MR	23.04 (28.67)MR	11.89 (20.16)MR	35.00 (36.27)MR	6.24 (14.45)MR	S-LY
40.	**JS 20-34 (C)**	4.00 (2.12)MR	24.12 (29.40)MR	9.54 (17.98)MR	44.00 (41.55)LR	5.97 (14.14)MR	S-LY
41.	**NRC 86 (C)**	3.50 (2.00)MR	25.51 (30.32)MR	9.45 (17.90)MR	24.00 (29.33)MR	7.28 (15.64)MR	**S-HY(T)**
42.	**PS 1092 (C)**	3.25 (1.94)MR	21.15 (27.37)MR	23.05 (28.68)S	28.50 (32.27)MR	9.15 (17.59)LR	**R-HY**
43.	**PS 1347 (C)**	3.50 (2.00)MR	26.38 (30.89)LR	25.13 (30.07)HS	32.00 (34.45)MR	5.41 (13.44)MR	R-LY
44.	**Pusa 97-12 (C)**	4.75 (2.29)LR	27.46 (31.59)LR	17.45 (24.68)LR	45.00 (42.13)LR	8.14 (16.57)LR	S-LY
45.	**RKS 18 (C)**	4.00 (2.12)MR	18.59 (25.53)**R**	3.08 (10.10) **HR**	38.00 (38.06)MR	7.60 (15.99)MR	**S-HY(T)**
46.	**SL 688 (C)**	5.00 (2.35)LR	32.10 (34.49)LR	22.45 (28.27)S	64.00 (53.13)LR	3.15 (10.21)**R**	S-LY
47.	**SL 958 (C)**	5.25 (2.40)LR	28.15 (32.03)LR	19.38 (26.11)LR	58.00 (49.60)LR	4.28 (11.91)MR	S-LY
48.	**VLS 59 (C)**	4.90 (2.32)LR	23.39 (35.41)S	18.47 (25.44)LR	34.50 (35.97)MR	9.47 (17.91)LR	R-LY
49.	**S.Em±**	**0.16**	**1.46**	**2.31**	**1.33**	**2.01**	-
	CD @ 5%	**(0.45)**	**(4.32)**	**(6.87)**	**(3.96)**	**(5.98)**	-
	CD @ 1%	**(0.60)**	**(5.55)**	**(8.01)**	**(5.14)**	**(7.12)**	-
	Mean	**(2.13)**	**(30.66)**	**(20.62)**	**(38.32)**	**(16.89)**	-

Table 3.7 : Ent. 2 e. Field screening of AVT entries for resistance to major insect-pests (Imphal)

S. No.	Entry	IMPHAL						
		Leaf webber larvae/m	No. of tobacco caterpillar larvae/m	No. of Bihar Hairy Caterpillar/mrl	No. of Aphids / plant	Stem tunnelling (%)	Percent defoliation at peak incidence/plant	Reaction to Insect-Pest Complex
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	AMS-MB 5-18	11.50 (3.46 LR	5.00 (2.34)MR	170.00 (13.01) LR	13.70 (3.69)MR	2.71 (10.31)MR	10.33 (18.96)MR	SLY
2.	DS 3105	15.00 (3.93) LR	14.00 (3.77) LR	201.00 (14.03) LR	32.70 (5.64) LR	4.21 (12.50) LR	11.37 (20.04) MR	SLY
3.	DS 3106	13.00 (3.66) LR	18.00 (4.29) LR	167.50 (12.69) LR	5.40 (2.03) MR	4.73 (13.22) LR	18.82 (25.91) LR	SLY
4.	DSb 32	8.00 (2.89) MR	9.00 (2.96) LR	84.50 (9.21) MR	0.80 (1.08) R	4.24 (12.54) LR	5.35 (13.74) MR	**S-HY(T)**
5.	JS 20-94	8.00 (2.92) MR	4.00 (2.07) MR	171.00 (12.76) LR	48.60 (7.00) LR	5.19 (13.67) LR	20.53 (27.20) LR	SLY
6.	JS 20-116	5.00 (2.34) MR	4.00 (2.12) MR	5.00 (1.97) **HR**	8.10 (2.93) MR	0.81 (6.21) **R**	0.17 (4.65) **R**	**RHY**
7.	KDS 921	12.00 (3.54) LR	9.00 (2.82) MR	110.00 (10.49) MR	21.00 (4.47) LR	3.81 (11.52) MR	6.87 (15.48) MR	**S-HY(T)**
8.	KDS 980	9.00 (3.08) MR	4.00 (2.12) MR	349.00 (16.92) LR	10.50 (3.20) MR	4.59 (12.90) LR	32.23 (31.19) LR	SLY
9.	KDS 1045	7.50 (2.83) MR	10.00 (3.23) LR	40.00 (6.15) **R**	7.80 (2.86) MR	4.65 (13.08) LR	3.33 (10.49) MR	**S-HY(T)**
10.	MACS 1520	6.00 (2.55) MR	8.00 (2.92) MR	150.00 (12.09) MR	13.50 (3.63) MR	4.82 (13.31) LR	15.20 (23.10) LR	SLY
11.	NRC 125	12.00 (3.52) LR	7.00 (2.56) MR	199.00 (14.10) LR	30.50 (5.53) LR	4.76 (13.16) LR	14.70 (22.84) LR	SLY
12.	NRC 126	12.00 (3.52) LR	7.00 (2.56) MR	199.00 (14.02) LR	40.50 (6.05) LR	4.74 (13.23) LR	18.97 (25.93) LR	SLY
13.	NRC 127	11.50 (3.46) LR	15.00 (3.93) LR	142.00 (11.94) MR	28.00 (5.03) LR	6.17 (14.96) LR	13.67 (22.10) LR	SLY
14.	PS 1556	7.50 (2.83) MR	3.00 (1.85) MR	106.00 (10.30) MR	52.50 (7.24) LR	4.49 (12.82) LR	9.67 (18.48) MR	SLY
15.	PS 1572	9.50 (3.14) LR	6.00 (2.52) MR	377.00 (19.40) LR	38.70 (6.11) LR	4.10 (12.34) LR	15.50 (23.39) LR	SLY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
16.	**RSC 10-46**	11.50 (3.46) LR	8.00 (2.92) MR	193.00 (13.86) MR	14.30 (3.45) MR	4.84 (13.30) LR	11.77 (20.22) MR	**S-HY(T)**
17.	**RSC 10-52**	12.00 (3.54) LR	13.00 (3.67) LR	87.50 (9.21) MR	1.80 (1.37) MR	4.92 (13.45) LR	4.75 (13.21) MR	SLY
18.	**RSC 10-70**	9.00 (3.04) MR	15.00 (3.93) LR	190.00 (13.76) LR	8.00 (2.38) MR	6.89 (15.74) LR	16.10 (24.04) LR	SLY
19.	**RSC 10-71**	3.00 (1.85) **HR**	17.00 (4.14) LR	50.00 (5.37) **R**	12.00 (2.83) MR	5.32 (13.96) LR	1.67 (7.67) **R**	SLY
20.	**RVS 2007-6**	11.00 (3.39) LR	24.00 (4.93) S	250.00 (15.83) LR	9.90 (3.12) MR	0.00 (4.05) **R**	16.67 (23.81) LR	SLY
21.	**RVS 2009-9**	13.00 (3.67) LR	3.00 (1.85) MR	78.00 (8.77) MR	19.00 (4.13) MR	1.81 (7.88) MR	5.93 (13.88) MR	SLY
22.	**RVS 2010-1**	10.50 (3.29) LR	12.00 (3.54) LR	87.00 (9.29) MR	12.00 (3.32) MR	3.10 (9.53) MR	6.50 (14.55) MR	SLY
23.	**SL 1028**	12.00 (3.49) LR	2.00 (1.58) MR	90.00 (9.24) MR	23.00 (4.79) LR	3.02 (9.44) MR	4.60 (13.05) MR	SLY
24.	**SL 1074**	9.00 (3.08) MR	5.00 (2.34) MR	85.00 (8.64) MR	14.90 (3.92) MR	0.00 (4.05) **R**	3.77 (11.85) MR	SLY
25.	**SL 1104**	22.00 (4.70) HS	10.00 (3.23) LR	216.00 (14.68) LR	34.60 (5.77) LR	8.99 (17.94) S	15.40 (22.53) LR	SLY
26.	**VLS 89**	10.00 (3.24) MR	12.00 (3.52) LR	84.00 (9.19)MR	37.90 (6.19) LR	5.46 (13.90) LR	5.60 (13.91) MR	**S-HY(T)**
27.	**DSb 21 (C)**	7.00 (2.73) MR	5.00 (2.25) MR	177.00 (12.74) LR	7.00 (2.74) **R**	7.99 (16.92) LR	8.50 (17.45) MR	SLY
28.	**JS -335 (C)**	14.50 (3.80) LR	8.00 (2.69) MR	435.00 (20.03) S	14.00 (3.36) MR	4.29 (12.58) LR	30.83 (31.84) LR	SLY
29.	**JS 93-05 (C)**	10.00 (3.23) MR	13.00 (3.61) LR	129.00 (11.17) LR	13.50 (3.73) MR	4.40 (12.27) LR	13.57 (21.80) LR	SLY
30.	**JS 95-60 (C)**	12.00 (3.53) LR	4.00 (2.07) MR	207.00 (14.02)LR	22.60 (4.80) LR	0.00 (4.05) **R**	16.90 (22.75) LR	SLY
31.	**JS 97 – 52 (C)**	15.00 (3.92) LR	9.00 (2.50) MR	113.00 (10.52) MR	55.20 (7.30)S	1.52 (7.44) MR	13.03 (21.54) LR	SLY
32.	**MAUS – 61 (C)**	10.00 (3.18) MR	18.50 (4.35) LR	101.00 (9.22) MR	4.00 (1.81) **R**	0.00 (4.05) **R**	14.87 (23.00) LR	**S-HY(T)**
33.	**PS-1092 (C)**	9.00 (3.08) MR	3.00 (1.63) MR	127.00 (10.55) MR	61.50 (7.38) LR	7.44 (16.36) LR	12.27 (19.84) LR	SLY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
34.	**RKS – 18 (C)**	13.50 (3.69) LR	15.00 (3.75) LR	280.00 (16.57) LR	37.60 (6.15) LR	1.79 (7.86) MR	27.53 (31.71) LR	SLY
35.	**SL-688 (C)**	8.00 (2.83) MR	11.00 (3.39) LR	216.00 (14.44) LR	16.80 (4.12) MR	3.18 (11.05) MR	20.80 (26.96) LR	**S-HY(T)**
36.	**VLS 59 (C)**	11.00 (3.39) LR	18.00 (4.28) LR	285.00 (16.89) LR	6.00 (2.52) **R**	4.77 (13.26) LR	21.63 (27.65) LR	SLY
37.	**VLS 63 (C)**	11.50 (3.43) LR	7.00 (2.73) MR	347.00 (18.64) LR	13.00 (4.13) MR	3.23 (11.12) MR	23.23 (28.40) LR	SLY
38.	**JS 20-98 (C)**	9.00 (3.04) LR	0.00 (0.71) **R**	155.00 (12.47) MR	14.60 (3.32) MR	0.69 (5.98) **R**	10.17 (18.58) MR	**S-HY(T)**
	SE ±	**(0.50)**	**(0.86)**	**(3.70)**	**(1.62)**	**(2.86)**	**(6.84)**	
	CD at 5 %	**(1.01)**	**(1.74)**	**(7.49)**	**(3.28)**	**(5.80)**	**(13.85)**	

Table 3.8 : Ent. 2 f. Field screening of AVT entries for resistance to major insect-pests (Medziphema)

Sl.NO	Entry	Leaf webber/m	Aphids/plant	Leaf hopper/plant	Blister beetle/m	Pod bug/m	Reaction to Insect-pest complex
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	AMS-MB-5-18	1.50 (1.41) **HR**	4.84 (2.26)**R**	0.85 (1.16) **HR**	2.14 (1.61)**R**	1.28 (1.33) **HR**	S-LY
2	DSb 32	2.90 (1.84)LR	8.15 (2.92)MR	1.85 (1.53)MR	3.23 (1.93)LR	2.50 (1.73)MR	S-LY
3	DS 3105	2.30 (1.67)MR	5.55 (2.46)**R**	1.09 (1.26) **HR**	2.83 (1.82)MR	2.85 (1.80)LR	R-LY
4	DS 3106	2.10 (1.61)MR	5.85 (2.51)**R**	1.05 (1.24) **HR**	2.48 (1.72)MR	1.30 (1.34) **HR**	R-LY
5	JS 20-94	2.85 (1.83)LR	7.65 (2.85)**R**	1.28 (1.33)**R**	3.01 (1.87)MR	1.80 (1.51)**R**	S-LY
6	**JS 20-116**	1.60 (1.44)**R**	7.15 (2.65)**R**	0.86 (1.16) **HR**	1.77 (1.49) **HR**	1.61 (1.44)**R**	S-LY
7	**KDS 921**	1.15 (1.28) **HR**	2.00 (1.57) **HR**	0.77 (1.12) **HR**	1.25 (1.32) **HR**	1.01 (1.22) **HR**	S-LY
8	**KDS 980**	1.65 (1.46)**R**	5.90 (2.49)**R**	1.09 (1.26) **HR**	1.99 (1.57)**R**	1.65 (1.46)**R**	S-LY
9	**KDS 1045**	1.35 (1.36) **HR**	6.30 (2.52)**R**	0.84 (1.16) **HR**	1.84 (1.52) **HR**	1.04 (1.24) **HR**	**R-HY**
10	MACS 1520	1.90 (1.55)**R**	6.90 (2.69)**R**	1.09 (1.26) **HR**	2.65 (1.77)MR	2.10 (1.60)MR	S-LY
11	NRC 125	3.15 (1.91)S	12.80 (3.64)MR	2.33 (1.68)LR	3.75 (2.03)S	2.43 (1.71)MR	S-LY
12	NRC 126	2.75 (1.79)LR	10.70 (3.35)MR	1.90 (1.55)MR	3.28 (1.94)LR	2.55 (1.74)MR	R-LY
13	NRC 127	3.70 (2.01)HS	21.15 (4.64)HS	3.31 (1.93)HS	4.83 (2.27)HS	4.16 (2.15)HS	S-LY
14	PS 1556	2.30 (1.67)MR	7.45 (2.80)**R**	1.15 (1.28) **HR**	2.86 (1.83)MR	2.21 (1.64)MR	S-LY
15	PS 1572	2.36 (1.69)MR	8.00 (2.87)MR	1.24 (1.32)**R**	3.06 (1.88)LR	2.28 (1.65)MR	S-LY
16	RSC 10-52	2.44 (1.71)LR	8.66 (2.99)MR	1.19 (1.30) **HR**	2.49 (1.73)MR	2.36 (1.68)MR	S-LY
17	RSC 10-70	3.15 (1.91)S	12.55 (3.61)LR	1.80 (1.52)MR	3.59 (2.02)LR	2.67 (1.77)LR	S-LY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
18	**RSC 10-71**	3.25 (1.92)S	13.25 (3.70)LR	1.93 (1.56)MR	3.55 (2.01)LR	2.28 (1.67)MR	R-LY
19	**RSC 10-46**	1.65 (1.46)**R**	5.60 (2.45)**R**	0.95 (1.20) **HR**	2.13 (1.62)**R**	1.43 (1.39) **HR**	R-LY
20	**RVS 2007-6**	1.45 (1.40) **HR**	3.10 (1.89) **HR**	0.79 (1.13) **HR**	1.79 (1.50) **HR**	1.56 (1.41)**R**	**R-HY**
21	**RVS 2009-9**	3.45 (1.98)HS	16.95 (4.17)S	2.58 (1.75)S	3.45 (1.98)LR	2.77 (1.81)LR	S-LY
22	**RVS 2010-1**	1.29 (1.34) **HR**	5.50 (2.43)**R**	0.96 (1.21) **HR**	1.90 (1.55)**R**	2.11 (1.59)MR	S-LY
23	**SL 1104**	3.10 (1.89)S	14.00 (3.80)LR	2.29 (1.67)LR	3.20 (1.92)LR	1.95 (1.55)**R**	S-LY
24	**SL 1028**	2.51 (1.73)LR	8.00 (2.91)MR	1.46 (1.40)**R**	3.19 (1.92)LR	1.40 (1.38) **HR**	S-LY
25	**SL 1074**	3.15 (1.91)S	18.35 (4.34)HS	2.83 (1.82)S	4.15 (2.16)S	4.00 (2.11)HS	S-LY
26	**VLS 89**	3.20 (1.92)S	9.05 (3.09)MR	1.61 (1.45)**R**	2.96 (1.85)MR	2.03 (1.59)**R**	S-LY
27	**JS 335(C)**	1.90 (1.55)**R**	4.10 (2.13) **HR**	0.94 (1.20) **HR**	1.84 (1.52) **HR**	1.23 (1.31) **HR**	S-LY
28	**JS 97-52(C)**	2.95 (1.86)LR	10.50 (3.29)MR	1.33 (1.35)**R**	3.38 (1.97)LR	1.95 (1.56)**R**	S-LY
29	**JS 93-05(C)**	3.65 (2.03)HS	19.65 (4.47)HS	2.47 (1.72)S	3.98 (2.11)S	2.62 (1.76)LR	S-LY
30	**PS 1347(C)**	3.30 (1.95)HS	11.45 (3.34)LR	1.75 (1.50)MR	2.73 (1.80)MR	2.60 (1.75)LR	S-LY
31	**RKS 18(C)**	1.15 (1.28) **HR**	1.15 (1.28) **HR**	1.10 (1.26) **HR**	2.92 (1.84)MR	2.85 (1.80)LR	R-LY
	SEm±	**(0.07)**	**(0.18)**	**(0.05)**	**(0.09)**	**(0.10)**	-
	CD (p=0.05)	**(0.19)**	**(0.52**	**(0.14)**	**(0.25)**	**(0.28)**	-

Table 3.9 : Ent. 2 g. Field screening of AVT entries for resistance to major insect-pests (Bangalore)

Sl. No.	Entries	Leaf miner		Defoliator		Stem fly		Pod Borer		Yield (Protd.)	Yield (Unprotd.)	Mini Max
		No. Larvae /pl	% damage	No. Larvae /pl	% damage	% seedling mortality	% tunneling	No Larvae / mrl	% damage			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1.	DS 31-06	6.58 (2.66)	52.78 (46.57)LR	7.14 (2.76)	72.46 (58.32)S	36.41 (37.10)MR	21.80 (27.82)MR	13.16 (3.70)	52.56 (46.45)LR	905	643	R-LY
2.	Dsb - 19	8.17 (2.94)	73.80 (59.19)S	12.25 (3.57)	57.65 (49.38)LR	31.40 (34.07)MR	28.56 (32.29)MR	7.45 (2.82)	63.70 (52.93)S	943	747	S-LY
3.	Dsb – 21	1.50 (1.41)	3.32 (10.49)**R**	0.85 (1.16)	8.43 (16.87)**R**	0.62 (4.51)**R**	1.87 (7.86)**R**	2.75 (1.80)	4.72 (12.54)**R**	1321	1130	**R-HY**
4.	Dsb 23-02	3.02 (1.88)	20.14 (26.65)**R**	2.83 (1.82)	9.40 (17.85)**R**	16.73 (24.13)**R**	10.84 (19.22)**R**	1.70 (1.48)	13.18 (21.28)**R**	1244	1044	**R-HY**
5.	DSb 28-03	1.23 (1.32)	3.32 (10.49)**R**	2.32 (2.61)	7.40 (15.78)**R**	1.70 (1.48)	2.17 (8.47)**R**	2.80 (1.82)	3.32 (10.49)**R**	1413	1174	**R-HY**
6.	Dsb – 32	8.50 (3.00)	72.14 (58.12)S	6.03 (2.56)	63.45 (52.78)S	23.60 (29.05)MR	30.06 (33.24)MR	6.94 (2.73)	30.15 (33.29)MR	858	642	S-LY
7.	JS 20-116	8.17 (2.33)	73.80 (59.19)S	12.25 (3.57)	57.65 (49.38)LR	31.40 (34.07)MR	28.56 (32.29)MR	7.45 (2.82)	63.70 (52.93)S	943	881	**S-HY(T)**
8.	JS 20-94	4.92 (2.33)	22.40 (28.24)MR	4.72 (2.28)	28.57 (32.30)MR	3.32 (10.49)**R**	24.15 (2942)MR	6.82 (2.71)	5.27 (13.27)**R**	1041	822	**R-HY**
9.	JS - 335	5.80 (2.51)	23.70 (28.45)MR	2.32 (2.61)	22.14 (28.12)MR	7.40 (15.78)**R**	67.40 (55.16)S	1.70 (1.48)	14.70 (21.29)**R**	1135	870	**R-HY**
10.	JS – 93-05	4.16 (2.16)	28.78 (32.43)MR	3.65 (2.04)	31.85 (34.34)MR	11.93 (20.20)**R**	8.40 (16.84)**R**	2.15 (16.3)	14.25 (22.17)	1243	912	**R-HY**
11.	KDS - 93	2.80 (1.82)	25.10 (30.05)MR	3.30 (1.95)	12.46 (20.66)**R**	5.12 (13.07)**R**	2.17 (13.07)**R**	3.23 (1.93)	33.50 (35.35)MR	943	710	R-LY
12.	KDS-753	6.48 (2.64)	69.15 (56.24)S	5.30 (2.41)	44.36 (38.87)LR	17.25 (24.53)**R**	39.41 (38.87)MR	3.52 (2.00)	23.40 (28.92)MR	1059	845	**R-HY**
13.	KDS-869	3.67 (2.04)	14.17 (22.10)**R**	4.96 (2.34)	35.80 (36.74)MR	14.63 (22.48)**R**	22.91 (28.59)MR	2.85 (1.83)	27.22 (31.44)MR	918	685	R-LY
14.	KDS-921	3.84 (2.08)	44.83 (42.02)LR	7.40 (2.81)	58.13 (49.66)LR	35.84 (36.76)MR	25.32 (30.20)MR	5.36 (2.42)	38.25 (38.19)MR	886	725	S-LY
15.	KDS-980	1.23 (1.32)	9.40 (17.85)**R**	3.12 (1.90)	25.84 (30.54)	38.93 (38.59)	45.12 (42.18)LR	5.10 (2.37)	28.18 (32.05)MR	693	546	R-LY
16.	MACS -1410	5.48 (2.45)	55.80 (48.31)LR	7.92 (2.90)	68.14 (55.61)S	41.84 (40.29)LR	52.15 (46.21)LR	6.82 (2.71)	36.13 (36.93)MR	870	685	**S-HY(T)**
17.	MACS -1460	11.23 (3.42)	80.56 (63.81)S	7.81 (2.88)	72.25 (58.19)S	33.53 (35.37)MR	40.14 (39.30)MR	8.65 (3.02)	52.91 (46.65)LR	654	458	S-LY
18.	MACS- 1520	4.80 (2.30)	36.40 (37.09)MR	7.32 (2.80)	29.48 (32.87)MR	4.10 (11.68)**R**	26.00 (30.64)MR	10.37 (3.30)	13.56 (21.60)**R**	1240	947	**R-HY**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
19.	**MACS – 1543**	5.36 (2.42)	58.64 (49.56)LR	8.92 (3.07)	83.82 (66.25)HS	8.36 (16.80)**R**	68.32 (55.72)S	7.24 (2.78)	13.20 (21.30)**R**	943	742	R-LY
20.	**MAUS – 2**	2.56 (1.73)	32.32 (34.63)MR	4.85 (2.31)	25.46 (30.29)MR	35.16 (36.35)MR	20.20 (26.20)**R**	4.45 (2.22)	36.63 (37.23)MR	1340	1052	**R-HY**
21.	**MAUS - 61**	3.89 (2.10)	28.16 (32.04)MR	5.60 (2.41)	36.61 (37.22)MR	5.01 (12.93)R	2.36 (8.83)**R**	3.45 (1.99)	8.14 (16.57)**R**	1287	1135	**R-HY**
22.	**MAUS- 612**	10.11 (3.26)	82.62 (65.34)HS	8.14 (2.94)	56.02 (48.44)LR	22.18 (28.09)MR	10.78 (19.16)**R**	9.72 (3.20)	61.81 (51.81)S	760	567	S-LY
23.	**MAUS-614**	4.50 (2.24)	18.45 (25.43)**R**	5.63 (2.48)	38.97 (38.61)MR	26.57 (31.02)MR	18.54 (25.49)**R**	6.13 (2.57)	36.10 (36.91)MR	885	652	R-LY
24.	**MAUS-711**	10.15 (3.26)	82.63 (65.34)HS	12.85 (3.65)	72.52 (58.36)S	41.52 (40.10)LR	36.06 (36.89)MR	7.45 (2.82)	66.17 (54.41)S	941	741	**S-HY(T)**
25.	**NRC-129**	1.06 (1.25)	22.15 (28.06)MR	0 (0.71)	10.41 (18.82)**R**	1.33 (6.61)**R**	6.32 (14.55)**R**	4.45 (2.22)	3.18 (10.27)**R**	1360	836	**R-HY**
26.	**RKS-113**	5.34 (2.42)	39.23 (38.76)MR	6.87 (2.71)	52.94 (86.67)LR	28.36 (32.16)MR	13.06 (21.18)**R**	7.64 (2.85)	38.63 (38.41)MR	872	658	R-LY
27.	**RKS-18**	6.83 (2.71)	19.73 (25.53)**R**	6.60 (3.02)	11.19 (19.05)**R**	38.20 (38.16)MR	51.45 (45.81)LR	6.30 (2.61)	35.75 (46.71)MR	1044	810	R-LY
28.	**RCS 10-71**	5.74 (2.50)	48.12 (43.90)LR	6.54 (2.65)	39.15 (38.72)MR	22.21 (28.11)MR	31.20 (33.94)MR	8.32 (2.97)	42.62 (40.74)LR	815	657	S-LY
29.	**RVS 2007-6**	7.15 (2.77)	69.10 (56.21)S	8.74 (3.04)	72.20 (58.16)S	36.75 (37.30)MR	52.81 (46.59)LR	6.78 (2.70)	42.14 (40.46)LR	785	563	S-LY
30.	**RVS 2009-9**	3.20 (1.92)	22.68 (28.43)MR	3.52 (2.00)	13.83 (24.97)**R**	10.80 (19.18)**R**	4.12 (11.71)**R**	2.15 (1.63)	3.06 (10.7)**R**	1112	945	**R-HY**
31.	**RVS 2010-1**	10.84 (3.87)	85.16 (67.32)HS	5.84 (2.52)	65.10 (53.77)S	28.52 (32.27)MR	44.34 (41.73)LR	7.48 (2.82)	60.36 (50.96)S	755	586	S-LY
32.	**TS 80**	1.36 (1.36)	17.12 (24.43)**R**	2.40 (1.70)	34.18 (35.76)LR	10.85 (19.22)**R**	28.43 (32.31)MR	3.05 (1.88)	3.77 (11.19)**R**	1235	987	**R-HY**
33.	**VLS-59**	9.45 (3.15)	73.72 (59.14)S	6.58 (2.66)	48.32 (44.02)LR	39.15 (38.72)MR	28.60 (32.32)MR	12.58 (3.62)	41.72 (40.22)MR	784	653	S-LY
34.	**VLS 63**	2.84 (1.83)	31.03 (33.84)MR	6.05 (2.56)	41.12 (39.87)LR	5.82 (13.95)**R**	11.12 (19.47)**R**	7.50 (2.83)	15.04 (22.81)**R**	1252	968	**R-HY**
35.	**VLS 92**	8.80 (3.05)	69.14 (56.23)S	6.25 (2.60)	70.60 (57.14)S	11.52 (19.83)**R**	8.63 (17.08)R	6.10 (2.57)	58.85 (50.08)LR	740	615	S-LY
36.	**VLS 99**	6.12 (2.57)	64.16 (53.20)S	2.72 (1.79)	30.12 (33.27)MR	11.10 (19.45)**R**	7.10 (15.45)**R**	1.28 (1.33)	8.85 (17.30)**R**	874	587	S-LY
	CV	**-**	**(11.30)**	**-**	**(13.13)**	**-**	**(12.20)**	**-**	**(10.40)**	**(12.54)**	**(12.56)**	**-**
	CD at 5%	**-**	**(19.65)**	**-**	**(18.47)**	**-**	**(24.50)**	**-**	**(21.34)**	**(312.65)**	**(285.40)**	**-**

Table 3.10 ENT 3a: Status of AVT-II entries for antixenosis and antibiosis against *S. litura* at Pantnagar:

	Genotypes	Antibiosis			Antixenosis	
		Approx. digestibility AD	Efficiency of Conversion Index ECI	Efficiency of Conversion of Digested food ECD	C value	Antixenosis response
1	**JS 20-90**	70.56 (57.16)	33.9 (35.22)	21.54 (26.78)	1.28	Preferred host
2	**JS 20-116**	65.58 (54.15)	32.61 (33.76)	24.14 (28.59)	0.85	Slight antixenosis
3	**PS 1556**	72.12 (58.20)	37.85 (37.45)	17.37 (24.09)	0.38	**Strong antixenosis**
4	**PS 1572**	65.67 (54.17)	16.11 (23.36)	9.44 (17.76)	0.49	**Strong antixenosis**
5	**RSC 10-46**	72.07 (58.18)	38.46 (38.30)	18.65 (24.63)	1.23	Preferred host
6	**RVS 2007- 06**	68.76 (56.06)	46.36 (42.20)	23.32 (28.69)	1.17	Preferred host
7	**RVS 2010- 01**	73.43 (59.22)	71.43 (59.12)	37.03 (37.54)	1.21	Preferred host
8	**SL 1028**	62.75 (52.53)	33.5 (34.63)	24.82 (29.14)	1.10	Preferred host
9	**SL 1074**	70.77 (57.37)	40.53 (39.15)	18.5 (25.44)	0.82	Slight antixenosis
10	**VLS 89**	78.08 (62.16)	71.12 (58.98)	25.28 (29.86)	1.25	Preferred host
11	**Bragg**	78.65 (62.49)	49.5 (44.22)	15.94 (23.42)	1.09	Preferred host
	CD at 5%	(4.75)	(12.48)	(9.92)	-	-

Table 3.11 ENT 3b: Status of AVT-II entries for antixenosis and antibiosis against *S. litura* at Bangaluru:

S. No	Genotypes	Antibiosis			Antixenosis	
		Approx. digestibility AD	Efficiency of Conversion Index ECI	Efficiency of Conversion of Digested food ECD	C value	Antixenosis response
1	**MACS 14-10**	75.52 (60.32)	33.16 (35.14)	38.72 (38.47)	1.00	Preferred host
2	**RSC 10-46**	78.10 (62.07)	27.32 (31.50)	41.14 (39.88)	0.60	Moderate antixenosis
3	**KDS 753**	63.64 (52.89)	52.90 (46.64)	75.80 (60.51)	0.73	Moderate antixenosis
4	**DSb 28-03**	60.50 (51.04)	24.18 (29.44)	24.34 (29.55)	0.60	Moderate antixenosis
5	**KDS 869**	71.70 (57.84)	55.15 (47.94)	68.50 (55.84)	0.84	Slight antixenosis
6	**JS 335**	80.30 (63.62)	25.74 (30.47)	25.21 (30.13)	-	-
	CD at 5%	(4.80)	(3.10)	(2.90)	-	-

Table 3.12 : Ent.4 a. Field screening of IVT entries for resistance to major insect-pests (Stem fly- % Stem tunneling)

S.N.	Entry	Dharwad	Pantnagar	Sehore	Parbhani	Amrawati	Imphal
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	**NRC 128**	12.54 (20.73)MR	49.29 (44.59)HS	18.85 (25.69) MR	39.05 (38.64)*S	ROOT ROT	0.00 (4.05) **HR**
2.	**RVS 2011-3**	20.34 (26.80)LR	61.71 (51.78) HS	22.25 (28.12) MR	34.53 (35.98)LR	55 (47.88) LR	5.29 (13.84) LR
3.	**DSb 34**	10.45 (18.85)MR	50.16 (45.09)HS	14.68 (22.51) MR	24.12 (29.40)MR	25 (29.89) **R**	0.00 (4.05) **HR**
4.	**MAUS 725**	9.45 (17.90)MR	76.42 (60.98)HS	7.39 (11.28) **R**	33.21 (35.18) LR	25 (29.89) **R**	0.00 (4.05) **HR**
5.	**SL 1068**	8.87 (17.32)MR	51.07 (45.61)HS	57.90 (49.64) S	33.74 (35.50) LR	55 (47.88) LR	3.10 (10.90) LR
6.	**JS 21-15**	14.53 (22.40)MR	35.78 (36.72)HS	3.61 (7.78) **HR**	29.77 (33.05) MR	45 (41.99) MR	2.41 (8.70) MR
7.	**AUKS 174**	13.54 (21.58)MR	23.93 (29.28)S	14.61 (22.43) MR	31.57 (34.16) LR	55 (47.88) LR	1.72 (7.76) MR
8.	**NRC 137**	18.86 (25.73)LR	53.28 (46.88)HS	20.19 (25.75) MR	27.05 (31.32) MR	50 (45.00) LR	3.92 (12.12) LR
9.	**VLS 95**	15.24 (22.97)MR	51.32 (45.76)HS	34.02 (35.97) LR	39.20 (38.74) S	ROOT ROT	0.00 (4.05) **HR**
10.	**CSB 10084**	15.43 (23.12)MR	33.35 (35.27)HS	20.03 (27.58) MR	17.68 (24.85) **HR**	ROOT ROT	0.00 (4.05) **HR**
11.	**MACS 1493**	8.65 (17.10)MR	48.66 (44.23)HS	17.15 (23.04) MR	19.47 (26.18) **HR**	40 (39.11) MR	7.05 (15.83) S
12.	**JS 20-17**	22.67 (28.42)LR	62.24 (52.08)HS	40.76 (39.69) LR	36.83 (37.13) LR	60 (50.89) LR	5.17 (13.69) LR
13.	**NRC 130**	24.36 (29.56)LR	29.66 (33.00)HS	18.47 (24.07) MR	37.19 (37.56) LR	25 (29.89) **R**	3.49 (11.35) LR
14.	**TS 53**	20.15 (26.66)LR	48.76 (44.29)HS	4.25 (8.48) **HR**	26.03 (30.66) MR	ROOT ROT	0.00 (4.05) **HR**
15.	**RVS 2011-4**	NOT GERMINATED					
16.	**SL 1123**	16.15 (23.69)LR	36.34 (37.07)HS	4.59 (11.20) **R**	39.54 (38.95)S	ROOT ROT	5.88 (14.61) LR
17.	**BAUS 102**	14.27 (22.19)MR	40.99 (38.81)HS	16.28 (21.78) MR	22.17 (28.07) **R**	35 (36.22) MR	7.17 (15.99) S

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
18.	**MACSNRC 1575**	17.34 (24.60)LR	64.59 (54.08)HS	46.12 (42.52) LR	32.62 (34.82) LR	25 (29.89) **R**	0.00 (4.05) **HR**
19.	**MAUS 731**	14.88 (22.68)MR	31.39 (34.07)HS	48.50 (39.13) LR	26.47 (30.95) MR	55 (47.88) LR	0.00 (4.05) **HR**
20.	**NRC 132**	13.56 (21.60)MR	75.77 (60.51)HS	48.05 (44.13) LR	42.17 (40.45)HS	60 (50.89) LR	0.00 (4.05) **HR**
21.	**VLS 94**	13.42 (21.48)MR	48.95 (44.40)HS	23.21 (28.85) MR	29.30 (32.68) MR	55 (47.88) LR	4.03 (12.25) LR
22.	**AMS 2014-1**	15.76 (23.38)LR	37.21 (37.57)HS	8.52 (16.90) MR	21.04 (27.29) **R**	60 (50.89) LR	1.44 (7.32) **R**
23.	**KDS 1095**	11.54 (19.85)LR	45.35 (42.33)HS	31.05 (33.85) LR	25.49 (30.30) MR	ROOT ROT	3.70 (10.19) MR
24.	**NRC 133**	23.56 (29.03)LR	64.34 (53.34)HS	27.90 (31.89) LR	27.77 (31.78) MR	55 (47.88) LR	5.97 (14.73) LR
25.	**DS 3108**	18.54 (25.49)LR	36.46 (37.14)HS	39.35 (38.19) LR	26.49 (30.96) MR	ROOT ROT	0.00 (4.05) **HR**
26.	**AMS 100-39**	15.22 (22.95)MR	37.92 (38.01)HS	48.05 (43.84) LR	32.77 (34.91) LR	ROOT ROT	3.72 (11.83) MR
27.	**NRC 136**	15.48 (23.16)LR	35.20 (36.39)HS	35.28 (36.36) LR	27.88 (31.84) MR	ROOT ROT	5.89 (14.49) LR
28.	**RVS 2011-1**	20.06 (26.60)LR	52.14 (46.23)HS	20.42 (26.74) MR	20.64 (26.97) **R**	ROOT ROT	3.70 (10.19) MR
29.	**CSB 10112**	21.14 (27.36)LR	36.60 (37.22)HS	15.50 (23.12) MR	20.65 (27.01) **R**	50 (45.00) LR	3.07 (9.49) MR
30.	**PS 1613**	19.87 (26.46)LR	59.78 (50.64)HS	17.57 (24.72) MR	53.45 (47.00) HS	45 (42.12) MR	8.30 (17.24) S
31.	**NRC 131**	17.35 (24.61)LR	28.84 (32.48)HS	49.58 (44.74) LR	20.52 (26.89) **R**	ROOT ROT	6.47 (15.20) S
32.	**KDS 992**	7.96 (16.38)MR	77.43 (61.64)HS	24.70 (29.73) MR	28.94 (32.53) MR	45 (42.12) MR	5.46 (13.93) LR
33.	**RSC 11-07**	6.47 (14.73)**R**	35.45 (36.54)HS	31.00 (33.87) LR	32.22 (34.58) LR	45 (42.12) MR	4.05 (12.30) LR
34.	**NRCSL 1**	7.45 (15.83)**R**	39.25 (38.79)HS	5.61 (12.33) **R**	29.22 (32.66) MR	55 (47.88) LR	5.40 (14.03) LR
35.	**PS 1611**	10.23 (18.65)MR	28.82 (32.47)HS	31.80 (34.00) LR	22.22 (28.10) **R**	ROOT ROT	0.00 (4.05) **HR**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
36.	**RSC 11-03**	13.66 (21.68)MR	36.33 (37.06)HS	43.00 (40.96) LR	21.04 (27.29) **R**	35 (36.22) MR	2.50 (8.81) **R**
37.	**NRC 134**	14.03 (21.99)MR	49.03 (44.10)HS	56.30 (48.71) S	29.61 (32.95) MR	35 (36.22) MR	7.85 (16.78) S
38.	**NRC 129**	24.35 (29.56)S	37.64 (37.84)HS	60.10 (50.87) HS	42.51 (40.67) HS	40 (39.23) MR	7.06 (15.96) S
39.	**RVS 2011-2**	13.97 (21.94)MR	44.98 (42.12)HS	45.98 (42.61) LR	36.97 (37.43) LR	40 (39.11) MR	6.82 (15.68) S
40.	**SKF-SPS-11**	13.26 (21.35)MR	46.67 (43.09)HS	24.00 (28.93) MR	38.20 (38.67)S	35 (36.22) MR	0.00 (4.05) **HR**
41.	**SKF-1050**	15.03 (22.80)MR	58.09 (49.66)HS	17.80 (24.81) MR	22.48 (28.17) **R**	40 (39.11) MR	3.33 (9.79) MR
42.	**Shalimar Soybean**	22.03 (27.98)LR	-	-	27.11 (31.36) MR	25 (29.89) **R**	7.20 (16.10) S
43.	**Shivalik (C)**	17.98 (25.08)LR	-	-	-	-	-
44.	**Bragg (C)**	14.51 (22.38)MR	-	-	-	-	-
45.	**JS 335 (C)**	14.84 (22.65)MR	-	-	22.48 (28.29) MR	35 (36.22) MR	5.93 (14.61) LR
46.	**NRC 86 (C)**	-	-	30.76 (28.79) MR	-	62.5 (52.25) LR	-
47.	**JS 20-34 (C)**	10.12 (18.54)MR	-	28.40 (32.16) MR	-48.52 (44.14) HS	60 (50.77) LR	-
48.	**JS 75-46 (C)**	19.14 (25.93)LR			-	-	
49.	**JS 72-44 (C)**	22.67 (28.42)LR	-	-	-	-	-
50.	**JS 93-05 (C)**	7.96 (16.38)MR	-	-	-	-	-
51.	**JS 97-52 (C)**	13.06 (21.18)MR	-	-	23.73 (29.14) MR	75 (60.11) HS	7.34 (16.26) S
52.	**JS 95-60 (C)**	12.08 (20.33)MR	-	52.70 (34.56) LR	-	-	-
53.	**RKS 18 (C)**	3.23 (10.35)R	-	-	-	-	5.77 (14.47) LR

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
54.	**NRC 37 (C)**	9.87 (18.30)MR	-	-	-	-	-
55.	**NRC 86 (C)**	9.65 (18.09)MR	-	-	28.71 (32.38) MR	-	-
56.	**MAUS 158 (C)**	-	-	-	30.14 (33.29) LR	-	-
57.	**MAUS 2 (C)**	-	-	-	33.47 (35.33) LR	-	-
58.	**DSB-21 (C)**	7.27 (15.64)MR	-	-	-	-	-
59.	**Punjab 1 (C)**	15.01 (22.79)MR	-	-	-	-	-
60.	**PS 1092 (C)**	23.44 (28.95)LR	-	-	-	-	-
61.	**PS 1347 (C)**	25.43 (30.27)S	58.11 (49.67)HS	-	-	-	-
62.	**PUSA 97-12 (C)**	16.95 (24.30)LR	53.98 (47.28)HS	-	-	-	-
63.	**SL 958 (C)**	19.46 (26.17)LR	32.62 (34.83)HS	-	-	-	-
64.	**SL 688 (C)**	22.52 (28.32)LR	-	-	-	-	-
65.	**VLS 58 (C)**	16.53 (23.98)LR	-	-	-	-	-
66.	**VLS 59 (C)**	18.68 (25.60)LR	-	-	-	-	-
67.	**VLS 63 (C)**	18.76 (25.66)LR	-	-	-	-	-
	SEm+	**(2.36)**	**(0.96)**	**(6.06)**	**(1.75)**	**(4.13)**	**(3.37)**
	CD at 5 %	**(7.06)**	**(2.73)**	**(18.06)**	**(4.84)**	**(11.91)**	**(6.80)**

Table 3.13: Ent. 4 b. Field screening of IVT entries for resistance to major insect-pests (Girdle beetle - % Plant infestation)

Code	Entry	Sehore	Parbhani	Dharwad	Amrawati	Kota	Pantnagar
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	**NRC 128**	9.53 (17.03) LR	5.86 (13.84)MR	8.93 (17.38)LR	4.97 (2.20) S	18.34 (25.33) LR	6.67 (14.95) S
2.	**RVS 2011-3**	5.73 (13.78) LR	8.27 (16.68) MR	10.98 (19.34)LR	6.91 (2.63) HS	15.00 (22.76) LR	10.00 (18.41) S
3.	**DSb 34**	9.74 (18.05) S	7.89 (15.84) MR	7.50 (15.89)MR	3.94 (1.94) LR	11.67 (19.92) MR	0.00 (0.00) **HR**
4.	**MAUS 725**	8.12 (16.49) LR	9.24 (17.67) MR	5.61 (13.70)MR	3.58 (1.89)LR	13.34 (21.27) LR	8.68 (17.13) S
5.	**SL 1068**	9.90 (18.24) S	7.05 (15.32) MR	6.79 (15.10)MR	3.17 (1.78) LR	11.67 (19.92) MR	2.28 (8.67) **HR**
6.	**JS 21-15**	1.63 (7.27) MR	8.77 (17.22) MR	7.62 (16.02)MR	2.84 (1.68) MR	5.00 (12.74) **HR**	0.00 (0.00) **HR**
7.	**AUKS 174**	9.74 (18.05) S	9.85 (18.18)LR	6.29 (14.52)MR	2.56 (1.60) MR	8.34 (16.70) MR	0.00 (0.00) **HR**
8.	**NRC 137**	9.06 (17.19) LR	8.69 (17.07) MR	10.40 (18.81)LR	2.91 (1.70) MR	13.34 (21.27) LR	0.00 (0.00) **HR**
9.	**VLS 95**	0.00 (0.00) **HR**	9.22 (17.59) MR	6.13 (14.33)MR	2.96 (1.72) LR	15.00 (22.76) LR	4.17 (11.78) **HR**
10.	**CSB 10084**	9.67 (18.10) S	11.41 (19.74) LR	7.44 (15.82)MR	3.66 (1.91) LR	16.67 (23.99) LR	0.00 (0.00) **HR**
11.	**MACS 1493**	9.83 (18.25) S	9.44 (17.87) LR	6.31 (14.54)MR	2.14 (1.46) LR	15.00 (22.76) LR	3.13 (10.19) **HR**
12.	**JS 20-17**	2.49 (8.87) MR	9.63 (18.01) LR	12.57 (20.76)LR	1.39 (1.18)**R**	16.67 (23.99) LR	14.29 (22.21) S
13.	**NRC 130**	1.58 (5.07) **R**	8.38 (16.81) MR	15.30 (23.02)S	3.42 (1.85) LR	16.67 (24.10) LR	10.00 (18.43) S
14.	**TS 53**	9.67 (17.99) S	10.10 (18.49) LR	14.76 (22.58)S	2.17 (1.47)MR	13.34 (21.27) LR	10.42 (18.83) S
15.	**RVS 2011-4**	--	--	--	2.50 (1.56) MR	--	--
16.	**SL 1123**	0.00 (0.00) **HR**	12.69 (20.84) LR	6.34 (14.58)MR	1.43 (1.18) **R**	15.00 (22.50) LR	2.09 (8.31) **HR**
17.	**BAUS 102**	0.83 (3.64) **R**	9.56 (18.00) LR	7.01 (15.35)MR	3.81 (1.95) LR	15.00 (22.76) LR	0.00 (0.00) **HR**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
18.	**MACSNRC 1575**	5.73 (13.78) LR	6.96 (15.29) MR	12.12 (20.37)LR	1.69 (1.30) **R**	13.34 (21.27) LR	0.00 (0.00) **HR**
19.	**MAUS 731**	16.13 (23.62) HS	9.84 (18.27) LR	6.85 (15.17)MR	2.84 (1.68) MR	5.00 (12.74) **HR**	0.00 (0.00) **HR**
20.	**NRC 132**	4.16 (11.70) LR	10.01 (18.35) LR	7.03 (15.37)MR	2.34 (1.53) MR	16.67 (23.99) LR	0.00 (0.00) **HR**
21.	**VLS 94**	8.86 (17.24) LR	5.08 (13.02) MR	6.43 (14.68)MR	1.42 (1.19) **R**	15.00 (22.76) LR	6.07 (14.26) LR
22.	**AMS 2014-1**	2.47 (8.87) MR	11.24 (19.58) LR	11.29 (19.63)LR	3.59 (1.89) LR	13.34 (21.27) LR	3.13 (10.19) **HR**
23.	**KDS 1095**	3.25 (10.31)MR	10.46 (18.86) LR	7.02 (15.36)MR	2.23 (1.49) MR	15.00 (22.76) LR	2.50 (9.10) **HR**
24.	**NRC 133**	8.12 (16.49) LR	28.69 (32.31)HS	13.48 (21.53)LR	1.65 (1.28) **R**	6.67 (14.97) **R**	8.34 (16.78) S
25.	**DS 3108**	2.48 (8.87) MR	8.98 (17.33) MR	11.03 (19.39)LR	2.83 (1.68) MR	18.34 (25.33) LR	5.05 (12.98) MR
26.	**AMS 100-39**	1.66 (5.24)**R**	11.08 (19.41) LR	6.16 (14.36)MR	2.23 (1.49) MR	13.33 (21.41) LR	3.57 (10.87) **HR**
27.	**NRC 136**	6.66 (14.83)LR	7.04 (15.30) MR	7.35 (15.72)MR	2.05 (1.43) MR	13.34 (21.27) LR	0.00 (0.00) **HR**
28.	**RVS 2011-1**	0.81 (3.64)**R**	10.70 (19.06) LR	10.11 (18.53)LR	2.46 (1.56) MR	15.00 (22.76) LR	0.00 (0.00) **HR**
29.	**CSB 10112**	2.47 (8.87)MR	9.09 (17.51) MR	11.23 (19.57)LR	2.20 (1.48) MR	13.34 (21.27) LR	4.17 (11.78) **HR**
30.	**PS 1613**	9.94 (18.08) S	13.21 (21.30) LR	9.58 (18.02)LR	2.52 (1.58) MR	11.67 (19.92) MR	0.00 (0.00) **HR**
31.	**NRC 131**	3.24 (9.97) MR	7.56 (15.94) MR	9.43 (17.88)LR	2.54 (1.59) MR	13.34 (21.27) LR	2.63 (9.59) **HR**
32.	**KDS 992**	4.12 (11.63)MR	19.29 (26.04) HS	6.02 (14.20)MR	2.87 (1.68) MR	11.67 (19.92) MR	7.15 (15.51) S
33.	**RSC 11-07**	11.54 (19.65) S	5.64 (13.72) MR	3.97 (11.49)MR	3.90 (1.97) LR	15.00 (22.76) LR	7.83 (16.25) S
34.	**NRCSL 1**	9.94 (18.08) S	4.26 (11.44) **R**	4.58 (12.35)MR	2.61 (1.61) MR	11.67 (19.92) MR	3.13 (10.19) **HR**
35.	**PS 1611**	8.16 (16.47) LR	11.41 (19.63) LR	6.85 (15.17)MR	3.16 (1.77) LR	13.34 (21.27) LR	3.13 (10.19) **HR**
36.	**RSC 11-03**	7.51 (15.69)LR	7.11 (15.43) MR	7.08 (15.43)MR	2.66 (1.62) MR	13.33 (21.41) LR	0.00 (0.00) **HR**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
37.	**NRC 134**	4.99 (12.68) LR	19.30 (26.02) HS	6.42 (14.67)MR	1.79 (1.34) MR	13.34 (21.27) LR	9.82 (18.25)S
38.	**NRC 129**	9.00 (17.40) LR	10.81 (19.14) LR	13.45 (21.51)LR	1.20 (1.09) **HR**	15.00 (22.76) LR	0.00 (0.00) **HR**
39.	**RVS 2011-2**	0.83 (3.64) **R**	8.70 (17.12) MR	7.04 (15.38)MR	2.90 (1.70) MR	13.34 (21.27) LR	7.14 (15.50) S
40.	**SKF-SPS-11**	8.16 (16.47) LR	10.78 (18.61) LR	6.26 (14.48)MR	1.80 (1.34) MR	13.33 (21.41) LR	2.63 (9.33) **HR**
41.	**SKF-1050**	0.00 (0.00) **HR**	5.35 (13.04) MR	6.55 (14.82)MR	2.27 (1.51) MR	11.67 (19.92) MR	0.00 (0.00) **HR**
42.	**Shalimar Soybean**	-	4.66 (12.07) **R**	13.87 (21.86)LR	2.52 (1.58) MR	15.00 (22.76) LR	-
43.	**NRC 86 (C)**	6.66 (14.46)LR	7.43 (15.73) MR	5.28 (13.28)MR	1.59 (1.26) **R**	15.00 (22.76) LR	-
44.	**JS 335(C)**	-	8.86 (17.31) MR	14.49 (22.37)S	8.78 (2.94) HS	21.67 (27.72) S	-
45.	**JS 20-34 (C)**	4.10 (11.02)MR	4.70 (12.51) **R**	6.97 (15.30)MR	11.54 (3.40) HS	15.00 (22.76) LR	-
46.	**JS 97-52(C)**	-	7.87 (16.28) MR	8.13 (16.56)LR	9.48 (3.06) HS	16.67 (24.10) LR	-
47.	**JS 75-46 (C)**	-	-	5.22 (13.20)MR	-	-	-
48.	**JS 72-44 (C)**	-	-	7.35 (15.72)MR	-	-	-
49.	**JS 93-05 (C)**	09.67 (17.99) S	-	7.57 (15.96)MR	-	-	-
50.	**JS 95-60 (C)**	-	-	6.24 (14.46)MR	-	-	-
51.	**PS 1092 (C)**	-	-	9.15 (17.60)LR	-	-	-
52.	**PS 1347 (C)**	-	-	5.41 (13.44)MR	-	-	0.00 (0.00) **HR**
53.	**MAUS 158 (C)**		11.00 (18.74) LR	-	-	-	-
54.	**MAUS 2 (C)**		13.64 (21.63) LR	-	-	-	-
55.	**PUSA 97-12 (C)**	-	-	8.14 (16.57)LR	-	-	4.78 (12.62) MR

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
56.	**RKS 18 (C)**	-	-	4.60 (12.38)MR	-	-	-
57.	**SL 688 (C)**	-	-	12.15 (20.39)LR	-	-	-
58.	**SL 958 (C)**	-	-	9.28 (17.73)LR	-	-	13.61 (21.63) S
59.	**Shivalik (C)**	-	-	10.33 (18.74)LR	-	-	-
60.	**NRC 37 (C)**	-	-	7.04 (15.38)MR	-	-	-
61.	**VLS 58 (C)**	-	-	7.49 (15.88)MR	-	-	-
62.	**VLS 59 (C)**	-	-	6.47 (14.73)MR	-	-	-
63.	**VLS 63 (C)**	-	-	7.63 (16.03)MR	-	-	-
64.	**Punjab 1 (C)**	-	-	16.39 (23.87)S	-	-	-
65.	**Bragg (C)**	-	-	11.84 (20.12)LR	-	-	-
66.	**DSb -21 (C)**	-	-	5.46 (13.51)MR	-	-	-
	SEm+	**(2.63)**	**(1.89)**	**(1.92)**	**(0.14)**	**(1.98)**	**(0.93)**
	CD at 5 %	**(6.50)**	**(5.23)**	**(5.79)**	**(0.41)**	**(5.66)**	**(0.33)**

Table 3.14: Ent. 4 c. Field screening of IVT entries for resistance to major insect pests (Defoliators)

Code	Entry	Defoliators (Number of larvae / m)						No. of semilooper/ mrl	No. of *S. litura* larvae/mrl
		Sehore	Amrawati	Pantnagar	Kota	Dharwad	Imphal	Parbhani	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	**NRC 128**	23.75 (29.17) S	0.67 (1.32) LR	4.00 (1.98) S	4.67 (2.27) LR	3.25 (1.94)MR	2.00 (1.58) **HR**	6.00 (2.54)MR	0.67 (1.06)
2.	**RVS 2011-3**	6.00 (14.18) **R**	0.50 (1.20) MR	2.75 (1.64) LR	4.34 (2.20) LR	4.01 (2.12)LR	5.00 (2.34) MR	9.00 (3.08) MR	0.67 (1.08)
3.	**DSb 34**	22.25 (28.14) S	0.67 (1.29) LR	4.25 (2.06) S	4.84 (2.31) LR	3.26 (1.94)MR	9.00 (3.08) LR	8.50 (2.99) MR	1.00 (1.22)
4.	**MAUS 725**	18.00 (23.60) LR	0.33 (1.07) MR	2.25 (1.49) MR	4.17 (2.16) LR	2.28 (1.67)R	3.00 (1.85) **R**	13.17 (3.69)LR	1.33 (1.35)
5.	**SL 1068**	14.25 (22.15) LR	0.84 (1.41) LR	3.50 (1.86) LR	8.17 (2.89) HS	2.36 (1.69) **R**	5.00 (2.34) MR	14.17 (3.81)S	1.17 (1.27)
6.	**JS 21-15**	7.85 (16.13) **R**	0.67 (1.29) LR	6.25 (2.50) S	2.84 (1.83) MR	3.14 (1.91)MR	1.00 (1.14) **R**	6.67 (2.67) MR	1.17 (1.28)
7.	**AUKS 174**	21.25 (27.02) LR	0.84 (1.41) LR	3.50 (1.87) LR	2.83 (1.82) MR	3.56 (2.01)MR	4.00 (2.12) MR	9.00 (3.07) MR	0.67 (1.06)
8.	**NRC 137**	20.00 (26.16) LR	0.33 (1.07) MR	1.75 (1.32) MR	5.00 (2.34) LR	4.03 (2.13)LR	3.00 (1.85)MR	13.83 (3.78) LR	0.67 (1.08)
9.	**VLS 95**	17.75 (23.38) LR	0.67 (1.29) LR	1.60 (1.27) **R**	4.67 (2.27) LR	3.78 (2.07)LR	6.00 (2.41) MR	9.83 (3.21) LR	0.50 (0.96)
10.	**CSB 10084**	14.25 (22.15)LR	0.50 (1.20) MR	2.65 (1.63) LR	4.50 (2.24) LR	4.17 (2.16)LR	7.00 (2.73) LR	10.67 (3.33) LR	1.00 (1.19)
11.	**MACS 1493**	18.00 (23.19)LR	0.67 (1.29) LR	1.25 (1.12) **HR**	5.34 (2.41) LR	3.03 (1.88)MR	7.00 (2.56) LR	11.67 (3.48) LR	1.33 (1.35)
12.	**JS 20-17**	17.5 (24.72) LR	0.67 (1.29) LR	1.50 (1.22) **R**	5.00 (2.34) LR	4.87 (2.32)LR	2.00 (1.41) **HR**	7.83 (2.88) MR	0.33 (0.91)
13.	**NRC 130**	15.75 (23.38) LR	0.33 (1.07) MR	0.50 (0.70) **HR**	4.83 (2.31) LR	5.68 (2.49)S	6.00 (2.55) LR	9.17 (3.10) MR	0.67 (1.06)
14.	**TS 53**	17.00 (21.35) LR	0.33 (1.07) MR	1.00 (1.00) **HR**	4.67 (2.27) LR	6.03 (2.56)HS	2.00 (1.41) **HR**	13.33 (3.70) LR	0.67 (1.06)
15.	**RVS 2011-4**	**NOT GERMINATED**							

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
16.	**SL 1123**	14.75 (22.55) LR	0.33 (1.07) MR	0.50 (0.70) **HR**	4.34 (2.20) LR	3.27 (1.94)MR	3.00 (1.85) **R**	15.67 (4.01) S	0.33 (0.89)
17.	**BAUS 102**	23.75 (29.17) S	0.33 (1.07) MR	2.25 (1.56)	4.67 (2.27) LR	3.66 (2.04)MR	7.00 (2.73) LR	8.17 (2.94) MR	1.33 (1.33)
18.	**MACSNRC 1575**	22.00 (27.97) S	0.33 (1.07) MR	0.25 (0.50) **HR**	4.50 (2.23) LR	4.38 (2.21)LR	4.00 (2.07) MR	13.17 (3.69) LR	1.33 (1.33)
19.	**MAUS 731**	14.50 (22.36) LR	0.50 (1.20) MR	2.00 (1.41) MR	2.34 (1.68) R	3.45 (1.99)MR	3.00 (1.63) **R**	16.67 (4.10)HS	0.83 (1.15)
20.	**NRC 132**	18.75 (25.26) LR	0.50 (1.20) MR	2.75 (1.66) LR	4.50 (2.24) LR	3.23 (1.93)MR	1.00 (1.14) **HR**	11.17 (3.41) LR	0.50 (0.99)
21.	**VLS 94**	15.50 (23.19) LR	0.50 (1.20) MR	3.00 (1.73) LR	4.34 (2.19) LR	3.15 (1.91)MR	2.00 (1.58) **HR**	10.50 (3.31) LR	1.33 (1.29)
22.	**AMS 2014-1**	12.75 (20.92) LR	0.50 (1.20) MR	1.75 (1.32) MR	5.00 (2.34) LR	4.69 (2.28)LR	13.00 (3.65)S	11.50 (3.44) LR	0.50 (0.96)
23.	**KDS 1095**	13.75 (22.24) LR	0.33 (1.07) MR	3.50 (1.87) LR	4.50 (2.23) LR	3.58 (2.02)MR	8.00 (2.89) LR	6.67 (2.67) LR	0.50 (0.99)
24.	**NRC 133**	9.50 (17.95) MR	0.50 (1.20) MR	3.00 (1.73) LR	2.84 (1.83) MR	4.86 (2.32)LR	2.00 (1.58) **HR**	11.17 (3.41) LR	0.50 (0.99)
25.	**DS 3108**	14.00 (21.96) LR	0.67 (1.29) LR	3.25 (1.80) LR	4.84 (2.31) LR	3.85 (2.09)MR	7.00 (2.68) LR	6.50 (2.64) MR	0.33 (0.89)
26.	**AMS 100-39**	12.50 (20.70) MR	0.50 (1.20) MR	2.25 (1.50) MR	4.83 (2.31) LR	3.06 (1.89)MR	14.50 (3.86) S	9.17 (3.10) MR	0.50 (0.96)
27.	**NRC 136**	11.75 (20.05) MR	0.33 (1.07) MR	2.25 (1.50) MR	4.50 (2.24) LR	3.24 (1.93)MR	1.00 (1.14) **HR**	12.33 (3.58) LR	0.33 (0.89)
28.	**RVS 2011-1**	14.00 (21.97) LR	0.67 (1.29) LR	1.50 (1.22) **R**	4.50 (2.23) LR	4.38 (2.21)LR	2.00 (1.41) **HR**	9.67 (3.18) LR	0.83 (1.15)
29.	**CSB 10112**	13.25 (21.34) MR	0.50 (1.20) MR	1.50 (1.22) **R**	4.50 (2.24) LR	5.43 (2.44)S	3.00 (1.63) **R**	14.00 (3.80) LR	0.67 (1.06)
30.	**PS 1613**	10.25 (18.64) MR	0.33 (1.07) MR	2.50 (1.60) LR	4.67 (2.26) LR	5.56 (2.46)S	11.00 (3.31) S	9.17 (3.10) MR	0.50 (0.99)
31.	**NRC 131**	8.50 (16.92) **R**	0.50 (1.20) MR	2.00 (1.41) MR	5.00 (2.34) LR	4.85 (2.31)LR	6.00 (2.55) LR	10.50 (3.30) LR	0.83 (1.15)
32.	**KDS 992**	8.00 (16.42) **R**	0.33 (1.07) MR	1.00 (1.00) **HR**	4.67 (2.27) LR	3.00 (1.87)MR	4.00 (2.07) MR	10.33 (3.28) LR	0.50 (0.99)
33.	**RSC 11-07**	7.75 (16.16) **R**	0.50 (1.20) MR	2.00 (1.41) MR	4.50 (2.23) LR	2.47 (1.72) **R**	5.00 (2.34)MR	7.00 (2.73) MR	0.67 (1.06)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
34.	**NRCSL 1**	11.25 (19.57) MR	0.33 (1.07)MR	6.25 (1.80) LR	4.50 (2.24) LR	3.45 (1.99)MR	6.00 (2.55) LR	10.83 (3.33) LR	0.67 (1.02)
35.	**PS 1611**	10.50 (18.91) MR	0.33 (1.07) MR	2.50 (1.55) MR	4.50 (2.23) LR	3.70 (2.05)MR	5.00 (2.34)MR	4.83 (2.28) **HR**	0.83 (1.15)
36.	**RSC 11-03**	14.50 (22.38) LR	0.50 (1.20) MR	8.00 (2.83) S	4.67 (2.27) LR	4.13 (2.15)LR	6.00 (2.55) LR	11.00 (3.38) LR	0.67 (1.06)
37.	**NRC 134**	15.50 (23.16) LR	0.83 (1.36) LR	5.75 (2.31) S	4.83 (2.31) LR	3.44 (1.98)MR	3.00 (1.63) **R**	7.50 (2.82) MR	0.67 (1.08)
38.	**NRC 129**	7.00 (15.33) **R**	0.50 (1.20)MR	2.00 (1.41) MR	5.00 (2.34) LR	5.78 (2.51)S	6.00 (2.12) LR	6.00 (2.54) MR	0.83 (1.13)
39.	**RVS 2011-2**	22.25 (28.14) S	0.50 (1.20) MR	3.25 (1.80) LR	4.34 (2.20) LR	2.98 (1.87)MR	7.00 (2.68) LR	8.67 (3.01) MR	0.67 (1.08)
40.	**SKF-SPS-11**	9.50 (17.90) MR	0.50 (1.20) MR	7.25 (2.69) S	4.67 (2.27) LR	3.13 (1.91)MR	6.00 (2.55) LR	6.33 (2.61) MR	0.33 (0.91)
41.	**SKF-1050**	9.50 (17.90) MR	0.67 (1.29) LR	.075 (0.86) **HR**	4.17 (2.16) LR	3.85 (2.09)LR	1.00 (1.14) **HR**	7.00 (2.70) MR	0.50 (0.99)
42.	**Shalimar Soybean**	-	0.50 (1.20)MR	-	4.84 (2.31) LR	5.02 (2.35)LR	2.00 (1.58) **HR**	9.00 (2.99) MR	0.67 (1.06)
43.	**Bragg (C)**	-	-	-	-	4.54 (2.24)LR	-	-	-
44.	**NRC 37 (C)**	-	-	-	-	3.23 (1.93)MR	-	-	-
45.	**NRC 86 (C)**	9.75 (18.18) MR	0.17 (0.79) **HR**	-	1.17 (1.29) **HR**	3.47 (1.99) MR	-	13.67 (3.75) LR	0.67 (1.06)
46.	**JS 335 (C)**	-	4.17 (2.54) HS	-	4.84 (2.31) LR	3.56 (2.01)MR	9.00 (2.96) S	7.00 (2.66) MR	0.17 (0.80)
47.	**JS 20-34 (C)**	9.25 (17.71) MR	2.17 (1.97) HS	-	1.84 (1.53) HR	4.12 (2.15)LR	-	3.83 (2.08) **HR**	0.50 (0.99)
48.	**JS 93-05 (C)**	-	-	-	-	3.35 (1.96)MR	-	-	-
49.	**JS 95-60 (C)**	10.00 (18.41) MR	-	-	-	3.69 (2.05)MR	-	-	-
50.	**JS 97-52 (C)**	-	2.17 (1.96) HS	-	1.84 (1.53) **HR**	3.44 (1.98)MR	10.00 (2.73) S	6.50 (2.64) MR	0.83 (1.15)
51.	**JS 75-46 (C)**	-	-	-	-	3.52 (2.00)MR	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
52.	**JS 72-44 (C)**	-	-	-	-	3.39 (1.97)MR	-	-	-
53.	**RKS 18 (C)**	-	-	-	-	4.06 (2.14)LR	10.00 (2.73) S	-	-
54.	**Pusa 97-12 (C)**	-	-	5.00 (2.24) S	-	4.81 (2.30)LR	-	-	-
55.	**PS1347 (C)**	-	-	5.50 (2.34) S	-	3.53 (2.01)MR	-	-	-
56.	**PS 1092 (C)**	-	-	-	-	3.29 (1.95)MR	-	-	-
57.	**SL 958 (C)**	-	-	1.25 (1.11) **HR**	-	5.19 (2.39)LR	-	-	-
58.	**Shivalik (C)**	-	-	-	-	3.98 (2.12)LR	-	-	-
59.	**SL688 (C)**	-	-	-	-	4.89 (2.32)LR	-	-	-
60.	**VLS 58 (C)**	-	-	-	-	3.47 (1.99)MR	-	-	-
61.	**VLS 59 (C)**	-	-	-	-	4.78 (2.30)LR	-	-	-
62.	**VLS 63 (C)**	-	-	-	-	4.18 (2.16)LR	-	-	-
63.	**Punjab 1 (C)**	-	-	-	-	6.38 (2.62)HS	-	-	-
64.	**DSB-21 (C)**	-	-	-	-	3.65 (2.04)MR	-	-	-
65.	**MAUS 158 (C)**	-	-	-	-	-	-	7.50 (2.82) MR	0.33 (0.91)
66.	**MAUS 2 (C)**	-	-	-	-	-	-	10.50 (3.31) LR	1.00 (1.22)
	SEm+	**(1.95)**	**(0.11)**	**(0.10)**	**(0.12)**	**(0.12)**	**(0.69)**	**(0.23)**	**(0.14)**
	CD at 5 %	**(5.57)**	**(0.32)**	**(0.29)**	**(0.35)**	**(0.34)**	**(1.40)**	**(0.65)**	**(0.41/NS)**

Table 3.15: Ent. 4 d. Field screening of IVT entries for resistance to major insect pests(Pod borer, Aphids, White fly, Leaf webber, Bean bug and YMV Rating)

S.No.	Entry	Aphid 3 leaf/plant				White fly		Leaf webber larvae/m		YMV Rating
		Dharwad	Imphal	Pantnagar	Medziphema	Pantnagar	Parbhani	Imphal	Medziphema	Delhi
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.	NRC 128	19.50 (26.19)MR	63.00 (7.97) S	6.48 (2.55) **HR**	21.65 (4.70)HS	7.35 (2.71) LR	1.90 (1.53)	7.00 (2.73) MR	1.95 (1.57)MR	1
2.	RVS 2011-3	22.57 (28.35)MR	51.20 (6.71) LR	9.33 (3.05) LR	14.10 (3.82)LR	10.17 (3.19) S	2.40 (1.69)	15.00 (3.93)LR	3.68 (2.04)S	1
3.	DSb 34	20.78 (27.11)MR	0.00 (0.71) **R**	2.34 (1.53) **HR**	7.10 (2.76)**R**	6.18 (2.49) MR	2.70 (1.69)	4.50 (2.16) MR	1.80 (1.52)**R**	7
4.	MAUS 725	16.78 (24.17) **R**	14.20 (3.04) MR	2.82 (1.68) **HR**	3.10 (1.87) **HR**	5.34 (2.31) **HR**	1.70 (1.46)	12.50 (3.55) LR	1.50 (1.41)MR	7
5.	SL 1068	23.82 (29.20)MR	30.00 (5.52) LR	10.02 (3.17) LR	2.70 (1.76) **HR**	6.18 (2.48) MR	0.60 (1.04)	9.00 (3.08)MR	3.25 (1.94)S	3
6.	JS 21-15	24.40 (29.59)LR	7.80 (2.36) MR	6.66 (2.58) **HR**	4.60 (2.25) **HR**	8.34 (2.89) S	2.20 (1.63)	17.00 (4.03)LR	2.90 (1.84)LR	5
7.	AUKS 174	21.94 (27.92)MR	24.60 (4.69) LR	9.18 (3.03) LR	12.20 (3.56)MR	6.66 (2.58) MR	1.30 (1.31)	7.50 (2.82)MR	2.60 (1.76)LR	7
8.	NRC 137	23.37 (28.90)MR	58.00 (7.62) S	4.68 (2.16) **HR**	6.25 (2.59) **R**	6.66 (2.58) MR	0.90 (1.17)	10.00 (3.24)LR	2.00 (1.58)MR	5
9.	VLS 95	22.57 (28.35)MR	42.80 (6.45) LR	11.67 (3.41) S	12.00 (3.32)LR	6.33 (2.52) MR	1.10 (1.26)	7.00 (2.71)MR	1.80 (1.51)R	BB
10.	CSB 10084	23.65 (29.09)LR	39.00 (6.27) LR	13.35 (3.65) S	17.35 (4.19)S	5.34 (2.30) **HR**	1.70 (1.46)	6.00 (2.52) MR	2.85 (1.83)LR	9
11.	MACS 1493	16.04 (23.60)MR	34.00 (5.35) LR	5.19 (2.27) **HR**	4.25 (2.17) **R**	6.51 (2.55) MR	2.40 (1.68)	4.50 (2.21) MR	1.70 (1.48)R	9
12.	JS 20-17	25.91 (30.59)LR	35.20 (5.92) LR	6.18 (2.48) **HR**	5.30 (2.40) **R**	5.85 (2.42) MR	1.70 (1.40)	13.50 (3.67) LR	0.70 (1.09) HR	3
13.	NRC 130	31.63 (34.21)S	14.00 (3.77) MR	9.33 (3.06) LR	2.75 (1.80) **HR**	5.82 (2.41) **R**	2.40 (1.68)	3.00 (1.63) **R**	2.00 (1.57)MR	5
14.	TS 53	26.99 (31.29)LR	56.60 (7.39) LR	10.02 (3.17) S	21.05 (4.62) **HR**	6.84 (2.62) MR	2.90 (1.79)	16.00 (4.03) LR	2.65 (1.77)LR	7
15.	RVS 2011-4	NOT GERMINATED								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
16.	**SL 1123**	22.32 (28.18)MR	51.40 (7.20) LR	13.50 (3.67) S	21.60 (4.69) **HR**	5.67 (2.38) **R**	0.90 (1.17)	9.00 (2.82) MR	2.75 (1.80)LR	0
17.	**BAUS 102**	24.68 (29.78)LR	10.00 (2.62) MR	4.50 (2.12)LR	5.25 (2.39) **R**	5.67 (2.38) **R**	1.30 (1.32)	22.50 (4.80) S	1.35 (1.34)**R**	9
18.	**MACSNRC 1575**	30.56 (33.55)S	0.00 (0.71) **R**	17.01 (4.12) S	3.50 (2.00) **HR**	4.02 (2.01) **HR**	1.90 (1.48)	8.00 (2.92) MR	1.60 (1.44)**R**	3
19.	**MAUS 731**	23.15 (28.75)MR	12.00 (2.83) MR	6.00 (2.45) **HR**	3.95 (2.09) **HR**	6.18 (2.49) MR	3.10 (1.87)	7.00 (2.74) MR	2.55 (1.75)LR	7
20.	**NRC 132**	24.34 (29.55)LR	53.00 (7.30) LR	16.17 (4.02) S	6.35 (2.61) **R**	9.84 (3.14) S	1.10 (1.25)	12.00 (3.52) LR	2.60 (1.76)LR	5
21.	**VLS 94**	23.08 (28.70)MR	26.20 (5.14) LR	4.02 (2.00) **HR**	4.10 (2.13) **HR**	12.33 (3.51) S	1.70 (1.46)	6.50 (2.60) MR	2.75 (1.80)LR	5
22.	**AMS 2014-1**	28.43 (32.21)LR	16.60 (4.10) LR	1.50 (1.23) **HR**	21.50 (4.67) **HR**	6.99 (2.64) LR	2.40 (1.70)	12.50 (3.60) LR	3.60 (2.02)S	9
23.	**KDS 1095**	24.47 (29.64)LR	20.00 (4.31) MR	7.50 (2.74) MR	1.75 (1.50) **HR**	6.33 (2.52) MR	2.80 (1.81)	4.50 (2.23) MR	3.30 (1.93)S	7
24.	**NRC 133**	33.43 (35.31)S	20.80 (4.44) MR	9.84 (3.14) S	4.25 (2.17) **HR**	8.16 (2.86) S	2.20 (1.63)	16.00 (4.05) LR	1.90 (1.55)MR	5
25.	**DS 3108**	27.65 (31.71)LR	11.00 (3.31) MR	12.00 (3.46) S	3.25 (1.93) **HR**	4.86 (2.20) **HR**	3.80 (2.07)	9.50 (3.11) MR	2.30 (1.67)MR	3
26.	**AMS 100-39**	28.09 (31.99)LR	4.00 (1.81) **R**	13.68 (3.70) S	1.50 (1.41) **HR**	5.34 (2.31) **HR**	3.50 (1.98)	11.00 (3.36) LR	2.10 (1.59)MR	7
27.	**NRC 136**	25.61 (30.39)LR	39.60 (6.31) LR	11.67 (3.42) S	8.20 (2.95) **R**	10.35 (3.21) S	1.90 (1.53)	15.50 (4.00) MR	2.15 (1.61)MR	7
28.	**RVS 2011-1**	28.45 (32.22)LR	45.80 (6.80) LR	18.00 (4.24) S	10.00 (3.21)MR	9.18 (3.03) S	1.70 (1.47)	14.00 (3.79) LR	2.15 (1.63)MR	9
29.	**CSB 10112**	30.03 (33.22)S	51.80 (7.23) LR	7.02 (2.65) **R**	20.00 (4.52)HS	9.18 (3.03) S	2.00 (1.56)	5.00 (2.25) MR	1.75 (1.50)**R**	7
30.	**PS 1613**	27.56 (31.65)LR	45.60 (6.77) LR	2.67 (1.63) **HR**	21.85 (4.72)HS	4.68 (2.16) **HR**	1.50 (1.41)	6.50 (2.60) MR	2.80 (1.81)LR	7

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
31.	**NRC 131**	26.54 (31.00)LR	10.40 (3.30) MR	14.19 (3.77) S	6.00 (2.52) **R**	10.80 (3.29) S	2.70 (1.78)	13.00 (3.67) LR	2.40 (1.70)LR	7
32.	**KDS 992**	21.32 (27.49)MR	18.40 (4.30) MR	7.50 (2.74) MR	5.75 (2.47) **R**	4.68 (2.16) **HR**	2.60 (1.75)	7.00 (2.68)MR	1.75 (1.50)R	BB
33.	**RSC 11-07**	15.46 (23.14) **R**	20.40 (4.38) MR	3.84 (1.96) **HR**	3.30 (1.95) **HR**	6.00 (2.45) MR	4.20 (2.16)	7.00 (2.74) MR	2.40 (1.69)MR	9
34.	**NRCSL 1**	18.65 (25.58)MR	14.00 (3.72) MR	4.35 (2.08) **HR**	3.85 (2.07) **HR**	3.51 (1.87) **HR**	1.30 (1.32)	11.00 (3.39) LR	3.50 (2.00)S	3
35.	**PS 1611**	23.76 (29.16)MR	16.00 (3.20) MR	9.84 (3.14) S	3.00 (1.87) **HR**	5.01 (2.24) **HR**	3.00 (1.86)	4.00 (2.12) MR	2.45 (1.71)MR	3
36.	**RSC 11-03**	24.89 (29.92)LR	16.00 (4.03) MR	5.19 (2.28) **HR**	1.60 (1.44) **HR**	6.18 (2.84)S	2.90 (1.81)	5.00 (2.34) MR	2.10 (1.59)MR	5
37.	**NRC 134**	24.08 (29.38)LR	57.00 (7.50) S	8.01 (2.80) LR	19.50 (4.46)HS	8.01 (2.80)MR	2.40 (1.68)	22.50 (4.75) S	4.20 (2.16)HS	7
38.	**NRC 129**	33.45 (35.32)HS	12.00 (3.32) MR	7.50 (2.74) MR	3.80 (2.06) **HR**	6.66 (2.58) MR	1.40 (1.36)	9.00 (3.04) MR	2.55 (1.74)LR	3
39.	**RVS 2011-2**	24.06 (29.36)LR	41.00 (6.42) LR	9.66 (3.11) LR	14.00 (3.80)LR	6.18 (2.49) MR	1.10 (1.26)	10.00 (3.18) MR	3.75 (2.06)HS	3
40.	**SKF-SPS-11**	23.09 (28.71)MR	12.40 (3.41) MR	9.84 (3.14) S	6.05 (2.53) **R**	4.32 (2.08) **HR**	1.60 (1.44)	17.00 (4.18) LR	2.35 (1.65)MR	9
41.	**SKF-1050**	27.86 (31.85)LR	2.40 (1.50) **R**	7.17 (2.68) **R**	20.30 (4.56)HS	5.67 (2.38) **R**	1.20 (1.30)	11.00 (3.36) LR	3.55 (2.01)S	1
42.	**Shalimar Soybean**	35.23 (36.39)HS	51.60 (7.19) LR	-	-	-	1.90 (1.54)	18.00 (4.29) LR	-	-
43.	**Bragg (C)**	21.43 (27.56)MR	-	-	-	-	-	-	-	-
44.	**Shivalik (C)**	26.85 (31.20)LR	-	-	-	-	-	-	-	-
45.	**JS-335 (C)**	25.03 (30.01)LR	24.80 (4.97) LR	-	6.25 (2.59) **R**	-	2.50 (1.67)	15.00 (3.92) LR	2.75 (1.79)LR	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
46.	**JS 20-34 (C)**	24.32 (29.54)LR	-	-	-	-	3.20 (1.84)	-	-	-
47.	**JS 72-44 (C)**	23.34 (28.88)MR	-	-	-	-	-	-	-	-
48.	**JS 75-46 (C)**	22.46 (28.28)MR	-	-	-	-	-	-	-	-
49.	**JS 93-05 (C)**	20.50 (26.91)MR	-	-	6.25 (2.59) **R**	-	-	-	3.25 (1.93)S	
50.	**JS 95-60 (C)**	23.25 (28.82)MR	-	-		-	-	-	-	-
51.	**JS 97-52 (C)**	24.10 (29.39)LR	33.60 (5.82) LR	-	4.55 (2.25) **HR**	-	1.80 (1.51)	11.50 (3.46) LR	3.05 (1.88)S	-
52.	**RKS - 18 (C)**	18.29 (25.31)MR	33.40 (5.79) LR	-	11.00 (3.39)MR	-	-	15.50 (4.36) LR	3.15 (1.91)S	-
53.	**Pusa 97-12 (C)**	27.52 (31.63)LR	-	23.49 (4.85) S	-	7.35 (2.71) LR	-	-	-	-
54.	**PS 1042(C)**		-	-	4.93 (2.31) **R**		-	-	2.25 (1.66)MR	
55.	**PS 1092 (C)**	21.35 (27.51)MR	-	-	-	-	-	-	-	-
56.	**PS1347 (C)**	26.38 (30.89)LR	-	10.68 (3.27) S		7.86 (2.80) LR	-	-	-	-
57.	**Punjab 1 (C)**	33.22 (35.18)HS	-	-	-	-	-	-	-	-
58.	**NRC 37 (C)**	17.05 (24.38)MR	-	-	-	-	-	-	-	-
59.	**NRC 86 (C)**	25.51 (30.32)LR	-	-	-	-	1.70 (1.47)	-	-	-
60.	**VLS 58 (C)**	23.87 (29.23)LR	-	-	-	-	-	-	-	-
61.	**VLS 59 (C)**	23.44 (28.95)MR	-	-	-	-	-	-	-	-
62.	**VLS 63 (C)**	24.54 (29.68)LR	-	-	-	-	-	-	-	-
63.	**SL 688 (C)**	32.43 (34.70)LR	-	-	-	-	-	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
64.	**SL 958 (C)**	28.35 (32.16)LR	-	14.64 (3.82) S	-	5.82 (2.41) **R**	-	-	-	-
65.	**DSb 21 (C)**	22.82 (28.52)MR	-	-	-	-	-	-	-	-
66.	**MAUS 158 (C)**	-	-	-	-	-	1.20 (1.30)	-	-	-
67.	**MAUS 2 (C)**	-	-	-	-	-	2.50 (1.67)	-	-	-
	SE ±	**(1.42)**	**(1.65)**	**(0.79)**	**(0.24)**	**(0.21)**	**(0.22)**	**(0.65)**	**(0.12)**	
	CD at 5 %	**(4.25)**	**(3.33)**	**(0.22)**	**(0.69)**	**(0.74)**	**(0.61/ NS)**	**(1.32)**	**(0.33)**	

Table 3.16: Ent. 4 d. Field screening of IVT entries for resistance to major insect pests (Leaf hopper, Blister beetle, Pod bug, Pod borer and Jassids)

Code	Entry	Leaf hopper/plant	Blister beetle/m	Pod Bug/m	No. of *H. armigera* larvae/m	No. of Jassids/ plant
		Medziphema			Parbhani	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	NRC 128	2.98 (1.86)LR	2.00 (1.58) **HR**	0.12 (0.78) **HR**	1.00 (1.22)	0.70 (1.08)
2.	RVS 2011-3	2.63 (1.76)MR	2.65 (1.77) **R**	1.43 (1.38) **R**	0.83 (1.13)	0.60 (1.03)
3.	DSb 34	1.08 (1.25) **HR**	2.99 (1.87) **R**	2.75 (1.80)MR	0.33 (0.91)	0.60 (1.04)
4.	MAUS 725	4.08 (2.14)S	2.75 (1.80) **R**	1.30 (1.32) **R**	0.83 (1.15)	0.30 (0.89)
5.	SL 1068	2.03 (1.59) **R**	2.38 (1.68) **R**	1.14 (1.28) **R**	0.33 (0.91)	0.40 (0.94)
6.	JS 21-15	1.65 (1.47) **HR**	1.23 (1.31) **HR**	2.30 (1.67)MR	1.33 (1.34)	0.60 (1.04)
7.	AUKS 174	1.90 (1.54) **R**	3.18 (1.90)MR	1.56 (1.43) **R**	0.50 (0.99)	0.50 (0.99)
8.	NRC 137	4.75 (2.29)HS	5.88 (2.51)HS	2.75 (1.80)MR	0.67 (1.02)	0.20 (0.82)
9.	VLS 95	1.33 (1.35) **HR**	2.73 (1.79) **R**	2.40 (1.70)MR	0.17 (0.80)	0.70 (1.09)
10.	CSB 10084	2.93 (1.85)LR	4.35 (2.19)LR	2.20 (1.64)MR	0.50 (0.96)	1.20 (1.28)
11.	MACS 1493	2.25 (1.66) **R**	4.07 (2.13)LR	0.92 (1.18) **HR**	0.67 (1.06)	0.50 (0.98)
12.	JS 20-17	3.48 (1.99)LR	2.25 (1.65) **R**	2.35 (1.68)MR	0.67 (1.06)	0.20 (0.82)
13.	NRC 130	1.98 (1.57) **R**	3.83 (2.08)MR	1.90 (1.53) **R**	0.67 (1.08)	0.40 (0.94)
14.	TS 53	2.15 (1.63) **R**	4.82 (2.30)S	4.30 (2.18)S	0.83 (1.13)	0.50 (0.99)
15.	RVS 2011-4	**NOT GERMINATED**				
16.	SL 1123	2.75 (1.80)MR	2.85 (1.82)**R**	0.78 (1.10)MR	0.67 (1.06)	0.50 (0.99)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
17.	**BAUS 102**	1.75 (1.50) **R**	3.03 (1.85)MR	0.72 (1.10) **R**	1.50 (1.38)	0.90 (1.17)
18.	**MACSNRC 1575**	1.89 (1.54) **R**	4.27 (2.16)LR	1.73 (1.48) **R**	1.50 (1.40)	0.40 (0.94)
19.	**MAUS 731**	1.70 (1.48) **R**	5.57 (2.44)S	3.90 (2.10)LR	0.33 (0.91)	0.00 (0.70)
20.	**NRC 132**	2.83 (1.82)MR	4.16 (2.13)LR	2.85 (1.83)MR	0.67 (1.08)	0.80 (1.14)
21.	**VLS 94**	2.03 (1.59) **R**	2.42 (1.71) **R**	2.85 (1.82)LR	0.17 (0.80)	0.40 (0.94)
22.	**AMS 2014-1**	2.55 (1.74)MR	4.58 (2.25)LR	1.15 (1.28) **R**	0.33 (0.89)	0.80 (1.13)
23.	**KDS 1095**	2.00 (1.58) **R**	3.66 (2.03)MR	1.75 (1.49) **R**	0.17 (0.80)	0.20 (0.83)
24.	**NRC 133**	3.40 (1.97)LR	3.15 (1.91)MR	3.85 (2.08)LR	0.50 (0.96)	0.60 (1.04)
25.	**DS 3108**	1.95 (1.57) **R**	4.10 (2.13)LR	2.35 (1.68)MR	0.50 (0.99)	0.70 (1.08)
26.	**AMS 100-39**	1.68 (1.47) **HR**	2.87 (1.83) **R**	3.55 (2.01)LR	0.50 (0.99)	0.50 (0.98)
27.	**NRC 136**	2.20 (1.64)**R**	3.91 (2.08)LR	4.45 (2.22)S	0.83 (1.15)	0.30 (0.87)
28.	**RVS 2011-1**	4.25 (2.17)HS	5.05 (2.35)S	2.75 (1.79)MR	0.33 (0.89)	1.00 (1.22)
29.	**CSB 10112**	1.80 (1.52) **R**	3.00 (1.87) **R**	5.90 (2.53)HS	0.67 (1.06)	0.70 (1.07)
30.	**PS 1613**	1.73 (1.49) **R**	2.50 (1.71) **R**	4.10 (2.14)S	0.50 (0.96)	0.40 (0.94)
31.	**NRC 131**	1.60 (1.45) **HR**	4.83 (2.31)S	5.75 (2.50)HS	0.67 (1.06)	1.00 (1.22)
32.	**KDS 992**	2.75 (1.79)MR	4.20 (2.13)LR	0.78 (1.10) **HR**	1.33 (1.33)	0.60 (1.04)
33.	**RSC 11-07**	1.83 (1.51) **R**	4.90 (2.32)S	3.60 (2.02)LR	0.83 (1.13)	0.80 (1.13)
34.	**NRCSL 1**	3.08 (1.87)LR	3.75 (2.06)MR	5.45 (2.42)HS	1.00 (1.22)	0.60 (1.04)
35.	**PS 1611**	1.38 (1.36) **HR**	2.10 (1.59) **HR**	2.15 (1.63)MR	0.17 (0.80)	1.20 (1.30)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
36.	**RSC 11-03**	2.80 (1.79)MR	2.58 (1.75) **R**	4.60 (2.25)S	0.50 (0.96)	0.60 (1.03)
37.	**NRC 134**	3.15 (1.91)LR	6.55 (2.65)HS	2.55 (1.74)MR	0.50 (0.96)	0.70 (1.09)
38.	**NRC 129**	2.25 (1.64) **R**	5.00 (2.33)S	1.11 (1.22) **R**	1.00 (1.22)	0.40 (0.94)
39.	**RVS 2011-2**	1.30 (1.34) **HR**	4.16 (2.16)LR	1.90 (1.55) **R**	0.17 (0.80)	0.90 (1.17)
40.	**SKF-SPS-11**	4.03 (2.10)S	3.35 (1.96)MR	0.60 (1.05) **HR**	0.50 (0.96)	0.40 (0.92)
41.	**SKF-1050**	1.85 (1.53)**R**	4.33 (2.18)LR	3.50 (1.98)LR	0.67 (1.08)	0.30 (0.89)
42.	**Shalimar Soybean**				0.50 (0.96)	0.60 (1.04)
43.	**NRC 86 (C)**	-	-	-	0.17 (0.80)	0.40 (0.94)
44.	**JS 20-34 (C)**	-	-	-	0.00 (0.70)	0.30 (0.89)
45.	**JS 335 (C)**	2.25 (1.64) **R**	1.28 (1.27) **HR**	1.93 (1.54) **R**	0.50 (0.99	0.60 (1.03)
46.	**JS 97-52(C)**	1.75 (1.50) **R**	1.92 (1.52) **HR**	3.60 (1.98)LR	0.17 (0.80)	0.50 (0.99)
47.	**RKS 18(C)**	2.18 (1.63) **R**	4.91 (2.32)S	1.79 (1.70) **R**	-	-
48.	**JS 93-05(C)**	2.65 (1.77)MR	3.91 (2.09)LR	1.60 (1.44) **R**	-	-
49.	**PS 1042(C)**	3.05 (1.87)LR	1.29 (1.31) **HR**	3.85 (2.08)LR	-	-
50.	**PS 1347 (C)**	-	-	-	-	-
51.	**PUSA 97-12(C)**	-	-	-	-	-
52.	**SL 958 (C)**	-	-	-	-	-
	SE ±	**(0.11)**	**(0.17)**	**(0.14)**	**(0.15)**	**(0.11)**
	CD at 5 %	**(0.30)**	**(0.49)**	**(0.40)**	**(0.43/ NS)**	**(0.31/ NS)**

Table 3.17: Ent 5. Evaluation of Bt 127 SC strain for efficacy against lepidopteran larvae infesting soybean

	Treatments	Sehore								Kota			
		Gesonia gemma				*Chrysodeixis acuta*				*Spodoptera litura*			
		1st spray		2nd spray		1st spray		2nd spray		1st spray		2nd spray	
		3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT
1	**Bt 127 SC @ 3 ml/l water**	0.66 (1.07)	0.66 (1.07)	1.41 (1.38)	0.49 (0.99)	1.33 (1.34)	0.66 (1.07)	1.66 (1.28)	0.92 (1.19)	2.00 (1.58)	1.75 (1.50)	1.75 (1.50)	2.00 (1.58)
2	**Bt Commercial Delfin @ 1 g/l water**	2.16 (1.63)	1.33 (1.35)	1.83 (1.52)	1.00 (1.22)	1.99 (1.57)	1.16 (1.28)	2.33 (1.67)	1.22 (1.31)	2.25 (1.65)	2.00 (1.58)	2.00 (1.58)	2.25 (1.66)
3	**Indoxacarb 15.8 EC @ 333 ml/ha**	0.35 (0.91)	0.10 (0.76)	0.58 (1.02)	0.24 (0.85)	0.66 (1.06)	0.35 (0.91)	0.67 (1.08)	0.33 (0.91)	1.50 (1.41)	1.25 (1.30)	1.00 (1.20)	1.00 (1.22)
4	**Quinalphos 25 EC @ 1500 ml/ha**	0.83 (1.19)	0.25 (0.87)	0.75 (1.12	0.33 (0.91)	0.83 (1.19)	0.83 (1.19)	0.75 (1.12)	0.42 (0.96)	1.25 (1.32)	1.00 (1.22)	0.75 (1.12)	0.75 (1.12)
5	**Chlorantraniliprole 18.5 SC @ 150 ml/ha**	0.50 (1.00)	0.15 (0.79)	0.41 (0.99)	0.33 (0.90)	0.66 (1.06)	0.50 (1.00)	0.92 (1.19)	0.17 (0.82)	1.25 (1.31)	0.75 (1.12)	0.50 (1.00)	0.50 (1.00)
6	**Untreated check**	4.00 (2.12)	5.82 (2.51)	4.33 (2.19)	11.74 (3.49)	4.58 (2.24)	4.00 (2.12)	3.99 (2.13)	2.75 (1.80)	4.00 (2.12)	5.25 (2.40)	7.00 (2.74)	7.75 (2.87)
	SEm±	**(0.06)**	**(0.07)**	**(0.07)**	**(0.17)**	**(0.13)**	**(0.06)**	**(0.15)**	**(0.09)**	**(0.059)**	**(0.066)**	**(0.073)**	**(0.046)**
	CD at 5 %	**(0.18)**	**(0.22)**	**(0.22)**	**(0.54)**	**(0.41)**	**(0.18)**	**(0.44)**	**(0.27)**	**(0.177)**	**(0.198)**	**(0.219)**	**(0.140)**

Table 3.17 contd..

	Treatments	Dharwad															
		Spodoptera litura (l/mrl)*				*Thysanoplusia orichalcea* (l/mrl)*				*Hedylepta indicata* (l/mrl)*				*Cydia ptychora* (% damage)**			
		1st spray		2nd spray		1st spray		2nd spray		1st spray		2nd spray		1st spray		2nd spray	
		3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT
1	**Bt 127 SC @ 3 ml/l water**	1.25 (1.32)	0.75 (1.12)	1.20 (1.30)	0.54 (1.02)	1.50 (1.41)	0.80 (1.14)	1.40 (1.38)	0.75 (1.12)	2.25 (1.66)	2.00 (1.58)	2.10 (1.61)	1.90 (1.55)	22.58 (28.36)	19.45 (26.16)	24.45 (29.62)	20.12 (26.64)
2	**Bt Commercial Delfin @ 1 g/l water**	1.50 (1.41)	1.20 (1.30)	1.75 (1.50)	1.25 (1.32)	1.75 (1.50)	1.20 (1.30)	2.00 (1.58)	1.75 (1.50)	2.75 (1.80)	2.50 (1.73)	2.80 (1.82)	2.40 (1.70)	25.19 (30.11)	24.47 (29.64)	26.78 (31.15)	25.14 (30.08)
3	**Indoxacarb 15.8 EC @ 333 ml/ha**	0.45 (0.97)	0.12 (0.79)	0.54 (1.02)	0.18 (0.82)	0.80 (1.14)	0.00 (0.71)	0.70 (1.10)	0.08 (0.76)	0.50 (1.00)	0.00 (0.71)	0.60 (1.05)	0.00 (0.71)	17.23 (24.52)	10.75 (19.13)	16.28 (23.79)	12.18 (20.42)
4	**Quinalphos 25 EC @ 1500 ml/ha**	1.95 (1.57)	1.50 (1.41)	2.25 (1.66)	1.70 (1.48)	1.25 (1.32)	0.70 (1.10)	1.25 (1.32)	0.80 (1.14)	2.50 (1.73)	2.10 (1.61)	2.40 (1.70)	2.25 (1.66)	23.21 (28.79)	20.17 (26.68)	25.32 (30.20)	22.08 (28.02)
5	**Chlorantraniliprole 18.5 SC @ 150 ml/ha**	0.27 (0.88)	0.02 (0.72)	0.19 (0.83)	0.08 (0.76)	1.20 (1.30)	0.08 (0.76)	1.00 (1.22)	0.12 (0.79)	1.50 (1.41)	1.00 (1.22)	1.00 (1.22)	0.80 (1.14)	12.23 (20.46)	7.45 (15.83)	10.29 (18.70)	8.10 (16.53)
6	**Untreated check**	4.75 (2.29)	5.80 (2.51)	5.85 (2.52)	7.28 (2.79)	4.12 (2.15)	5.53 (2.46)	5.27 (2.40)	6.97 (2.73)	5.15 (2.38)	6.86 (2.71)	4.90 (2.32)	6.01 (2.55)	32.18 (34.55)	37.45 (37.72)	36.45 (37.12)	38.18 (38.15)
	SEm+	**(0.08)**	**(0.06)**	**(0.09)**	**(0.07)**	**(0.18)**	**(0.20)**	**(0.21)**	**(0.20)**	**(0.24)**	**(0.22)**	**(0.26)**	**(0.20)**	**(0.88)**	**(0.75)**	**(0.92)**	**(0.78)**
	CD at 5 %	**(0.23)**	**(0.17)**	**(0.28)**	**(0.21)**	**(0.55)**	**(0.59)**	**(0.65)**	**(0.39)**	**(0.75)**	**(0.69)**	**(0.81)**	**(0.59)**	**(2.64)**	**(2.29)**	**(2.72)**	**(2.38)**

* Figures in the parenthesis are transformed $\sqrt{x + 0.5}$ values, ** Transformed angular values

Table 3.17 contd..

Treatments		Imphal												Indore			
		S. litura (larvae/ m)				Bean leaf webber/m				Bihar hairy caterpillar/m				*S. litura* (larvae/m)		Semilooper /m	
		1st spray		2nd spray		1st spray		2nd spray		1st spray		2nd spray					
		3DAT	7DAT	3DAT	7DAT	3DAT	7DAT	3DAT	7DAT	3DAT	7DAT	3DAT	7DAT	3DAT	7DAT	3DAT	7DAT
1	Bt 127 SC @ 3 ml/l water	0.25 (0.84)	0.25 (0.84)	1.70 (1.10)	0.50 (0.97)	2.75 (1.77)	1.25 (1.31)	1.25 (1.27)	1.75 (1.49)	60.75 (6.27)	43.75 (6.30)	8.50 (2.89)	4.50 (2.07)	9.59 (3.08)	7.92 (2.63)	7.42 (2.72)	9.25 (3.02)
2	Bt Commercial Delfin @ 1 g/l water	0.25 (0.84)	0.25 (0.84)	1.72 (0.97)	0.50 (0.97)	4.00 (2.07)	2.25 (1.65)	1.25 (1.26)	1.25 (1.27)	83.50 (9.04)	42.75 (6.39)	26.00 (4.95)	5.50 (2.23)	10.92 (3.30)	8.34 (2.87)	8.83 (2.97)	9.00 (2.99)
3	Indoxacarb 15.8 EC @ 333 ml/ha	0.00 (0.71)	0.25 (0.84)	1.61 (0.97)	0.00 (0.71)	2.50 (1.70)	0.75 (1.10)	0.75 (1.06)	0.75 (1.06)	0.00 (0.71)	11.00 (2.66)	0.00 (0.71)	0.50 (0.93)	6.83 (2.57)	6.25 (2.49)	1.25 (0.94)	3.83 (1.85)
4	Quinalphos 25 EC @ 1500 ml/ha	0.00 (0.71)	1.00 (1.18)	1.56 (0.71)	0.75 (1.10)	2.00 (1.56)	0.75 (1.06)	0.50 (0.93)	0.00 (0.71)	0.00 (0.71)	12.00 (2.27)	4.00 (1.77)	5.00 (1.90)	7.34 (2.68)	6.33 (2.48)	4.67 (2.13)	5.67 (2.36)
5	Chlorantraniliprole 18.5 SC @ 150 ml/ha	0.00 (0.71)	0.00 (0.71)	1.70 (0.71)	0.25 (0.84)	1.25 (1.27)	0.25 (0.84)	0.25 (0.84)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	1.00 (1.06)	0.00 (0.71)	6.25 (2.46)	5.34 (2.24)	3.59 (1.80)	5.75 (2.35)
6	Untreated check	2.00 (1.50)	4.75 (2.27)	2.34 (2.22)	4.75 (2.28)	8.75 (3.03)	4.00 (2.11)	3.75 (2.06)	3.00 (1.86)	161.00 (12.54)	135.00 (11.62)	51.00 (7.06)	22.00 (4.09)	11.25 (3.35)	12.75 (3.56)	8.75 (2.96)	10.42 (3.23)
	SEm+	-	-	-	-	-	-	-	-	-	-	-	-	**(0.21)**	**(0.24)**	**(0.24)**	**(0.21)**
	CD at 5 %	**(0.37)**	**(0.41)**	**(0.38)**	**(0.39)**	**(0.46)**	**(0.34)**	**(0.44)**	**(0.42)**	**(3.70)**	**(2.91)**	**(1.56)**	**(1.82)**	**(0.63)**	**(0.71)**	**(0.71)**	**(0.64)**

Table 3.18: Ent 5. Effect of Bt 127 SC strain on grain yield of soybean across locations

Treatments		Yield (kg/ha)				
		Kota	Imphal	Dharwad	Sehore	Mean
1	Bt 127 SC @ 3 ml/l water	1524	1259	1984	1577	**1586**
2	Bt Commercial Delfin @ 1 g/l water	1476	1321	1807	1488	**1523**
3	Indoxacarb 15.8 EC @ 333 ml/ha	1786	1494	2118	1753	**1788**
4	Quinalphos 25 EC @ 1500 ml/ha	1833	1537	1854	1676	**1725**
5	Chlorantraniliprole 18.5 SC @ 150 ml/ha	1881	1605	2196	1706	**1847**
6	Untreated check	1214	889	1487	1370	**1240**
	SEm+	**73.43**	-	**7.40**	**58.82**	-
	CD (P=0.05)	**221.34**	**106.69**	**22.30**	**182.35**	-

Table 3.19: Ent 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants [STEM FLY]

Treatment	% Seedling mortality due to stem fly		% Stem tunnelling due to stem fly									
	Pantnagar	Dharwad	Pantnagar		Sehore		Dharwad		Indore		Parbhani	
			30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG
T-1	3.03	2.12	18.00	68.00	4.54 (9.51)	23.28 (28.72)	5.67	7.25	4.37	23.84	26.63	33.39
T-2	2.88	3.15	49.00	69.00	14.08 (21.09)	42.61 (40.44)	10.15	15.38	22.00	36.74	33.72	41.01
T test	**NS**	**NS**	**S**	**NS**	**S**	**S**	**S**	**S**	**S**	**S**	**NS**	**S**

DAG – Days After Germination

Treatment	% Seedling mortality due to stem fly		% Stem tunnelling due to stem fly									
	Pantnagar	Dharwad	Pantnagar		Sehore		Dharwad		Indore		Parbhani	
			30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG
T-2	2.88	3.15	49.00	69.00	14.08 (21.09)	42.61 (40.44)	10.15	15.38	22.00	36.74	33.720	41.017
T-3	3.13	3.47	66.00	98.00	6.10 (11.82)	19.98 (26.28)	16.02	20.45	28.62	39.34	31.875	40.187
T test	**NS**	**NS**	**S**	**NS**	**S**	**S**	**S**	**S**	**NS**	**NS**	**NS**	**NS**

Table 3.20: Ent 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants [DEFOLIATORS]

Treatment	Defoliators (Nos. /m)																			
	Pantnagar								Dharwad						Sehore		Indore			
	BHC		GSL		Spodoptera		% Defoliation		Spodoptera		Semilooper		% Defoliation		30 DAG	45 DAG	Spodoptera		Semilooper	
	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG			30 DAG	45 DAG	30 DAG	45 DAG
T-1	0.00	0.07	1.57	7.94	0.60	2.27	1.70	4.70	3.15	4.76	2.35	4.67	12.50	21.50	1.59 (1.42	2.33 (1.66)	0.67	8.53	3.23	7.57
T-2	0.00	0.07	1.87	1.67	0.43	3.70	1.73	4.40	3.56	5.01	2.75	4.84	20.00	30.00	2.43 (1.72)	1.93 (1.56)	0.23	8.87	2.70	6.90
T test	**NS**	**NS**	**NS**	**S**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**S**	**S**	**S**	**NS**	**NS**	**NS**	**NS**	**NS**

Treatment	Defoliators (Nos. /m)																			
	Pantnagar								Dharwad						Sehore		Indore			
	BHC		GSL		Spodoptera		% Defoliation		Spodoptera		Semilooper		% Defoliation		30 DAG	45 DAG	Spodoptera		Semilooper	
	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG	30 DAG	45 DAG			30 DAG	45 DAG	30 DAG	45 DAG
T-2	0.00	0.07	1.87	1.67	0.43	3.70	1.73	4.40	3.56	5.01	2.75	4.84	20.00	30.00	2.43 (1.72)	1.93 (1.56)	0.23	8.87	2.70	6.90
T-3	0.07	0.23	1.13	2.47	0.23	5.73	1.07	2.07	4.03	5.12	2.66	4.53	18.50	27.50	1.63 (1.44)	1.76 (1.51)	0.37	9.23	2.73	7.43
T test	**NS**	**NS**	**S**	**NS**	**NS**	**NS**	**S**	**S**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**S**	**S**	**NS**	**NS**	**NS**	**NS**

BHC – Bihar Hairy Caterpillar; GSL – Green Semilooper

Table 3.21: Ent 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants [WHITE FLY]

Treatment	White fly (Nos. /leaf)										
	Pantnagar			Dharwad			Parbhani			Sehore	Indore
	10 DAG	20 DAG	30 DAG	10 DAG	20 DAG	30 DAG	10 DAG	20 DAG	30 DAG		
T-1	0.26	0.20	1.71	0.20	0.58	1.05	0.00	0.461	1.478	2.66 (1.78)	1.26
T-2	0.36	0.22	1.72	0.34	0.72	1.34	0.00	0.867	1.571	3.00 (1.81)	1.53
T test	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**-**	**S**	**NS**	NS	**NS**

Treatment	White fly (Nos. /leaf)										
	Pantnagar			Dharwad			Parbhani			Sehore	Indore
	10 DAG	20 DAG	30 DAG	10 DAG	20 DAG	30 DAG	10 DAG	20 DAG	30 DAG		
T-2	0.36	0.22	1.72	0.34	0.72	1.34	0.00	0.867	1.571	3.00 (1.81)	1.53
T-3	0.34	0.26	1.47	0.39	0.65	1.42	0.00	0.847	1.200	3.33 (1.89)	1.28
T test	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**-**	**NS**	**S**	**NS**	**S**

Table 3.22: Ent 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants [GIRDLE BEETLE]

Treatment	Girdle beetle (%Infestation)											
	Dharwad			Sehore			Indore			Parbhani		
	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG
T-1	2.41	4.23	5.38	6.49 (14.63)	8.78 16.96	10.32 (19.12)	2.03	4.16	5.23	4.334	6.000	10.500
T-2	2.08	4.36	5.10	5.92 (14.10)	13.41 (21.38)	15.20 (22.67)	1.47	3.91	4.98	6.500	10.166	16.833
T test	**NS**	**NS**	**NS**	**NS**	**S**	**S**	**NS**	**NS**	**NS**	**NS**	**S**	**S**

Treatment	Girdle beetle (%Infestation)											
	Dharwad			Sehore			Indore			Parbhani		
	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG	30 DAG	45 DAG	60 DAG
T-2	2.08	4.36	5.10	5.92 (14.10)	13.41 (21.38)	15.20 (22.67)	1.47	3.91	4.98	6.500	10.166	16.833
T-3	2.34	3.98	4.83	9.66 (18.21)	8.97 (17.30)	11.94 (20.04)	1.52	3.17	4.17	5.167	8.500	13.333
T test	**NS**	**NS**	**NS**	**S**	**S**	**S**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

Table 3.23: Ent 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants

[POD BORER AND GRAIN YIELD]

Treatment	Pod borer damage (%)	Grain yield (kg/ha)				
	Dharwad	Sehore	Parbhani	Pantnagar	Dharwad	Mean
T-1	23.15	1756	1305	2566	2474	**2025**
T-2	23.47	1577	1425	2410	2370	**1945**
T test	**NS**	**S**	**NS**	**S**	**S**	**--**

Treatment	Pod borer damage (%)	Grain yield (kg/ha)				
	Dharwad	Sehore	Parbhani	Pantnagar	Dharwad	Mean
T-2	23.47	1577	1425	2410	2370	**1945**
T-3	24.01	1819	1176	2010	2295	**1825**
T test	**NS**	**S**	**S**	**S**	**S**	**--**

पादप रोग विज्ञान
Plant Pathology

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Biswanath Chariali (Assam)	Dr. K.K. Das
Eastern Zone	
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Ugar Khurd (Karnataka)	Mr. J.S. Patavardhan
K.Digraj (Maharashtra)	Dr. C. T. Kumbhar

Abbreviations used for soybean diseases

S. No.	Disease	Abbreviation	Pathogen
1.	Charcoal rot	CR	*Macrophomina phaseolina (Rhizoctonia bataticola)*
2.	Collar rot	Coll. R	*Sclerotium rolfsii*
3.A.	Rhizoctonia root rot	RRR	*Rhizoctonia solani*
3.B.	Rhizoctonia aerial blight	RAB	*Rhizoctonia solani*
4.	Bacterial pustule	BP	*Xanthomanas campestris* pv. *glycines*
5.	Bacterial blight	BLB	*Pseudomonas savastanoi* pv. *glycinea*
6.	Fusarium rot / wilt	FR /FW	*Fusarium* species
7.	Soybean mosaic virus	SMV	*Soja virus I*
8.	Soybean yellow mosaic virus	YMV	*Mungbean yellow mosaic virus*
9.	Bud Proliferation/ No Podding	BPro./NPod.	*Phytoplasma*
10.	Myrothecium leaf spot	MLS	*Myrothecium roridum*
11.	Frogeye leaf spot	FLS	*Cercospora sojina*
12.A.	Cercospora leaf spot/blight	CLS	*Cercospora kikuchii*
13.B.	Purple seed stain	PSS	*Cercospora kikuchii*
14.	Rust	Rust	*Phakopsora pachyrhizi*
15.	Alternaria leaf spot	ALS	*Alternaria* species
16.	Brown spot	BS	*Septoria glycine*
17.	Target leaf spot	TLS	*Corynespora cassicola*
18.	Phoma leaf blight	PhB	*Phoma medicaginis*
19.	Cotyledonary spot	CS	A number of fungi are involved
20.	Indian bud blight	IBB	A strain of *Groundnut bud necrosis virus*
21.	Powdery mildew	PM	*Microsphaera diffusa*
22.	Anthracnose	Anth.	*Colletotrichum truncatum*
23.	Pod and stem blight	P&SB	*Diaporthe phaseolorum var. sojae*
24.	Wilt complex	WC	-
25.	Pod diseases/ blight	PB PB(Ct) PB(Mr) PB(Mp) PB(Ph) PB(Fus) PB(Cer)	a.*Colletotrichum truncatum* b. *Myrothecium roridum* c. *Macrophomina phaseolina* d. *Phomopsis* species e. *Fusarium* species f. *Cercospora* species
26	Choanephora leaf blight	ChLB	*Choanephora infundibulifera*
27	Red Crown rot	RCR	*Colonectria* species
28	Helminthosporium Leaf spot	HLS	*Helminthosporium* species
29	Sudden death syndrome	SDS	*Fusarium* species
30	Soybean crinkle leaf virus / Soybean crinkle virus	SCLV/SCV	Soybean crinkle leaf gemini virus

Table 4.1: PP1 Survey for soybean diseases (diseases scenario at different centers)

S. No.	Location / Disease	Northern Hill Zone		Northern Plain Zone				North Eastern Hill Zone		Eastern zone	Central Zone			Southern Zone			No. of Centres (15)
		Palampur	Almora	Ludhiana	Pantnagar	Dholi	Delhi	B. Chariali	Medziphema	Raipur	Sehore	Jabalpur	Amravati	Ugarkhurd	k- Digraj	Dharwad	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	CR				$							$	$				3
2	Coll. R							$	$				$				3
3	RAB				$				$			$					3
4	Rust								$					$	$	$	4
5	BS	$									$	$					3
6	MLS											$					1
7	TLS													$		$	2
8	CLS/PSS							$								$	2
9	FLS	$	$											$		$	4
10	ALS											$	$	$		$	4
11	PB(Ct)	$	$		$			$	$	$		$	$	$		$	10
12	BP	$	$		$				$			$	$			$	7
13	BLB				$			$									2
14	YMV	$		$	$	$	$	$			$	$	$	$		$	11
15	SMV			$	$			$				$					4
16	FR /FW				$				$								2
17	BND						$										1
18	RRR										$						1
19	IBB									$							1
20	SCLV/SCV										$						1
Centre-wise no. of diseases reported		5	3	2	8	1	2	6	6	2	4	9	6	6	1	8	69

Table 4.2: PP2 Trap nursery trial for disease monitoring (Infection Index)

S. No.	Varieties	Northern Hill Zone							Northern Plain Zone								North Eastern Hill Zone							
		Almora DOS: 15/06/2017			Palampur DOS: 22/06/2017				Pantnagar DOS : 17/07/2017						Delhi		Biswanath Chariali DOS: 27/07/2017					Medziphema DOS: 05/07/2017		
		FLS	BP	PB (ct)	FLS	BS	PB (ct)	BP	BP	BLB	PB(Ct)	RAB	SMV	YMV	YMV	BND	Coll-R	CLS	PB (Ct)	YMV	SMV	FW	RAB	PB (Ct)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	JS 72-44	44.4	22.2	22.2	33.3	33.33	11.1	11.11	33.77	0.00	31.94	66.66	11.10	11.10	98.41	0.40	44.4	22.2	33.3	11.1	0.0	15.45	12.22	23.00
2	JS 75-46	33.3	30.3	34.4	44.4	33.33	11.1	11.11	33.33	96.90	34.56	44.44	33.17	22.22	91.67	0.00	33.3	33.3	44.4	22.2	0.0	18.83	4.60	23.33
3	JS 71-05	44.4	22.2	44.4	55.55	33.33	11.11	0.00	0.00	0.00	55.91	66.65	16.66	11.10	97.18	0.70	44.4	33.3	55.6	22.2	11.1	8.28	18.95	32.27
4	JS 72-280	55.5	22.2	11.1	33.33	33.33	20.66	8.88	0.00	0.00	66.04	77.77	9.87	11.11	93.59	1.60	55.6	44.4	55.6	0.0	0.0	25.45	7.11	30.72
5	PK 262	33.3	22.2	22.2	55.55	44.66	11.11	0.00	0.00	0.00	21.71	33.17	3.08	12.33	96.72	0.82	33.3	11.1	33.3	0.0	11.1	17.75	34.39	23.55
6	PK 472	22.2	22.2	11.1	33.33	24.66	11.11	0.00	0.00	0.00	34.56	22.22	0.00	0.00	98.15	0.46	33.3	22.2	33.3	22.2	0.0	20.72	42.38	52.78
7	MACS 58	44.4	22.2	33.3	11.11	55.55	11.11	44.44	0.00	0.00	66.66	55.54	9.87	11.11	96.49	0.88	55.6	33.3	22.2	11.1	0.0	12.22	6.83	48.55
8	JS 93-05	33.3	22.2	33.3	11.11	77.77	44.44	33.33	0.00	93.13	65.42	76.53	11.11	11.10	-	-	44.4	44.4	33.3	0.0	0.0	18.51	73.66	29.99
9	Punjab 1	55.5	11.1	33.3	11.11	11.1	11.1	77.77	33.17	0.00	44.44	77.76	0.00	11.10	87.30	2.78	55.6	22.2	22.2	0.0	0.0	13.33	0.00	32.93
10	Bragg	48.1	11.1	33.3	33.33	33.33	55.55	8.88	9.87	0.00	9.87	44.44	5.55	11.10	44.14	1.13	44.4	33.3	44.4	11.1	0.0	0.00	0.00	0.00
11	Monetta	22.2	33.3	44.4	16.66	33.33	33.33	20.66	34.56	0.00	20.83	55.54	9.87	11.10	94.03	1.49	33.3	22.2	22.2	0.0	0.0	7.27	35.11	30.38
12	KHSB 2	11.1	22.2	33.3	20.66	33.33	11.11	11.11	33.33	0.00	33.17	77.76	4.94	9.87	95.92	1.02	44.4	11.1	33.3	11.1	0.0	0.00	0.00	0.00
13	NRC 7	11.1	11.1	44.4	20.66	33.33	44.44	0.00	9.87	0.00	33.33	44.43	0.00	0.00	97.67	0.00	55.6	33.3	55.6	22.2	0.0	8.87	64.39	22.16
14	VLS 58	33.3	44.4	11.1	11.11	33.33	33.3	11.11	12.34	0.00	11.10	54.93	0.00	0.00	92.86	1.79	33.3	22.2	33.3	0.0	0.0	13.85	6.66	53.03
15	JS 335	22.2	33.3	44.4	33.33	33.33	55.55	0.0	11.10	0.00	33.17	66.66	22.21	37.02	97.40	0.00	44.4	22.2	33.3	11.1	0.0	22.27	74.11	82.67
16	Shivalik	55.5	22.2	22.2	77.77	33.33	24.66	0.00	0.00	57.77	77.76	97.50	33.32	11.10	-	-	33.3	33.3	44.4	22.2	0.0	17.26	0.00	21.55

-:entry not mentioned in report

Table 4.2: contd...

S. No	Varieties	Central Zone														Southern Zone			
		Sehore			Jabalpur DOS : 26/06/2017						Amravati DOS: 28/06/2017					Dharwad DOS: 22/07/2017			
		YMV (S)	TLS	CR*	YMV	CR	RAB	BS	PB (Ct)	BP	YMV	CR	PB (ct)	BP	ALS	Rust	PSS PDI	PSS %	PB (ct)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	JS 72-44	28.5	4.6	9	8.0	14.5	2.7	0.0	2.5	0.0	3.75	12.50	8.65	5.03	26.23	74.32	4.94	5.83	23.85
2	JS 75-46	27.3	3.65	8	9.1	23.5	17.0	6.4	2.2	0.0	4.96	3.75	6.10	0.00	36.82	71.03	6.58	8.33	20.49
3	JS 71-05	1.0	5.8	4	5.8	24.5	2.4	0.0	0.0	0.0	12.50	0.00	7.63	0.00	25.92	48.96	9.46	6.50	21.87
4	JS 72-280	7.3	4.6	0	9.5	34.2	12.4	0.0	0.0	0.0	3.75	15.75	5.23	0.00	24.66	48.96	6.17	7.18	20.73
5	PK 262	3.4	4.1	8	12.2	46.5	0.0	0.0	0.0	0.0	2.50	18.75	0.00	0.00	6.72	65.83	4.53	6.17	23.69
6	PK 472	0.6	1.25	7	8.4	37.4	5.4	2.4	0.0	0.0	3.50	75.35	0.00	0.00	17.34	48.71	4.94	6.67	19.25
7	MACS 58	7.4	6.5 S	5	13.5	45.7	4.8	1.5	0.0	0.0	3.75	22.50	4.55	10.63	21.48	69.45	7.41	4.67	25.91
8	JS 93-05	2.4	5.8	0	11.5	43.3	14.5	0.0	4.7	0.0	12.75	17.86	0.00	0.00	0.00	64.96	9.05	5.50	28.88
9	Punjab 1	8.0	6.5	0	9.0	48.9	15.6	0.0	0.0	12.6	11.75	39.33	0.00	24.33	0.00	54.75	4.94	7.75	24.44
10	Bragg	2.0	4.2	7	12.4	71.0	13.5	0.0	2.6	1.2	9.40	34.55	19.70	0.00	3.28	52.25	5.76	6.50	23.68
11	Monetta	7.5	2.4	5	11.0	25.0	2.5	8.5	0.0	4.5	8.75	0.00	23.80	0.00	16.48	72.83	9.47	6.25	27.38
12	KHSB 2	7.0	2.25	9	12.0	34.3	12.1	0.0	0.0	1.5	9.75	8.25	0.00	5.43	5.29	50.78	4.53	8.83	17.76
13	NRC 7	-	-	-	15.5	15.5	8.5	4.3	3.5	0.0	2.75	23.20	6.63	0.00	7.93	65.63	4.94	10.08	41.21
14	VLS 58	2.0	0.8	9	8.9	90.4	1.2	5.0	0.0	0.0	9.75	39.96	18.35	4.46	25.45	53.10	8.23	4.50	29.25
15	JS 335	23.3	8.0	7	9.3	70.8	10.7	0.0	4.2	0.0	11.25	36.30	19.06	6.76	21.56	84.06	17.28	14.42	56.64
16	Shivalik	14.4	3	7	7.1	45.4	8.7	5.6	0.0	2.0	2.75	5.75	8.55	4.20	11.36	52.43	9.46	7.67	23.29

*Disease grades

Table 4.3: PP3 (a). Infection index of various diseases in CIVT

S. No.	Varieties	FLS		BP				PB (ct)									RAB			YMV								BS	BLB	
		Almora	Palampur	Pantnagar^{inc}	Almora	Amravati	Medziphema	Almora	Pantnagar	Medziphema	Ugarkhurd	Palampur	Raipur	B.Chariali	Indore	Dharwad	Medziphema	Pantnagar	Indore	Delhi	Jabalpur	Ugarkhurd	Dholi	Pantnagar	Ludhiana	B.Chariali	Amravati	Palampur	Pantnagar	B.Chariali
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	**NRC 128**	S	MR	AR	AR	AR	AR	HR	MR	MR	MR	AR	HR	MR	MR	MR	HS	MS	HR	MR	HR	AR	MS	HR	MR	HR	AR	MR	AR	AR
2	**RVS 2011-3**	MS	MS	AR	HR	MR	AR	HR	MS	AR	MR	HS	MS	MR	MR	MR	HR	MS	HR	HS	HR	AR	MS	HR	MS	HR	AR	MR	AR	HR
3	**DSb 34**	MS	MR	AR	AR	MR	AR	HR	MR	AR	MR	MS	MS	MS	S	MR	HR	HS	MS	HS	HR	AR	MS	AR	MS	HR	AR	MR	AR	HS
4	**MAUS 725**	MS	MS	AR	AR	HR	AR	AR	S	AR	MR	S	MS	HS	S	MR	MR	HS	S	Dead	R	HR	MR	AR	MR	MR	HR	MR	HS	AR
5	**SL 1068**	S	AR	AR	HR	HR	AR	AR	HR	HR	MR	HR	HR	MR	S	MR	MR	MR	S	HS	HR	MR	MS	AR	MR	HR	AR	MR	AR	AR
6	**JS 21-15**	MS	HR	AR	HR	HR	AR	AR	MS	AR	MS	MS	MS	MS	S	MS	HR	HS	MS	HS	HR	MR	MS	HR	MS	MR	AR	MR	AR	MR
7	**AUKS 174**	S	AR	HR	AR	MR	AR	HR	HR	HR	MR	HR	HR	MS	MR	MR	MR	HS	MR	HS	MR	AR	MR	HR	MS	MR	HR	MR	AR	MR
8	**NRC 137**	S	MR	AR	AR	AR	AR	AR	HR	AR	MS	HR	HR	MR	S	MS	MS	S	MS	HS	HR	HR	MS	HR	S	HR	AR	MR	AR	HR
9	**VLS 95**	MS	MS	AR	AR	MR	HS	AR	HS	S	MR	MS	S	MS	S	MR	HR	HS	S	Dead	HR	AR	MS	MR	S	MR	AR	MR	S	HS
10	**CSB 10084**	S	MR	MS	AR	MR	HS	HR	MR	AR	MS	MS	HR	MS	S	MS	HR	HS	S	HS	R	HR	MS	HR	S	MR	AR	MS	AR	MR
11	**MACS 1493**	S	MR	AR	AR	MR	AR	AR	MS	MR	MR	HR	HR	MR	MR	MR	MS	S	MR	MR	MR	MR	S	MR	MS	HR	HR	MR	MR	AR
12	**JS 20-17**	MS	MS	MS	HR	MR	AR	HR	MR	HR	MS	MS	MS	MR	S	MS	AR	S	S	MR	HR	MR	MR	HR	HR	MR	AR	MR	AR	HR
13	**NRC 130**	S	MR	AR	HR	MR	S	AR	HS	AR	MS	HS	MS	MS	MR	MS	HR	HS	MR	HS	HR	AR	MS	HR	HS	MR	AR	HR	AR	HR
14	**TS 53**	MS	MR	AR	AR	HR	AR	AR	MR	HR	MR	AR	HR	MR	S	MR	MR	S	S	HS	HR	MR	HS	AR	MS	HS	HR	MR	AR	MR
15	**RVS 2011-4**	S	-	-		--	-	-	-	-		-	HR	-	S	-	-	-	MS	Dead	NG			-	-	-	-	-	-	-
16	**SL 1123**	-	MR	AR	HR	MR	AR	AR	MR	MR	MR	HR	HR	MR	S	MR	MR	MR	MS	MR	R	HR	S	AR	HR	HR	AR	MR	AR	AR
17	**BAUS 102**	HR	MR	AR		MR	AR	MS	MS	HR	MR	HS	MR	MS	HR	MR	AR	MS	HR	HS	MR	MR	MS	MR	HS	MR	HR	MR	AR	HR
18	**MACSNRC 1575**	S	MR	AR	HR	MR	AR	AR	S	HS	MR	S	HS	MR	S	MR	MS	HS	MS	Dead	HR	MR	MS	AR	MR	MR	AR	MR	S	AR
19	**MAUS 731**	MR	MS	AR	HR	MR	AR	AR	MR	S	MR	HS	MS	HR	S	MR	HR	HS	MS	HS	HR	HR	S	MS	S	MR	HR	MR	AR	AR
20	**NRC 132**	MS	MS	AR	AR	HR	AR	AR	HR	HR	MS	HR	MR	MR	S	MS	HS	HS	MS	HS	HR	MR	S	HR	HS	MR	AR	MR	AR	HR
21	**VLS 94**	S	MS	AR	AR	MR	AR	AR	MR	HR	MS	MS	MS	HR	S	MS	MR	HS	MS	HS	MR	MR	S	AR	HS	AR	AR	MS	AR	AR
22	**AMS 2014-1**	S	MR	AR	HR	HR	AR	AR	MR	MR	MR	MR	MR	MS	MR	MR	HR	MS	MR	HS	MR	HR	MS	MR	S	MR	HR	MR	AR	HR
23	**KDS 1095**	S	MR	AR	HR	MR	AR	AR	MR	S	MR	MR	MS	MS	MS	MR	HR	S	MS	S	HR	MR	S	MR	S	MR	HR	MR	MS	MR
24	**NRC 133**	MS	MS	AR	HR	MR	AR	AR	HR	HR	MS	AR	MR	MS	MR	MS	MS	S	MR	HS	MR	MR	S	AR	HS	MR	HR	MR	AR	HR
25	**DS 3108**	MS	MR	AR	HR	MR	AR	AR	AR	S	MR	MR	MR	MS	MR	MR	HR	MR	MS	MR	HR	-	MS	MR	MR	MR	AR	MR	AR	HR

Table 4.3: contd...

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
26	**AMS 100-39**	MS	MS	AR	HR	MR	AR	HR	MR	MS	MR	MS	S	HR	S	MR	HR	MS	S	HS	HR	HR	MS	AR	S	AR	AR	MR	AR	MR
27	**NRC 136**	S	MR	AR	AR	AR	AR	HR	MR	HR	MR	AR	HS	MS	S	MR	S	S	MS	HS	HR	MR	S	MR	HS	MR	AR	MS	AR	HR
28	**RVS 2011-1**	MS	S	MS	HR	MR	AR	HR	HR	MR	MS	S	S	MR	MR	MS	MR	MS	MS	HS	HR	MR	MS	MR	HS	MR	HR	MR	AR	HR
29	**CSB 10112**	S	MR	S	HR	MR	AR	AR	MR	MS	MR	AR	MR	MS	S	MR	HR	HS	MS	HS	HR	HR	S	MR	HS	MR	HR	MR	AR	MR
30	**PS 1613**	S	MR	AR	AR	HR	AR	AR	HR	MR	MR	AR	HR	MR	S	MR	MR	HR	S	HS	HR	MR	S	MR	S	MR	AR	MS	AR	MR
31	**NRC 131**	S	MR	AR	AR	HR	AR	AR	MS	S	MS	MS	HS	HS	MS	MS	AR	HS	MR	HS	HR	MR	MR	MR	HS	MR	AR	MR	AR	HR
32	**KDS 992**	MS	HR	AR	AR	HR	AR	HR	S	MS	MR	HR	S	MS	MS	MR	MR	HS	MR	Dead	HR	HR	S	MR	HR	MR	HR	MR	HS	MR
33	**RSC 11-07**	MS	MS	MR	AR	MR	AR	AR	MR	HR	MR	MR	MR	MR	MR	MR	AR	HS	MR	HS	MR	MR	S	MR	HS	MR	HR	MR	AR	HR
34	**NRCSL 1**	MS	MR	MR	AR	MR	AR	AR	MR	MS	MS	HR	HR	MR	S	MS	MR	S	MS	MR	HR	MR	S	-	HR	MR	AR	MR	AR	HR
35	**PS 1611**	MS	MR	MR	AR	HR	AR	AR	MR	AR	MR	MR	HR	MS	MS	MR	HR	S	MR	MR	HR	HR	HS	-	HR	MS	AR	MR	AR	HR
36	**RSC 11-03**	MS	MR	AR	HR	MR	AR	HR	MR	MS	MR	HR	MS	MR	MR	MR	S	HS	MS	HS	HR	MR	S	-	HS	HS	AR	MR	AR	HR
37	**NRC 134**	S	MR	AR	HR	AR	AR	HR	HR	MS	MS	HR	MR	MR	S	MS	HS	MS	MS	HS	HR	MR	MS	-	HS	MR	HR	MR	AR	HR
38	**NRC 129**	S	MR	AR	AR	AR	AR	AR	MS	S	MR	MS	MR	MS	S	MR	MS	S	MS	HS	HR	HR	MS	-	HS	HS	HR	HR	AR	HR
39	**RVS 2011-2**	S	S	MR	AR	MR	AR	AR	MR	HR	MR	S	MR	MS	S	MR	MR	S	MS	HS	HR	MR	S	-	HS	MS	AR	MR	AR	MR
40	**SKF-SPS-11**	MS	MS	MR	AR	MR	AR	AR	MR	HS	MS	HR	S	MR	HR	MS	MS	MS	MR	HS	HR	MR	S	-	HS	MR	HR	HR	AR	HR
41	**SKF-1050**	MS	MS	AR	AR	MR	AR	AR	MS	HS	MR	MS	S	MS	MS	MR	S	HS	MS	MR	HR	HR	S	-	HS	MS	AR	HR	AR	HR
42	**Shalimar Soybean**	MS	MS	AR	AR	AR	-	AR	S	-	MR	S	MR	-	MR	MR	S	MR	-	-	HR	MR	-	-	HS	-	AR	MR	AR	-
1	**Shivalik (c)**	-	HS	-	-	-	-	-	-	-	MS	MS	-	-	-	MS	-	-	-	-	R	MR	-	MR	-	MR	MR	MS	-	-
2	**Bragg (c)**	-	-	HR	AR	-	-	-	MR	-	HS	-	HR	S	-	HS	MS	-	-	HS	R	HR	-	-	-	-	-	-	AR	MS
3	**VLS 2 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	HR		-	MS	-	-	-		-	-
4	**VLS 58 (c)**	-	MR	-	-	-	-	-	-	-	MS	MR	-	S	-	MS	-	-	S	-	HR	MR	-	MS	-	-	MR	MR	-	MS
5	**VLS 59 (c)**	-	HR	-	-	-	-	-	-	-	MS	MR	-	-	-	MS	-	-	-	-	-	MR	-	-	-	-	MR	MR	-	-
6	**VLS 63 (c)**	-	MR	-	-	-	-	-	-	-	MS	HR	-	-	-	MS	-	-	-	-	-	MR	-	-	-	-	MR	MR	-	
7	**PS 1092 (c)**	-	HR	-	-	-	-	-	-	-	-	MS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-
8	**SL 688 (c)**	-	-	AR	-		AR	-	HR	AR	MS	-	-	-	-	MS	MR		-	-	-	HR	-	-	-	-	-	-	AR	-
9	**SL 988 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
10	**PS 1042 (c)**	-	-	-	-	-	AR	-	-	HR	S	-	-	-	-	MR	-		-	-	-	-	-	-	-	-	-	-	-	-
11	**PS 1347(c)**	-	-	-	-	-	AR	-	-	HR	MS	-	-	-	-	MR	-		-	-	-	AR	-	-	HR	-	-	-	-	-

Table 4.3: contd...

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
12	**RKS 18 (c)**	-	-	-	AR	-	AR	-	-	S	MS	-	-	-	-	MS	MS		-	-	-	-	-	-	-	-	-	-	-	-
13	**JS 97-52 (c)**	-	-	-	-	HR	-	AR	-	AR	MS	-	-	-	-	MS	HS	-	-	-	-	MR	-	-	-	HR	-	-	-	-
14	**JS 93-05 (c)**	-	-	-	-	HR	-	AR	-	HR	HS	-		S	-	HS	S	-	-	-	-	MR	S	S	-	MR	-	-	-	MS
15	**JS 335 (c)**	-	MS	HR	AR	HR	-	AR	MR	HS	MS	S	HR	S	S	MS	MS	S	-	-	-	MS	HS	MS	-	MS	MR	MR	-	MS
16	**JS 72-44 (c)**	-	-	MR		-	-	-	MR	-		-	-	-	-	MS	MS	-	-	-	-	MR	-	-	-	-	-	-	-	-
17	**JS 75-46 (c)**	-	-	AR	-	-	-	-	MR	-	-	-	-	S	MS	-	-	-		-	-	-	-	-	-	-	-	-	HS	S
18	**JS 95-60 (c)**	-	-	-	-	AR	-	-	-	-	-	-	-	-	MR	-	-	-	-	-	-	-	-	-	-	-	HR	-	-	-
19	**JS 20-29 (c)**	-	-	-	-	-	-	-		-	-	-	-	-	MR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	**JS 20-34 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	MR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	**Punjab 1 (c)**	-	-	MR	-	MR	-	-	MR	HS	-	-	-	-	HS	-	-	-	-	-	-	MR	-	-	-	-	-	-	AR	AR
22	**DSb 21 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	MS	-	-	-	-	-	-	AR	-	HR	-	-	-	-	-	-
23	**SL 525 (c)**	-	-	-	-	-	-	AR	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
24	**RAUS 5 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	**NRC77 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	**NRC7 (c)**	-	-	-	-	-	-	-		-	-	-	HR	-	S	-	-	-		-	-	-	-	-	-	-	-	-	-	-
27	**NRC 86 (c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	**NRC 37 (c)**	-	-	-	-	-	-	-	-	MS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Entries RVS 2011-4 and Shalimar Soybean recorded poor germination across different centers

Table 4.3: contd...

S. No	Varieties	TLS	SCV	RRR	BND	Rust				IBB	SMV		ALS	Coll.R.		CR			PSS
		Sehore	Sehore	Sehore	Delhi	Ugarkhurd	Dharwad	Medziphema	K.Digraj	Raipur	Pantnagar	B. Chariali	Amravati	Indore	B. Chariali	Amravati	Jabalpur	Sehore	Dharwad
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	**NRC 128**	MR	HR	AR	MR	MR	MR	AR	MR	HR	AR	AR	AR	HR	MR	HR	HS	AR	HR
2	**RVS 2011-3**	MS	-	S	HR	S	SR	-	HS	HR	HR	HR	MR	HR	MR	AR	MR	-	HR
3	**DSb 34**	S	HR	AR	HR	HR	HR	AR	**HR**	HR	HR	HR	HR	HR	MS	AR	HS	AR	HR
4	**MAUS 725**	MS	HR	MS	Dead	MS	MS	AR	HS	HR	HR	MR	MR	MR	HS	AR	HS	AR	HR
5	**SL 1068**	MR	MS	AR	HR	MS	MS	MS	HS	HR	AR	AR	HR	MR	HR	S	HS	AR	HR
6	**JS 21-15**	HR	R	MR	HR	S	MS	AR	HS	HR	AR	HR	MR	MS	MS	AR	S	AR	HR
7	**AUKS 174**	S	HR	AR	HR	S	S	AR	HS	HR	MR	MR	HR	MR	MR	AR	AR	AR	HR
8	**NRC 137**	MR	HR	AR	HR	MS	MS	AR	HS	HR	HR	HR	AR	MR	HR	AR	MS	AR	HR
9	**VLS 95**	MS	MS	MR	Dead	S	MS	AR	HS	S	MS	AR	HR	MS	MS	HS	HS	HS	MR
10	**CSB 10084**	S	HR	MR	HR	S	S	AR	HS	HR	HR	MR	HR	S	MS	HS	HS	HS	HR
11	**MACS 1493**	MR	HR	MR	S	S	S	AR	HS	MR	MS	HR	MR	MR	MR	HR	MR	S	HR
12	**JS 20-17**	MR	R	AR	MR	MS	MS	AR	HS	HR	AR	HR	MR	MS	MR	AR	AR	AR	HR
13	**NRC 130**	S	HR	HR	R	MS	MS	AR	HS	MR	MS	HR	MR	MS	MS	AR	MS	AR	HR
14	**TS 53**	S	R	AR	HR	MS	MS	AR	**HR**	HR	AR	HR	AR	S	MR	HS	HS	HS	HR
15	**RVS 2011-4**	-	-	-	Dead	-	-	-	--	AR	-	-	--	S	-	-	NG	-	-
16	**SL 1123**	MS	MS	AR	MR	MS	MS	AR	HS	HR	MR	HR	MR	MS	MR	HS	S	AR	MS
17	**BAUS 102**	MR	MS	AR	HR	MR	MR	AR	HS	HR	MR	HR	HR	MR	MS	HR	HR	AR	HR
18	**MACSNRC 1575**	MS	HR	AR	Dead	S	S	AR	HS	S	MR	HR	HR	MS	MR	HR	HS	AR	HR
19	**MAUS 731**	MR	MS	AR	HR	S	S	AR	HS	HR	MR	AR	MR	MS	AR	AR	MR	AR	MR
20	**NRC 132**	HR	R	AR	HR	MS	MS	AR	HS	HR	HR	HR	AR	S	MR	AR	MR	AR	HR
21	**VLS 94**	MR	MS	AR	HR	MS	MS	AR	HS	HR	AR	AR	MR	MS	HR	MS	MR	AR	HR
22	**AMS 2014-1**	MR	HR	AR	HR	S	S	AR	HS	HR	MR	HR	HR	MR	HS	AR	HR	AR	HR
23	**KDS 1095**	MS	HR	AR	MR	MS	MS	AR	HS	HR	MR	HR	HR	MS	MR	HS	S	AR	HR
24	**NRC 133**	MR	HR	AR	HR	S	S	AR	S	HR	HR	HR	HR	MR	MS	AR	AR	AR	HR
25	**DS 3108**	MR	HR	HR	MR	S	S	AR	MR	HR	MR	HR	HR	MR	HS	HS	HS	AR	HR
26	**AMS 100-39**	S	R	AR	HR	S	S	AR	S	HR	HR	AR	HR	S	HR	AR	AR	AR	HR
27	**NRC 136**	MS	HR	AR	HR	S	S	AR	HS	HR	AR	MR	AR	S	MS	AR	MS	AR	MR
28	**RVS 2011-1**	S	MS	AR	HR	S	S	AR	HS	HR	HR	HR	MR	MR	MR	AR	AR	AR	HR
29	**CSB 10112**	S	HR	HR	HR	S	S	AR	S	HR	HR	MR	HR	MS	HS	HS	HS	AR	HR
30	**PS 1613**	MR	HR	AR	HR	S	MS	AR	HS	HR	AR	HS	AR	MS	MR	S	S	AR	MR
31	**NRC 131**	MR	HR	AR	HR	S	S	AR	HS	MS	HS	MR	MR	S	MS	AR	S	AR	HR
32	**KDS 992**	HR	HR	AR	Dead	MS	MS	AR	**HR**	MS	MR	HR	AR	MR	MR	AR	MR	AR	HR
33	**RSC 11-07**	HR	HR	AR	HR	S	S	AR	HS	HR	HR	HR	MR	MR	MR	HR	AR	AR	HR

Table 4.3: contd...

1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19	20	21
34	**NRCSL 1**	S	HR	AR	HR	MS	MS	AR	HS	HR	HR	HR	HR	MR	MR	S	S	AR	HR
35	**PS 1611**	MR	HR	AR	MR	HS	HS	AR	HS	HR	HR	MR	HR	MR	MS	AR	AR	AR	MR
36	**RSC 11-03**	MR	MS	AR	HR	S	S	AR	HS	HR	HR	HR	AR	MS	HR	AR	AR	AR	HR
37	**NRC 134**	MR	HR	AR	HR	S	S	AR	HS	HR	HR	HR	AR	MS	MR	AR	MS	AR	HR
38	**NRC 129**	MR	HR	AR	HR	S	S	AR	HS	MR	HR	MR	MR	S	HS	AR	MR	AR	HR
39	**RVS 2011-2**	-	HR	AR	HR	S	S	AR	HS	HR	AR	MR	MR	MS	MS	HR	S	AR	HR
40	**SKF-SPS-11**	HR	HR	AR	HR	S	S	AR	HS	HR	MR	HR	MR	MR	MR	AR	AR	AR	HR
41	**SKF-1050**	S	S	HR	MR	S	MS	AR	HS	MR	MR	HR	HR	MR	HS	MR	S	-	HR
42	**Shalimar Soybean**	S	S	HR		S	MS	-	HS	S	HR	_	MR	MR	-	HS	HS	-	MR
1	**Bragg (c)**	S	-		-	S	S	-		HR	HR	S			S	-			MS
2	**VLS 58 (c)**	-	-		-	S	S	-		-	-	MR			S				MS
3	**VLS 59 (c)**	-	-		-	MS	MS	-		-	-	-			-	-			MS
4	**VLS 63 (c)**	-	-		-	S	S	-		-	-	-			-	-			MR
5	**PS 1042 (c)**	-	-		-	S	MS	HR		-	-	-			-	-			-
6	**SL 688 (c)**	-	-		-	S	MS	AR			HR	-			-	-			MS
7	**SL 988 (c)**	-	-		-	-	-	-		-	-								
8	**PS 1347 (c)**	-	-		-	S	MS	MR		-	-	-			-	-			MR
9	**RKS 18 (c)**	-	-		-	S	S	S		-	-	-	MS		-	-			MS
10	**JS 97-52 (c)**	MS	HR	AR	-	MS	MS	MR		-	-	-	MS		-	HR	S	AR	MR
11	**JS 93-05 (c)**	S	-		-	S	S	AR	HS	-	-	MS	MR		S	MR	HS		MR
12	**JS 335 (c)**	S	HR	AR	-	HS	HS	S	HS	HR	HR	MS	HR	S	S	MS	MR	S	MS
13	**JS 72-44 (c)**		HR	AR	-	-	MS	-		-	HR	-			-	-		AR	-
14	**JS 75-46 (c)**	-	-		-	-	S	-		-	MR	MS			S	-			-
15	**JS 95-60 (c)**	-	-		-	-	-	-		-	-	-			-	-			MS
16	**JS 20-29 (c)**	-	-		-	-	-	-		-	-	-			-	HR			-
17	**JS 20-34 (c)**	MR	MS	AR	-	-	-	-		-	-	-			-	MS		HR	MR
18	**Punjab 1 (c)**	-	-		-	-	MS	-		-	HR	-			-	-	S		-
19	**EC241778 (c)**	-	-		-	-	-	-		-	-	-			-	-			-
20	**EC241780 (c)**	-	-		-	-	-	-		-	-	-			-	-			-
21	**NRC 77 (c)**	-	-		-	S	S	-		-	-	-			-	-			-
22	**NRC 86 (c)**	-	HR		-	-	S	-		-	-	-			-	S		HR	MS
23	**DSb 21(c)**	-	-		-	HR	HR	-	HR	-	-	-			-	-			HR
24	**SL525(c)**	-	-		-	-	-	MR		-	-	-			-	-			-
25	**RAUS 5(c)**	-	-		-	-	-	-		-	-	-			-	-			-
26	**NRC 37 (c)**	S	-		-	-	-	-		HR	-	-			-	-			-
27	**NRC 7 (c)**	-	-		-	-	-	-		-	-	-			-	-			-
28	**VLS 2 (c)**	-	-	MS	-	-	-	-		-	-	-			-	-		HS	-
29	**Shivalik**	MR	MS	AR	-	S	-	-		-	-	-			-	-	-	AR	MS

-: Entries RVS 2011-4 and Shalimar Soybean recorded poor germination across different centers

Table 4.4: PP3 (b). Infection index of various diseases in AVT-I

S. No.	Varieties	Northern Hill Zone				Northern Plain Zone									
		Palampur			Almora	Pantnagar							Delhi*		Dholi
		FLS	PB (ct)	BS	FLS	BS	BLB	PB (ct)	RAB	SMV	YMV	Ludhiana	YMV	BND	YMV
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**AMS–MB 5-18**	HR	HR	MR	**S**	AR	AR	MR	HS	HR	MR	HS	HS	HR	-
2	**DSb 32**	HR	MR	MR	S	AR	HR	MR	HS	HR	AR	MR	HS	HR	MS
3	**DS 3105**	MS	MR	MR	HS	HR	AR	MR	MR	AR	AR	HS	HR	HR	MS
4	**DS 3106**	MS	MS	MR	HS	AR	AR	HR	MR	AR	AR	HS	HR	HR	S
5	**KDS 921**	HR	AR	MR	S	AR	S	MS	MS	HS	MR	-	-	-	MR
6	**KDS 980**	MS	MR	MR	S	AR	HS	MS	HS	MR	AR	-	-	-	MS
7	**KDS 1045**	AR	MR	MR	MS	AR	S	AR	HS	MR	HR	-	-	-	MS
8	**MACS 1520**	MR	AR	HR	HS	AR	AR	MR	HS	HR	MR	HS	HS	HR	MS
9	**NRC 125**	AR	HR	MR	-	AR	AR	MR	HS	MR	MR	HS	HS	HR	-
10	**NRC 126**	MR	AR	HR	-	MR	AR	MR	HS	AR	AR	-	HS	HR	-
11	**NRC 127**	MS	HR	MR	S	MR	AR	MR	HS	AR	AR	HS	HS	HR	MS
12	**RSC 10-52**	AR	MR	MR	-	AR	AR	MS	MS	HR	MR	-	HS	HR	MR
13	**RSC 10-70**	MR	MR	MR	-	AR	AR	HR	HR	HR	HR	-	HS	HR	MS
14	**RSC 10-71**	MR	MR	MR	-	AR	AR	MR	S	MR	S	-	HS	HR	MS
15	**RVS 2009-9**	AR	AR	HR	-	HR	AR	MR	HS	AR	AR	HS	HS	HR	-
16	**SL 1104**	HS	HR	MR	-	AR	AR	MS	MS	HR	HR	HS	HR	HR	-
1	**Bragg ©**	-	-	-	-	AR	AR	MR	MS	HR	HR	-	-	-	-
2	**JS 97-52 ©**	-	-	-	-	AR	AR	MR	HS	AR	AR	-	-	-	-
3	**JS 72-44 ©**	-	-	-	-	MR	AR	MR	S	HR	MR	HS	-	-	-
4	**JS 335 ©**	MS	MR	MR	-	AR	AR	MR	HS	MR	MR	-	-	-	S
5	**JS 93-05 ©**	-	-	-	-	AR	HS	MR	HS	MR	MR	-	-	-	S
6	**JS 20-29©**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	**PS 1092 ©**	HR	MS	MS	-	-	-	-	-	-	-	-	-	-	-
8	**Punjab 1 ©**	-	-	-	-	MR	AR	MR	HS	HR	HR	-	-	-	-
9	**DSb 21 ©**	-	-	-	-	AR	HS	MS	S	MS	HR	-	-	-	-
10	**SL 688 ©**	-	-	-	-	AR	AR	MR	MR	HR	AR	-	-	-	-
11	**Shivalik ©**	S	MR	MS	-	AR	HR	HR	HS	MR	HR	-	-	-	-
12	**VLS 59 ©**	HR	MR	MR	-	AR	AR	HR	HS	AR	AR	-	-	-	-
13	**VLS 63 ©**	MR	HR	MR	-	AR	MS	MR	MS	HR	AR	-	-	-	-
14	**JS 75-46 ©**	-	-	-	-	AR	HS	MR	S	MS	MS	-		-	-
15	**VLS 58 ©**	MR	MR	MR	-	-	-	-	-	-	-	-	-	-	-

-: Reaction for entries not reported

Table 4.4: PP3 (b). Infection index of various diseases in AVT-I

S. No.	Varieties	North Eastern Hill Zone					
		Medziphema		B. Chariali			
		PB (ct)	RAB	Coll R	PB (ct)	YMV	SMV
1	2	3	4	5	6	7	8
1	**AMS–MB 5-18**	HR	AR	HR	AR	AR	AR
2	**DSb 32**	MS	MR	HR	HR	AR	AR
3	**DS 3105**	HR	AR	MR	HR	AR	AR
4	**DS 3106**	MR	AR	HS	S	MS	MS
5	**KDS 921**	HR	AR	HR	AR	AR	AR
6	**KDS 980**	MR	S	AR	HR	AR	AR
7	**KDS 1045**	HR	MR	HR	AR	AR	AR
8	**MACS 1520**	HR	S	AR	HR	AR	AR
9	**NRC 125**	MR	S	-	-	-	-
10	**NRC 126**	AR	S	-	-	-	-
11	**NRC 127**	HR	MS	HR	AR	AR	AR
12	**RSC 10-52**	MS	MR	HS	S	MS	MS
13	**RSC 10-70**	MR	MS	MR	HR	AR	AR
14	**RSC 10-71**	MS	HR	HS	S	MS	MS
15	**RVS 2009-9**	AR	S	-	-	-	-
16	**SL 1104**	MR	HR	-	-	-	-
1	**Bragg ©**	-	-	S	S	MS	S
2	**NRC 37 ©**	-	-	-	-	-	-
3	**JS 97-52 ©**	HS	AR	S	MS	MR	MS
4	**JS 335 ©**	MS	S	HS	S	MR	MR
5	**JS 93-05 ©**	MR	S	HS	S	MR	MR
6	**RKS 18 ©**	-	-	-	-	-	-
7	**DSb 21 ©**	-	-	-	-	-	-
8	**PS 1042 ©**	MR	AR	-	-	-	
9	**PS 1347 ©**	AR	MR	-	-	-	
10	**VLS 59©**	MR	HS	-	-	-	-
11	**VLS 63©**	AR	AR	-	-	-	-
12	**SL 688©**	HR	MR	-	-	-	
13	**SL 525©**	HR	MR	-	-	-	-

***** **-:**Not reported

Table 4.4: PP3 (b). Infection index of various diseases in AVT-I

S. No.	Varieties	Eastern Zone	
		Raipur	
		IBB	PB(Ct)
1	2	3	4
1	**AMS–MB 5-18**	HR	HR
2	**DSb 32**	HR	MR
3	**DS 3105**	HR	MR
4	**DS 3106**	HR	HR
5	**KDS 921**	HR	MR
6	**KDS 980**	HR	MR
7	**KDS 1045**	MR	MS
8	**MACS 1520**	HR	MR
9	**NRC 125**	HR	MR
10	**NRC 126**	HR	HR
11	**NRC 127**	HR	HR
12	**RSC 10-52**	HR	MR
13	**RSC 10-70**	HR	HR
14	**RSC 10-71**	HR	HR
15	**RVS 2009-9**	HR	MR
16	**SL 1104**	HR	MR
1	**Bragg ©**	HR	HR
2	**NRC 37 ©**	HR	HR
3	**JS 97-52 ©**	-	-
4	**JS 335 ©**	-	-
5	**JS 93-05 ©**	-	-
6	**RKS 18 ©**	-	-
7	**DSb 21 ©**	-	-
8	**PS 1042 ©**	-	-
9	**PS 1347 ©**	-	-
10	**VLS 59©**	--	--
11	**VLS 63©**	-	-
12	**SL 688©**	-	-
13	**SL 525©**	-	-

Table 4.4: Contd… PP 3 (b). Infection index of various diseases in AVT-I

S. No.	Varieties	Central Zone									Southern Zone						
		Jabalpur		Sehore			Amravati				Dharwad			Ugarkhurd			K.Digraj
		CR	YMV	SCV	TLS	CR	YMV	CR	ALS	BP	Rust	PSS	PB (ct)	Rust	PB (ct)	YMV	Rust
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	**AMS–MB 5-18**	MR	R	HR	S	AR	HR	AR	HR	HR	MS	HR	MS	MS	MS	MS	-
2	**DSb 32**	S	HR	HR	S	AR	AR	HS	HR	MR	HR	HR	MS	HR	MS	MS	HR
3	**DS 3105**	MR	HR	MS	HR	AR	AR	AR	HR	AR	MR	HR	MS	MR	MS	MS	HS
4	**DS 3106**	MS	HR	MS	HR	AR	AR	AR	AR	AR	MR	HR	MS	MR	MS	MS	HS
5	**KDS 921**	MS	HR	R	HR	AR	MR	AR	HR	AR	MS	HR	MS	MS	MS	MS	-
6	**KDS 980**	MS	HR	HR	MS	AR	HR	HR	MR	MR	S	HR	MS	S	MS	MS	HS
7	**KDS 1045**	MR	HR	R	HR	AR	AR	AR	HR	HR	S	HR	MR	MS	MR	MR	-
8	**MACS 1520**	AR	MR	MR	MS	AR	HR	AR	HR	HR	S	HR	MS	S	MS	MS	HS
9	**NRC 125**	AR	HR	HR	MS	AR	HR	AR	AR	HR	MR	HR	MS	MR	MS	MS	-
10	**NRC 126**	S	HR	HR	HR	AR	AR	AR	HR	MR	MR	MR	MR	MR	MR	MR	-
11	**NRC 127**	HS	HR	HR	HR	AR	AR	AR	HR	AR	MS	HR	MR	MS	MR	MR	HS
12	**RSC 10-52**	AR	R	HR	HR	AR	HR	AR	AR	HR	MR	HR	MS	MR	MS	MS	-
13	**RSC 10-70**	MR	HR	HR	HR	AR	AR	AR	AR	AR	S	HR	MS	S	MS	MS	-
14	**RSC 10-71**	MR	R	HR	HR	AR	AR	AR	HR	AR	MS	MR	MS	MS	MS	MS	-
15	**RVS 2009-9**	MS	HR	R	HR	AR	AR	AR	HR	HR	MS	HR	MR	MS	MR	MR	-
16	**SL 1104**	MS	HR	HR	HR	AR	AR	MS	HR	HR	S	MR	MR	S	MR	MR	-
1	**Bragg ©**	S	MR	HR	MR	-	-	-	-	-	S	MS	HS	S	HS	MR	-
2	**NRC 37 ©**	MR	R	HR	MS	AR	-	-	-	-	MS	MR	MS	MS	MS	HR	-
4	**JS 97-52 ©**	S	HR	HR	HR	HR	HR	HR	MS	HR	MS	MR	MS	MS	MS	MR	-
5	**JS 72-44 ©**	-	-	HR	S	AR					MS	MR	MS	MS	MS	HR	-
6	**JS 335 ©**	MS	R	MR	HR	S	MR	MS	MR	HR	HS	MS	MS	HS	MS	MS	-
7	**JS 95-60 ©**	S	HR	HR	S	AR					S	MS	MR	S	MR	MR	-
8	**JS 93-05 ©**	HS	R	HR	S	AR	MR	MR	HR	HR	S	MR	HS	S	HS	HR	-
9	**JS 75-46 ©**	MR	R	-	-	-					S	MR	MS	S	MS	MR	-
10	**Punjab 1 ©**	S	HR	-	-	-	HR	MS	AR	MR	MS	MR	HS	MS	HS	MR	-
11	**DSb 21 ©**	HS	HR	MR	S	MS	-	-	-	-	HR	HR	MS	HR	MS	HR	-
13	**SL 688 ©**	HS	HR	HR	HR	AR	-	-	-	-	MS	MS	MS	MS	MS	MR	-
15	**PS 1347 ©**	HS	HR	-	-	-	-	-	-	-	-	-	-	MS	MR	MR	-
16	**PS 1092 ©**	MR	HR	-	-	-	-	-	-	-	MS	MR	MR	MS	MR	MR	-
17	**Shivalik ©**	-	-	-	-	-	-	-	-	-	S	MS	MS	S	MS	MR	-
19	**VLS 63 ©**	HS	HR	-	-	-	-	-	-	-	-	-	-	S	MS	MR	-
20	**VLS59©**	MS	MR	HR	S	AR					MS	MS	MS	MS	MS	MR	-
21	**VLS58©**	MS	HR	-	-	-	-	-	-	-	S	MS	MS	S	MS	MR	-
22	**RKS 18©**	-	-	-	-	-	-	-	-	-	S	MS	MS	S	MS	MR	-
23	**NRC 86©**	AR	MR	HR	S	AR	MS	MR	AR	AR	-	-	-	S	MS	MR	-
24	**SL 958©**	-	-	-	-	-	-	-	-	-	-	-	-	S	MS	HR	-
25	**Pusa 97- 12©**	-	-	-	-	-	-	-	-	-	MS	MS	MS	MS	MR	HR	-
26	**JS 20-34©**	-	-	-	-	-	-	-	-	-	S	MR	MR	S	MR	HR	-

Table 4.5: PP3 (c). Infection index of various diseases in AVT-II

S. No.	Varieties	Northern Hill Zone				Northern Plain Zone									
		Palampur			Almora	Pantnagar						Dholi	Ludhiana	Delhi[nc]	
		FLS	PB (ct)	BS	FLS	BP	BLB	PB (ct)	RAB	SMV	YMV	YMV	YMV	YMV	BND
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**JS 20-94**	MR	MR	MR	HS	MR	AR	MR	HS	AR	HR	MS	HR	HS	HR
2	**JS 20-116**	AR	MS	HR	S	AR	AR	MR	HS	AR	AR	MR	HS	HS	HR
3	**PS 1556**	MS	AR	MR	HS	AR	AR	MR	S	MR	HR	MS	-	S	HR
4	**PS 1572**	HR	AR	MR	-	AR	AR	HR	HR	AR	AR	AR	HR	HR	HR
5	**RSC 10-46**	MR	MR	MR	S	AR	AR	M	S	AR	AR	AR	-	-	-
6	**RVS 2007-6**	MR	MR	MR	S	MR	AR	MR	MS	MR	MR	MS	HR	-	-
7	**RVS 2010-1**	MR	HR	MR	-	AR	AR	MR	HS	HR	HR	MR	S	-	-
8	**SL 1028**	MS	HR	MR	-	AR	AR	HR	HR	AR	AR	MR	HR	HR	HR
9	**SL 1074**	S	HR	MS	-	AR	AR	HR	HR	AR	HR	HR	HR	HR	HR
10	**VLS 89**	MR	MR	MR	MR	AR	AR	MR	MR	AR	HR	MS	HS	HS	HR
1	**JS 335 (C)**	MS	MS	MR	-	HR	AR	MR	MS	HR	HR	S	HS	-	-
2	**Shivalik (C)**	S	MR	MS	HS	AR	S	S	HS	MR	HR	-	-	-	-
3	**VLS 59 (C)**	-	MR	MR	S	AR	AR	MS	S	AR	AR	S	-	-	-
4	**VLS 63 (C)**	MR	HR	MR	-	AR	MS	MR	MS	HR	AR	S	-	-	-
5	**SL 688 (c)**	-	-	-	-	AR	AR	HR	MR	HR	HR	-	-	-	-
6	**RKS 18 (c)**		-	-	-	-	-	-	-	-	-	-	-	-	-
7	**Bragg (c)**	-	-	-	S	HR	AR	MR	MS	HR	HR	-	-	-	-
8	**JS 72-44 (C)**	-	-	-	-	MR	HR	MR	S	HR	HR	-	-	-	-
9	**JS 75-46 (C)**	-	-	-	-	AR	S	MR	S	MR	MR	-	-	-	-
10	**Pb -1 (C)**	-	-	-	-	MR	AR	MS	S	AR	HR	-	-	-	-
11	**JS 93-05(C)**	-	-	-	S	AR	S	MR	HS	HR	HR	S	-	-	-
12	**JS 97-52 (C)**	-	-	-	-	AR	AR	MR	S	AR	AR	-	-	-	-
13	**JS 20-34(c)**	-	-	-	-	AR	AR	MS	HS	AR	AR	-	-	-	-
14	**PS 1347(c)**	-	-	-	-	-	-	-	-	-	-	-	-	HR	HR
15	**SL 688(c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	**SL 958(c)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	**DSb 21 (C)**	-	-	-	-	AR	S	MS	S	MS	AR	-	-	-	-

-:Not reported

Table 4.5: Contd… PP3 (c). Infection index of various diseases in AVT-II

S. No.	Varieties	North Eastern Hill Zone						
		Medziphema		B.Chariali				
		RAB	PB (ct)	Coll-R	PB (Ct)	YMV	SMV	RDC
1	2	3	4	5	6	7	8	9
1	**JS 20-94**	MR	HR	HR	HR	HR	AR	R-HY
2	**JS 20-116**	MR	MS	HR	HR	AR	AR	R-HY
3	**PS 1556**	MR	HR	MS	MS	MR	HR	S-HY (T)
4	**PS 1572**	AR	AR	MS	MS	HR	HR	S-HY (T)
5	**RSC 10-46**	AR	HR	MR	MR	AR	AR	R-HY
6	**RVS 2007-6**	MR	HS	MR	MS	HR	HR	S-LY
7	**RVS 2010-1**	MR	MR	MS	MS	MS	HR	S-HY (T)
8	**SL 1028**	HR	MR	HR	HR	AR	AR	R-HY
9	**SL 1074**	HR	HR	HR	AR	AR	AR	R-HY
10	**VLS 89**	MS	MR	HR	AR	HR	AR	R-HY
1	**RKS 18©**	-	-	-	-	-	-	
2	**Bragg ©**	-	-	S	S	MS	S	S-LY
3	**NRC 37 ©**	-	-	-	-			-
4	**JS 97-52 ©**	HS	AR	-	-	-	-	-
5	**JS 335 ©**	S	HS	HS	S	MR	MR	S-LY
6	**JS 93-05 ©**	MR	S	HS	S	MR	MR	S-LY
7	**JS 75-46 ©**	-	-	S	MS	MR	MS	S-LY
8	**VLS 58©**	-	-	S	MS	MR	MS	S-LY
9	**PS 1042 ©**	MR	AR	-	-		-	-
10	**PS 1347 ©**	MR	AR	-	-		-	-
11	**SL 688**	MR	HR	-	-	-	-	-
12	**SL 525**	MR	HR	-	-	-	-	-

RDC = Reaction to disease consortium.

Table 4.5: Contd… PP3 (c). Infection index of various diseases in AVT-II

S. No.	Varieties	Eastern Zone	
		Raipur	
		IBB	PB(Ct)
1	2	3	4
1	**JS 20-94**	HR	MR
2	**JS 20-116**	HR	MR
3	**PS 1556**	HR	MS
4	**PS 1572**	HR	MR
5	**RSC 10-46**	HR	HR
6	**RVS 2007-6**	HR	MR
7	**RVS 2010-1**	HR	HR
8	**SL 1028**	HR	HR
9	**SL 1074**	HR	MR
10	**VLS 89**	MS	MS
1	**RKS 18©**	-	-
2	**Bragg ©**	MS	HR
3	**NRC 37 ©**	HR	HR
4	**JS 97-52 ©**	-	
5	**JS 335 ©**	-	
6	**JS 93-05 ©**	-	
7	**VLS 63**	HS	MS
8	**VLS 59©**	HS	MR
9	**PS 1042 ©**	-	
10	**PS 1347 ©**	-	
11	**SL 688**	-	
12	**SL 525**	-	

Table 4.5: PP3 (c). Infection index of various diseases in AVT-II

S. No	Varieties	Central Zone									Southern Zone						
		Jabalpur		Sehore			Amravati				Ugarkhurd			Dharwad			K.Digraj
		CR	YMV	SCV	TLS	CR	YMV	CR	ALS	BP	Rust	YMV	PB (ct)	Rust	PSS	PB (ct)	Rust
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	**JS 20-94**	HS	HR	R	MS	AR	AR	HR	HR	MR	MS	HR	MS	MS	HR	MS	HS
2	**JS 20-116**	HS	HR	HR	MR	AR	HR	HR	HR	AR	MS	MR	MS	MS	HR	MS	HS
3	**PS 1556**	S	HR	HR	MS	S	AR	HR	AR	AR	MS	MR	MS	MS	HR	MS	-
4	**PS 1572**	HS	HR	R	MS	S	HR	MR	AR	AR	MS	HR	MS	MS	MR	MS	-
5	**RSC 10-46**	MR	HR	HR	HR	AR	HR	AR	AR	HR	MS	MR	MR	MS	HR	MR	-
6	**RVS 2007-6**	MR	R	HR	HR	MR	HR	HR	AR	HR	MS	MR	MS	MS	HR	MS	-
7	**RVS 2010-1**	S	HR	HR	HR	AR	HR	AR	HR	AR	MS	HR	MS	MS	MR	MS	
8	**SL 1028**	MR	HR	HR	HR	AR	AR	MS	HR	AR	MR	MR	MS	MR	HR	MS	-
9	**SL 1074**	MR	HR	HR	HR	AR	HR	HR	HR	MR	MR	MR	MR	MR	MR	MR	-
10	**VLS 89**	S	HR	MS	HR	-	HR	HS	HR	AR	MS	HR	MS	MS	HR	MS	HS
1	**Bragg ©**	S	MR	HR	MR	-	-	-	-	-	S	MR	HS	S	MS	HS	-
2	**NRC 37 ©**	MR	R	HR	MS	AR	-	-	-	-	MS	HR	MS	MS	MR	MS	-
3	**NRC 77 ©**	-	-	-	-	-	-	-	-	-	--	-	-	-	-	-	-
4	**JS 97-52 ©**	S	HR	HR	HR	HR	HR	HR	MS	HR	MS	MR	MS	-	-	-	-
5	**JS 72-44 ©**	-	-	HR	S	AR					MS	HR	MS	MS	MR	MS	-
6	**JS 335 ©**	MS	R	MR	HR	S	MR	MS	MR	HR	HS	MS	MS	HS	MS	MS	-
7	**JS 95-60 ©**	S	HR	HR	S	AR	HR	HR	AR	AR	S	MR	MR	-	-	-	--
8	**JS 93-05 ©**	HS	R	HR	S	AR	MR	MR	HR	HR	S	HR	HS	S	MR	HS	-
9	**JS 75-46 ©**	MR	R	-	-	-	-	-	-	-	S	MR	MS	S	MR	MS	-
10	**JS 20-34 ©**	AR	R	HR	MS	AR	-	-	-	-	S	HR	MR	-	-	-	-
11	**Punjab 1 ©**	S	HR	-	-	--	HR	MS	AR	MR	MS	MR	HS	MS	MR	HS	-
12	**DSb 21 ©**	HS	HR	MR	S	S	-	-	-	-	HR	HR	MS	HR	HR	MS	-
13	**SL 525 ©**	-	-	-	-	-	AR	-	-	-	-	-	-	-	-	-	-
14	**SL 688 ©**	HS	HR	HR	HR	AR	-	-	-	-	MS	MR	MS	MS	MS	MS	-
14	**PS 1042 ©**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	**PS 1347 ©**	HS	HR	-	-	-	-	-	-	-	MS	MR	MR	MS	MR	MR	-
16	**PS 1092 ©**	MR	HR	-			-	-	-	-	MS	MR	MR	MS	MR	MR	-
17	**Shivalik ©**	AR	HR	MR	-	HS	-	-	-	-	S	MR	MS	S	MS	MS	-
19	**VLS 63 ©**	HS	HR	HR	S	HS	-	-	-	-	S	MR	MS	S	MR	MS	-
20	**VLS59©**	MS	MR	HR	S	AR	-	-	-	-	MS	MR	MS	MS	MS	MS	-
21	**VLS58©**	MS	HR	-	-	-	-	-	-	-	S	MR	MS	S	MS	MS	-
22	**RKS 18©**	-	-	-	-	-	-	-	-	-	S	MR	MS	S	MS	MS	-
23	**RAUS 5 ©**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	**NRC 86 ©**	AR	MR	-	-	-	-	-	-	-	S	MR	MS	S	MS	MS	-
25	**Pusa 97-12 ©**	-	-	-	-	-	-	-	-	-	MS	HR	MS	MS	MS	MS	-

-:Not reported

Table 4.6: PP4 Performance of the previous year's resistant entries

S.No.	Northern Plain Zone				Northern Hill Zone		Central Zone		
	Pantnagar DOS: 17/07/2017				Almora DOS: 13/07/2017		Amravati DOS:06/07/2017		
	Varieties	Year of Test	RAB	YMV	Varieties	FLS	Varieties	Year of Test	CR
1	2	3	4	5	6	7	8	9	10
1	**PS 1589**	2017	1	1	**NSO 81**	55.5	SL 958	5 th	AR
2	**PS 1517**	2016	0	0	**KSO 245**	33.3	JS 20-71	4 th	AR
3	**SL 1074**	2016	1	1	**JS 20-34**	33.3	JS 20-89	4 th	AR
4	**SL 1028**	2015	1	1	**VLS 76**	11.1	DS 3050	4 th	HR
5	**MACS 1460**	2016	1	0	**NRC 85**	55.5	SL 955	4 th	AR
6	**PS 1556**	2015	3	0	**KDS 344**	33.3	AMS 1002	3 rd	HR
7	**PS 1550**	2015	7	1	**KBS-8**	55.5	AMS 1003	3 rd	HR
8	**JS 20-98**	2015	3	0	**NRC 88**	33.3	MACS 1370	3 rd	HR
9	**DS 3101**	2015	3	0	**VS 2004-9**	11.1	JS 20-96	2 nd	AR
10	**PS 1552**	2015	5	1	**VS 2005-40**	11.1	JS 20-87	2 nd	AR
11	**SL 955**	2014	9	0	**VS 2006-17**	11.1	RVS 2002-4	2 nd	AR
12	**SL 983**	2014	5	1	**VLS 47**	11.1	JS 20-53	2 nd	AR
13	**PS 1546**	2013	3	0	**JS-40**	33.3	MAUS 706	2 nd	HR
14	**SL 979**	2014	1	0	**MACS 1058**	33.3	AMS-MB 5-18	1 st	AR
15	**SL 982**	2014	1	1	**DSB-11**	11.1	JS 20-98	1 st	AR
16	**SL 958**	2012	3	0	**JS (SH) 2002-11**	55.5	MACS 1460	1 st	AR
17	**PS 1518**	2014	1	0	**BAUS-96**	55.5	KDS 753	1 st	MR
18	**PS 1569**	2016	3	0	**MAUS-282**	33.3	RSC 10-46	1 st	AR
19	**MACS 1407**	2016	3	0	**JS-20-14**	22.2	PS 1556	1 st	HR
20	**DS 2705**	2014	3	0	**JS (SH)2002-14**	22.2	RVS 2008-24	1 st	AR
21	**PS 1540**	2014	5	0	**NRC 79**	33.3	RVS 2007-06	1 st	HR
22	**PS 1410**	2006	5	0	**AMS 1**	11.1	JS 335 ©		MS
23	**DS 2708**	2012	3	0	**RHS-52**	33.3	Punjab 1 ©		MS
24	**DS 3104**	2016	7	0	**JS (SH)2003**	33.3	TAMS 38 ©		HS
25	**SL 688**	2004	5	0	**NRC 82**	33.3			
26	**RKS 113**	2014	5	1	**JS 20-19**	11.1			
27	**NRC 127**	2017	3	0	**JS-9**	11.1			
28	**DS 3106**	2017	5	0	**NRC 84**	11.1			
29	**NRC 124**	2017	5	0	**KHS 86**	11.1			
30	**PS 1570**	2016	1	0	**TS 7**	55.5			
31	**PS 1042**	2000	3	0	**KS 5343**	33.3			
32	**PS 1505**	2012	1	0	**KS-3**	55.5			
33					**VLS 74**	11.1			
34					**VLS 73**	11.1			

1	2	3	4	5	6	7	8	9	10
35					**DSB 20**	22.2			
36					**AMS-MB-5-18**	22.2			
37					**AMS-MB-5-19**	11.1			
38					**KDS 378**	11.1			
39					**VLS 86**	11.1			
40					**VLS 87**	33.3			
41					**NRC 42**	55.5			
42					**Himso 1685**	11.1			
43					**MACS 1407**	33.3			
44					**MACS 706**	33.3			
45					**NRC 99**	11.1			
46					**VLS 89**	11.1			
47					**KDS 753**	33.3			
48					**KDS 869**	33.3			
49					**MACS 1442**	33.3			
50					**IVT 3**	22.2			
51					**IVT 20**	11.1			

Contd.,

S. No	Central Zone								Southern Zone									
	Jabalpur DOS: 26/06/2017			Sehore DOS :30/06/2017					Dharwad DOS:22/07/2017					Ugarkhurd DOS:25/07/2017				
	Varieties	Year of Test	CR	Varieties	Year of Test	CV	TLS	CR	Varieties	Year of Test	Rust	PSS	PB (ct)	Varieties	Year of Test	Rust	YMV	PB (ct)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	JS 20-69	6th	HR	RS 2002-4	2nd	HR	MR	AR	DSb 23-2	1	HR	HR	MR	DSb 28-3	5th	HR	MR	MR
2	JS 20-87	4th	HR	RVS 2001-4	3rd	HR	MR	AR	DSb 28-3	1	HR	HR	MR	DSb 30-2	2nd	MR	MR	MR
3	JS 20-96	4th	HR	JS 20-34	4th	HR	MS	AR	DSb 30-2	3	MR	HR	MR	EC 391336	2nd	HR	HR	MR
4	JS 20-98	4th	HR	JS 20-69	3rd	HR	S	S	DSb 21	6	HR	HR	MS	EC 242104	2nd	HR	MR	MS
5	JS 20-116	4th	R	JS 9560	4th	HR	S	AR	KDS 726	5	MS	MR	S	EC 3551	2nd	HR	HR	MR
6	JS 21-05	4th	HR	DS 3101*	2nd	-		-	KDS 780	7	S	HR	S	EC 241778	10th	HR	MR	MR
7	JS 21-08	3rd	R	PS 1556*	2nd	-	-	-	KDS 753	1	HR	MR	MS	EC 241780	10th	HR	MR	MR
8	JS 20-18	4th	HR	DSb 21	2nd	MR	MR	S	PS 1569	5	MS	MR	MS	DSb 21 (C)	8th	HR	HR	MS
9	JS 20-19	4th	HR	JS 20-96	2nd	HR	S	AR	RVS 2002-4	5	MS	HR	MS	JS 21-08	2nd	MR	MR	MS
10	JS 20-20	4th	HR	RSC 10-46	1st	HR	MR	AR	RVS 2008-24	5	MS	HR	MS	DSb 32	2nd	HR	MR	MS
11	JS 20-51	4th	HR						RVS 2008-8	5	MS	HR	MS	KDS 921	2nd	MS	HR	MS
12	MACS 1442	2nd	R						EC 391336	3	HR	MR	MR	DSb 31	2nd	MR	MR	MS
13	MAUS 706	2nd	R						EC 379152	3	HR	HR	MR	KDS 980	2nd	MS	MR	MS
14	MAUS 740	2nd	R						EC 242104	3	HR	HR	MS	KDS 869	2nd	MS	MR	MS
15	NRC 117	2nd	HR						EC 3551	1	HR	HR	MR	JS 335 (C)		HS	MS	S
16	NRC 124	2nd	HR						EC 241780	8	HR	HR	MR					
17	SL 1104	4th	HR						EC 241778	8	HR	HR	MR					
18	SL 1113	4th	HR						GP 268	5	MS	MR	MS					
19	SL 1074	4th	HR						JS 21-08	3	MR	MR	MS					
20	SL 900	4th	HR						DSb 32	1	HR	HR	MS					
21	SL 955	4th	HR						KDS 921	5	MS	HR	MS					
22	SL 983	4th	HR						DSb 31	3	MR	HR	MS					
23	SL 96	5th	HR						KDS 980	5	MS	HR	MS					
24	SL 710	5th	HR						KDS 869	5	MS	HR	MS					
25	SL 738	5th	HR						JS 335 (C)	-	HS	S	S					
26	CAT 87	5th	HR															
27	DS 3105	1st	HR															
28	DS 3106	1st	HR															
29	DS 3102	1st	HR															
30	Himso 1681	1st	HR															
31	VLS 89	1st	HR															

***Poor germination**

Table 4.7a: PP5 Integrated management of Pod blight complex of soybean

S. No.	Treatments	Northern Plain Zone							Northern Hill Zone						
		Pantnagar DOS :18.07.2017							Palampur DOS :22.06.2017						
		Percent disease index	% pod infected	% germination	No. of plant stand per 9.6 m^2 plot	100 seed weight (g)	Yield (q/ha)	IC:B ratio	Germination (%)	Plant stand (%)	PDI (%)	% pod infected (Ct)	100 seed weight (g)	Seed yield (kg/ha)	B:C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	ST with Carboxin + Thiram @3g/kg seed	51.73	246.33	34.14	15.08	8.30	15.55	1:20	71.3	64.7	45.2	28.3	11.82	1248.1	0.83
2.	ST with Carbendazim + mancozeb @2g/kg seed	44.85	212.33	39.08	17.16	8.86	15.92	1:78.13	68.9	62.2	40.7	30.0	12.20	1270.4	0.86
3.	ST with Trichoderma @5g/kg seed	42.28	201.00	42.87	17.27	8.07	15.55	1:169.32	65.9	60.9	37.8	28.3	11.96	1229.6	0.81
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	51.86	247.33	22.21	13.32	9.01	17.03	1:5.26	70.7	63.8	7.4	7.7	12.97	1514.2	1.05
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	45.27	215.33	35.46	14.37	9.61	18.23	1:7.90	68.6	63.1	8.1	8.3	12.64	1451.8	0.97
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	41.24	195.66	39.05	16.88	8.55	13.88	1:0.63	64.6	58.9	8.8	10.0	12.68	1377.8	0.87
7.	Spray with Thiophanate methyl @0.1% at 55 and 75 DAS	36.94	174.00	34.97	14.77	8.67	14.81	1:2.29	58.8	54.9	10.4	11.7	12.38	1385.2	0.90
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	35.83	169.00	48.14	15.68	8.25	13.60	1:0.26	58.2	54.7	32.6	16.7	12.56	1288.9	0.77
9.	Control	35.62	168.33	60.48	20.21	7.89	13.51	-	60.6	54.9	49.6	33.3	11.67	1040.8	0.54
	S. Em ±														
	CD (5%)	6.09	28.86	12.46	5.34	0.34	0.75	-	6.19	6.58	5.79	10.47	0.691	129.56	-
	CV (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table:4.7 contd…….

S. No.	Treatments	Northern Eastern Zone							Southern Zone						
		Medziphema DOS :07.07.2017							Dharwad DOS:22.07.2017						
		Germination (%)	Plant stand (%)	PDI	% pod infected	100 seed weight (g)	Seed yield (kg/ha)	BR:IC	Germination (%)	Plant stand Per 9sq.mt	PDI	% pod infected	100 seed weight (g)	Seed yield (kg/ha)	B:C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	ST with Carboxin + Thiram @3g/kg seed	76.67	15.27	34.40	28.91	11.46	1466.67	20.79	100.00 (89.96)	38.00	20.15 (26.64)	18.47 (25.4)	14.00	1805.55	2.52
2.	ST with Carbendazim + mancozeb @2g/kg seed	73.33	14.73	35.58	32.63	10.99	1433.33	29.39	100.00 (89.96)	38.00	21.52 (27.57)	22.28 (28.1)	13.07	2027.77	2.96
3.	ST with Trichoderma @5g/kg seed	70.00	13.67	38.33	32.16	10.80	1340.74	24.74	97.00 (81.81)	34.67	31.40 (34.05)	29.19 (32.7)	12.14	1749.99	2.43
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	79.67	15.80	26.30	22.81	13.28	1640.74	2.35	97.67 (83.33)	38.00	16.00 (23.55)	14.59 (22.3)	13.94	2666.66	3.77
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	74.00	15.07	29.95	26.44	12.41	1566.67	2.19	98.67 (86.12)	37.33	18.39 (25.38)	16.50 (23.8)	14.30	2416.66	3.33
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	67.33	13.67	32.55	27.57	10.99	1488.89	1.97	94.33 (77.29)	33.33	28.11 (32.00)	25.04 (29.9)	13.88	1972.21	2.54
7.	Spray with Thiophanate methyl @0.1% at 55 and 75 DAS	66.33	13.40	31.57	28.07	11.35	1485.19	1.98	95.00 (77.09)	35.00	29.44 (32.85)	30.29 (33.4)	13.10	1888.88	2.44
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	67.00	12.93	42.64	33.64	10.01	974.07	0.58	93.00 (74.79)	34.00	31.31 (34.01)	31.53 (34.1)	13.17	1722.22	2.32
9.	Control	62.67	11.87	70.46	65.35	9.82	881.48		88.33 (70.47)	26.33	38.73 (38.47)	42.82 (40.9)	12.14	1316.66	1.62
	S. Em ±	3.08	0.70	2.00	2.07	0.33	110.57		2.57	1.03	0.83	1.20	0.16	99.28	
	CD (5%)	9.14	2.08	5.95	6.15	0.98	328.55		7.71	3.15	2.50	3.61	0.48	297.63	
	CV (%)	7.53	8.64	9.13	10.85	5.11	14.03		5.49	5.89	5.47	6.94	2.10	8.81	

Table:4.7 contd…….

S. No.	Treatments	Central Zone																			
		Amravati DOS : 29/06/2017							Jabalpur DOS: 26 /06/2017						Sehore DOS :30/06/2017						
		% Germination	Plant stand (30 DAS)	% Disease index	% pod infection	100 seed weight(g)	Seed Yield (kg/ha)	IC BR	Germination%	Plant stand at 30 DAS	PDI	% Pod Infected	100 Seed Weight (g)	Yield (Kg/ha)	(C:B) ratio	Germination %	Plant Stand	PDI	Pod infected %	100 seed wt.	Seed yield Kg/ha	B:C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.	ST with Carboxin + Thiram @3g/kg seed	94.52 (76.53)*	18.17	10.93 (3.30)	14.52 (3.80)	8.37	966	1: 13.0	63.53	258.3	0.78	10.57	9.29	716.3	1.20	84.99	35.96	20.11	9.07	11.96	503.33	1:1.19
2.	ST with Carbendazim + mancozeb @2g/kg seed	92.80 (74.67)	17.57	11.73 (3.42)	16.11 (4.01)	7.81	939	1: 11.3	62.83	253.6	0.90	11.54	8.72	713.6	1.16	81.54	34.10	20.47	12.20	11.96	470.00	1:0.45
3.	ST with Trichoderma @5g/kg seed	90.16 (71.85)	16.63	13.98 (3.73)	18.59 (4.31)	7.60	904	1: 18.0	55.66	238.6	1.80	15.12	8.1	670.0	1.10	80.21	33.04	21.81	13.63	11.63	460.833	1:0.44
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	94.55 (76.77)	18.23	5.72 (2.36)	11.06 (3.32)	11.09	1246	1: 3.75	64.57	256.6	0.52	5.70	9.74	811.6	1.40	83.84	33.09	16.74	9.43	11.8	507.5	1:0.41
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	92.64 (74.28)	17.53	6.85 (2.62)	12.11 (3.47)	10.33	1139	1:2.8	64.87	259.0	0. 77	6.10	9.70	798.3	1.36	81.84	33.29	16.37	9.97	11.96	534.16	1:0.38
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	90.29 (71.97)	16.77	7.09 (2.66)	13.14 (3.62)	9.40	1033	1: 1.96	53.23	235.0	0.80	6.70	8.27	776.6	1.12	80.84	32.73	17.11	9.80	10.63	447.5	1:0.32
7.	Spray withThiophanate methyl @0.1% at 55 and 75 DAS	85.68 (68.17)	15.70	9.97 (3.06)	13.89 (3.72)	9.49	1000	1:1.9	51.90	222.0	1.53	6.97	8.14	746.6	1.14	72.98	31.43	16.27	11.90	10.46	416.667	1:0.31
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	84.80 (67.22)	15.67	13.57 (3.68)	18.22 (4.26)	7.48	874	1: 3.5	52.66	223.0	1.26	15.23	8.24	690.0	1.08	74.75	30.34	16.01	9.70	11.63	415.833	1:0.34
9.	Control	84.50 (66.99)	15.43	17.84 (4.22)	22.70 (4.75)	6.47	740		53.07	226.0	2.93	17.39	8.17	656.6	-	74.75	26.68	24.71	18.07	10.3	404.167	
	SE ± (m)	2.02	0.68	0.13	0.14	0.47	84.75		**1.78**	**10.0**	**0.44**	**2.00**	**NS**	**39.2**		1.27	1.54	0.45	0.48	0.33	17.9	
	CD (P=0.05)	6.06	2.05	0.38	0.41	1.41	254.06		63.53	258.3	0.78	10.57	9.29	716.3	1.20	3.81	4.66	1.35	1.46	0.99	53.68	
	CV (%)	4.86	7.03	6.86	5.99	9.42	14.94		62.83	253.6	0.90	11.54	8.72	713.6	1.16	-	-	-	-	-	-	

* Figures in parentheses are arc sine values.

Table 4.7a: PP5 Integrated management of Pod blight complex of soybean (Pooled analysis-2015,2016,2017)

S. No.	Treatments	Northern Plain Zone						Northern Hill Zone						
		Pantnagar						Palampur						
		Percent disease index	% pod infected	% germination	No. of plant stand per 9.6 m^2 plot	100 seed weight (g)	Yield (q/ha)	Germination (%)	Plant stand (%)	PDI (%)	% pod infected (Ct)	100 seed weight (g)	Seed yield (kg/ha)	B:C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	ST with Carboxin + Thiram @3g/kg seed	34.14	15.08	51.73	246.33	8.30	15.55	71.95	62.86	43.7	28.40	12.5	1345.33	0.96
2.	ST with Carbendazim + mancozeb @2g/kg seed	39.08	17.16	44.85	212.33	8.86	15.92	68.59	62.11	38.8	29.60	12.5	1327.56	1.02
3.	ST with Trichoderma @5g/kg seed	42.87	17.27	42.28	201.00	8.07	15.55	64.96	58.36	36.5	29.07	12.4	1293.17	0.97
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	22.21	13.32	51.86	247.33	9.01	17.03	71.93	62.51	6.9	7.67	13.5	1583.85	1.28
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	35.46	14.37	45.27	215.33	9.61	18.23	68.34	63.45	8.9	9.53	13.1	1517.68	1.19
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	39.05	16.88	41.24	195.66	8.55	13.88	64.59	57.78	10.6	10.17	13.1	1441.31	1.08
7.	Spray with Thiophanate methyl @0.1% at 55 and 75 DAS	34.97	14.77	36.94	174.00	8.67	14.81	58.64	54.02	11.6	9.47	13.0	1548.73	1.2
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	48.14	15.68	35.83	169.00	8.25	13.60	58.44	54.56	31.8	15.64	12.8	1344.31	0.87
9.	Control	60.48	20.21	35.62	168.33	7.89	13.51	60.69	56.15	49.6	34.34	12.1	1134.25	0.75
	CD (5%)	12.46	5.34	6.09	28.86	0.34	0.75	5.22	4.44	4.612	5.78	0.389	121.19	-

Table:4.7 contd…….

S. No.	Treatments	Northern Eastern Zone						
		Medziphema						
		Germination (%)	Plant stand (%)	PDI	% pod infected	100 seed weight (g)	Seed yield (kg/ha)	BR:IC
1	2	3	4	5	6	7	8	9
1.	ST with Carboxin + Thiram @3g/kg seed	84.39	16.62	29.27	27.26	11.22	1450.61	16.33
2.	ST with Carbendazim + mancozeb @2g/kg seed	82.17	16.20	32.61	31.39	10.97	1372.82	20.53
3.	ST with Trichoderma @5g/kg seed	78.89	15.11	35.57	33.01	10.76	1167.90	12.73
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	86.17	16.88	20.49	18.96	12.97	1881.47	3.35
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	82.00	16.03	23.85	23.24	12.27	1746.90	2.94
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	76.44	15.12	26.80	25.07	11.75	1593.83	2.31
7.	Spray with Thiophanate methyl @0.1% at 55 and 75 DAS	74.22	14.65	27.25	27.15	11.45	1534.56	2.22
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	72.45	14.46	36.40	34.11	10.62	1218.53	1.83
9.	Control	69.00	13.90	59.81	56.45	9.98	959.27	
	S. Em ±	1.34	0.24	1.81	2.15	0.20	98.08	
	CD (5%)	3.99	0.72	5.38	6.39	0.60	291.42	

Table:4.7 contd…….

S. No.	Treatments	Central Zone													
		Amravati							Sehore						
		Germination (%)	Plant stand (%)	PDI	% pod infected	100 seed weight (g)	Seed yield (kg/ha)	BR:IC	Germination (%)	Plant stand Per 9sq.mt	PDI	% pod infected	100 seed weight (g)	Seed yield (kg/ha)	B:C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	ST with Carboxin + Thiram @3g/kg seed	94.39 (76.76)*	18.30	14.43 (22.18) *	17.64 (24.71) *	9.21	1311	1:13.3	89.39	39.26	16.6	11.08	12.07	835.017	1 : 1.15
2.	ST with Carbendazim + mancozeb @2g/kg seed	92.92 (74.94)	17.61	15.50 (23.05)	19.51 (26.08)	8.72	1288	1:11.9	85.94	37.40	16.9	12.80	11.73	859.667	1 :0.83
3.	ST with Trichoderma @5g/kg seed	90.66 (72.41)	16.79	18.10 (25.06)	22.57 (28.27)	8.22	1219	1:15.1	84.61	36.34	18.3	14.23	11.73	855.417	1 :0.82
4.	T1 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	94.35 (76.61)	18.32	8.74 (16.97)	12.83 (20.87)	11.81	1628	1:4.2	88.24	36.39	13.7	10.03	11.90	887.083	1 :0.75
5.	T2 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	92.69 (74.42)	17.49	10.04 (18.28)	14.18 (21.98)	11.01	1523	1:3.2	86.24	36.59	13.3	10.12	11.40	887.917	1 :0.76
6.	T3 + spray with Thiophanate methyl @0.1% at 55 and 75 DAS	90.84 (72.54)	16.74	11.15 (19.28)	16.39 (23.78)	9.98	1406	1:2.3	85.24	36.03	14.1	10.40	11.40	857.083	1 :0.73
7.	Spray with Thiophanate methyl @0.1% at 55 and 75 DAS	83.48 (66.42)	15.52	13.84 (21.66)	17.24 (24.38)	9.95	1390	1:2.4	77.38	34.73	13.7	11.53	10.57	816.667	1 :0.70
8.	Spray with Trichoderma @5g/litre at 55 and 75 DAS	82.70 (65.64)	15.62	17.94 (24.94)	21.59 (27.58)	8.17	1226	1:3.9	79.15	33.64	13.5	10.30	11.73	799.583	1 :0.72
9.	Control	82.23 (65.37)	15.19	25.54 (30.19)	28.77 (32.34)	7.38	1080		79.15	29.98	22.0	18.67	10.40	710.417	
	S. Em ±	1.71	0.49	0.62	0.90	0.29	45.00		1.27	1.54	0.45	0.42	0.22	24.80	
	CD (5%)	5.13	1.46	1.86	2.71	0.87	134.90		3.81	4.63	1.36	1.27	0.66	74.38	
	CV (%)	4.13	5.00	4.81	6.12	5.38	5.81		-	-	-	-	-	-	

Table 4.8: PP6. Evaluation of germplasm lines for identification of multiple disease resistant sources

S.NO	Palampur DOS:22/06/2017				Jabalpur DOS:26/06/2017				Dharwad DOS:22/07/2017				Ludhiana	
	genotypes	FLS (%)	PB (ct)	BS	genotypes	CR	YMV	RAB	genotypes	Rust	PSS	PB(Ct)	genotypes	YMV (0-9 scale)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	P 501	AR	HR	MR	P 501	AR	HR	MR	P 501	MR	HR	MS	EC 333860	4.0
2	PR 15-126-3-8	MS	HR	MS	PR 15-126-3-8	HS	HR	MR	PR 15-126-3-8	S	HR	MR	PR 15-126-3-8	6.0
3	PLSO 57	MR	AR	HR	PLSO 57	AR	HR	AR	PLSO 57	MS	HR	MS	NRC 84	8.0
4	SPC 174	S	MS	MS	SPC 174	S	HR	MR	SPC 174	MS	HR	MS	V 1	6.0
5	TGX 849-D-13-4	MS	AR	MR	TGX 849-D-13-4	AR	HR	AR	TGX 849-D-13-4	MR	HR	MR	PR 35	2.0
6	TGX 854-42 D	HR	S	MR	TGX 854-42 D	AR	HR	MR	TGX 854-42 D	S	HR	MR	EC 241777	6.0
7	TGX 855-32 E	AR	AR	HR	TGX 855-32 E	MS	R	MS	TGX 855-32 E	S	MR	MS	EC 241768	7.0
8	TK 5	HR	MS	HR	TK 5	AR	HR	AR	TK 5	S	HR	MR	GPC 32	7.0
9	V 1	HS	AR	MR	V 1	S	HR	MR	V 1	S	HR	MR	NRC 67	7.0
10	EC 333860	MS	MR	MR	EC 333860	MR	HR	AR	EC 333860	S	HR	MS	VP 1165	6.0
11	EC 358002	MR	HR	HR	EC 358002	S	HR	AR	EC 358002	HS	HR	MS	EC 241771	6.0
12	EC 377883 B	MR	HR	HR	EC 377883 B	S	HR	MR	EC 377883 B	HS	MR	MR	EC 241778	Killed by bud blight
13	PPI 72-2-5-6	MR	MR	MR	PPI 72-2-5-6	MS	HR	HR	PPI 72-2-5-6	HS	HR	MS	EC 390981 A	6.0
14	VP 1143	MR	MR	MR	VP 1143	MS	R	MR	VP 1143	S	HR	MS	TGX 854-42 D	4.0
15	VP 1147 A	MR	HR	MR	VP 1147 A	MS	HR	AR	VP 1147 A	S	MR	MS	DSb 1	9.0
16	VP 1162	HR	MR	HR	VP 1162	MR	HR	AR	VP 1162	S	MR	MS	NRC 78	7.0
17	VP 1164	MS	MR	MR	VP 1164	MR	HR	AR	VP 1164	S	HR	MR	EC 377883 B	5.0
18	EC 390981 A	S	AR	HR	EC 390981 A	MS	HR	AR	EC 390981 A	MS	MR	MR	EC 114573	7.0
19	DB 1588	HR	AR	MR	DB 1588	HS	HR	MR	DB 1588	MS	HR	MR	MAUS 176	7.0
20	DN 290	MR	HR	MS	DN 290	HS	HR	AR	DN 290	S	HR	MS	JS 20-37	6.0
21	EC 109540	HR	HR	MR	EC 109540	MS	MR	MR	EC 109540	S	HR	MR	VP 1143	5.0
22	EC 114573	HR	AR	MR	EC 114573	MS	HR	AR	EC 114573	MS	HR	MR	EC 241756	5.0
23	EC 18594	MR	HR	MS	EC 18594	AR	MR	AR	EC 18594	S	MR	MR	EC 250591	4.0
24	EC 241650	MS	MS	MR	EC 241650	MR	HR	AR	EC 241650	MS	MR	MS	EC 241778	4.0
25	EC 241756	MR	MS	MR	EC 241756	MR	HR	AR	EC 241756	MS	MR	MS	DN 290	8.0
26	EC 241768	MR	AR	HR	EC 241768	MS	HR	MR	EC 241768	MS	MR	MS	PPI 72-2-5-6	6.0

Table: 4.8 contd.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
27	EC 241771	HR	HR	MR	EC 241771	MR	HR	AR	EC 241771	S	MR	MS	EC 250583	7.0
28	EC 241777	MR	MR	HR	EC 241777	MS	HR	AR	EC 241777	S	HR	MR	EC 251886	6.0
29	EC 241778	HR	HR	HR	EC 241778	MR	HR	AR	EC 241778	MR	HR	MR	NRC 71	7.0
30	EC 241778	HR	HR	HR	EC 241778	AR	HR	AR	EC 241778	MS	HR	MS	EC 241807	7.0
31	EC 241807	MS	AR	HR	EC 241807	AR	HR	AR	EC 241807	MS	HR	MS	PS 1347	2.0
32	EC 242104	MR	HR	MR	EC 242104	MS	HR	AR	EC 242104	S	HR	S	VP 1162	2.0
33	EC 245986	HR	AR	HR	EC 245986	MR	HR	MR	EC 245986	S	MR	S	DB 1588	7.0
34	EC 250583	MR	HR	MS	EC 250583	S	R	MR	EC 250583	S	MR	S	VP 1164	5.0
35	EC 250591	MS	HR	MR	EC 250591	AR	R	HR	EC 250591	MR	HR	MR	TK 5	6.0
36	EC 251886	S	MR	HR	EC 251886	S	MR	AR	EC 251886	S	HR	MS	KB 17	5.0
37	GPC 32	MR	HR	HR	GPC 32	MR	HR	AR	GPC 32	MS	MR	MS	EC 109540	4.0
38	DSb-1	HR	MR	HR	DSb 1	MS	HR	MR	DSb 1	MS	MR	MS	EC 242104	6.0
39	JS 20-37	MS	AR	MR	JS 20-37	AR	HR	MR	JS 20-37	MS	HR	MS	TGX 855-32 E	5.0
40	JS 20-42	MR	MR	MR	JS 20-42	MR	R	MR	JS 20-42	MR	HR	MS	SPC 174	4.0
41	KB 17	MR	AR	MR	KB 70	MS	R	MR	KB 17	MS	MR	MS	EC 358002	5.0
42	MACS 176	HR	MR	MR	MAUS 176	MS	HR	AR	MAUS 176	MS	MR	MS	EC 241650	5.0
43	NRC 67	MR	MR	MR	NRC 67	AR	R	AR	NRC 67	MS	HR	MS	EC 1619	5.0
44	NRC 71	HR	MR	MR	NRC 71	MR	HR	AR	NRC 71	MS	HR	MS	EC 18594	9.0
45	NRC 76	MR	HR	MR	NRC 78	AR	HR	MR	NRC 78	MS	HR	S	TGX 854-42 D	7.0
46	NRC 84	HR	MS	MS	NRC 84	MR	HR	AR	NRC 84	MS	HR	MS	P 501	7.0
47	PS 1347	AR	HR	MR	PS 1347	MR	HR	MR	PS 1347	MS	HR	MS	EC 245986	7.0
48	SQL 89	HR	HR	MR	SQL 89	AR	MR	AR	SQL 89	S	MR	MS	JS 20-42	6.0
49	VP 1165	HR	MR	MS	PB 1165	MS	HR	MR	VP 1165	S	MR	MS	SQL 89	5.0
50	EC 1619	MR	AR	MR	EC 1619	AR	HR	MR	EC 1619	MS	HR	MS	VP 1147 A	5.0
51	JS 335 (Check)	MS	S	MR	JS 335	MR	R	AR	JS 335	HS	S	S		
52	Shivalik (Check)	S	MS	MS	TAMS 38	HS	HR	AR	DSb 21	HR	MR	MS		
53					JS 93-05	S	HR	MR						
54					NRC 7	MR	MR	MR						
55					Punjab 1	S	MR	MR						

-: No germination

Table 4.9 :PP 7. Screening of released varieties against charcoal rot (*Macrophomina phaseolina*) disease

S. No.	Varieties	CR reaction		
		Jabalpur (DOS:26-6-2017)	Amravati (DOS:06-07-2017)	Sehore (30-6-2017)
1	**JS 20-29**	MS	MR	AR
2	**JS 20-69**	AR	AR	AR
3	**JS 20-34**	AR	MR	AR
4	**JS 95-60**	HS	MR	AR
5	**JS 93-05**	HS	MS	AR
6	**JS 97-52**	S	MS	AR
7	**NRC 37**	MS	MR	AR
8	**RVS 2001-4**	MS	AR	AR
9	**KDS 344**	-	MS	AR
10	**DSb 21**	HS	HS	AR
11	**DSb 1**	HS	MS	AR
12	**MAUS 71**	MS	MS	AR
13	**MAUS 158**	MS	MS	AR
14	**MAUS 162**	AR	MS	AR
15	**RKS 45**	MR	MS	AR
16	**RKS 24**	MR	MS	AR
17	**MACS 1118**	MR	MR	AR
18	**JS 335**	MS	S	MS
19	**NRC 7**	S	MS	-
20	**TAMS 38**	HS	HS	MS
21	**NRC 86**	-	MS	-
22	**MAUS 612**	-	MS	-

Table 4.10:PP 8. Bioefficacy of Zillon against Yellow Mosaic Virus Disease (1st Year)-Paid Trial

S. No.	Treatments	Northern Plain Zone							
		Pantnagar DOS :18.07.2017				Ludhiana DOS :07.07.2017			
		Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)	Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)
1	2	3	4	5	6	7	8	9	10
1.	Spraying with zillon @ 4 ml/l at 15 and 30 DAS	1.61	26.63	7.88	13.22	100	88.00	-	-
2.	Spraying with zillon @ 6 ml/l at 15 and 30 DAS	2.36	18.41	8.50	15.86	100	86.84	-	-
3.	Spraying with zillon @ 4 ml/l at 15 and 45 DAS	1.24	33.22	8.19	12.69	100	89.00	-	-
4.	Spraying with zillon @ 6 ml/l at 15 and 45 DAS	0.61	14.81	8.49	15.13	100	96.92	-	-
5.	Spraying with zillon @ 4 ml/l at 15, 30 and 45 DAS	1.84	28.39	8.94	14.41	100	100.00	-	-
6.	Spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS	0.60	18.51	9.29	16.33	100	100.00	-	-
7.	Spraying with triazophos @ 1.5 ml/l @ 15 and 45 DAS	1.51	20.98	8.29	13.48	100	100.00	-	-
8.	Untreated control	3.30	39.81	7.75	11.37	100	100.00	-	-
	CD (5%)	1.21	19.43	0.38	1.63	-	-	-	-

Table: 4.10 contd.

S. No.	Treatments	Central Zone							
		Jabalpur DOS :29.06.2017				Amarvati DOS :29.07.2017			
		Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)	Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)
1	2	3	4	5	6	7	8	9	10
1.	Spraying with zillon @ 4 ml/l at 15 and 30 DAS	17.93	4.50	8.65	8.20	8.76 (2.96)	3.67 (1.91)	8.19	9.89
2.	Spraying with zillon @ 6 ml/l at 15 and 30 DAS	17.3	4.30	8.75	8.23	8.67 (2.94)	3.75 (1.94)	8.25	10.08
3.	Spraying with zillon @ 4 ml/l at 15 and 45 DAS	17.5	4.40	8.60	8.22	8.06 (2.84)	2.67 (1.63)	8.73	10.43
4.	Spraying with zillon @ 6 ml/l at 15 and 45 DAS	15.46	3.85	8.70	8.39	7.82 (2.79)	2.58 (1.61)	9.14	10.57
5.	Spraying with zillon @ 4 ml/l at 15, 30 and 45 DAS	12.0	3.00	9.00	8.43	6.97 (2.64)	2.33 (1.53)	10.28	11.85
6.	Spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS	10.4	2.60	9.10	8.58	6.58 (2.56)	2.25 (1.50)	10.73	12.69
7.	Spraying with triazophos @ 1.5 ml/l @ 15 and 45 DAS	9.45	2.40	9.14	8.65	7.14 (2.67)	2.42 (1.55)	10.23	11.62
8.	Untreated control	23.5	5.85	8.40	7.90	11.00 (3.31)	6.25 (2.50)	7.14	8.33
	S. Em ±	-	-	-	-	0.06	0.03	0.45	6.72
	CD (5%)	1.95	-	NS	4.31	0.17	0.05	1.36	2.04
	CV (%)	-	-	-	-	3.72	3.12	8.58	10.89

Table: 4.10 contd.

S. No.	Treatments	Southern Zone				Northern Eastern Hill Zone			
		Dharwad(Ugarkhurd) DOS :10.07.2017				Medziphema DOS :07.07.2017			
		Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)	Percent disease incidence	Infection index	100 seed weight (g)	Yield (q/ha)
1	2	3	4	5	6	7	8	9	10
1.	Spraying with zillon @ 4 ml/l at 15 and 30 DAS	15.5	22.34	13.60	13.19	0	0	11.16	16.47
2.	Spraying with zillon @ 6 ml/l at 15 and 30 DAS	14.8	20.50	13.80	12.68	0	0	10.81	14.18
3.	Spraying with zillon @ 4 ml/l at 15 and 45 DAS	14.7	22.88	13.42	13.50	0	0	11.13	13.46
4.	Spraying with zillon @ 6 ml/l at 15 and 45 DAS	12.2	18.71	13.44	14.39	0	0	10.57	16.72
5.	Spraying with zillon @ 4 ml/l at 15, 30 and 45 DAS	11.3	16.57	14.33	15.93	0	0	10.54	13.29
6.	Spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS	12.4	14.76	14.70	18.30	0	0	10.46	13.88
7.	Spraying with triazophos @ 1.5 ml/l @ 15 and 45 DAS	19.0	22.89	13.47	14.89	0	0	11.18	16.17
8.	Untreated control	23.0	28.65	13.58	11.97	0	0	10.44	12.83
	S. Em ±	1.45	0.89	0.25	1.16	-	-	0.26	1.19
	CD (5%)	2.04	2.71	0.77	3.52	-	-	0.79	3.61
	CV (%)	14.30	7.41	3.17	13.95	-	-	-	-

PP 9:Table 4.11. Assessment of polymer coating on efficacy of seed treating chemicals and inoculants

Treatments	Pantnagar(15-07-2017)				Indore					
	Percent seedling mortality		Anthracnose		Percent seedling mortality		PDI/Pod filling stage			
	10 DAG	20 DAG	Percent disease incidence	Percent disease index	10 DAG	20 DAG	Coll.R	RRR	Anth.	Root Rot
JS 335 seed treated with carboxin and thiamethoxam with polymer coating. Seed treatment with Rhizobium and PSB culture at the time of sowing	3.04	3.04	3.45	5.46	3.1	9.63	58.0	41.0	69.5	45.0
JS 335 seed treated with carboxin and thiamethoxam with polymer coating. Seed treatment without Rhizobium and PSB culture at the time of sowing	2.88	2.88	3.39	6.73	4.28	15.19	58.0	41.0	69.5	45.0
JS 335 seed treated with (pre-mix pyroclostrobin and thiaphenate methyl) + (pre-mix thirum and corbaxin) + thiamethoxam with polymer coating.	3.13	3.13	3.56	10.70	4.62	12.49	62.9	55.0	69.65	51.3

PP 9:Table 4.12. Assessment of polymer coating on efficacy of seed treating chemicals and inoculants

Treatments	Dharwad(18-07-2017)			Sehore*		
	Percent seedling mortality		Anthracnose	% Seedling mortality	Target leaf spot (0-9 scale)	Viral disease (CI)
	10 DAG	20 DAG	Percent disease index			
JS 335 seed treated with carboxin and thiamethoxam with polymer coating. Seed treatment with Rhizobium and PSB culture at the time of sowing	4.10 (11.55)	5.50 (13.56)	11.15 (19.47)	**0**	31.00 (32.52)	12.32
JS 335 seed treated with carboxin and thiamethoxam with polymer coating. Seed treatment without Rhizobium and PSB culture at the time of sowing	5.50 (13.53)	9.75 (18.19	23.79 (29.15)	**0**	36.22 (45.63)	12.85
JS 335 seed treated with (pre-mix pyroclostrobin and thiaphenate methyl) + (pre-mix thirum and corbaxin) + thiamethoxam with polymer coating.	5.30 (13.26)	8.75 (17.20	15.75 (23.37)	**0**	25.22 (26.56)	8.82
T test (0.05)				-	NS 1.09 2.26	NS -0.16 2.26
T_1 v/s T_2	NS	S	S	-	**S** 2.43 2.26	NS 2.148 2.262

*Mean of 10 replications

सूक्ष्मजीव विज्ञान
Microbiology

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Southern Zone

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Table: MB 1/16-A: Isolation and screening of rhizobacteria capable of producing ACC deaminase activity, antioxidant potential and phytohormones for developing inoculants to mitigate abiotic stress in soybean.

Delhi center

Growth* in terms optical density (OD $_{600}$nm) of fluorescent pseudomonads grown in media amended with PEG at different rates.

Isolate no.	0%	10%	20%	30%
T2-7	2.19	1.53	0.73	**1.37**
T3-9	1.9	1.5	1.1	**1.3**
T3-13	2.1	1.1	0.56	0.74
T3-14	1.8	0.75	0.56	0.75
T4-15	2.1	0.69	0.54	**0.79**
T4-16	1.96	0.72	0.69	0.72
T2-5	1.29	1.1	0.82	0.62
T3-15	1.85	0.98	0.72	**0.81**
T1-3	1.18	0.84	0.65	0.34
T1-5	2.1	1.33	0.84	0.47
T2-8	1.94	1.2	**1.3**	0.46
T2-11	1.75	1.24	**1.31**	0.46
T3-12	1.35	1.19	0.69	0.41
T3-15	1.64	1.03	1.12	**0.9**

- **Observations are of 72hrs incubation and mean of 3 replicates**

Indore center

S. No.	Sample ID	SI	Identification
1	DSR-1A	0.6248	*Bradyrhizobium japonicum*-GC subgroup A
2	DSR-1C	0.6192	*Bradyrhizobium japonicum*-GC subgroup A
3	DSR-2A	0.54	*Bradyrhizobium japonicum*-GC subgroup B
4	DSR-4A	0.5725	*Spingomonas paucimobilis*
5	DSR-4B	0.6074	*Bradyrhizobium japonicum*-GC subgroup A
6	IND-5		No Match
7	DSR- 18A		No Match
8	DSR-11B	0.6553	*Rhodovulum sulfidophilum*
9	DSR-19 A	0.7593	*Rhodovulum sphaeroides*
10	DSR-3 A	0.1724	*Microbacterium flavescens*
11	DSR-11 D	*0.6594*	*Rhodovulum sulfidophilum*
12	DSR-11 A	*0.6738*	*Rhodovulum sulfidophilum*

Pantnagar center

Sl. No.	Cultivar/ Germplasm/ Soil	Isolate code	Sl. No.	Cultivar/ Germplasm/ Soil	Isolate code
1.	PS-1092 (1)	PSR-1	19.	PS-1347 (2)	PSR-19
2.	PS-1092 (2)	PSR-2	20.	1GP	PSR-20
3.	PS-1042 (1)	PSR-3	21.	2GP	PSR-21
4.	PS-1042 (2)	PSR-4	22.	3GP	PSR-22
5.	PS-1225 (1)	PSR-5	23.	5GP	PSR-23
6.	PS-1225 (2)	PSR-6	24.	6GP	PSR-24
7.	PS-19 (1)	PSR-7	25.	7GP	PSR-25
8.	PS-19 (2)	PSR-8	26.	9GP	PSR-26
9.	PS-21 (1)	PSR-9	27.	10GP (2)	PSR-27
10.	PS-21 (2)	PSR-10	28.	10GP (1)	PSR-28
11.	PS-23 (1)	PSR-11	29.	OM-121	PSR-29
12.	PS-23 (2)	PSR-12	30.	OS-11	PSR-30
13.	PS-22 (1)	PSR-13	31.	FP-121	PSR-31

14.	PS-22 (2)	PSR-14	32.	FP-122	PSR-32
15.	PS-24	PSR-15	33.	OM-111	PSR-33
16.	PS-1536 (1)	PSR-16	34.	OL-121	PSR-34
17.	PS-1536 (2)	PSR-17	35.	OL-122	PSR-35
18.	PS-1347 (1)	PSR-18	36.	FS-111	PSR-36

Ludhiana center

Intensity of growth in different pseudomonads of soybean at PEG(6000) concentration 0, 15, 25 and 35 % at 28±2ºC in King's B medium.

Bacterial isolates	Different PEG (6000) concentration (%)			
	0	15	25	35
LSE-1	++++	++++	+++	+
LSE-2	++++	++++	++++	++
LSE-3	++++	++++	++++	+++
LSE-4	++++	++++	+++	+
LSE-5	++++	++++	++	+
LSE-6	++++	++++	+++	++
LSE-7	++++	++++	++	+
LSE-8	++++	++++	++	+

Table MB1/16-B Multifarious plant growth promoting traits of non-rhizobial endophytic bacteria in soybean.

Ludhiana Center

Bacterial isolates	ACC deaminase activity			Catalase	Super oxide dismutase (SOD)	IAA production (µg/ml) at 6 days	
	DF-ACC	DF+ACC	DF+$(NH_4)_2SO_4$			(-Tyrptophan)	(+Tyrptophan)
LSE-1	-	-	-	+	+	10.06	45.84
LSE-2	++	+++	+++	+	+	15.71	48.77
LSE-3	++	+++	+++	+	+	13.06	45.86
LSE-4	-	++	-	+	+	13.32	46.38
LSE-5	+	-	-	+	+	14.50	47.75
LSE-6	++	++	++	+	+	13.08	45.50
LSE-7	-	-	-	+	+	13.28	44.80
LSE-8	-	++	-	+	+	14.50	47.80

+= Low; ++= moderate; +++= High growth ; ++++= Excellent growth

Table MB 3/14: Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination

Delhi center

Treatment	Nodules (no./plant) (at 50% flowering stage)	Nodule dry mass (at 50% flowering stage) (g/plant)	N-content in shoots (%)	N-content in grains (%)	Grain yield (kg/ha)
Paenibacillus polymyxa (HKA 15)+AMF consortia	28.77a	106.66a	2.37a	6.76a	1041.66a
Farmers practice (20, 40, 60 Kg NPK/ha)	28.22a	98.44a	2.11a	6.72a	985.00a
LSD (P=0.05)	2.61	48.42	0.85	0.32	136.03

Sehore center

Treatments	Nodule number /plant at 50% flowering stage	Nodule dry weight(mg.) /plant at 50% flowering stage	N content in (%) shoots at harvest	N content (%) in grain at harvest	P Content (%) in shoot at harvest	P Content (%) in grain at harvest	Total N uptake (kg/ha.)	Total P uptake (kg/ha.)	Grain yield kg/ha.	B :C Ratio
Paenibacillus polymyxa (HKA 15)+AMF consortia	35.6	91.12	1.25	6.64	0.31	0.49	154.5	15.07	1875	3.6:1
Farmers practice (20, 40, 60 Kg NPK/ha)	20.10	60.01	0.99	6.10	0.21	0.29	112.29	7.50	1500	2.5:1

Pantnagar center

Treatments	No. of Nodules/ plant	Nodule dry weight (g/plant)	N content in shoot at harvest (%)	N content in grain (%)	Total N uptake (kg/ha)	P content in shoot at harvest (%)	P content in grain (%)	Total P uptake (kg/ha)	Grain yield (kg/ha)	B:C Ratio
Paenibacillus polymyxa (HKA 15) + AMF consortia	63	0.210	1.59	5.95	79.83	0.28	0.57	9.28	1050	0.34
Farmer's Practice	95	0.354	1.36	5.89	72.00	0.24	0.53	7.86	950	0.21

Indore center

Treatments	Nodule number /plant at 50% flowering stage	Nodule dry weight(mg.) /plant at 50% flowering stage	N content in (%) shoots at harvest	N content (%) in grain at harvest	P Content (%) in shoot at harvest	P Content (%) in grain at harvest	Grain yield kg/ha.
Paenibacillus polymyxa (HKA 15)+AMF consortia	58.22a	198.44a	6.11a	6.72a	0.076a	0.768a	1385.00a
Farmers practice (20, 40, 60 Kg NPK/ha)	58.77a	206.66a	6.37a	6.76a	0.066a	0.841a	1441.66a
LSD (P=0.05)	4.61	98.42	1.015	0.38	0.013	0.114	186.03

Ludhiana center

Treatments	Nodule number /plant at 50% flowering stage	Nodule dry weight(mg.) /plant at 50% flowering stage	Total N content in (%) shoots at harvest	Total P Content (%) in shoot at harvest	Grain yield kg/ha.	*Gross returns (Rs/ha)	**Net returns (Rs/ha)	B :C Ratio
Paenibacillus polymyxa (HKA 15)+AMF consortia	39	100.8	2.20	0.156	2250	68625	38,672	2.31
Farmers practice	28	85.7	1.98	0.145	1962	59841	30,138	2.01

*Market price of soybean = Rs. 3050/- quintal
** Cost of microbial consortium @ Rs. 100 per packet (for one acre)
Cost of cultivation of farmer's practice = Rs. 29,703
Cost of cultivation of microbial treatments = Rs. 29,953

MB 4/13 : Nodulation ability of AVT-II entries at respective centres.

Screening AVT-II lines of North Plain Zone along with checks for nodulation ability

A: Delhi center

AVT-II Line	NN/plant	NDW/plant (mg)	DSW/plant (g)	%N content
SL 1074	6.7	11.1	32.8	3.4
PS 1572	16.2	84.4	41.0	3.4
SL 1028	0	0.0	24.5	3.6
PS 1092	6.9	22.2	34.2	3.2
PS 1347	3.9	21.1	36.6	3.6
SL 688	17.2	77.8	26.8	2.9
Pusa 9712	11.8	56.7	49.7	2.9

B: Ludhian center

AVT–II entries (varieties)	Number of nodules/plant	Dry Weight of nodules/plant (mg)	Leghaemoglobin content (mg/g of nodules)
SL1074	50	78.9	12.5
PS1572	35	77.9	10.9
SL1028	34	67.6	10.0
PS1092	33	75.4	10.9
PS1347	36	69.7	7.7
SL688	46	75.8	13.8
Pusa 97-12	35	53.2	6.3
SL 958	56	79.3	12.3
CD at 5%	11.56	14.76	4.27

C: Pantnagar

AVT-II Entries	Nodule No/pl.	Nodule dry weight (g/pl.)	Leghaemoglobin content in nodules (mg/g)
SL 1074	16	0.069	0.846
PS 1572	33	0.274	1.810
SL 1028	20	0.117	1.800
PS 1347 (check)	21	0.162	1.850
SL 688 (check)	30	0.288	1.743
PUSA 97-12 (check)	13	0.102	1.748
PS 1092(check)	20	0.201	1.664
C.D. = 0.05	11	0.143	0.358

Screening AVT-II lines of central zone along with checks for nodulation ability

D:Indore center

Variety	Nodule number	Nodule dry weight (mg/g nodules)	Leghaemoglobin content (mg/g nodules)
JS 20-116	145.22a	290a	5.74b
RVS 2007-6	61.22bc	208b	4.97c
JS 20-94	40.66c	151.66c	3.99d
NRC 127	29.44c	91.33d	4.44cd
RSC 10-46	85b	247.33ab	7.38a
LSD (P=0.05)	35.51	49.73	0.66

E: Sehore center

Variety	Nodule number	Nodule dry weight (mg/g nodules)	Leghaemoglobin content (mg/g nodules)
JS 97- 52	24.1	30.2	2.7
NRC -86	25.5	26.3	2.9
RVS -2007-6	33.2	34.6	3.1
JS 20- 94	19.2	25.1	2.9
JS 20-34	17.5	22.7	2.9
JS 93-05	16.6	23.3	2.8
JS 20-116	18.6	22.8	2.9
JS335	16.2	25.9	2.9
RSC 10-46	19.1	21.5	2.8
JS 95-60	15.6	23.6	2.8

सारांश प्रतिवेदन
Summary Reports

SUMMARY REPORT OF BREEDING TRIALS KHARIF 2017

1. Northern Hill Zone

1.1 Initial Varietal Trial

Proposed Testing Centres: Almora, Palampur, Bajaura, Majhera
Data received from: All the Centres

The yield data of 42 test entries and three checks is presented in Table 1.1.1 of this compilation. Grain yield varied from 445 kg/ha (SKF 1050) to 2210 kg/ha (VLS 63) with an average of 1509 kg/ha. However, none of the test entries was superior to the best check VLS 63 (2210 kg/ha).

1.2 Advanced Varietal Trial-II

Proposed Testing Centres: Almora, Palampur, Bajaura, Majhera
Data received from: All the Centres

VLS 89 was a repeat entry in AVT II trial and was evaluated along with three checks. The yield performance and maturity are shown in Table 1.1.6 and 1.1.8 of this compilation. VLS 89 has out yielded the best check VLS 63 by 10%. Mean maturity duration of the trial ranged from 114 to 120 days with an average of 116 days.
The mean performance of VLS 89 over four years has been shown in Table 1. Based on three years yield data VLS 89 has out yielded the best check VLS 59 by 11%.

1. Table 1: Mean Performance of AVT-II Entries of Northern Hill Zone

S.No.	Entries	Yield (Kg/ha)				Mean	Rank	Maturity
		IVT-2014	AVT I-2015	AVT II-2016	AVT II-2017			
1	VLS 89	2408	1811	2483	2466.50	2292.125	I	116
2	PS 1092(C)	1562	1535	1978	1853.25	1732.063	IV	117
3	VLS 59(C)	2142	1796	2179	2113.25	2057.563	II	113
4	VLS 63(C)	1482	2020	2348	2248.00	2024.500	III	116

2. Northern Plain Zone

2.1 Initial Varietal Trial

Proposed Testing Centres: Pantnagar, Delhi, Ludhiana.
Data received from: All the Centres

The yield data of 42 test entries along with three checks has been presented in Table 1.2.1 of this compilation. Grain yield ranged from 420 kg/ha (SKF 1050) to 3371 kg/ha (NRC 128) with a mean of 1395 kg/ha. Five entries *viz.*, NRC 128 (3371 Kg/ha), PS 1611 (2675 Kg/ha), PS 1613 (2362 Kg/ha), NRC 134 (2222 Kg/ha) and NRCSL 1 (2115 Kg/ha) were superior to the best check SL 958 (1983 Kg/ha). The maturity duration varied from 97 days (Shalimar Soybean 1) to a maximum of 122 days (PS 1613) with a mean value of 109 days (Table 1.2.3).

2.2 Advanced Varietal Trial-I

Proposed Testing Centres: Pantnagar, Delhi, Ludhiana,
Data received from: All the Centres

The grain yield and maturity of eight test entries and three checks is presented in Table 1.2.6 of this compilation. Two entries SL 1104 and DS 3106 out yielded the best check PS 1347 by a margin of 10 and 5 percent, respectively both in AVT I of 2017 and mean of IVT 2016 and AVT I of 2017 (Table 2). The maturity duration of AVT-I trial ranged from 108 to 119 days (Table 1.2.8). Two years data shows the maturity duration range of 112 to 123 days with an average of 117 days.

Table 2: Mean Performance of AVT-I Entries of Northern Plain Zone

S.No.	Entry	Yield (Kg/ha)		Mean	Rank	Maturity
		IVT-2016	AVT I-2017			
1	SL 1104	2432	2302.33	2367.165	I	122.500
2	RVS 2009-9	2494	1292.50	1893.250	VIII	111.500
3	NRC 126	2765	1132.00	1948.500	V	116.085
4	RSC 10-70	2864	1423.00	2143.500	III	116.500
5	NRC 125	2222	1198.00	1710.000	XI	115.000
6	RSC 10-71	2519	1302.00	1910.500	VI	116.250
7	NRC 127	2395	1210.00	1802.500	IX	114.835
8	DS 3106	2235	2203.33	2219.165	II	122.685
9	Pusa 97-12(C)	2074	1736.33	1905.165	VII	118.665
10	PS 1347(C)	2037	2090.33	2063.665	IV	119.670
11	SL 688(C)	1642	1781.00	1711.500	X	118.670

2.3 Advanced Varietal Trial-II

Proposed Testing Centres: Pantnagar, Delhi, Ludhiana, Dholi
Data received from: All the Centres

The grain yield and maturity of two test entries and four checks is presented in Table 1.2.11 and 1.2.13 of this compilation. Both of the test entries out yielded the best check PS 1347 (1781 Kg/ha) by more than 10%. Maturity duration ranged from 113 to 117 days with an average of 116 days. Based on the three year data, both of the test entries could out yield the best check PS 1347 (1664 Kg/ha) by more than 15% (Table 3). The mean maturity duration ranged from 114 to 120 with an average of 117 days.

Table 3: Mean Performance of AVT-II Entries of Northern Plain Zone

S.No.	Entries	Yield (Kg/ha)			Mean	Rank	Maturity
		IVT-2015	AVT I-2016	AVT II-2017			
1	SL 1074	1901.33	1860	1982.82	1914.717	II	119.083
2	PS 1572	1925.67	1775	2076.31	1925.660	I	120.377
3	PS 1092(C)	-	1531	1361.36	1446.180	V	115.950
4	PS 1347(C)	1498.00	1713	1781.3	1664.100	III	116.333
5	SL 688(C)	1481.33	1607	1573.52	1553.950	IV	116.067
6	Pusa 97-12(C)	1399.33	1331	1430.53	1386.953	VI	114.700

SL 1028 was tested again in AVT II trial during 2017 and the entry outyielded the best check PS 1347 by 21% (Table 4). Based on the four year data SL 1028 exhibited the yield advantage of 21%. Maturity duration of SL 1028 was 124 days while that of trial ranged from 116 to 124 days with an average of 120 days.

Table 4: Mean Performance of Repeat Entry of AVT-II in Northern Plain Zone

S. No.	Entries	Yield (Kg/ha)				Mean	Rank	Maturity
		IVT-2014	AVT-I 2015	AVT II-2016	AVT II-2017			
1	SL 1028*	2939	2014	1965	2148.05	2267	I	124.11
2	PS 1092(C)	2173	1695	1531	1361.36	1690	IV	118.98
3	PS 1347(C)	2099	1929	1713	1781.30	1881	II	121.92
4	SL 688(C)	2445	1526	1607	1573.52	1788	III	120.13
5	Pusa 97-12(C)	-	-	1331	1430.53	1381	V	116.05

***AVT II Repeat Entry**

3. North Eastern Hill Zone

3.1 Initial Varietal Trial

Proposed Testing Centres: B.Chariali, Imphal, Umiam
Data received from: All the Centres

The yield data of 42 test entries along with three checks has been presented in Table 1.3.1 of this compilation. Data of Umiam was rejected due to high CV. The mean yield varied from 667 Kg/ha (SKF 1150) to 1679 Kg/ha (CSB 10084). Fifteen test entries were superior to the best check JS 335 (1297 kg/ha). Top ten entries *viz.* CSB 10084, NRC 128, SL 1068, SL 1123, PS 1613, NRC 137, CSB 10112, DS 3108, NRCSL 1 and VLS 95 have been advanced to AVT I. Mean maturity duration of the trial varied from 87 (Shalimar Soybean 1) to 112 days (CSB 10112 and TS 53) with an average of 102 days.

3.2 Advanced Varietal Trial-I

Proposed Testing Centres: B.Chariali, Imphal, Umiam
Data received from: All the Centres

The yield and maturity data of five test entries along with three checks is presented in Table 1.3.6 and 1.3.8, respectively of this compilation. Data from Umiam was rejected due to high CV and low mean yield. The yield ranged from 1131 Kg/ha (DSb 32) to 1760 Kg/ha (KDS 921) with only the highest yielding entry out yielding the best check RKS 18 (1658 Kg/ha) by 6%.

Mean yield and maturity of two years is presented in Table 5. Based on two years performances two entries KDS 921 (1855 Kg/ha) and RSC 10-71 (1726 Kg/ha) performed significantly better than the best check JS 97-52 (1593 Kg/ha) by 16 and 8%, respectively. The entries showed the maturity range of 104 to 113 days.

Table 5: Mean Performance of AVT-I Entries of North Eastern Hill Zone

S.No.	Entry	Yield (Kg/ha)		Mean	Rank	Maturity
		IVT-2016	AVT I-2017			
1	RSC 10-71	2230	1221.5	1726	II	110
2	DSb 32	2198	1131	1665	III	104
3	KDS 921	1950	1759.5	1855	I	113
4	KDS 1045	1844	1341	1593	V	103.5
5	DS 3105	1835	1360	1598	IV	108
6	JS 335(C)	1309	1377.5	1343	VII	103.5
7	JS 97-52(C)	1704	1481.5	1593	V	110
8	RKS 18(C)	1506	1658	1582	VI	104

3.3 Advanced Varietal Trial-II

Proposed Testing Centres: B.Chariali, Imphal, Umiam

Data received from: B.Chariali and Imphal

JS 20-116 was tested along with three checks in AVT II in NEHZ and it was found to be inferior to the best check RKS 18 in yield by 14% (Table 1.3.11). However, based on the mean performance of three years, JS 20-116 outyielded the best check by 13% (Table 6). The entry, with average maturity duration of 101days, was the earliest in maturity.

Table 6: Mean Performance of AVT-II Entries of North Eastern Hill Zone

S.No.	Entries	Yield (Kg/ha)			Mean	Rank	Maturity
		IVT-2015 (NEZ)	AVT I-2016 (NEHZ)	AVT II-2017			
1	JS 20-116	2506	1894	1383	1927.667	I	100.73
2	JS 335(C)	1747	1375	1348	1490.000	IV	101.52
3	RKS 18(C)	2019	1543	1572	1711.333	III	103.23
4	JS 97-52(C)	2173	1542	1491.5	1735.500	II	107.83

PS 1556 has been tested twice in AVT I trial during 2015 and 2016 and it was evaluated in AVT II trial this year. Two check varieties RKS 18 and JS 97-52 outyielded PS 1556 during 2017. However based on the average performance of the four years PS 1556 could out exhibit a yield advantage of 11% (1822 Kg/ha) over the best check RKS 18 (1644 Kg/ha). PS 1556 was latest in maturity with a maturity duration of 109 days (Table 7).

Table 7: Mean Performance of AVT I Repeat Entry in AVT II in North Eastern Hill Zone

S. No.	Entries	Yield (Kg/ha)				Mean	Rank	Maturity
		IVT-2014 (NEZ)	AVT I-2015 (NEZ)	AVT I-2016 (NEHZ)	AVT II 2017			
1	PS 1556	2214	1584	1667	1464	1821.667	I	109
2	JS 335(C)	1547	1653	1375	1348	1525.000	IV	102
3	RKS 18(C)	1662	1727	1543	1572	1644.000	II	104
4	JS 97-52(C)	1782	1588	1542	1492	1637.333	III	108

4. Eastern Zone

4.1 Initial Varietal Trial

Proposed Testing Centres: Bhawanipatna, Raipur, Ranchi, Dholi

Data received from: All the Centres

The yield data of 42 test entries along with three checks has been presented in Table 1.4.1 of this compilation. Mean maximum yield of 2130 kg/ha was recorded in RSC 11-07 whereas the mean minimum yield was recorded by NRC 131 and MACS 1575 (920 kg/ha). Fourteen test entries could out yield the best check JS 335 (1580 kg/ha). Top ten entries *viz* RSC 1107, NRC 128, NRCSL 1, AMS 2014-1, NRC 132, RSC 11-03, NRC 137, MACS 1493, NRC 136 and VLS 94 have been advanced to AVT I. The average yield for this zone was 1491 kg/ha. Maturity duration ranged from 98 days (RVS 2011-3, NRC 130) to 111 days (PS 1613) with average duration of 105 days. Check varieties had a maturity duration range of 107 to 111 days (Table 1.4.3).

4.2 Advanced Varietal Trial-I

Proposed Testing Centres: Bhawanipatna, Raipur, Ranchi, Dholi

Data received from: All the Centres

Table 1.4.6 and 1.4.8 of this compilation shows yield and maturity data of two test entries (RSC 10-71 and RSC 10-52) and three checks. Both of the test entries could out yield the best check RKS 18. The maturity ranged from 107 days (JS 335) to 112 days (JS 97-52).

Based on the mean yield data of two years both of the entries could out yield the best check JS 97-52 (Table 8) by 14%. Average maturity duration ranged from 106 to 109 days.

Table 8: Mean Performance of AVT-I Entries of Eastern Zone

S.No.	Entry	Yield (Kg/ha)		Mean	Rank	Maturity
		IVT-2016	AVT I-2017			
1	RSC 10-71	2049	1590.25	1819.625	II	109
2	RSC 10-52	2185	1520.75	1852.875	I	108
3	JS 335(C)	1531	1275.00	1403.000	V	106
4	RKS 18(C)	1778	1429.75	1603.875	IV	107
5	JS 97-52(C)	1918	1330.50	1624.250	III	109

4.3 Advanced Varietal Trial-II

Proposed Testing Centres: Bhawanipatna, Raipur, Ranchi

Data received from: All the Centres

The data for yield and maturity of two entries with three checks has been presented in Table 1.4.6 and 1.4.8 of this compilation. RVS 2010-1 and JS 20-116 have shown a yield advantage of 22% and 17% over the best check RKS 18 (1430 Kg/ha). The maturity ranged from 106 to 112 days.

Average grain yield and maturity data over three years has been shown in Table 9. Based on three years average data, both of the entries have shown an yield advantage of 20% and 18% respectively over best check JS 97-52 (1876 Kg/ha). Mean maturity duration ranged from 101 to 107 days.

Table 9: Mean Performance of AVT-II Entries of Eastern Zone

S.No.	Entries	Yield (Kg/ha)			Mean	Rank	Maturity
		IVT 2015	AVTI 2016	AVTII 2017			
1	JS 20-116	2506	2204	1677.75	2129.250	II	101
2	RVS 2010-1	2451	2294	1744.5	2163.167	I	101
3	JS 335(C)	1747	2078	1275	1700.000	V	102
4	RKS 18(C)	2019	1976	1429.75	1808.250	IV	104
5	JS 97-52(C)	2173	2125	1330.5	1876.167	III	107

5. Central Zone

5.1 Initial Varietal Trial

Proposed Testing Centres: Amravati, Anand, Indore, Jabalpur, Jalna, Kota, Morena, Nagpur, Parbhani, Sehore, Amreli, Lok Bharti

Data received from: All the Centres

The data from Jalna and Morena was rejected due to high coefficient of variation and that of Indore and Jabalpur was rejected due to low mean yield. The yield data of 42 test entries along with four checks has been presented in Table 1.5.1. The mean value for yield varied from 856 kg/ha (SKF 1050) to 2164 kg/ha (AMS 100-39). Only one test entry AMS 100-39 could out yield the best check variety NRC 86 (2023 Kg/ha) by more than 7%. The maturity duration has been found to be as low as 88.5 days (NRC 130) to 105 days (SL 1068) with an average of 98 days. Four test entries had the equivalent maturity duration to that of earliest maturity check JS 20-34 (Table 10). Out of these four entries two entries NRC 130 and NRC 131 have out yielded the earliest maturing check by 27% 1nd 15%.

Table 10: Mean performance of early maturing entries in Central Zone.

S. No	Entry	Maturity (Days)	Yield (Kg/ha)
1.	NRC 130	88.5	1712
2.	Shalimar Soybean 1	89.2	1024
3.	SKF 1050	89.0	856
4.	NRC 131	90.6	1555
5.	JS 20-34 (early check)	88.8	1305

5.2 Advanced Varietal Trial-I

Proposed Testing Centres: Amravati, Anand, Indore, Jabalpur, Jalna, Kota, Morena, Nagpur, Parbhani, Sehore.

Data received from: All the Centres

Data from Indore and Jabalpur was rejected due to low mean yield and that of Jalna was rejected due to high CV and low mean yield. The yield and maturity data of seven entries along with four checks have been presented in Table 1.5.6 and 1.5.8 of this compilation. Three test entries AMS-MB-5-18, MACS 1520 and RSC 10-52 were superior to the best check NRC 86 (1617 Kg/ha) by more than 7%. Maturity duration ranged from 89 days (JS 20-34) to 104 days (JS 97-52 and RSC 10-71).

Based on the mean performances over two years (Table 11), three test entries out yielded the best check NRC 86 (1976 Kg/ha). NRC 127 is an EDV of JS 97-52 and has null KTI. NRC 127 has outyield JS 97-52 by 4% in yield. Mean maturity duration over three years ranged from 89 days (JS 20-34) to 105 days (RSC 10-70 and RSC 10-71).

Table 11: Mean Performance of AVT-I Entries of Central Zone

S.No.	Entry	Yield (Kg/ha)		Mean	Rank	Maturity
		IVT-2016	AVT I-2017			
1	RSC 10-70	2627	1497.14	2062.07	IV	104.91
2	RSC 10-71	2485	1418.29	1951.65	VI	105.08
3	RSC 10-52	2633	1732.00	2182.50	III	102.25
4	MACS 1520	2929	1814.00	2371.50	I	100.75
5	AMS-MB 5-18	2485	1921.00	2203.00	II	100.85
6	KDS 980	2451	1430.14	1940.57	VII	100.70
7	NRC 127*	2196	1418.71	1807.36	VIII	102.02
8	NRC 86(C)	2335	1617.43	1976.22	V	101.45
9	JS 20-34(C)	1631	1535.14	1583.07	XI	89.30
10	JS 97-52(C)	2103	1362.14	1732.57	IX	103.70
11	JS 335(C)	2076	1345.00	1710.50	X	101.60

*EDV of JS 97-52 for null KTI trait.

5.3 Advanced Varietal Trial-II

Proposed Testing Centres: Amravati, Anand, Jabalpur, Jalna, Kota, Morena, Nagpur, Parbhani, Sehore
Data received from: All the Centres

Data from Jabalpur and Jalna was rejected due to low mean yield and high CV. Data from Sehore was rejected due to high CV. Yield and maturity data of two entries with five checks has been presented in Table 1.5.11 and 1.5.13 of this compilation. JS 20-116 could out yield the best check NRC 86 by a margin of 17%.

Based on the pooled data of three years, JS 20-116 and JS 20-94 out yielded the best check NRC 86 by 21% and 11% respectively (Table 12). The maturity duration of both the test entries was 97 days.

Table 12: Mean Performance of AVT-II Entries of Central Zone

S.No.	Entries	Yield (Kg/ha)			Mean	Rank	Maturity
		IVT-2015	AVT I-2016	AVT II-2017			
1	JS 20-116	1950.25	2986	1771	2235.750	I	97.167
2	JS 20-94	1938.50	2667	1560	2055.167	II	97.000
3	JS 335(C)	1259.25	2649	1322	1743.417	V	98.000
4	JS 97-52(C)	1744.67	2387	1276	1802.557	IV	103.000
5	NRC 86(C)	1413.75	2617	1510	1846.917	III	100.233
6	JS 20-34(C)	1308.25	2088	1230	1542.083	VI	87.107

RSC 10-46 and RVS 2007-6 were the repeat entries for AVT II trial in Central Zone. RVS 2007-6 out yielded the best check JS 95-60 by 10%. However based on the average yield performance over 4 years RVS 2007-6 and RSC 10-46 out yielded the best check JS 93-05 by 30% and 22%. Maturity duration of test entries ranged from 101 to 102 days and those of checks from 88 to 103 with JS 95-60 being the earliest maturing check and JS 97-52 being the latest maturing check.

Table 12: Mean Performance of Repeat Entry of AVT-II in Central Zone

S. No.	Entries	Yield (Kg/ha)				Mean	Rank	Maturity
		IVT 2014	AVT I 2015	AVT II 2016	AVT II 2017			
1	RSC 10-46	2133	1763	2455	1438	1947	II	102
2	RVS 2007-6	2316	1869	2466	1621	2068	I	101
3	JS 335(C)	1447	943	2111	1322	1456	VI	99
4	JS 97-52(C)	1437	1536	1806	1276	1514	V	103
5	JS 95-60(C)	1541	1130	2111	1474	1564	IV	88
6	JS 93-05(C)	1674	1043	2227	1429	1593	III	95

6. Southern Zone

6.1 Initial Varietal Trial

Proposed Testing Centres: Adilabad, Bidar, Bengaluru, Coimbatore, Dharwad, K.Digraj, Pune,
Data received from: All the Centres

The yield data of 42 test entries along with four checks has been presented in Table 1.6.1. Mean yield ranged from 1568 kg/ha (Shalimar Soybean 1) to 2703 kg/ha (MACS 1493) with the average yield of 2209 kg/ha. RKS 18 had highest yield value (2291 kg/ha) among all the four checks. Thirteen test entries were found to be significantly superior over the best check. Ten highest yielding entries are MACS 1493, RSC 11-07, KDS 992, AMS 100-39, AMS 2014-1, DSb 34, NRC 132, NRCSL 1, BAUS 102 and SKF-SPS-11. The maturity duration for this zone varied from 87 days (MACS 1575) to 105 days (NRC 133) with a mean value of 97 days (Table 1.6.3).

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SUMMARY REPORT OF AGRONOMIC TRIALS *KHARIF* - 2017

By and large, all the trials were conducted during *kharif* 2017 at 20 Centres representing 6 zones of the country as per technical programme. The experiment-wise salient findings (Table 2.1.1 to 2.7.10) are given as under.

1. ASP 1 /16. Evaluation of AVT II entries under different sowing dates

` The new entries with two sowing dates were tested in split plot with three replications to study the response of soybean new entries to different sowing dates (Table 2.1.1-2.1.15).

1.1. Northern hill zone (Palampur and Almora)

1.1.1. Entries

Soybean new entry VLS 89 yielded higher than VLS 63 (5.20 and 10.69 %) and VLS 59 (31.32 and 18.78 %) at Palampur and Almora (Table 2.1.1). On zonal mean basis, the highest yield was noted with VL 89 as compared to check VLS 63 (6.69%) and VLS 59 (27.46%).

Similar trend was also recorded in dry matter at 30, 45 and 60 DAS, CGR, RGR, branches/plant, pods/plant, seed index, straw yield, harvest index, grain production index and rainfall use efficiency (Table 2.1.2.and 2.1.3.).

1.1.2. Sowing date

Normal planting of soybean produced significantly higher yield to the tune of 215.38% at Palampur and 100.09% at Almora than 20 days later planting. On the zonal mean basis, the normal planting yielded more (127.22%) than late planting (Table 2.1.1.).

A similar trend was also noted in all the parameters. However, the harvest index was numerically higher with late planting (Table 2.1.2.and 2.1.3.).

1.1.3. Interaction effect

The interaction between entries and sowing dates was found to be significant at both the centre and entry VL 89 planted under normal time produced maximum yield at Palampur and Almora (Table 2.1.1.).

1.2. Northern plain zone (Ludhiana and Pantnagar)

1.2.1. Entries

All the three new entries yielded lesser than check SL 958 at Ludhiana, while at Pantnagar, all the 3 new entries yielded better than SL 688. On the basis of zonal mean, all the three new entries yielded lesser than SL 958, however, all the three new entries SL 1074, SL 1028 and PS 1558 produced more yield (101.89, 110.54 and 96.31%) as compared to check SL 688 (Table 2.1.4.).

Among new entries, SL 1028 showed higher values of all the studied parameters like dry matter at 30, 45 and 60 DAS, CGR, RGR, branches/plant, pods/plant, seed index, straw yield, harvest index grain production efficiency and rainfall use efficiency (Table 2.1.5.).

1.2.2. Sowing dates

Timely planting of all the new entries of soybean gave significantly higher yield (4.23 to 164.12%) at both the centers than late planting. The zonal mean revealed that the normal planting

produced higher yield (32.83%) than late planting. A similar trend was also observed in all the studied parameters like dry matter at 30, 45 and 60 DAS, CGR, RGR, branches/plant, pods/plant, seed index, straw yield, harvest index grain production efficiency and rainfall use efficiency (Table 2.1.5).

1.2.3. Interaction effect

The interaction between entries and sowing dates was found to be non- significant at Ludhiana and Pantnagar (Table 2.1.4.).

1.3. Eastern zone (Ranchi, Raipur and Bhawanipatna)

1.3.1. Entries

The entries differed significantly among themselves at all the centres. Only one new entries i.e. RVS 2010-1 yielded higher (2.60%) than check JS 97 52 at Raipur. While at Ranchi, there were no yield under late sown conditions, however, under normal sown condition, all the three new entries RVS 2010-1(23.05%), PS 1556 (9.60%) and JS 20-116 (1.92%) yielded better than check. New entries JS 20-116 (47.62%), RVS 2010-1(30.19%) and PS 1556 (20.66%) produced more yield than check at Bhawanipatna (Table 2.1.6.). On the zonal mean basis, new entry JS 20-116 and RVS 2010-1 produced negligibly higher yield as compared to check- JS 97 52.

On zonal mean basis, more or less a similar trend was also observed in all the parameters under study (Table 2.1.7.-2.1.8).

1.3.2. Sowing dates

Timely planting of soybean yielded significantly higher (18.08 to 134.40 %) than late planting at Raipur and Ranchi centres (Table 2.1.6.). On zonal mean basis, the highest yield (68.06%) was recorded under normal planting as compared to late planting.

On zonal mean basis, maximum values of all the growth and yield attributes were associated with normal planting (Table 2.1.7.-2.1.8).

1.3.3. Interaction effect

The interaction between entries and sowing date was found significant at Raipur centre (Table 2.1.6.). New entry RVS 2010-1 planting under normal condition gave maximum yield than rest of the combinations.

1.4. North eastern hill zone (Imphal, Medziphema)

1.4.1. Entries

Both the new entries i.e. JS 20-116 and RVS 2010-1 yielded lesser than check at both the centres as well as in zonal mean (Table 2.1.9.).

On zonal mean basis, more or less a similar trend was also observed in all the parameters under study (Table 2.1.10. and 2.1.11.).

1.4.2. Sowing dates

Timely planting of soybean yielded significantly higher (10.48 to 42.02%) than late planting at both the centres (Table 2.1.9.). On zonal mean basis, the highest yield (18.52%) was recorded under normal planting as compared to late planting.

On zonal mean basis, maximum values of all the growth and yield attributes were associated with normal planting (Table 2.1.10. and 2.1.11.).

1.4.3. Interaction effect

The interaction between entries and sowing date was found non-significant at both the three centre (Table 2.1.9.).

1.5. Central zone (Sehore, Amravati and Kota)

1.5.1. Entries

New entries of soybean differed significantly among themselves at all the centres (Table 2.1.12.). New entry JS 20-226 (87.56%), RVS 2007-06 (51.78%) and RSC 10-46 (22.12%) produced higher yield than check at Sehore. All the new entries like RSC 10-46 (88.71%), RVS 2007-06 (59.97%), JS 20-226 (52.88%), JS 20-94 (50.93%) and NRC 127 (35.20%) yielded higher than check at Amravati. At Kota, new entries JS 20-116 and NRC 127 produced marginally higher yield than check. On zonal mean basis, JS 20-226 (45.16%), RSC 10-46 (30.53%), RVS 2007-06 (30.11%), JS 20-94 (11.94%) and NRC 127 (11.02%) yielded more than check.

On zonal mean basis, JS 20-16 showed higher values of straw yield, HI, grain production index and RUE than rest of the entries (Table 2.1.13. and 2.1.14.). No definite trend was noted in dry matter accumulation and growth analysis parameters.

1.5.2. Sowing dates

The maximum yield was recorded when soybean was planted at normal time (21.68 to 224.91%) at all the centres as compared to late planting (Table 2.1.12.). On the basis of zonal mean, normal planting gave higher yield to the tune of 108.90% than late planting.

On zonal mean basis, the parameters under study were with normal planting (Table 2.1.13. and 2.1.14.).

1.5.3. Interaction effect

The interaction between entries and sowing date was found significant at Sehore centre (Table 2.1.12.). The maximum yield was recorded with RVS 2007-06 x normal planting.

2. ASP2/15. Sustainable soybean production through crop rotation and tillage systems

Two tillage systems (minimum and conventional) and four crop rotations were tested in strip plot design with four replications to study the response of soybean to tillage systems and crop rotations (Table 2.2.1-2.2.26).

2.1. North plain zone (Pantnagar and Ludhiana)

2.1.1. Crop rotations

Soybean, rabi and soybean equivalent yield remained unaffected due to different crop rotation at both the centres (Table 2.2.1.).

The net reurns and B:C ratio was higher with minimum tillage. Soybean- soybean- maize – soybean showed maximum net returns and B:C ratio (Table 2.2.4.).

2.1.2. Tillage systems

Soybean yield and *rabi* yield differed non-significantly between two tillage systems at Ludhiana and Pantnagar. Soybean equivalent yield was significantly higher with conventional tillage at Pantnagar (Table 2.2.3.). The net returns and B:C ratio was higher with minimum tillage (Table 2.2.4.).

2.1.3. Interaction effect

Interaction between tillage systems and crop rotations was found to be non-significant at both the centres.

2.2. Eastern zone (Raipur and Ranchi)

2.2.1. Crop rotations

The highest soybean yield was associated with Soy-Maize-Soy-Maize (Table 2.2.5.). *Rabi* crop yield differed non-significantly among crop rotations (Table 2.2.6.). The maximum SEY was recorded with soy-maize-soy-maize at both the centres as well as in pooled data (Table 2.2.7.).

Soy-Maize-Soy-Maize showed highest net returns and B:C ratio (Table 2.2.8.). Soy-Soy-Maize-Soy rotation was found to be nutrient exhaustive at Raipur (Table 2.2.9.). The initial values of soil OC, N. P, and K and nutrient uptake were given in Table 2. 2.9. The balance sheet of N, P and K were given in Table 2.2.10., 2.2.11. and 2.2.13.

2.2.2. Tillage systems

The highest soybean yield was with conventional tillage at Raipur while at Ranchi, there were non-significan difference between tillage systems (Table 2.2.5.). The *rabi* crop yield remained unaffected due to tillage systems at both the centres (Table 2.2.6.). The maximum SEY was recorded with conventional tillage at Raipur as well as in pooled data (Table 2.2.7.).

The maximum net returns and B:C ratio were with minimum tillage (Table 2.2.8.).The initial values of soil OC, N. P, and K and nutrient uptake were given in Table 2. 2.9. Minimum tillage was found to be nutrient exhaustive than conventional tillage. The balance sheet of N, P and K were given in 2.2.10., 2.2.11. and 2.2.13.

2.2.3.Interaction effect

Interaction between tillage systems and crop rotations was found to be non-significant at both the centres.

2.3. Central zone (Kota and Amravati)

2.3.1. Crop rotation

Soybean-maize- soybean-maize yielded maximum at both the centres and zonal mean (Table 2.2.13.). *Rabi* crop yield did not influence by the different crop rotations at Kota (Table 2.2.13 and Table 2.2.14.).The highest *rabi* crop yield was recorded with Soybean-soybean-soybean-Maize and followed by continuous soybean at Amravati as well as in zonal mean. The maximum SEY was with soybean-maize-soybean-maize (Table 2.2.15.).

The maximum net returns and B:C ratio was with soybean-Maize-soybean-Maize and followed by continuous soybean (Table 2.2.16.). The initial values of soil parameters and nutrient uptake at of Kota and Amravati are given in Table 2.2.17. and 2.2.18..

2.3.2. Tillage systems

Tillage systems failed to bring any appreciable difference in soybean, *rabi* crop yield and SEY at Kota, while at Amravati, conventional tillage produced higher yield (soybean, *rabi* and SEY) than minimum tillage (Table 2.2.13. to 2.2.15.). On zonal mean basis, conventional tillage gave higher yield to the tune of 4.16, 2.92 and 3.58% of soybean, rabi and SEY over minimum tillage, respectively (Table 2.2.13 to 2.2.15.)

Conventional tillage was found to be economical than minimum tillage (Table 2.2.16.).The initial values of soil parameters and nutrient uptake at of Kota and Amravati are given in Table 2.2.17. and 2.2.18..

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2.3.3. Interaction effect

Interaction between tillage systems and crop rotations was found to be non-significant at both the centres (Table 2.2.14.).

2.2. Southern zone (Dharwad, Coimbatore, Bengaluru, Adilabad and Pune)

2.4.1. Crop rotation

Soybean-Soybean-maiz**e**-soybean rotation produced maximum SEY at bangaluru (Table 2.2.20.). *Kharif* crop yield was highest with soybean- maize- soybean-maize at all the four centres and zonal mean (Table 2.2.22.). The maximum *rabi* crop yield was with continuous soybean as evidenced from the zonal mean (Table 2.2.23.). Soybean-maize-soybean-maize showed maximum SEY than rest of the treatments (Table 2.2.24.).

A similar trend was also observed in economics of different treatments were given in Table 2.2.25.. The soil analysis and nutrient uptake data are given in table 2.2.26. to 2.2.28..

2.4.2. Tillage systems

Tillage systems significantly influenced soybean yield, *rabi* yield and SEY at Bengaluru (Table 2.2.20.). Conventional tillage yielded higher than minimum tillage at Adilabad and Coimbatore (Table 2.2.22.). On zonal mean basis, conventional tillage gave higher soybean (4.47%) over minimum tillage, respectively. *Rabi* crop yield was higher with conventional tillage than minimum tillage at all the centres (Table 2.2.23.). On the basis of zonal mean, the conventional tillage produced maximum SEY to the tune of 8.41% than minimum tillage (Table 2.2.24.)

A similar trend was also observed in economics of different treatments were given in Table 2.2.225. The soil analysis and nutrient uptake data are given in table 2.2.26. to 2.2.28..

2.4.3. Interaction effect

Interaction between tillage systems and crop rotations was found to be non-significant at all the centres (Table 2.2.22. to 2.2.25.).

3. ASP 3/15. Effect of foliar nutrition on soybean

A trial was conducted in RBD with 3 replications to study the effect of foliar nutrition (at pod initiation) on soybean productivity (Table 2.3.1.- 2.3.10).

3.1. North plain zone (Ludhiana, Delhi and Pantnagar)

Soybean yield differed significantly due to different treatments at Delhi and Pantnagar centres (Table 2.3.1.). Significantly highest yield was associated with RDF + zinc @ 0.5% at pod initiation stage and closely followed by RDF + B @ 0.5%, RDF + urea @2%, RDF + NPK (19:19:19) @ 2%, and RDF + DAP @ 2% at Delhi. The maximum yield was recorded with NPK (19:19:19) @ 2% and remained at par with RDF + water, RDF + urea @ 2%, RDF + Zn, RDF + Mo and RDF + B at Pantnagar. On zonal mean basis, the foliar feeding of nutrients at pod initiation stage increased the soybean yield to the tune of 1.55 to 9.92% and highest being with RDF + urea @ 2% (9.92%) followed by RDF + Zn @ 0.5% (9.12%) and RDF + B @ 0.5% (6.81%).

The maximimum values of straw yield, gross and net returns and B:C ratio was associated with RDF + urea @ 2% and closely followed by RDF + Zn @ 0.5%. The dry matter, CGR, RGR and RUE at Delhi are given in Table 2.3.1. and 3.2.2.. The highest cost of cultivation was associated with RDF + Mo followed by RDF + Zn.

3.2.Eastern (Raipur, Ranchi)

Soybean yield significantly influenced by the different treatments (Table 2.3.3.) at both the centres. The foliar feeding of nutrient significantly enhanced the soybean yield to the tune of 12.88 to 22.80% as compared to RDF alone at Raipur while at Ranchi, it was 3.64 to 16.51%. The maximum yield was recorded with RDF + DAP @ 2% and RDF + NPK @ 2% at Raipur and Ranchi. On the basis of zonal mean basis, the magnitude of yield enhancement was in line – NPK @ 2% (15.95%), RDF+ DAP @ 2% (15.57%), RDF + urea @ 2% (11.81%), RDF + MOP @ 0.5% (10.34%), RDF + B @ 0.5% (7.95%), RDF + Zn @ 0.5% (7.57%), RDF + Mo @ 0.5% (7.51%), and RDF + water (1.85%).

The maximum yield attributes were noted with RDF + NPK. The highest net returns and B:C ratio was recorded with RDF + DAP (Table 2.3.3. and 2.3.4.). No definite trend was recorded in dry matter and growth rates (Table 2.3.4.).

3.3.North eastern hill (Imphal and Medziphema)

Soybean yield significantly influenced by the different treatments (Table 2.3.5.) at both the centres. The foliar nutrition significantly enhanced the soybean yield to the extent of 17.84 to 36.01% at Imphal and 7.24 to 65.50% at Medziphema. The highest yield was recorded with RDF+MoP @ 0.5% and RDF + NPK @ 2% as compared to RDF alone at Imphal and Medziphema, respectively. On the basis of zonal mean basis, the maximum yield was recorded with RDF + MoP @ 0.5% (41.85%), RDF + B (33.14%), RDF + DAP (28.79%), RDF + Mo (21.53), RDF + urea (21.12%), RDF + NPK (17.59%), RDF + Zn (14.19%) and RDF + water (11.05%).

The maximum yield attributes, straw yield, harvest index, net returns, B:C ratio and RUE were higher with RDF + MoP @ 0.5% (Table 2.3.5.). No definite trend was recorded in dry matter and growth rates (Table 2.3.6.).

3.4. Central zone (Indore, Sehore, Amravatia, Devgarh Baria and Kota)

Soybean yield significantly influenced by the different treatments at all the centres except Sehore and Indore (Table 2.3.7.). The foliar nutrition significantly enhanced the soybean yield. The application of RDF + DAP @ 2% produced the highest yield at Kota and Amravati, while NPK (19:19:19)@ 2% gave maximum yield at Devgad Baria. On zonal mean basis, the yield trend was noted as with RDF + DAP (18.56%) followed by RDF + NPK (15.52%), RDF + MoP (13.32%), RDF + Zn (9.25%), RDF + B (9.25%), RDF + urea (8.09%) and RDF + Mo (5.11%).

Most of the parameters (Table 2.3.7. and 2.3.8.) dry matter, yield attributes, net returns and B:C ratio were higher with RDF + NPK (Table 2.3.7).

3.5. Southern zone (Pune, Dharwad, Bengaluru, Adilabad and Coimbatore)

Soybean yield significantly influenced by the different treatments at all the centres (Table 2.3.9.). The maximum yield was recorded with RDF + urea @ 2% at Pune and Bangaluru, RDF + NPK @ 2% at Coimbatore and Adilabad and RDF + B @ 0.5% at Dharwad. On zonal mean basis, the highest yield was recorded with RDF + DAP (18.33%) followed by RDF + NPK and RDF + urea (17.22%), RDF + MoP (10.90%), RDF + Mo (9.84%), RDF + Zn (9.65%), RDF + B (7.56%) and RDF + water (2.88%).

The highest net returns and BC ratio were recorded with RDF + DAP and followed by RDF + Urea (Table 2.3.9.). The maximum branches and pods/plant was observed with RDF +DAP. The highest plant dry matter at 30, 45 and 60 DAS was with RDF + DAP/Urea. No definite trend was recorded in CGR and RGR at all the stages of observations (2.3.10.).

4. ASP 4/15. Effect of fertigation on soybean productivity (Raipur)

Even treatments of fertigation were tested under RBD to evaluate the effect of fertigation on soybean productivity Raipur and Devgard baria (Table 2.4.1.– 2.4.9.).

4.1. North eastern zone (Raipur)

The application of RDF as basal and irrigation at flowering, pod initiation and seed filling stages increased the soybean yield to the tune of 4.04%, 4.76% and 16.53% as compared to RDF, respectively (Table 2.4.1.). When 50% RDF as basal and 50% RDF as fertigation at seed filling stages further enhanced the seed yield to the extent of 6.40%9% over RDF and irrigation at seed filling.

Harvest index, branches/plant and seed index remained at par due to different treatments (Table 2.4.1.). Fertigation at seed filling produced maximum straw yield, RUE and found most profitable and nutrient exhaustive (Table 2.4.1.). Fertigation at seed filling stage possesses the higher values of dry matter and CGR at all the stages (Table 2.4.2.) The highest nutrient uptake was recorded in fertigation at seed filling (2.4.3.). The balance sheet of N, P and K indicated that all the treatment showed positive balance and highest being with fertigation at seed filling stage (Table 2.4.4. to 2.4.6.).

4.2. Central (Devgad baria)

The application of RDF as basal and irrigation at flowering, pod initiation and seed filling stages increased the soybean yield to the tune of 25.89%, 12.99% and 10.57% as compared to irrigation and RDFas basal, respectively (Table 2.4.7.). When 50% RDF as basal and 50% RDF as fertigation at flowering, pod initiation and seed filling stages further enhanced the seed yield to the extent of 32.26%, 15.86% and 12.90% over RDF, respectively. The fertigation system produced 3.30% higher yield than irrigation system (averaged over treatments). When comparing the fertigation and irrigation

system, fertigation at flowering (5.05%). fertigation at pod initiation (2.53%) and fertigation at seed filling (2.21%) produced higher yield than irrigation.

Harvest index, branches/plant and seed index remained at par due to different treatments (Table 2.4.7.). Fertigation at flowering produced maximum dry matter at different stages, CGR, RGR, straw yield, RUE, net returns and B:C ratio and nutrient exhaustive (Table 2.4.7. and 2.4.8.). Fertigation at seed filling stage possesses the higher values of dry matter and CGR at all the stages (Table 2.4.8.). The highest nutrient uptake was with fertigation at seed filling stage (Table 2.4.9.).

5. ASP 5 /15. Refinement of soybean production technology for problematic soil (Acidic) in North eastern zone

A trial was conducted in randomized block design with 3 replications with the objective to reclaim the acidic soils of north eastern region- Imphal and Medziphema (Table 2.5.1.-2.5.2.).

2.5.1. Organic manure

Application of farm yard manure @ 2.5 t/ha significantly enhanced the soybean yield at Imphal (12.27%) and Medziphema (26.44%) as well as in zonal mean (19.86%). Similar trend was also observed in yield attributes and economical parameters (Table 2.5.1.).

2.5.2. Lime

Soybean yield linearly increased as the levels of lime increased up to 600 kg/ha and then declined at Imphal , while at Medziphema , it was linearly increased up to 800 kg/ha lime (Table 2.5.1.). On zonal mean basis, the 600 and 800 kg/ha lime behaved identically and produced significantly higher yield than lower levels of lime. Similar trend was also observed in yield attributes and economical parameters (Table 2.5.2.).

2.5.3. Interaction effect

The interaction between organic manure and lime levels was fond to be non-significant at both the centres.

6. ASP 6/15. Evaluation of new molecules of herbicides for controlling of weeds in soybean (Pantnagar, Raipur, Sehore, Kota and Dharwad)

Two new molecules of herbicides viz., F8072 and PIH 485 with check chemical- and pendimethalin + imazethapyr and pendamethalin along with weedy check under RBD to evaluate the bio-efficacy against weeds in soybean (Table 2.6.1. to 2.6.16.).

2.6.1. North plain zone (Pantnagar)

Soybean yield significantly influenced by the herbicidal treatment (67.01 to 109.68%) as compared to weedy check (Table 2.6.1.). Significantly highest yield was recorded with new molecule F 8072 premix @ 725 g ai/ha (1250 ml/ha) as PE and remained at par with rest of the herbicides and produced higher yield to the tune of 19.07 and 16.83% as compared to pedimethalin + imazethapyr and pedimethalin, respectively. Another new molecule PIH 485 85% WG @ 102 g ai/ha (120 g/ha) as PPI also produced higher yield to the extent of 11.49 and 9.39% than pedimethalin + imazethapyr and pedimethalin, respectively. The number of pods/plant, seed index and harvest index remained non-significant due to different treatments.

Weed control efficiency of test herbicide i.e. F 8072 and PIH 485 showed above 80% at 45 and 60 DAS (Table 2.6.2. –2.6.4.).

2.6.2. Eastern zone (Raipur)

The herbicidal weed control significantly enhanced the soybean yield (31.64 to 91.62%) as compared to weedy check (Table 2.6.5.). Both the new herbicide i.e. F8022 and PIH 485 were found to be less effective than check herbicide i.e. pendimethalin + imazethapyr however, both the new herbicide was found to be better than check chemical pendimethalin. Both the new molecules of herbicides were yielded higher (26.11 to 35.137%) than check herbicides i.e. Pendamethalin. PIH 485 @ 127.5 g ai/ha as PPI produced maximum yield than its lower level and F 8022. The highest branches and pods/plant was with PIH 485 @ 127.5 g ai/ha. The seed index and harvest index remained unaffected due to various treatments.

The weed control efficiency of new herbicides were lesser than check herbicide i.e. . pendimethalin + imazethapyr and remained at par with pendimethalin at 30 DAS. While at latter stage, both the new herbicides showed higher WCE than pendimethalin (2.6.6. to 2.6.8.).

2.6.3. Central zone (Kota and Sehore)

Soybean yield significantly influenced by the different treatments at both the centres (Table 2.6.9.). Application of F 8072 @ 725 g ai/ha produced significantly higher yield and remained at par with both the levels of PIH 485 at Sehore. At Kota, bothe the new herbicides yielded lower than check herbicide i.e. pendimethalin + imazethapyr. On zonal mean basis, F 8072 @ 725 g ai/ha as PE and PIH 485 @ 127.5 g ai/ha as PPI produced higher yield than both the check herbicides. The other parameters followed more or less similar trend as was observed in yield.

All the new herbicide showed higher weed control efficiency than check herbicides pendimethalin at all the three stages of observations (2.6.10. to 2.6.12.).

2.6.4. Southern zone (Dharwad)

All the new herbicides as well as check herbicides behaved identically among themselves and found to be superior over weedy check (Table 2.6.13.). Straw yield, harvest index and yield attributes followed the similar trend as observed in yield.

Weed control efficiency of new herbicides i.e. PIH and check herbicide pendimethalin + imazethapyr showed 100% at 30 DAS. At latter stages, all the chemicals behaved more/less identically (Table 2.6.15. to 2.6.16.).

7. ASP7/17. Bridging yield gap of soybean through site specific nutrient management (SSNM)

Seven treatments of nutrient under RBD to evaluate the yield gap of soybean due to omission of nutrients (Table 2.7.1. to 2.7.10).

a. North plain zone (Delhi, Pantnagar and Ludhiana)

The application of nutrients through expert system (SSNM) produced maximum yield and remained at par with RDF at Pantnagar and Ludhiana, while at Delhi as well as in zonal mean, RDF gave higher yield than SSNM (Table 2.7.1.). On zonal mean basis, the highest net returns and B:C ratio was associated with RDF.

The highest yield gap was with absolute control at all the centres. The highest yield gap was with absolute control at all the centres and followed by farmers practice at Ludhiana only. The yield gap analysis revealed that the omission of N, P and K from nutritional schedule through SSNM reduced the yield to the tune of 400, 381 and 38 kg/ha at Delhi. The corresponding values were 415, 294 and 122 kg/ha at Ludhiana and 118, 410 and 275 kg/ha at Pantnagar, respectively. The yield gap due to N. P and K omission from nutritional schedule through RDF was higher than SSNM at Delhi,

however, just reverse was true at Ludhiana and Pantnagar (Table 2.7.2.). The maximum yield gap was observed due to omission of P followed by N and K.

b. North eastern zone (Raipur. Ranchi and Bhawanipatna)

The maximum yield was recorded with SSNM and closely followed by the RDF at all the centres as well as in pooled data (Table 2.7.3.). The SSNM gave higher yield to the tune of 7.9% as compared to RDF. On zonal mean basis, the highest net returns and B:C ratio was associated with SSNM.

The highest yield gap was with absolute control at Raipur and Ranchi. The highest yield gap was due to omission of P from SSNM as well as from RDF followed by omission of N and K at Raipur and Ranchi. While at Bhawanipatna, the maximum yield gap was with omission of N followed by P and K (Table 2.7.4.).

c. North eastern hill zone (Imphal and Medziphema*)*

The maximum yield was recorded with SSNM and RDF at Imphal and Medziphem, respectively (Table 2.7.5.). On zonal mean basis, RDF produced maximum yield (8.35%) than SSNM. The omission of P and K from nutritional schedule through SSNM produced higher yield than SSNM at Medziphema.

The highest yield gap was with absolute control and followed by farmers practice at Imphal. While at Medziphema, the highest gap was with farmers practice followed by absolute control. The yield gap due to omission of N, P and K from nutritional schedule through SSNM was in line N, P and K at Imphal. The highest yield gap due to N omission was recorded at Medziphema (Table 2.7.6.).

d. Central zone (Sehore, Kota, Indore, Amravati and Devgarhbaria)

The maximum yield was noted with SSNM at Sehore, Indore and Devgarhbaria and remained at par with RDF (Table 2.7.7.). The N and K omission produced higher yield than SSNM at Amravati. On zonal mean basis, the highest yield was with RDF and closely followed by SSNM.

The highest yield gap was with absolute control at all the centres except Kota and followed by farmers practice at Indore and Sehore. Yield gap analysis indicated that the highest gap was noted when P omission from nutritional schedule through SSNM followed by K and N at Indore, Sehore (Table 2.7.8.). The maximum yield gap was recorded with K omission followed by N and P at Devgarhbaria. The highest yield gap was due to N omission followed by K and P. The maximum yield gap was noted when P omitted from nutritional schedule at Amravati. More or less similar trend of yield gap was recorded under RDF.

e. Southern zone (Pune, Dharwad, Bangalore, Adilabad and Coimbatore)

Application of nutrients through SSNM produced maximum yield and remained at par with RDF at Banagaluru, Pune and Coimbatore (Table 2.7.9.). At Adilabad and Dharwad, application of RDF recorded highest yield and remained at par with SSNM. The maximum net reurns and B:C ratio was associated with SSNM.

The highest yield gap was with absolute control at all the centres and followed by farmers practice at Dharwad and Bangaluru. The yield gap due to omission of nutrients from nutritional schedule indicates that the omission of N showed maximum gap at Dharwad, Bangaluru, Adilabad and Coimbatore. While at Pune, it was maximum with K omission.

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SOYBEAN FRONTLINE DEMONSTRATIONS *KHARIF* - 2017

During the year, 26 centers have conducted a total of 1142 FLDs on farmer's fields against the target of 1100 FLDs in plot of 0.4 ha each (Table 6.1). The physical and financial targets and achievements were presented in Table 6.1. The centres namely Bhawaniptna and Ugarkhurd did not conduct the frontline demonstrations during 2017-18. All the ten FLDs were failed due to disease. Dholi centres conducted 15 FLDs during the year and out of 15, ten FLDs were on soybean + pigeonpea intercropping. Of the 1121 FLDs, 74.46 and 25.55% were represented by man and farm women. While the representation of categories wise beneficiaries were 12.04% by SC, 11.33% by ST, 44.07% by OBC and 32.56% by general (Table 6.2).

Data accrued from successful 1132 FLDs on full package (all the recommended inputs and cultural practices and improved soybean varieties) revealed that the adoption of research emanated improved soybean production technology led to an increase in yield and net returns to the tune of 27.61 and 43.17% over farmers practice which was achieved by the additional expenditure of only Rs. 3450/ha (Table 6.3). The difference in gross returns due to improved technology and farmer's practice was 32.52%. Soybean yield as high as 2730 and 2093 kg/ha could be obtained in some farmer's field under the improved production technology and farmer's practice at Sangli and Bengaluru, respectively. The lowest yield under improved technology and Farmer's practice was recorded at SOPA, Indore and Sehore (1373 and 931 kg/ha). The estimated yield gap II was 384 kg/ha.

In all 1111 frontline demonstrations, a total of 34 improved varieties have been demonstrated in farmer's fields (Table 6.4). The maximum demonstrations was conducted on variety JS 95 60 followed by MAUS 162, VLS 63, VLS 65, JS 93 05, MAUS 158, JS 20 34, and harasoya. Among the varieties, soybean variety KDS 344 gave highest yield (2805 kg/ha) followed by KDS 736 (2637 kg/ha), MACS 1281 (2563 kg/ha), MACS 1188 (2530 kg/ha), MAUS 2 and Basra (2503 kg/ha). The lowest yield was recorded in JS 97 52 (1165 kg/ha). None of the variety yielded below 1 t/ha.

The details of cost of soybean cultivation have been worked out. The information have not been provided by the different centres like Almora, Pantnagar, Sehore, Pantnagar, SOPA, Srijan, KVK, Karda and Raipur. The details of cost of cultivation under improved technology and farmers practice (Table 6.5) indicated that the soybean cultivation cost under improved technology was higher to the tune of 21.70% as compared to farmers practice cultivation cost. Under the improved production technology, the trend of expenditure was in line- Seed and sowing, followed by fertilizer application, land preparation, harvesting, threshing, herbicide application, interculture operations/ hand weeding, insecticide application, others. However, in case of farmers practice the trend was seed and sowing, land preparation, fertilizer, interculture operations, harvesting, threshing, insecticide,herbicide application, others.

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SUMMARY REPORT OF ENTOMOLOGY TRIALS *KHARIF* - 2017

Seven entomological field trials were conducted during *kharif* 2017 at 13 Coordinated centres viz. Delhi, Pantnagar, Ludhiana (Northern Plain Zone), Palampur (Northern Hill Zone), Sehore, Parbhani, Kota, Amrawati (Central Zone), Bangalore and Dharwad (Southern Zone), Raipur (Eastern zone) and Imphal and Medziphema (North Eastern Hill Zone). Trial wise salient findings are presented below:

Ent. 1. Seasonal incidence of insect pests and their bio-control agents

A. Incidence of insect-pests: The information on incidence of major insect-pests at different coordinating centres is compiled in **Table 3.1**. Total **24** insect spp. infested soybean crop in different zones during *kharif* 2017 at different coordinating centres:

Zone	Insects
North Plain Zone (Delhi, Pantnagar)	*Bamisia tabaci, Obereopsis brevis, S. obliqua, S. litura, D. orichalcea, H. indicata, M. maculosus,* ***Melanagromyza sojae,*** **Aphids**.
North Eastern Hill Zone (Imphal, Medziphema)	*Helicoverpa armigera,* ***Spilarctia obliqua****, A. modicella,* **Aphids**, *Melanagromyza sojae,* Leaf miner, *Bamisia tabaci, S. litura, C. acuta, Obereopsis brevis, Empoasca kerri.* **Flea Beetle**
Central Zone (Sehore, Kota, Parbhani, Amravati)	*Cneorane* spp, ***Melanagromyza sojae***, ***Gesonia gemma****, Chrysodeixis acuta, Spodoptera litura,* ***Obereopsis brevis****, Helicoverpa armigera, Diachrysia orichalcea, Spilarctia obliqua, Hedylepta indicata*, *Myllo*cerus spp., Grass hopper.
Southern Zone (Bangalore and Dharwad)	*Melanagromyza sojae, Obereopsis brevis, S. litura, , D. orichalcea, Spilarctia obliqua, N. viridula,* ***Cydia ptychora***, Thrips, Aphids, Jassids, *Bamisia tabaci*, Myllocerus spp., *A. modicella,* ***H. indicata***, *Helicoverpa armigera, Riptortus pedestris, A. albistriga*.

The extent of infestation/damage by major insect-pests at different coordinating centres is given below :

Location	Major insects (infestation / damage)
Palampur	Bean bug maximum 10.5/m; Jassids 24.5 /3 leaves; White fly 28.0 /3 leaves
Delhi	White fly maximum 5.7/leaf at germination; YMV rating of 8.0 on 1-9 scale
Pantnagar	Stem fly – 100 % infestation and 38.8 % Stem tunnelling; Aphids – 14.4/ 3 leaves; Semiloopers – 9.2/m; Defoliation 29.0 %.
Sehore	*Gessonia gemma* -9.7 larvae /mrl ; *Chrysodeixis acuta* -7.4 larvae /mrl ; Defoliation-28.5 %; Stem fly -80% infestation ; Girdle beetle -30.5%infestation
Parbhani	Girdle beetle – 13.81 % infestation; Stem fly – 36.7 % stem tunnelling;
Amravati	Stem fly – 70 % infestation
Kota	Girdle beetle – 23.3 % infestation ; Semiloopers – 4.33 larvae/m; Defoliation – 5.0 % at flowering and 25.0 % at peak
Dharwad	*C. ptychora* – 44.5 % pod damage; *H. indicata* – 24.6 % infestation;
Bangalore	Leaf miner-8.3 larvae/ m; *S. litura* – 14.1 larvae/m; *H. armigera* – 8.2 larvae /m; Stem fly – 11.1 % seedling mortality
Imphal	*S. obliqua* – 150 larvae / m; Leaf Weber – 7.3 larvae /m; Aphids – 31.6 /plant; *S. litura* – 7.0 larvae/m

B. Incidence of Bio-control agents (BCAs) : Periodic incidence of natural enemies were recorded in soybean ecosystem. The important ones were ; entomopathogenic fungus – *Beauveria bassiana Nomurea rileyi*, Parasitoids – *Bracon* sp., *Sturmia* sp., *Apanteles* sp., *Cotesia flavipus*; *Carcellia illota;* Predators – Spiders, Coccinelids, *Chrysoperla carnea, Cantheconidia furcellata,* and have exhibited their potential in suppressing insect populations **(Table 3.2**). Extent of larval mortality due to bio-control agents (BCAs) is given hereunder:

Location	BCAs	Period	Extent
Pantnagar	Bacterial infection	--	7.5 % in *S. obliqua*; 10.0 % in *S. litura*
Sehore	Nothing significant		
Parbhani	Nothing significant		
Kota	*Carcelia* and *Cotesia spp.*	--	7.0 % parasitoidation
Dharwad	*Apanteles* spp. *M. anisopliae* *N. rileyi*	36 SMW 37 SMW 38 SMW	7.0 % parasitoidation 8.2 % infection 11.9 % infection
Bangalore	*B. bassiana* and NPV	--	8.0 to 17.0 % infection
Imphal	*N. rileyi* and *B. bassiana*	July to September	10 to 30 % mortality
Palampur centre also reported occurrence of Coccinellids, as natural enemies (3-4 beetles/m).			

Ent. 2. Screening for resistance against major insect-pests (IVT and AVT entries)

AVT-I and -II entries of different zones, along with those found resistant in previous years were screened for insect resistance / tolerance. Further, they were categorized into different resistance categories against individual insect spp. by employing **AICRPS method** and against location specific insect-pest complex by **Maximin - Minimax method (Tables 3.3 to 3.16).** Information on reaction of different entries against major insect-pests during last three years (2015, 2016 and 2017) was compiled and promising genotypes were identified by using following criteria:

1. Resistance against one insect spp. at 3 or more locations in any of the 3 years,
2. Multiple resistance at any location in any of the 3 years, or
3. Resistance against one insect spp. in 2 or more years at any location.

Based on above criteria, following lines are identified as potential donors for insect resistance / tolerance against specific insect pests as indicated below:

S. No.	Genotype	Insect(s)
1.	AMS-MB 5-18	LD, PC, SF, GB
2.	DSb 32	LD, GB, APH, WF, LM
3.	JS 20-116	SF, PC, LF, APH, LH, BlB, PdB
4.	KDS 753	PC, LD, SF
5.	KDS 869	PC, SF, GB
6.	MACS 1460	PC, SF
7.	NRC 117	LD, PC
8.	NRC 126	PC, PB, GB, LD
9.	NRC 127	PC, PB, LD
10.	RSC 10-46	PC, LF, APH, LH, BlB, PdB
11.	RVS 2010-1	SF, GB, PC, LD, LF, APH, LH
12.	RVS 2007-6	SF, PC, GB, LF, APH, LH, BlB, PdB
13.	SL 1074	SF, LD, PC

PC - Pest Complex; GB – Girdle Beetle; PB – Pod Borer; SF – Stem Fly; WF – White Fly; LM – Leaf Miner; BB – Bean Bug; BlB – Blister Beetle; LD – Lepidopteran Defoliators; LF – Leaf Folder; APH – Aphids, LH – Leaf Hopper; PdB – Pod Bug

ENT 3: Status of AVT-II entries for antixenosis and antibiosis against *S. litura*

The trial was allotted to Pantnagar and Bangaluru centers. At Pantnagar, among 11 genotypes tested, entries PS 1556 and PS 1572 have shown **strong antixenosis** (C=0.38 and 0.49 respectively) against *S. litura*.

PS 1572 has also exhibited good level of antibiosis with least ECD (9.44), ECI (16.11) and AD (65.67) as compared to other genotypes. At Bengaluru centre, entry DSb 28-03 performed better than all other entries showing least values for all the digestibility indices and Preference Index (C).

Antibiosis and Antixenosis reaction of entries at <u>Pantnagar</u>:

	Genotypes	Antibiosis			Antixenosis	
		Approx. digestibility AD	Efficiency of Conversion Index ECI	Efficiency of Conversion of Digested food ECD	C value	Antixenosis response
1	**JS 20-90**	70.56 (57.16)	33.9 (35.22)	21.54 (26.78)	1.28	Preferred host
2	**JS 20-116**	65.58 (54.15)	32.61 (33.76)	24.14 (28.59)	0.85	Slight antixenosis
3	**PS 1556**	72.12 (58.20)	37.85 (37.45)	17.37 (24.09)	0.38	**Strong antixenosis**
4	**PS 1572**	65.67 (54.17)	16.11 (23.36)	9.44 (17.76)	0.49	**Strong antixenosis**
5	**RSC 10-46**	72.07 (58.18)	38.46 (38.30)	18.65 (24.63)	1.23	Preferred host
6	**RVS 2007- 06**	68.76 (56.06)	46.36 (42.20)	23.32 (28.69)	1.17	Preferred host
7	**RVS 2010- 01**	73.43 (59.22)	71.43 (59.12)	37.03 (37.54)	1.21	Preferred host
8	**SL 1028**	62.75 (52.53)	33.5 (34.63)	24.82 (29.14)	1.10	Preferred host
9	**SL 1074**	70.77 (57.37)	40.53 (39.15)	18.5 (25.44)	0.82	Slight antixenosis
10	**VLS 89**	78.08 (62.16)	71.12 (58.98)	25.28 (29.86)	1.25	Preferred host
11	**Bragg**	78.65 (62.49)	49.5 (44.22)	15.94 (23.42)	1.09	Preferred host
	CD at 5%	(4.75)	(12.48)	(9.92)	-	-

Antibiosis and Antixenosis reaction of entries at <u>Bangaluru</u>:

S. No	Genotypes	Antibiosis			Antixenosis	
		Approx. digestibility AD	Efficiency of Conversion Index ECI	Efficiency of Conversion of Digested food ECD	C value	Antixenosis response
1	**MACS 14-10**	75.52 (60.32)	33.16 (35.14)	38.72 (38.47)	1.00	Preferred host
2	**RSC 10-46**	78.10 (62.07)	27.32 (31.50)	41.14 (39.88)	0.60	Moderate antixenosis
3	**KDS 753**	63.64 (52.89)	52.90 (46.64)	75.80 (60.51)	0.73	Moderate antixenosis
4	**DSb 28-03**	60.50 (51.04)	24.18 (29.44)	24.34 (29.55)	0.60	Moderate antixenosis
5	**KDS 869**	71.70 (57.84)	55.15 (47.94)	68.50 (55.84)	0.84	Slight antixenosis
6	**JS 335**	80.30 (63.62)	25.74 (30.47)	25.21 (30.13)	-	-
	CD at 5%	(4.80)	(3.10)	(2.90)	-	-

Ent. 4. Screening of IVT entries for resistance to major insect-pests

Forty two coded entries were screened against major insect-pests at coordinating centres (**Tables 3.11 to 3.16**). Promising entries showing desirable reaction against one major insect-pest at more than one location and/or against more than one insect spp. at one or more locations are listed below, which will be tested further in next season:

Insect	Entry (No. of locations)
Stem fly	**AMS 2014-1 (2)**, CSB 10084 (2), **DSb 34 (2)**, **MACS 1575 (2)**, MAUS 725 (3), **NRCSL 1 (2)**, PS 1611 (2), **RSC 11-03 (2)**, **TS 53 (2)**
Defoliators	**JS 21-15 (2)**, **JS 20-17 (2)**, KDS 992 (2), **RSC 11-07 (2)**, **RVS 2011-1 (2)**, **SKF 1050 (2), SL 1123 (2), TS 53 (2)**
Girdle beetle	AMS 100-39 (2), BAUS 102 (2), **JS 21-15 (2)**, **MACS 1575 (2)**, **MAUS 731 (2)**, NRC 133 (2), NRC 129 (2), **NRCSL 1 (2)**, **RVS 2011-1 (2)**, **SKF 1050 (2)**, **SL 1123 (3)**, VLS 95 (2)
Aphids	**AMS 2014-1 (2)**, AMS 100-39 (2), **DSb 34 (3)**, **JS 21-15 (2)**, **JS 20-17 (2)**, MAUS 725 (3), MAUS 1493 (2), **MAUS 731 (2)**, **NRC 137 (2)**, **NRCSL 1 (2)**, **RSC 11-07 (2)**, **RSC 11-03 (2)**, **SKF 1050 (2)**, VLS 94 (2)

Entries shown in **bold** exhibited resistance against more than one insect spp.

ENT 5. Evaluation of Bt 127 SC strain for efficacy against lepidopteran larvae infesting soybean (2nd year)

The trial was allotted to Sehore, Kota, Dharwad, Imphal and Indore centers. Efficacy of Bt 127 SC was assessed against various defoliating larvae viz. *Gessonia gemma*, *Chrysodeixis acuta*, *Spodoptera litura*, *Helicoverpa armigera*, *Spilarctia obliqua*, leaf webber and pod borer (*C. ptychora*).

At all the centers, Bt 127 SC proved to be significantly superior over untreated control, thus establishing its efficacy (Tables 3.17 to 3.18) The effect on lepidopteran defoliators, including *S. litura*, was numerically better than but statistically on par with commercial Bt formulation, Delfin. On the basis of yields at 4 centers, all the treatments recorded significantly higher yield than the untreated control. Chemical insecticide treated plots yielded more than Bt formulations treated ones. However there was no significant difference in yields obtained with Bt 127 and Delfin.

It is important to mention here that Bt 127 SC is formulated by an ICAR Institute (IIOR, Hyderabad) from indigenous strain and would be very cost effective. The commercial formulation, on the other hand, consists of exotic strains and is very costly. Promotion of such bio-control products developed by public R&D set up should be encouraged.

ENT 6. Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants (1st year)

Main objective of this trial was to see the effect of polymer coating on retention of efficacy of seed treating chemicals and its compatibility with inoculants. The trial was conducted at Pantnagar, Sehore, Parbhani, Dharwad and Indore centers (Tables 3.19 to 3.23). Effect of different treatments given in following tables indicate that seed treatment with pesticides followed by polymer coating is effective in retaining their efficacy up to 30 to 45 days. The preliminary results suggest that seed treatment with pesticides followed by polymer coating can be done much before the actual sowing to suitably adjust within the narrow planting window. Seed treatment is effective to control early stage insects and diseases and marinating desired plant population and ensuring good yields.

Comparison of effect of treatments on girdle beetle, pod borer and grain yield (over locations)

Treatment	% Girdle beetle Infestation		% Pod borer Infestation		Yield kg/ha	
T1 Carboxin and Thiamethoxam **WITH** polymer coating	**Range** 2.03 to 6.49 on 30 DAG; 4.16 to 8.78 on 45 DAG; 5.23 to 10.50 on 60 DAG.	Mean difference **NS** at 4/4 locations on 30 DAG; at 2/2 locations on 45 and 60 DAG.	23.15	NS at lone centre Dharwad.	**Range** 1305 to 2566	Significant at 3 / 4 locations
T2 Carboxin and Thiamethoxam **WITHOUT** polymer coating	**Range** 1.47 to 6.50 on 30 DAG; 3.91 to 13.41 on 45 DAG; 4.98 to 16.83 on 60 DAG.		23.47		**Range** 1425 to 2410	

Treatment	% Girdle beetle Infestation		% Pod borer Infestation		Yield kg/ha	
T2 Carboxin and Thiamethoxam **WITHOUT** polymer coating	**Range** 1.47 to 6.50 on 30 DAG; 3.91 to 13.41 on 45 DAG; 4.98 to 16.83 on 60 DAG.	Mean difference **NS** at 3/4 locations on 30, 45 and 60 DAG.	23.47	NS at lone centre Dharwad.	**Range** 1425 to 2410	Significant at 4 / 4 locations
T3 Pre-mix Pyroclostrobin & Thiaphenate Methyl + pre-mix Thiram & Carboxin + Thiamethoxam **WITH** polymer coating.]	**Range** 1.52 to 9.66 on 30 DAG; 3.17 to 8.97 on 45 DAG; 4.17 to 13.33 on 60 DAG.		24.01		**Range** 1176 to 2295	

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SUMMARY REPORT OF PLANT PATHOLOGY TRIALS *KHARIF* - 2017

Nine Pathology field trials were conducted during *kharif* 2017 at 15 co-ordinated centres spread over six zones to generate information on prevalence of diseases & their severity, sources of resistance to single and multiple diseases, screening of released varieties against charcoal rot, management strategies in pod blight complex, bioefficacy of zillon against YMV disease and assessment of polymer coating on efficacy of seed treating chemicals and inoculants. Trial wise salient findings are presented below: (Table 4.1 to 4.12).

As reported by various centres, although a total 20 diseases appeared across the country on soybean but only seven of them were wide spread occurring in 3 or more zones and five were zone specific. Except FLS at Almora and Palampur, YMV at Pantnagar, Ludhiana,Dholi and Delhi, Coll R and PB (Ct) at Medziphema and Biswanath Chariali, PB(Ct) and IBB at Raipur, Coll R,CR and PB(Ct) at Jabalpur and Amaravati, rust and PB (Ct) at Ugar khurd, Dharwad, K. Digraj.RRR at Sehore which appeared in moderate to severe form, severity of other diseases was mild to moderate at most of the locations. Two disease viz., PB (Ct) and YMV were found in all the five zones which are the key diseases across the locations. RRR and SCV confined to only at Sehore while BND appeared only at Delhi and IBB at Raipur in moderate to severe form.The other hemibiotrphic diseases at different locations appeared in mild to moderate form. In general, the disease pressure differed at different locations across zones which is mainly due to variation in congenial weather prevalent across the locations.

The major results of the trials are presented here as under:

PP 1: Survey for soybean diseases

Disease scenario across the locations was envisaged by synthesis and analysis of the information available through survey and surveillance and also severity of diseases recorded in other trials of soybean pathology (Table 4.1 to 4.5). In NHZ, at Almora, FLS was moderate to severe. At Palampur, FLS and PB(Ct) were in moderate severe form, YMV and BP were with mild severity. In NPZ, at Pantnagar, RAB, BLB BP and PB(Ct) were severe and YMV and SMV were mild to moderate severity. At Ludhiana, YMV was severe and SMV was mild form, while at Delhi, YMV were severe and BND was mild to moderate. At Dholi, YMV was in moderate to severe form. In NEZ, At Raipur, PB (Ct) and IBB were mild to moderate form.In NEHZ, At Biswanath Chariali, disease pressure was low except Coll R, PB (Ct) and CLS which were moderate, YMV SMV and BLB were mild. At Medziphema, BP, PB (Ct) and RAB were moderate to severe, other diseases like CollR and rust were in mild to moderate form. In CZ, at Sehore, RRR appeared in severe form along with Soybean Crinkle Virus which needs further confirmation on its identification.YMV and BS were in mild to moderate form. At Amravati, Charcoal Rot (CR) was found moderate to severe from. Disease pressure of *Alternaria* leaf spot (ALS) and Yellow Mosaic Virus (YMV) were found moderate form whereas Pod Blight (Ct), Bacterial Pustule (BP) and Collar rot was found very mild form. At Jabalpur, YMV and CR were moderate to severe, BS, MLS, ALS , PB(Ct) and BP were in mild to moderate form. In SZ, rust was severe at Dharwad,Ugakhurd and K.Digraj. PB(Ct), PSS,YMV were moderate at Dharwad and Ugar Khurd.

PP 2: Trap nursery trial

Appearance of various major diseases was monitored at 10 centres across the zones (Table 4.2) on 16 susceptible varieties. In NHZ, at Almora, the situation was different from previous year where in FLS, PB (Ct) and BP appeared in mild to moderate form. At Palampur, FLS and BS appeared in moderate to severe form, while, PB (Ct) and BP in mild form. In NPZ, at Pantnagar, PB(Ct) and RAB in were severe form and YMV , SMV BP and BLB were in mild form. At Delhi, YMV was in severe form and BND was in mild form. In NEHZ, at Biswanath Chariali, the disease situation was almost same as that of last two years as CollR, PB (Ct) and CLS appeared in moderate form and YMV & SMV

appeared in mild form. At Medziphema, RAB PB (Ct) and FW were in moderate to severe form. In CZ, at Sehore, CR and TLS appeared in moderate to severe form while YMV appeared in mild to moderate form. At Jabalpur, this year, CR appeared in moderate to severe form and YMV,RAB, BS,BP and PB(Ct) were in mild to moderate form. At Amravati, CR were in moderate form and other diseases such as YMV, PB(Ct) ,ALS and BP appeared in mild form. In SZ, rust appeared in severe form at all the three centres viz., Ugar Khurd, Dharwad and Kasbe Digraj and PB (Ct) and PSS appeared in moderate moderate form at Ugar Khurd and Dharwad.

PP 3(a): Incidence of various diseases in IVT

Fourty two entries along with checks were screened at 15 locations across the zones against major diseases (Table 4.3). Evaluation of entries were considered reliable only for FLS, PB (Ct), RAB, YMV, Rust, TLS,SCV,IBB,CollR and CR appeared in moderate to severe form in susceptible checks or in any test entry at one or more centres. Disease pressure of rest of the diseases i.e. BP, BS, BLB, ALS, RRR, BND, PSS/CLS, SMV ALS and PB (Ct) at Almora, Ugarkhurd was low to moderate in susceptible check as well as in test entries. Therefore, the resistant status of the entries to diseases of latter group was not reliable and needs further confirmation. The data of those centres where susceptible check/test entries showed susceptible or highly susceptible reaction considered for classifying varieties in to different resistance categories. The entries observed Absolute Resistant (AR) and Highly Resistant (HR) at such centre (s) and did not express susceptible reaction to same disease at other centres where infection in susceptible check (s) and in entries was even less than 77.7 were also considered as resistant.

Appearance of FLS was severe at Almora and moderate at Palampur.No entry showed AR reaction at Almora, while SL 1068, AUKS 174 showed AR reaction at Palampur. Entry BAUS 102 at Almora and two entries (JS 21-15, KDS 992) showed HR reaction to FLS at Palampur. Appearance of PB(Ct) was moderate to severe at Pantnagar,Medziphema,Palampur, Raipur,B.Chairali,Indore,Ugarkhurd and Dharwad. At Pantnagar,DS 3108 showed AR reaction, while eight entries(SL 1068,AUKS 174,NRC 137,NRC 132,NRC 133, NRC 134,RVS 2011-1,PS 1613), at Medziphema, eight entries(RVS 2011-3,DSb 34,MAUS 275,JS 21-15, NRC 130,NRC 137,CSB 10084,PS 1611) showed AR reaction where as,11 entries(SL 1068,AUKS 174,JS 20-17,TS 15,BAUS 102, VLS 94,NRC 32,NRC 133,NRC 136,RSC 11-07,RVS 2011-2) showed HR reaction. At Palampur,six lines(NRC 128,NRC 133,NRC 136, TS 53,CSB 11012,PS 1613) recorded AR reaction where in, 11 entries (SL 1068,AUKS 174, NRC 132,NRC 137,MACS 1493,SL 1123, KDS 992,NRCSL 1,RSC 11-03,NRC 134,SKF-SPS-11) showed HR reaction. None of the entries showed AR reaction at Raipur where as 12 entries (NRC 128, NRC 137,SL 1068,AUKS 174,CSD 10084,MACS 1493,TS 53,RVS 2011-4,SL 1123,PS 1613,NRCSL 1,PS 1611) showed HR reaction. At B.Chariali none of entries showed AR reaction and three entries (MAUS 731, VLS 94, AMS 100-39) showed HR reaction. At Indore none of entries were AR to PB (Ct) where as two entries showed (BAUS 102, SKF-SPS-11) HR reaction under very high disease pressure. None of entries showed either AR or HR reaction at Dharwad. Entry NRC 137 showed AR reaction over two locations.

RAB appeared in severe form at Medziphema, Pantnagar and Indore and with moderate to severe form. Entries JS 20-17, BAUS 102, NRC 131 and RSC 11-07 recorded AR reaction at Medziphema where as 13 entries showed HR reaction. None of entries recorded AR reaction and PS 1613 showed HR reaction at Pantnagar. None of entries recorded AR reaction and NRC 128, RVS 2011-3 and BAUS 102 showed HR reaction at Indore.None of the entries showed AR/HR reaction to YMV and eight entries showed MR reaction at Delhi center.Similar observation was recorded at Dholi center where is none of entries showed either AR/HR reaction and only two entries showed MR reaction.Five entries showed HR reaction at Ludhiana.Two entries (VLS 94,AMS 100-39) showed AR and five entries HR reaction at B.Chairali. The data of Jabalpur,Pantnagar,Ugarkhurd and Amravati was not considered reliable due to less than 77.7 infection index.

At Sehore,none of the entries showed AR reaction and five entries showed HR reaction for TLS and for SCV, none of the entries showed AR reaction,though several entries showed HR reaction, only two entries SKF 1050,Shalimar Soybean showed susceptible reaction suspected to be soybean crinkle virus which needs further investigation for identification of virus associated.

With respect to IBB reaction at Raipur only one entry RVS 2011-4 showed AR reaction while all the other entries showed HR reaction except NRC 131 showed MS and VLS 95,MACS 1575 and Shalimar Soybean showed S reaction. At Indore,none of the entries showed AR reaction while entries (NRC 28,RVS 2011-4 and DSb 34) showed HR reaction to CollR.At.B.Chairiali,entry MAUS 731 showed AR reaction and five entries (SL 1068,NRC 137,VLS 94, AMS 100-39 and RSC 11-03) showed HR reaction to CollR.Rust was severe at Ugarkhurd,Dharwad and K.Digraj. DSb 34 showed HR reaction at Ugarkhurd, Dharwad and K.Digraj. TS 53 and KDS 992 showed HR reaction at K.Digraj only. CR was severe in test entries and checks both at Amravati, Jabalpur and Sehore. At Amravati,21 entries, nine entries at Jabalpur and 34 entries at Sehore showed AR reaction.

PP 3(b): Incidence of various diseases in AVT-I

A total of sixteen entries, which were promoted to AVT-1 from IVT in all the zones, have been evaluated against major diseases at 14 centres (Table 4.4) along with checks. Susceptible check varieties or test entries contracted severe disease (I. I. equal or more than 77.7).For FLS at Palampur and Almora,RAB,BLB and YMV at Pantnagar, YMV at Delhi & Dholi, CollR and PB (Ct) at B.Chairali, PB(ct) and RAB at Medziphema, CR at Jabalapur, and Sehore , TLS ar Sehore, rust at Dharwad, Ugarhurd, and K.Digraj,PB(Ct) at Dharwad and Ugarkhurd are reliable. Therefore, resistant status of entries against these diseases at above locations was considered as reliable. The entries observed AR and highly resistant (HR) at such centre (s) and did not express susceptible reaction to same disease at other centre (s) of the same zone were considered as real resistant. Resistant status of BS at Palampur, BS,PB (Ct) and SMV at Pantnagar,BND at Delhi,YMV and SMV at B.Chariali,YMV at Jabalpur,SCV at Sehore and YMV,CR,ALS and BP at Amravati,ALS & BP at Amaravati and PSS at Dharwad were considered as not reliable.

In NHZ, at Palampur four entries (KDS 1045,NRC 125,RSC 10-52 AND RVS 2009-9) showed AR reaction to FLS and another three entries (AMS MB 5-18,DSb 32 and KDS 921) showed HR reaction.However,at Almora, all the entries showed either S or HS reaction except KDS 1045 which showed MS reaction.

In NPZ at Pantnagar,the entry KDS 1045 showed AR reaction to PB(Ct) while, entries DS 3106,RSC 10-70 recorded HR reaction. The entry RSC 10-70 recorded HR reaction to RAB and two entries (DS 3105 and DS 3106) showed MR reaction to RAB.For reaction to YMV,seven entries (DSb 32,DS 3105,DS 3106,KDS 980,NRC 126,NRC 127 and RVS 2009-9) showed AR reaction while, three entries (KDS 1045,RSC 10-70 and SL 1104) showed HR reaction. At Delhi, entries DS 3105,DS 3106 and SL 1104 showed HR reaction while rest of entries recorded HS reaction. The entry SL 1104 showed HR reaction both at Pantnagar and Delhi. The entries DS 3105 and DS 3106 recorded AR reaction at Pantnagar and HR reaction at Delhi center.At Dholi, none of the entries showed AR/HR reaction. The entries KDS 921 and RSC 10-52 showed MR reaction. At Ludhiana, none of the entries showed AR/HR reaction except DSb 32 which showed MR reaction to YMV.

In NEHZ, at Medziphema two entries(NRC 126 and RVS 2009-9) showed AR reaction to PB(Ct) while six entries(AMS-MB5-18,DS 3105,KDS 921,KDS 1045,MACS 1520 and NRC 127) showed HR reaction to PB(Ct).At B .Chairali,KDS 980 and MACS 1520 showed AR reaction to CollR while five entries (AMS MB 5-18,DSb 32,KDS 921 ,KDS 1045 and NRC 127) recorded HR reaction for CollR.In case of SMV at B.Chairali,nine entries showed AR reaction except DS 3106,RSC 10-52 and RSC 10-70 showed MS reaction. The entries AMS MB 5-18, DS 3105, KDS 921, KDS 1045 and NRC 127 showed AR/HR reaction at both Medziphema and B.Chariali locations.

In CZ at Jabalpur, the entries MACS 1520,NRC 125 and RSC 10-52 showed AR reaction to CR.At Sehore,none of entries showed AR reaction to TLS while 11 entries showed HR reaction to TLS.In SZ at Dharwad,DSb 32 showed HR reaction to Dharwad, Ugarkhurd and K.Digraj. Rest of the entries showed MS/S reaction to rust.

PP 3(c): Incidence of various diseases in AVT-II

Ten entries at 14 locations across the country were evaluated for their reaction to diseases along with checks as per procedure described in Table 4.5. Susceptible check variety (s) or test entry (s) with severe disease rating (1.1 equal or morethan 77.7) for FLS at Palampur and Almora, BLB,PB and RAB at Pantnagar,YMV at Dholi,Ludhiana and Delhi, CR at Jabalpur,Sehore and Amravati,TLS at Sehore,rust at Dharma,Ugarkhurd and K.DigrajPB(Ct) at Ugarkhurd and Dharwad.Therefore the resistant of entries against those disease at above locations were considered on reliable. The data with respect to PB(Ct),BS at Palampur, BP,SMV and YMV at Pantnagar,YMV at B.Chariali and Jabalpur,SCV at Sehore,YMV,ALS and BP at Amravati,YMV at Ugarkhurd,PSS at Dharwad and BND at Delhi were incomplete and hence did not consider for analysis of results. In NHZ, at Palampur JS 20-116 recorded AR reaction and PS 1572 showed HR reaction for FLS.None of entries showed AR/HR reaction at Almora.However, entry VLS 89 showed MR reaction for FLS at Palampur and Almora centers.

In NPZ, At Pantnagar,PS 1572,SL 1028 and SL 1074 showed AR reaction to BLB and HR reaction to PB(Ct) and RAB which indicated multiple disease resistance. For the reaction to YMV, the entry PS 1572 showed AR reaction at Dholi and HR reaction at Ludhiana and Delhi.SL 1074 showed HR reaction at Dholi,Ludhiana and Delhi centers. In NEHZ, at Medziphema, PS 1572,RSC 10-46 showed AR reaction and SL 1028 and SL 1074 recorded HR reaction to RAB.In case of PB (Ct),the entry JS 20-94 showed HR reaction at Medziphema and B.Chariali.PS 1572 showed AR reaction and RSC 10-46 and SL 1074 showed HR reaction to PB(Ct) at Medziphema.Two entries showed AR reaction and three entries HR reaction to PB(Ct) at B.Chariali. In CZ, none of entries showed AR/HR reaction to CR. Six entries showed AR reaction to CR at Sehore.Six entries showed HR reaction to TLS at Sehore center.

In SZ, at Dharwad, none of entries showed either AR/HR reaction to rust at Dharwad,Ugarkhurd and K.Digraj. The SL 1028 and SL 1074 showed MR reaction at Dharwad and Ugarkhurd for rust. For PB (Ct), none of entries showed AR/HR reaction at Ugarkhurd and Dharwad.The entries RSC 10-46 and SL 1074 recorded MR reaction both at Ugarkhurd and Dharwad.

PP 4: Performance of previous year resistant entries

Disease specific resistant entries/varieties of past years were further evaluated to select those which are showing durable resistance status at various identified locations (Table 4.6). In NPZ, at Pantnagar out of 32 previous entries, PS 1517 maintained AR status and 9 maintained HR status to RAB. In case of YMV the data was not reliable due to less disease severity and could not satisfy minimum infection index of 77.7.

In NHZ, at Almora, out of 51 entries tested none of entries maintained AR/ HR reaction.The entry VLS 89 showed MR reaction to FLS including other 20 entries maintaining MR status. In CZ at Amravati, out of 21 entries, 13 maintained AR status to CR. At Jabalpur, out of 31 entries tested, 26 maintain HR reaction for CR. At Sehore, out of 10 entries tested six entries AR reaction to CR, none of the entries showed AR/HR to TLS. In case of CV, the data was not reliable due to less disease severity and could not satisfy minimum infection index of 77.7.

At Dharwad out of 24 entries tested, DSb 23-2, DSb 28-3, DSb 30-2, DSb 32 and KDS 753 maintained HR reaction to rust, EC 391336, EC 379152, EC 242104 the new sources of resistance identified two years back maintained HR recation to rust in the third year of experimentation.

At Ugarkhurd, out of 14 entries, 8 entries maintained HR reaction to rust and 6 entries MR reaction to PB (Ct). The variety DSb 21 maintained HR reaction to rust for the last eight years both at Ugarkhurd and Dharwad.

PP 5: Integrated management of pod blight complex of soybean

This is the third year of the experiment. Experiment was conducted with nine treatments in a RBD design at Palampur (NHZ), Pantnagar (NPZ), Jabalpur, Sehore, Amravati (CZ), Medzhiphema

(NEZ) and Dharwad (SZ) (Table 4.7). This year Pod blight complex was moderate to severe at the locations tested across the zones. Pooled data of other centres revealed that seed treatment either with Carboxin + Thiram(2g/kg) or Carbendazim + Mancozeb(2g/kg) has increased the germination as compared to the control. Pod blight complex was reduced with seed treatment (ST) with Carboxin + Thiram(3g/kg) + spraying of Thiophanate methyl at 55 and 75 DAS (T4&T5). Yield was also found to be increased in T4 i.e. ST with Carboxin+ Thiram @ 2g/kg seed + spray of Thiophanate methyl 0.1% at 55 and 75 DAS followed by T5 i.e. ST with Carbendazim+ Mancozeb 2g/kg seed + spray of Thiophanate methyl 0.1 % at 55 and 75 DAS as compared to control at all the centres except Pantnagar and Sehore where there was no significant difference in yield among the treatments. Thus,it can be concluded and recommended that the seed treatment(Carboxin + Thiram) (3g/kg)followed by spraying of Thiophanate methyl has reduced pod blight complex incidence and increased germination and yield (Table 4.7).

PP.6. Evaluation of germplasm lines for identification of multiple disease resistant sources

Fifty germplasm each were evaluated at Palampur, Jabalpur and at Dharwad centres for identification of multiple disease resistance. Evaluation of FLS and PB(Ct) at Palampur, CR at Jabalpur and rust, PB and PSS at Dharwad were considered reliable looking to the target disease pressure at the location. At Palampur, CAT 1328, CAT 1878 and PS 1347 entries were AR and 16 HR to FLS. 12 entries showed AR and 17 entries HR reaction to PB(Ct), At Jabalpur 12 lines showed AR to Charcoal rot. The disease reaction of RAB and YMV was not found reliable due to less disease severity and could not satisfy minimum infection index of 77.7. At Dharwad, no germplasm line was observed as resistant for rust, five lines MR to rust, and 14 lines MR to PB(Ct). The lines CAT 1328 showed AR reaction to FLS and CR,MR reaction to rust and HR reaction to PSS(Table 4.8).

PP.7. Screening of released varieties against charcoal rot (*Macrophomina phaseolina*) disease

Twenty two varieties each were evaluated at Jabalpur,Amravati and Sehore centres for assessing the reaction to charcoal rot disease. The data of Sehore center was not reliable due to less disease severity and could not satisfy minimum infection index of 77.7 The variety JS 20-69 showed AR reaction at Jabalpur and Amravati.The varieties JS 20-69,JS 20-34 and MAUS 162 showed AR reaction at Jabalpur while,JS 20-69 and RVS 2001-4 showed AR reaction at Amravati(Table 4.9).

PP. 8. Bioefficacy of Zillon against Yellow Mosaic Virus Disease (1st Year)-<u>Paid Trial</u>

Eight treatments including various dosages of Zillon were evaluated at NPZ (Pantnagar and Ludhiana), CZ (Jabalpur and Amarvati),SZ(Ugarkhurd) and NZ(Medziphema) centers during *Kharif* 2017.The severity of YMV was low to moderate across all the locations except NPZ zone.In NPZ atLudhiana center where infection index was 100 resulting in cent percent loss to soybean and could not derive any conclusion with respect to Zillon.At Pantnagar, spraying with zillon @ 6 ml/l at 15 and 45 DAS recorded minimum infection index (14.81) followed by Spraying with zillon @ 6 ml/l at 15 and 30 DAS(18.41).The maximum infection index was recorded in untreated control(39.81).The maximum yield of 16.33 q/ha was recored in spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS which was stastically on par with
spraying with zillon @ 6 ml/l at 15 and 30 DAS(15.86 q/ha) and spraying with zillon @ 6 ml/l at 15 and 45 DAS(15.13q/ha).The minimum seed yield of 11.37q/ha was recorded in untreated control.In CZ at Jabalpur,though infection index was low to moderate,the minimum infection index was recorded in spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS(2.6) and maximum in untreated control(5.85 I.I.).There was no significant difference wrt to seed yield among different treatments.At Amravati, low to moderate severity was recorded,with minimum the minimum infection index was recorded in spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS(2.25) while maximum in untreated control(2.25I.I). There was no significant difference wrt to seed yield among different treatments. In SZ,the YMV infection was moderate at Ugarkhurd with minimum infection index in case of spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS (14.76) followed by spraying with zillon @ 4 ml/l at 15, 30

and 45 DAS(16.57).The maximum infection index was recorded in untreated control(28.65).The seed yield was maximum (18.30 q/ha) in treatment of spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS followed by 15.83q/ha in case of spraying with zillon @ 4 ml/l at 15, 30 and 45 DAS which are stastically on par with each other.The minimum seed yield was recorded in untreated control(11.97q/ha).No conclusions could be drawn from NEZ Medziphema center due to absence of YMV in that area.

Among the different treatments across the zones, spraying with zillon @ 6 ml/l at 15, 30 and 45 DAS was found better in reducing the infection index of YMV followed by spraying with zillon @ 4 ml/l at 15, 30 and 45 DAS which is numerically superior over chemical control.Hence,spraying with Zillon at 4 to 6 ml/L at 15,30 and 45 DAS be advocated for management of Yellow Mosaic Virus disease and enhancement of yield in soybean(Table 4.10).

PP 9: Assessment of polymer coating on efficacy of seed treating chemicals and inoculants

Three different treatments involving polymer seed coating were evaluated against location specific seed borne and seedling diseases at NPZ(Pantnagar),CZ(Indore and Sehore) and SZ(Dharwad).At Pantnagar, among three different treatments, JS 335 seed treated with carboxin and thiamethoxam with polymer coating. Seed treatment without Rhizobium and PSB culture at the time of sowing recorded 2.88 per cent mortality with infection index of 6.73 for anthracnose.At Sehore,percent seedling mortality was minimum (9.63) in case of JS 335 seed treated with carboxin and thiamethoxam with polymer coating,seed treatment with Rhizobium and PSB culture at the time of sowing with increased severity of CR,RRR,Anthracnose and Roll Tot rot.In Sehore,there was no seedling mortality and also no significant difference wrt to severity of TLS and CV.At Dharwad,the seedling mortality was minimum(5.50%) after 20DAG with anthracnose infection index of 11.15.Thus,the studies clearly indicated effectiveness of polymer coating in reducing the seedborne infections at Pantnagar and Dharwad,where as at Sehore and Indore,there was no significant influence which needs further investigation for confirmation.

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RESULTS OF AICRPS MICROBIOLOGICAL TRIALS CONDUCTED DURING KHARIF 2017 AT INDORE CENTRE

MB 1/16: Isolation and screening of rhizobacteria capable of producing ACC deaminase activity, antioxidant potential and phytohormones for developing inoculants to mitigate abiotic stress in soybean (Centres: Pantnagar, Delhi, Indore, Sehore and Dharwad

Isolates recovered last year from the rhizosphere of soybean and received from PAU Ludhiana is being characterized (results will be shown during the meeting) through FAME and further confirmation through 16SrRNA gene sequencing and selection based on abiotic stress characteristics/biochemical parameters (ACC deaminase, Catalase, peroxidases, SOD, cytokinin, IAA, GA etc.,) under moisture stress tolerance in a gradient of PEG under *in vitro* is underway.

MB 2/17: Development of multi trait soybean rhizobia and their evaluation under in vitro

The rhizobial isolation from root nodules was carried out based on germination time from higher trehalose accumulating drought tolerant lines and characterized. Based on FAME's profiling isolates were mainly belong to *Bradyrhizobium sp* (Table 1 and Fig 1). These isolates were tested for selected PGP and physiological traits viz. Nitrate & nitrite reductase assay, ACC deaminase assay, Indole Acetic acid assay,) under in-vitro conditions (Table 1).

Based on FAME, a total of 11 *bradyrhizobial* strains (mainly belonging to *Bradyrhizobium* genus) were recovered and characterized from the root nodules of drought-tolerant lines. In addition to identification through FAME's profiling, molecular identification of these isolates was also carried out. The 16S r-RNA gene amplicons have been obtained using the universal primer sets viz. rD1 & fD1 and 27F&1492R. One novel rhizobial i.e., strain *Bradyrhizobium daqingense* (isolated from drought-tolerant line PK-472) has been reported from Indian rhizosphere for the first time. The novel strain has been found to have comparatively highest ACC deaminase activity. However, with regard to moisture stress tolerance characteristics evaluated under invitro with a gradient of PEG ranged up to 30%, two bradyrhizobial strains i.e., IND-1 (*B. japonicum*) and *B.liaoningense* performed better than this strain. Nevertheless *Bradyrhizobium daqingense* strains (D-4A & D-4B) showed significantly higher leghemoglobin content.

S. No.	Sample ID	SI	Identification
1.	DSR-1 A	0.6248	Bradyrhizobium-japonicum-GC subgroup A
2.	DSR-1 C	0.6192	Bradyrhizobium-japonicum-GC subgroup A
3.	DSR-2 A	0.54	Bradyrhizobium-japonicum-GC subgroup B
4.	DSR-4 A	0.5725	Sphingomonas-paucimobilis
5.	DSR-4 B	0.6074	Bradyrhizobium-japonicum-GC subgroup A
6.	IND-5		NO MATCH
7.	DSR-18 A		NO MATCH
8.	DSR-11 B	0.6553	Rhodovulum-sulfidophilum
9.	DSR-19 A	0.7593	Rhodobacter-sphaeroides
10.	DSR-3 A	0.1724	Microbacterium-flavescens
11.	DSR-11 D	0.6594	Rhodovulum-sulfidophilum
12.	DSR-11 A	0.6738	Rhodovulum-sulfidophilum

Figure 1 Chromatogram of representative strains (Rhizobial isolate)

Volume: DATA File: E162121.93B Samp Ctr: 16 ID Number: 1060
Type: Samp Bottle: 14 Method: RTSBA6
Created: 2/12/2016 6:44:47 PM
Sample ID: D-4 A

RT	Response	Ar/Ht	RFact	ECL	Peak Name	Percent	Comment1	Comment2
0.6896	411806	0.005	----	6.6802		----	< min rt	
0.6975	1.495E+9	0.018	----	6.7316	SOLVENT PEAK	----	< min rt	
2.8525	756	0.016	0.983	15.8353	Sum In Feature 3	2.59	ECL deviates -0.005	16:1 w7c/16:1 w6c
2.8839	638	0.009	0.982	15.9264	16:1 w5c	2.18	ECL deviates -0.002	
2.9091	3707	0.010	0.982	16.0000	16:0	12.69	ECL deviates 0.000	Reference -0.002
3.5446	22916	0.010	0.970	17.8458	Sum In Feature 8	77.48	ECL deviates -0.002	18:1 w7c
3.5975	857	0.014	0.969	18.0000	18:0	2.89	ECL deviates 0.000	Reference -0.001
3.9107	645	0.013	0.962	18.9331	19:0 cyclo w8c	2.16	ECL deviates 0.001	
----	756	---	----	----	Summed Feature 3	2.59	16:1 w7c/16:1 w6c	16:1 w6c/16:1 w7c
----	22916	---	----	----	Summed Feature 8	77.48	18:1 w7c	18:1 w6c

ECL Deviation: 0.002 Reference ECL Shift: 0.001 Number Reference Peaks: 2
Total Response: 29519 Total Named: 29519
Percent Named: 100.00% Total Amount: 28685
Matches:

Library	Sim Index	Entry Name
RTSBA6 6.21		
	0.545	Bradyrhizobium-japonicum-GC subgroup A (4D, Rhiz X medium)
	0.510	Rhodovulum-sulfidophilum
	0.482	Actinomadura-oligospora (72h)
	0.458	Gluconobacter-asaii/cerinus/oxydans
	0.386	Bradyrhizobium-japonicum-GC subgroup B (4D, Rhiz X medium)
	0.377	Brevundimonas-diminuta (Pseudomonas diminuta)
	0.357	Roseomonas-genomospecies-5
	0.347	Ochrobactrum-anthropi (Achromobacter Vd, CDC group Vd)

Chromatogram showing 18:1w7c/18:1w6c (MUFA as dominant FAs)

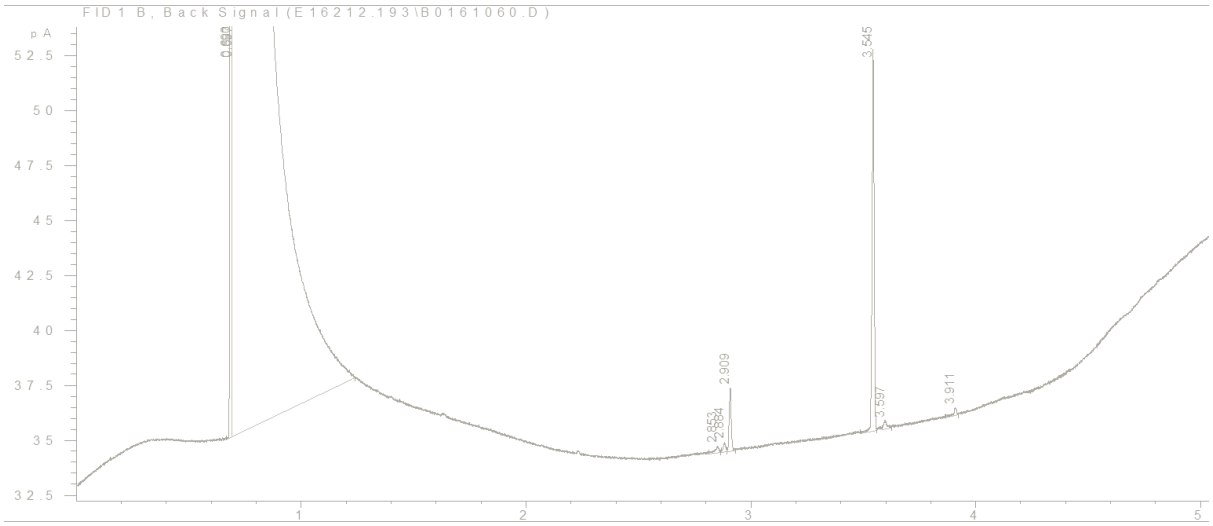

Figure-2: Distance tree of *B. daqingense* (GenBank Acc No. KX230052) obtained using NCBI BLAST pairwise alignment.

MB 3/14: Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination at field site

Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination using soybean (JS 95-60) as an indicator crop was conducted during Kharif 2017. Parameters such as nodule number, nodule biomass recorded at 50% flowering stage and N & P content in shoots and grains along with grain yield were recorded at harvest stage.

In case of nodulation parameters viz., nodule number and nodule dry weight were enhanced by co-inoculation with *Paenibacillus polymyxa* (HKA 15) and AMF (*Rhizophagus intraradices* + *Funneliformis geosporus*+ *Funneliformis mosseae* + *Septoglomus constrictum*) and found at par with plots yields receiving recommended dose of fertilizer (Farmer's practice 20, 40, 60 Kg NPK/ha). However the values were statistically at par.

Shoot nitrogen was found to be higher case of co-inoculation as compared to farmer's practice and same trend was followed by seed nitrogen. However non- significant differences were present among treatments. In case seed phosphorus co-inoculation with *Paenibacillus polymyxa* (HKA 15) and AMF (*Rhizophagus intraradices* + *Funneliformis geosporus*+ *Funneliformis mosseae* + *Septoglomus constrictum*) resulted in non-significantly higher values whereas in case of shoot phosphorus slightly higher values were observed in case of farmer's practice, however as indicated earlier in both the cases, the values were statistically at par.

Yield was also enhanced by co-inoculation with *Paenibacillus polymyxa* (HKA 15) and AMF (*Rhizophagus intraradices* + *Funneliformis geosporus*+ *Funneliformis mosseae* + *Septoglomus constrictum*) and was found at par with the yield obtained from the application of recommended dose of fertilizers/farmer's practice (Table 2).

In conclusion, co- inoculation of *Paenibacillus polymyxa* (HKA 15) with AM fungi performed better than farmer's practice (20, 40,6 0 Kg NPK/ha) which signifies reduction in fertilizer inputs by microbial intervention.

Table 2: Table MB 3/14: Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination at IISR Exp site

Treatment	Nodules (no./plant) (at 50% flowering stage)	Nodule dry mass (at 50% flowering stage) (g/plant)	N-content in shoots (%)	N-content in grains (%)	P-content in shoots (%)	P-content in grains (%)	Grain yield (kg/ha)
Farmers practice (20, 40, 60 Kg NPK/ha)	58.22a	198.44a	6.11a	6.72a	0.076a	0.768a	1385.00a
Paenibacillus polymyxa (HKA 15)+AMF consortia	58.77a	206.66a	6.37a	6.76a	0.066a	0.841a	1441.66a
LSD (P=0.05)	4.61	98.42	1.015	0.38	0.013	0.114	186.03

*Data are average of 6 replications; LSD, least significance difference at 5% level of significance by Duncans multiple range test of ANOVA

MB 4/13: Nodulation ability of AVT-II entries of respective centres at IISR Experiment farm

Pre-released AVT-II entries: JS 20-116, RVS 2007-6, JS 20-94, NRC 127, RSC 10-46

Five AVT-II entries promoted in Central Zone (JS 20-116, RVS 2007-6, JS 20-94, NRC 127, RSC 10-46) were tested under field conditions. A significant positive correlation was obtained between nodule dry weight and leghemoglobin (r=0.62), nodule number and leghemoglobin (r=0.55). In terms of nodulation, JS 20-116 showed best results in the form of higher nodule number, nodule biomass in nodules than all the other varieties. This was followed by RSC 10-46. However in terms of Leghemoglobin content RSC 10-46 showed significantly higher values over all other varieties. This was followed by JS 20-116. (Table-3)

Overall JS 20-116 and RSC 10-46 were found to be better in terms of maintaining higher nodulation.

Table 3: Evaluation of five AVT-II entries of respective centres (JS 20-116, RVS 2007-6, JS 20-94, NRC 127, RSC 10-46) for nodulation parameters at IISR Exp. farm

Variety	Nodule number	Nodule dry weight (mg/g nodules)	Leghaemoglobin content (mg/g nodules)
JS 20-116	145.22a	290a	5.74b
RVS 2007-6	61.22bc	208b	4.97c
JS 20-94	40.66c	151.66c	3.99d
NRC 127	29.44c	91.33d	4.44cd
RSC 10-46	85b	247.33ab	7.38a
LSD (P=0.05)	35.51	49.73	0.66

*Data are average of 3 replications; LSD, least significance difference at 5% level of significance by Duncans multiple range test of ANOVA

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Soybean processing and value addition

Introduction

Soybean has received the status as one of the most important edible plants known for its seeds as a source of protein, oil and nutraceuticals. Apart from proteins, soybean contains basic nutritive constituents, such as lipids, vitamins, minerals, free sugar and contains isoflavones, flavanoids, saponins and peptides that are of therapeutic value. Soybean is the most acknowledged source of plant protein, which also contributes to a wide range of health benefits. Soybean is consumed in two forms, unfermented and fermented. Soybean is considered a good substrate for functional foods, since fermentation by probiotics has the potential to (1) reduce the levels of some carbohydrates possibly responsible for gas production in the intestinal system, (2) increase free isoflavone levels and (3) favour desirable changes in bacterial populations in the gastro intestinal tract. In the present scenario fermentation is applied to improve bioactive components responsible for health benefits and reduction of antinutritional factors. Fermentation of soybean with different micro-organisms improves the biofunctional properties due to the increase in free isoflavones and peptides.

The main objections to soybean products by some consumers are the associated intrinsic flavour which has been described as beany/grassy or astringent and phenomenon of flatulence. Indeed, the first benefit of soybean fermentation is the reduction of its beany flavour and chalkiness. Furthermore, soybeans are high in phytate (phytic acid) and oxalate(oxalic acid), substances that can lock the uptake of essentials mineral- calcium, magnesium, iron, copper and zinc in the intestinal tract. Fermentation can reduce antinutritional factors and objectionable flavour. This can be achieved by using microbial cultures in the form of mono and multi cultures.

The present study on soybean and fermented soybean-*hawaijar* reveals that the nutrient composition of *hawaijar*enhanced after the fermentation process. The antioxidant and antidiabetic activity of *hawaijar* were significantly higher than the unfermented soybean, suggesting the role of fermentation in improving these properties. Thus, hawaijar can act as a potential diet supplement to overcome malnutrition and degenerative diseases.

Objective/Technical Programme

1. To develop nutraceutical/functional food from fermented soybean
2. Extraction of Poly-Glutamate (PGA) from fermented soybean
3. To develop fortified biscuit from soybean and banana rhizome starch with different levels of wheat flour

Programme 1:To develop nutraceutical/functional food from fermented soybean-*hawaijar*

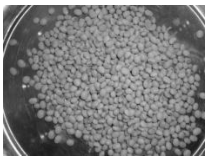
The concept of functional foods and nutraceuticals have received increased scientific and commercialinterest. The health benefits of functional foods and nutraceuticals are generally focused on several areas, including prevention and treatment of cardiovascular diseases, various types of cancer, diabetes and extension of a healthy lifespan. Various nutritional or nutraceutical supplement products have been produced from soybean like Vitamin-E, isoflavone etc.

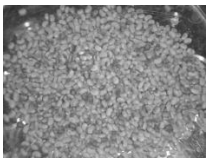
Fermented soybean-*hawaijar* is an indigenous traditional fermented soybean with characteristic flavour and stickiness. During fermentation, complex organic compounds are broken down into smaller molecules by microorganisms, which exert various physiological functions beyond their nutritional properties. It is consumed commonly in the local diet as a low cost source of high protein food. Hence an attempt was made to see fermented soybean-*hawaijar* for their anti-diabetic and fibrinolytic activity.Thus, *hawaijar* can act as a potential diet supplement to overcome malnutrition and degenerative diseases.

The seeds of JS-335 soybean varieties were procured from Andro Research Farm, CAU, Imphaland local variety with small seeded type were purchased from local farmers of Manipur. The seeds were cleaned manually, dried in sun and stored in plastic containers for further use. Soybean seeds were soaked in water. It is difficult to maintain consistent quality control when making traditional fermented soybean-*hawaijar*. So the complete procedure for preparation of inoculated fermented soybean-*hawaijar*has been developed with fermentation started by inoculation with different strain of*Bacillus* spp. strain S and strain H (Diagram 1).

Diagram1: Flow Chart for fermented soybean- *Hawaijar* preparation using *Bacillus* spp. starter culture

Raw soybean





Soak 100g soybean seeds overnight

Boil in cooker with 5 whistle followed by 45min cooking in low flame

Wash the cooked seeds two times with boiled water and drain it

Transfer 20g each cooked seeds to stainless steel tray with lid

Inoculate *Bacillus* spp. of different strain inoculum and mix it thoroughly

Incubate the inoculated seeds at 40-42^0 for 20-22 hrs

Quality fermented soybean is ready to serve

Biochemical analysis:

Antidiabetic assay

α-Amylase activity was determined by the method of MuCue and Shetty, using starch as a substrate in a colorimetric reaction using 3,5-dinitro salicylic acid. A starch solution (0.1%w/v) was obtained by stirring 0.1g of potato starch in 100ml of 16mM of sodium acetate buffer. The enzyme solution was prepared by mixing 27.5g of α-amylase n 100ml of distilled water. The colorimetric reagent was prepared by mixing sodium potassium tartarate solution and 96mM 3,5-dinitro salicylic acid solution. Both control and ethanol extracts (0.5g/ml and 1.0g/ml) were added with starch solution and left to react with α-amylase solution under alkaline condition at 25^0C. The reaction was measured over 3 minutes. The generation of maltose was quantified by the reduction of 3, 5-dinitro salicylic acid to 3-amino-5-nitro salicylic acid. The reaction is detectable at 540nm. The anti-diabetic activity was investigated through the inhibition of α-amylase, an enzyme that made the digestion of starch and so reduced the glucose absorption.

The α-amylase inhibition was expressed as a percentage of inhibition and calculated by the following equation.

(Maltose) Test

% Reaction= ……..x100

(Maltose) Control

% Inhibition= 100- % reaction $\pm$SD

Fibrinolytic activity

3ml of 0.6% Fibrinogen (Sigma F4883) is mixed with 2% agarose solution at 45-50^0C. To this mixture, 1 unit of Thrombin (Sigma T6884) was added and mixed thoroughly. Then it was poured in 90mm petriplate immediately and allowed to cool down to form the fibrin plate. 4µl of the extracted crude enzyme solution is spotted on the plate. 1% $NaCl_2$ solution is also spotted and it act as the control. Thus spotted plate was incubated at 37^0C for 3 hours. After incubation, a clear halo is seen around the spotted area.

Thrombolytic activity

10ml of 2% agarose solution at 45^0C is added with 2ml of fresh (just removed) chicken blood from jugular vein and mixed thoroughly. Then it is poured in a sterile 90mmpetriplate and allowed to cool down to form the blood agar plate. 4µl of the extracted crude enzyme solution is spotted on the plate. 1% $NaCl_2$ solution is also spotted and it is used as the control. Thus spotted plate was incubated at 37^0C for 3 hours. After incubation, a clear halo is seen around the spotted area.

Results

Diabetes is a metabolic disease, which is characterized by increase in blood sugar level and is classified as type I and type II. Type I is insulin dependent diabetes, where the pancreas fails to secrete insulin, whereas type II (non-insulin dependent) is caused by an imbalance in blood sugar absorption and insulin secretion. Fermented soybean has been reported to possess antidiabetic properties against the type II diabetes mellitus.

Antidiabetic activityof fermented soybean extract showed alpha-amylase activity more pronounced than in the soybean aqueous extract as shown in Table 1. Fermented soybean products may be better for preventing or delaying the progression of Type II diabetes compared with non fermented soybean. Fermented soybean-*Hawaijar* prepared from local small seeded type of soybean with both the culture showed 65% antidiabetic activity in aqueous extract and the unfermented soybean showed 40% of antidiabetic activity in aqueous extract (Table 1).The antidiabetic properties in the aqueous extracts of fermented soybean is due to the higher content of smaller peptides.

The present study reveals that the nutrient composition offermented soybean-*hawaijar* enhanced after the fermentation process. The antidiabetic activity of *hawaijar* were significantly

higher than the unfermented soybean, suggesting the role of fermentation in improving these properties. Thus, *hawaijar* can act as a potential diet supplement to overcome malnutrition and degenerative diseases.

Table 1: Antidiabetic activity of raw and fermented soybean-*Hawaijar*

Samples	Raw Soybean	Fermented soybean prepared from local small seeded type variety	Fermented soybean prepared from JS-335 variety
Aqueous extract % of inhibition	40%	65% (using *Bacillus*sp.StrainS culture)	63% (using *Bacillus*sp.StrainS culture)
	40%	65% (using *Bacillus*sp.Strain H culture)	63% (using *Bacillus*sp.Strain H culture)

Fibrinolytic activity

The colonies showing clearing zone on the fibrin plate (Plate 1a & b) indicate the degree of fibrinolytic activity of fermented soybean using different strain of *Bacillus* sp. The diameter of the halo of clearing zone was measured for thrombolytic activity. Higher fibrinolytic activity was observed in samples C_1V_1 and C_2V_1 with halo diameter of 0.65cm each followed by C_2V_2 of 0.55cm (Table 2). The fibrinolytic activity in fermented soybean products originated from microorganisms mostly from *Bacillus* spp. The fibrinolytic enzymes from these traditional foods may be explored for novel fibrinolytic therapy.

Table 2: Fibrinolytic activity of fermented soybean

Samples	Average diameter of halo (cm)
C_1V_1	0.65
C_1V_2	0.45
C_2V_1	0.65
C_2V_2	0.55

Where,

$C_1V_{1=}$ Local small seeded type with *Bacillus* sp. strain S
$C_1V_{2=}$ JS-335 with *Bacillus* sp. strain S culture
$C_2V_{1=}$ Local Small seeded type with *Bacillus* sp. strain H
$C_2V_{2=}$ JS-335 variety with *Bacillus* sp. strain H

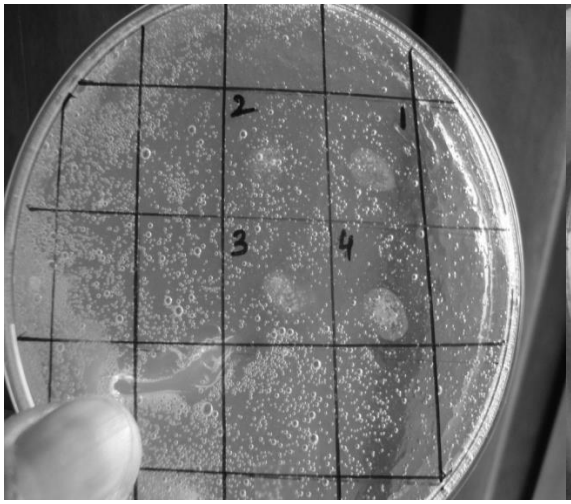


Plate1:(a)

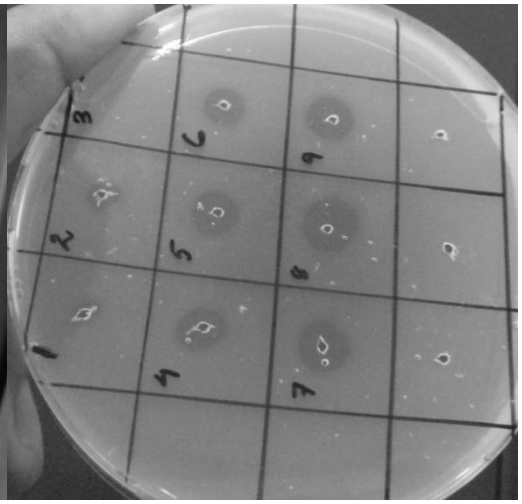


Plate1: (b)

Plate 1(a):Fibrinolytic activity of different fermented soybean 1=(C_1V_1 Local small seeded type with *Bacillus* sp. strain S); 2= C_1V_2 JS-335 with *Bacillus* sp. strain S culture); 3=(C_2V_1 Local Small seeded type with *Bacillus* sp. strain H); 4= (C_2V_2 JS-335 variety with *Bacillus* sp. strain H)

Plate 1(b):Fibrinolytic activity of fermented soybean extracts of C1V1(Local small seeded type with *Bacillus* spp. strain S) at different doses

Thrombolytic activity

The colonies showing clearing zone on the blood agar plateshows the presence of thrombolytic activity (Plate 2).

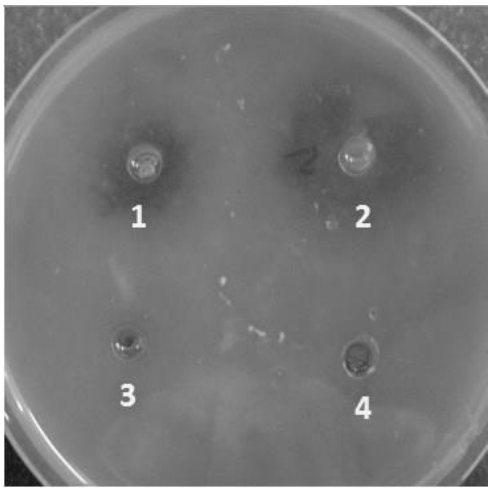


Plate 2: Thrombolytic activity of crude extracts from fermented soybean (1=C_1V_1 Local small seeded type with *Bacillus* sp. strain S); 2= C_1V_2 JS-335 with *Bacillus* sp. strain S culture); 3=(C_2V_1 Local Small seeded type with *Bacillus* sp. strain H); 4=(C_2V_2 JS-335 variety with *Bacillus* sp. strain H)

Programme 2:Extraction of Poly-Glutamate (PGA) from fermented soybean

Poly-Glutamate **(**PGA) is produced by *Bacillus spp.*in many fermented soybean products giving the characteristic of a sticky texture to the product. Current research has highlighted various uses of PGA as a functional food ingredient in cryoprotectants, bitterness-relieving agents, thickeners and mineral absorbents. The cryoprotectant properties of PGA make it suitable for preservation of cryolabile nutrients. Functional foods supplemented by a proper quantity of PGA may therefore serve as a therapeutic tool for osteoporosis treatment.

Biochemical analysis

Extraction of PGA by organic/solvent

Weighed 100g of previously fermented soybean and then add 200ml of water and stirred gently to extract water soluble PGA. The solid part/seeds of fermented soybean is removed by sedimentation and decantation. To the remaining solution, double the amount of precooled ethanol is added and kept in refrigeration for 3 hours. Centrifuge the solution at 6000rpm for 6 min. and then supernatantis discarded. The pellet thus obtain is driedin hot air oven at 45^0C until its weight became constant in subsequent weighing.

Thin Layer Chromatography (TLC)assay

The extracted crude PGA (0.3g) was digested using 5ml of 6N HCl and keeping in water bath at 110^0C for 24 hours. The solution was spotted in the TLC plate (Merck). 1.0µl of glutamate solution was also spotted in the TLC plate as control. The mobile phase,solvent mixture of ethanol, acetic acid and water (3:1:1) was used during the experiment. The TLC was continued for 2hr 15min.

RESULT

Extraction of Poly-Glutamate (PGA) from fermented soybean using ethanol has been standardised keeping different temperature at constant pH.From the Table 3, the crude PGA production from fermented soybean increased with increase in temperatureupto45^{0}C and then decline steadily.In this study, it is evident that the maximum PGA yield of 2.3g/100g wet fermented soybean was recorded by treatment C_1V_1at 45^{0}C followed by C_2V_1 with 2.2g/100gwet fermented soybean at constant pH 7.4 (Table 3 & Fig. 1).

Table 3: Production of crude PGA (g/100g) by solvent extraction at different temperature

Temperature	Crude PGA (g/100g)			
	C_1V_1	C_1V_2	C_2V_1	C_2V_2
30^{0}C	0.3	0.2	0.4	0.2
35^{0}C	0.5	0.4	0.5	0.5
40^{0}C	1.2	0.7	1.0	0.8
45^{0}C	2.3	1.3	2.2	1.5
50^{0}C	1.6	1.1	1.5	1.0

Where,

$C_1V_{1=}$ Local small seeded type with *Bacillus* sp. strain S
$C_1V_{2=}$ JS-335 with *Bacillus* sp. strain S culture
$C_2V_{1=}$ Local Small seeded type with *Bacillus* sp. strain H
$C_2V_{2=}$ JS-335 variety with *Bacillus* sp. strain H

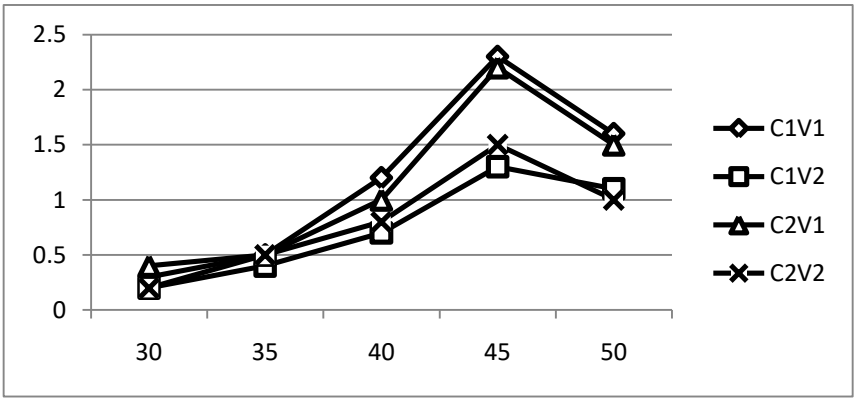


Fig 1: Production of crude PGA from fermented soybean at different temperature

Extraction of Poly-Glutamate (PGA) from fermented soybean using ethanol has been standardised keeping different pH at constant temperature. From the Table 4, the crude PGA production from fermented soybean increased with increasein pH upto 8 and thendecline steadily.In this study, it is evident that the maximum PGA yield of 2.5g/100g was recorded by treatment C_1V_1(Local small seeded type with *Bacillus* spp. strain S)at pH 8 followed by C_2V_1 (Local Small seeded type with *Bacillus* sp. strain H)with 2.3g/100g at constant temperature 42^{0}C (Table 4 & Fig. 2)

Table 4: Production of crude PGA (g/100g)from fermented soybean using different culture at different pH

pH	Crude PGA (g/100g)			
	C_1V_1	C_1V_2	C_2V_1	C_2V_2
5	0.4	0.3	0.3	0.2
6	0.8	0.7	0.8	0.7
7	1.7	1.3	1.5	1.1
8	2.5	2.2	2.3	2.2
9	2.0	1.9	2.0	1.9

Where,

$C_1V_{1=}$ Local small seeded type with *Bacillus* sp. strain S
$C_1V_{2=}$ JS-335 with *Bacillus* sp. strain S culture
$C_2V_{1=}$ Local Small seeded type with *Bacillus* sp. strain H
$C_2V_{2=}$ JS-335 variety with *Bacillus* sp. strain H

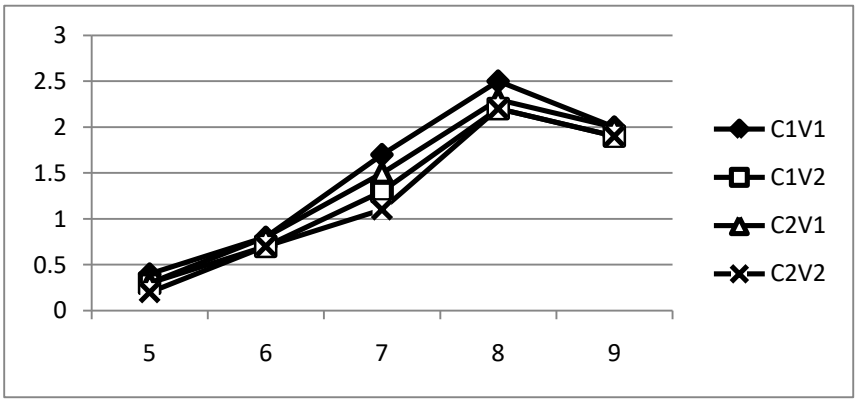


Fig 2: Production of crude PGA from fermented soybean at different pH

The production of PGA was confirmed qualitatively by hydrolysis of polymer and detection of the monomers by Thin Layer Chromatography(TLC), and thus can be concluded that the mucilagenous mass/ slimy texturein the fermented soybean was polymer of glutamate (Plate 3) and hence it is Poly-Glutamate(PGA).It is evident from this TLC plate that the extracted sample containingcrude PGA has been broken down to glutamate (Plate 3). PGA has several applications as foods as well as non-foods.

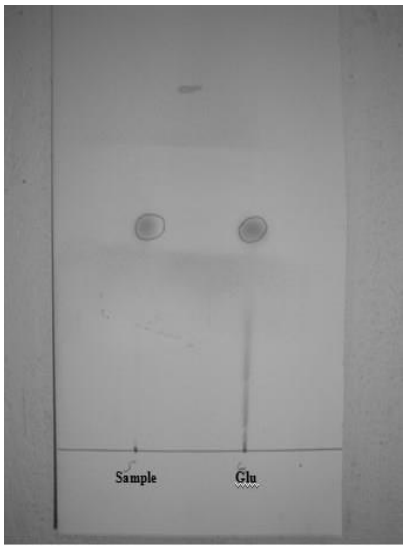


Plate 3: TLC plate showing the breakdown of PGA to glutamate

Programme 3: To develop fortified biscuit from soybean and banana rhizome starch with different levels of wheat flour

Biscuits are high in carbohydrates, fat, and calorie but low in fibre, vitamin, and mineral which make it unhealthy for daily use. The main ingredients of any bakery products is wheat, which is having deficiency of essential amino acid lysine whereas soybean is richer in lysine and can be complement to wheat in bakery products. This may be achieved through incorporation of protein-rich ingredients from soybean and wheat flour as a fortification of biscuits. Soybean is one of the new protein supplements, which when used partially to replace or complement wheat flour in the production of bakery products such as biscuits, bread and other confectionery could go a long way in improving the nutritional status of such products. The banana rhizome starch has good residualamount of minerals and dietaryfibre along with antimicrobial and antioxidantactivity.

The use of bananarhizome starch as an ingredient in the biscuit manufacturing not only increases its nutritional value it also helps in by-product utilization. The present study was, therefore undertaken to study the compositional evaluation designed to blend banana rhizome starch, soy flour and wheat flour as a source of protein and fibre to make protein and fibre rich biscuits.

The seed of JS-335variety of soybean were procured from Andro Research Farm, CAU, Imphal. The seeds were cleaned manually, dried in sun and stored in plastic containers for further use.

Preparation of Composite Flour

Composite flour is prepared by substituting the wheat flour with soy flour and banana rhizome starch in the ratio of 1:25:74, 2:25:73, 3:25:72, 4:25:71 and 100:0:0(control) of banana rhizome starch: soy flour: wheat flour (Table5). The method adopted in the preparation of soy fortified biscuits is shown in Figure 3.

Chemical analysis: Soy fortified biscuits samples/products were subjected for chemical analysis. Like fat, protein and fibre content using standard procedure of AOAC. The protein content was determined by Kjeldahl method.

Results

The results of protein contents were shown in Table 6, which revealed that there was high significant differences between the samples. Results showed that the protein content gradually increased from 9.43% to 16.90% with increased addition of banana rhizome starch. In general,treatment T_4 gave the highest yield (16.90%) followed by treatment T_3 (15.70) as compared with the control sample T_5 (9.43%).Appraisal of data n Table 6 revealed that there was no significant difference in the fat content of soy fortified biscuit.

Table 5:Treatments of composite flour

Treatments		Banana rhizome starch (%)	Soy Flour (%)	Wheat Flour (%)
T1	JS-335	1	25	74
T2		2	25	73
T3		3	25	72
T4		4	25	71
T5	Control	-	-	100

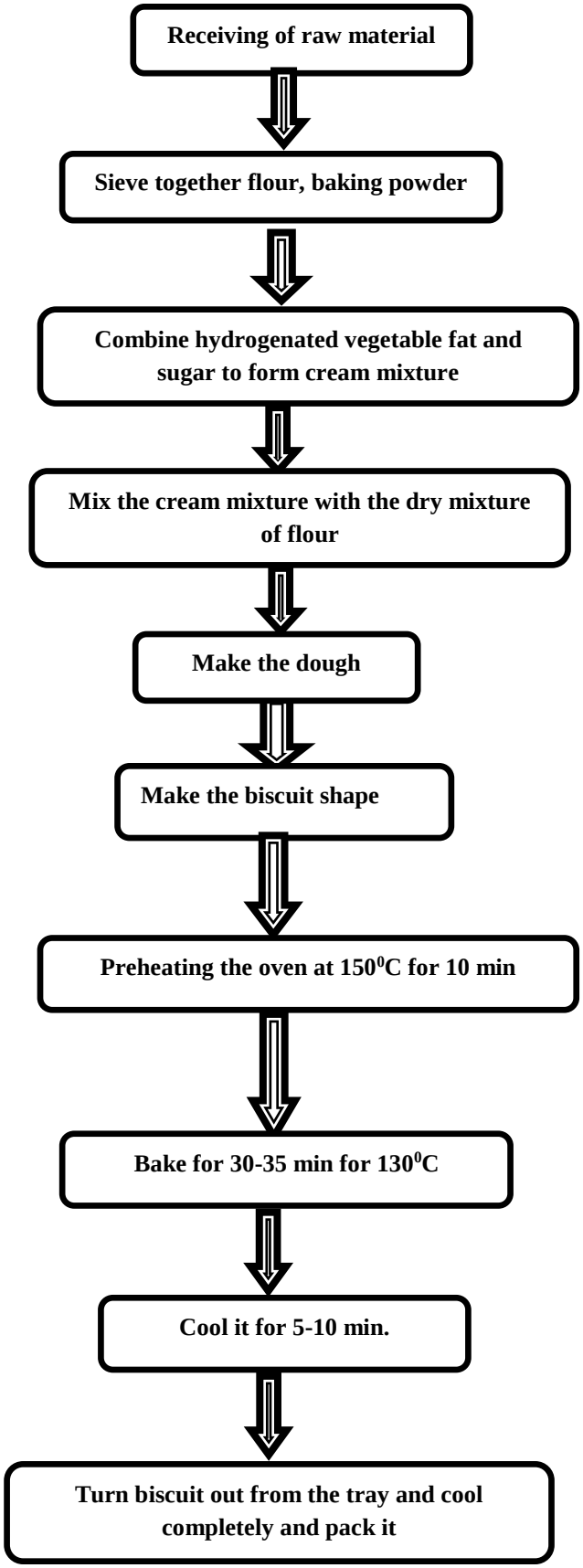


Figure 3: Flowchart for the preparation of soy fortified biscuit

The fibre content of the biscuit increased with the increase in supplementation. The increase in fibre content could be due to the rise fraction of blended flour. Since dehulled soya flour was used, thus banana rhizome starch has higher fibre content than both soyflour and wheat flour as shown in treatment T4 (2.82%) than the control T5 (0.12%) (Table 6).

Table6:Physico-chemical characteristics of soy fortified biscuits

Treatments	Parameters		
	Fat(%)	Protein(%)	Fibre(%)
T1	21.40	14.20	0.48
T2	21.42	14.98	1.02
T3	21.53	15.70	2.20
T4	21.59	16.90	2.82
T5	21.61	9.43	0.12
S.Ed(+)	0.51	0.71	0.12
C.D	1.13	1.59	0.26

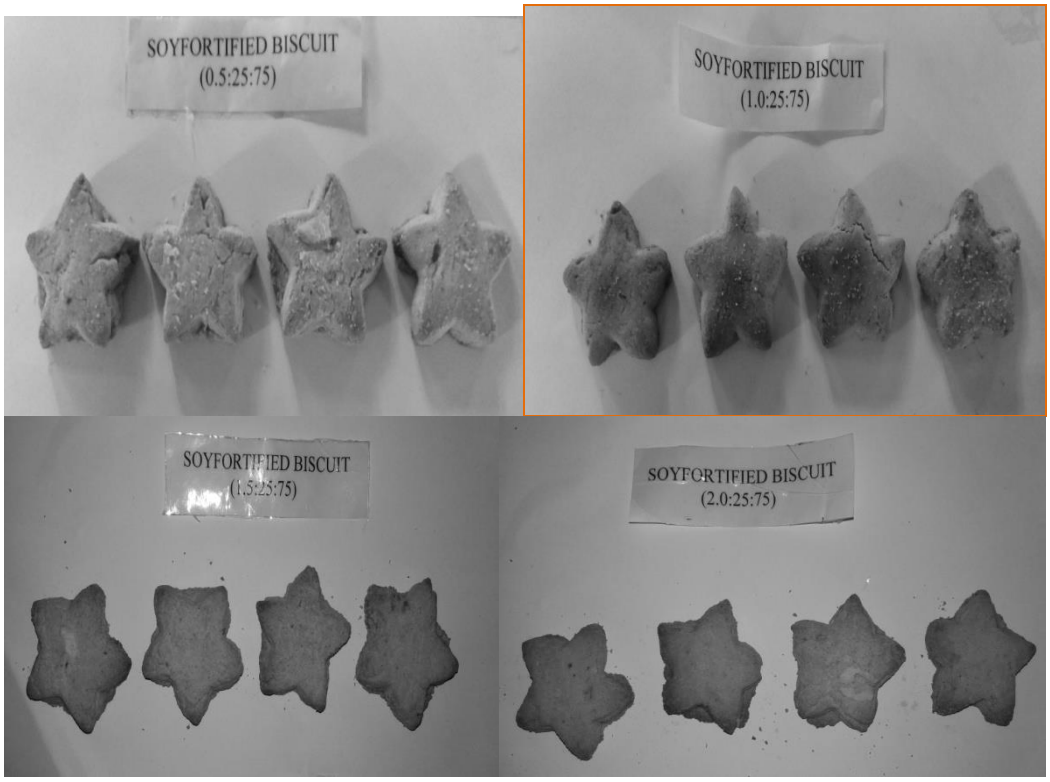


Plate 3: Soy fortified biscuits prepared from 25% soy flour (JS-335) with different percentage of banana rhizome starch and wheat flour

CONCLUSION

Soybean is becoming an important crop for its nutritional value and health food applications.Thus soybean has a great potential as a source of important nutrients and nutraceuticals of implication to human health. Although soybean is a rich source of plant protein, its nutritive values are concealed by the anti-nutritive properties. Fermentation not only reduces the toxins but also it is an excellent processing method for improving nutritional and functional properties of soybeans due to the increased content of small bioactive compounds. Thus, hawaijar can act as a potential diet supplement to overcome malnutrition and degenerative diseases.Peptides in fermented soybean products exhibit bioactive properties such as ACE-inhibitory, antioxidant, antitumor, antidiabetic and antimicrobial property. It can be concluded that the antioxidant activity,antidiabetic and thrombolytic activity of *hawaijar* from solid-state fermentation of soybean meal using different strain of *Bacillus* spp. have good potential for application in the management of Type II diabetes, hypertension and the fermented soybean-*hawaija*r meal has good potential for application in the production of a novel physiologically functional food .

परिशिष्ट

Appendices

RECOMMENDATIONS OF 47TH ANNUAL GROUP MEETING (May 2-4, 2017) AND ACTION TAKEN REPORT

S. No.	Recommendations	Action Taken
1.	Need based contingency to be provided to newly identified voluntary centers.	Need based contingency @ Rs. 15,000/- per trial was provided to identified voluntary centers.
2.	Original breeders should supply the seeds of check varieties for IVT.	Fresh seed of check varieties were supplied by concerned breeders.
3.	For Northern Plain Zone, the check variety SL 688 should be replaced with SL 985.	Check variety SL 688 was used in IVT in NPZ.
4.	Palampur, Raipur and Coimbatore centers should be included for germplasm evaluation.	Germplasm lines were evaluated at Palampur, Raipur and Coimbatore centers during *kharif* 2017.
5.	To speed up the varietal development, off-season generation advancement should be explored under National Hybridization Programme.	Off-season generation advancement was taken up at Indore and Bangaluru. At Indore, 28 F2s were confirmed as true hybrids with average 1431 plants. At Bengaluru center, a total of 146 crosses received from 11 centers were advanced during off-season.
6.	In National Hybridization Programme, the female parent should be preferable from the same zone.	Female parents from same zone were used in NHP.

Appendix – II

Multilocation Germplasm Evaluation

With the purpose of identification of superior germplasm lines for yield and associated traits and their subsequent integration in breeding programmes across AICRP on Soybean centres to broaden the genetic base of coming soybean varieties, a multilocation evaluation trial of 125 germplasm lines (part of core collection developed at ICAR-IISR, Indore) was conducted across 7 locations representing all the zones of AICRP *viz* Palampur (NHZ), Pantnagar (NPZ), Imphal (North Eastern Hill Zone), Raipur (EZ), Indore and Parbhani (CZ) and Pune (SZ) for 8 morphological traits (Days to flower (DF), Days to maturity (DM), Plant Height (PH in cm), Branches / plant, Pods / plant, 100 seed weight (100 SW in g) and yield / plant (g) as per the programme given below.

DESIGN	:	Augmented Design
PLOT SIZE	:	Single row, 3m long
REPLICATION	:	Nill
LOCATIONS (7)	:	Palampur, Pantnagar, Imphal, Raipur, Indore, Parbhani and Pune
ENTRIES	:	125
Zonal Checks		
• Palampur	:	Shivalik, Palam Early Soya-1, Him Soya, Hara Soya, Himso 1685
• Pantnagar	:	PS 1347,
• Imphal	:	JS 335, RKS 18, NRC 37, PS 1347, JS 95-60
• Raipur	:	-
• Indore	:	JS 335, JS 97-52, JS 20-34, NRC 86
• Parbhani	:	JS 335, JS 95-60, NRC 37, RKS 18, PS 1347
• Pune	:	DSb 21, RKS 18, MACS 1188, JS 93-05, JS 335

Mean performance of 125 germplasm lines over 7 locations along with the performance of checks (16) is given in Table 1 and identified entries for different traits are given in Tables 2 - 8. Only five germplasm lines matured in less than 95 days and among these five, three were check (JS 95-60, JS 93-05, JS 20-34). Ten germplasm lines had 100 seed weight of more than 13g and check varieties of Palampur Himso 1685 and Palam Early Soya-1 had the largest seed size. Palam Early Soya-1 and Himso 1685 not only had the largest seed size but had the highest yield per plant. Among germplasm lines MACS 1188 had 15.8 gm 100 seed weight and 16 gm yield per plant. Boxplots giver for germplasm accessions as well as test locations described the basic statistics of performance for individual traits.

Table 1: Mean performance of germplasm lines over locations

S. No.	CAT NO.	ACCESSION NO.	Days to Flower	Days to Maturity	Plant Height	Branches /Plant	Pods /Plant	100 SW(g)	Yield /Plant (g)
1	CAT 81	AGS 31	54.65	111.74	90.27	3.20	58.44	8.94	8.87
2	CAT 1091	IC 24065	50.50	107.88	75.09	3.70	44.55	9.88	8.66
3	CAT 1157	JS 143	44.47	104.99	54.87	3.18	38.26	9.13	6.51
4	CAT 120	AGS 76	48.19	107.85	63.25	3.01	49.16	10.32	8.09
5	CAT 1260	MACS 263	52.33	110.94	75.91	3.02	51.93	6.38	7.17
6	CAT 1267 B	MACS 58 (S)	53.33	112.71	86.67	3.35	41.17	9.76	7.34
7	CAT 1290	NKG 43	50.25	110.05	69.02	2.87	38.28	10.30	7.53
8	CAT 1293B	NLS 11	44.90	105.94	47.19	3.49	31.28	9.45	7.71
9	CAT 1328	P 501	52.07	110.74	79.56	3.07	48.73	12.86	13.48
10	CAT 140A	AKSS 143	57.50	110.45	77.73	2.66	57.66	7.49	9.40
11	CAT 153	B 160-3	39.22	99.17	46.34	2.77	28.24	13.48	8.26
12	CAT 156	B 1664	52.05	108.14	81.06	2.95	38.36	11.23	7.03
13	CAT 1809	TGX 825-17D	50.90	106.57	70.00	2.87	32.19	10.47	6.18
14	CAT 1811	TGX 825-1E	50.67	111.05	82.41	2.42	44.06	10.78	6.95
15	CAT 1826	TGX 849-247D	51.62	108.42	59.65	3.31	51.19	10.19	10.21
16	CAT 1828	TGX 849-25D	53.47	110.17	71.65	3.34	42.96	9.43	9.15
17	CAT 1839	TGX 849-380	50.93	107.02	61.43	3.34	48.36	11.06	12.81
18	CAT 1843B	TGX 849-813	47.76	105.94	73.24	3.63	53.06	10.50	9.51
19	CAT 1847	TGX 849-D-13-4	59.79	115.02	92.60	3.91	64.96	6.84	8.27
20	CAT 1878	TGX 855-32E	50.90	105.37	64.87	3.05	55.90	9.38	12.01
21	CAT 1890	TGX 85B-48	44.33	107.28	57.09	2.96	45.24	10.86	9.56
22	CAT 1912	TGX 899-285D	52.39	108.62	64.37	2.62	40.42	10.00	7.05
23	CAT 1920	TGX 995-26	50.50	106.59	62.43	2.85	44.28	9.71	9.65
24	CAT 1921A	TGX 996-4F6	41.19	97.88	54.28	3.42	33.66	10.80	8.14
25	CAT 1927A	TK 5	43.19	104.42	50.02	3.27	31.77	11.24	9.75
26	CAT 1931	TUNN MAYO 2	50.90	108.22	61.34	2.54	36.37	9.20	6.93
27	CAT 1935B	V 1	52.10	109.82	61.38	3.08	30.59	10.02	6.78
28	CAT 1937	V 43	51.10	107.97	65.04	2.71	42.39	9.20	10.24
29	CAT 1942	V 55	53.82	109.39	82.91	3.60	45.50	9.09	7.66
30	CAT 1950	VAM SAW	56.62	113.94	70.68	2.77	49.37	8.97	8.93
31	CAT 1957	VLS 11	48.65	106.79	68.10	2.89	50.69	7.29	8.44
32	CAT 1958	VLS 12	50.07	110.65	69.57	3.62	42.86	11.71	13.47
33	CAT 1969	WT 187B	44.90	106.05	58.36	2.92	48.56	11.38	11.69
34	CAT 1971	WT 191	45.12	107.29	46.25	3.04	48.50	9.68	10.51
35	CAT 1975	WT 35	39.25	97.25	52.51	2.50	23.67	10.23	4.93
36	CAT 1977	WT 89	52.76	111.28	80.96	3.66	66.79	10.26	10.06
37	CAT 1987B	EC 23001	42.76	100.51	46.84	2.53	35.21	10.73	9.53
38	CAT 1988	EC 23003	49.33	108.62	54.49	2.76	34.15	11.27	8.09
39	CAT 1993A	EC 264	46.76	107.08	59.34	2.51	44.91	9.09	9.69
40	CAT 1994	EC 30942	42.65	99.51	50.05	2.34	32.68	11.71	9.63
41	CAT 1995	EC 333860	49.33	107.71	65.80	3.73	50.16	10.52	11.68
42	CAT 1996	EC 341115	50.39	108.82	65.51	3.64	45.14	10.49	9.35
43	CAT 2005	EC 343311	50.07	110.08	64.75	3.40	43.20	11.95	10.15
44	CAT 2008	EC 350664	46.90	106.28	62.57	3.22	44.21	12.21	10.81
45	CAT 2018	EC 357990	53.90	111.99	81.22	3.10	41.77	11.38	11.79
46	CAT 2024	EC 357998	49.79	107.79	65.03	2.68	44.42	9.54	9.14
47	CAT 2026	EC 358002	46.90	106.62	81.71	3.13	49.46	12.12	12.09
48	CAT 2034B	EC 377883	48.76	105.22	65.75	3.04	45.03	9.98	8.70
49	CAT 2036A	EC 380522	45.33	103.85	51.56	1.83	26.55	9.33	9.47
50	CAT 2039	EC 60020-8-7/18	45.47	105.94	49.57	2.86	39.47	9.93	10.44
51	CAT 2047	GC 12	49.65	105.79	62.87	2.58	45.50	9.45	10.64
52	CAT 2049	GC 15	49.56	107.28	54.97	2.81	35.70	10.92	9.15
53	CAT 2050	GC 17	49.22	106.08	64.70	3.23	52.62	9.64	11.19
54	CAT 2051	GC 22	44.07	104.82	52.32	2.20	34.82	11.41	8.66
55	CAT 2055	GC 80	49.56	106.42	57.44	2.60	37.27	10.03	6.84
56	CAT 2057	GC 84040-7-1 (84051-32-0)	50.93	108.54	69.46	2.81	48.15	10.09	11.10
57	CAT 2058	GC 84051-32-1	50.36	107.74	70.62	3.15	46.34	8.90	9.84
58	CAT 2059	GC 84058-18-4	45.79	105.17	84.03	2.91	49.24	10.58	11.45
59	CAT 2065	ICS 84/86-85B-41	36.99	96.71	72.58	2.43	36.30	10.73	6.70
60	CAT 2066	M 108	43.27	103.99	47.55	2.35	34.21	9.70	6.94
61	CAT 2067	M 486	46.07	107.74	49.87	3.42	48.17	10.25	10.53
62	CAT 2070A	Pb 1(S)	44.96	105.68	78.71	2.56	48.41	11.04	9.61

63	CAT 2070B	Pb 1(S)	49.93	106.94	65.54	3.20	55.51	9.72	10.58
64	CAT 2071	PPI 72-2-5-6	44.50	104.94	52.48	2.71	37.55	11.27	10.16
65	CAT 2082	VP 1143	49.79	106.97	59.60	2.78	42.74	9.08	9.45
66	CAT 2083A	VP 1147	49.50	106.17	65.42	2.51	49.16	9.96	8.58
67	CAT 2084	VP 1149	51.36	107.22	65.66	2.51	42.51	10.09	8.57
68	CAT 2086A	VP 1156	50.79	110.02	70.51	2.75	49.21	11.75	12.70
69	CAT 2086B	VP 1156	47.96	106.25	65.13	3.05	53.98	9.87	13.83
70	CAT 2090	VP 1162	41.65	105.11	51.85	2.24	23.78	10.97	9.15
71	CAT 2091	VP 1164	49.96	107.25	68.22	2.43	47.35	10.15	10.09
72	CAT 2092	VP 1165	43.93	106.22	71.30	3.16	52.51	10.13	10.26
73	CAT 2093	VP 1168	42.27	103.57	60.51	2.43	43.08	10.53	10.52
74	CAT 2094	VP 1170	49.82	108.97	68.80	2.90	50.64	10.32	11.14
75	CAT 2096B	VP 1174	47.70	109.71	67.99	2.92	49.89	8.97	8.57
76	CAT 2097A	VP 1177	51.56	110.54	67.77	3.11	41.46	11.42	8.42
77	CAT 2097B	VP 1177	50.50	109.85	68.78	2.83	51.44	10.72	10.67
78	CAT 2098B	VP-1180	51.56	108.68	67.47	3.59	51.39	8.20	6.25
79	CAT 2099B	VP-1181	50.10	110.79	47.02	3.26	40.20	11.93	10.52
80	CAT 2127B	EC 389174	50.36	111.28	60.74	2.79	42.95	7.00	6.93
81	CAT 2144A	EC 390981	51.65	111.94	76.09	3.38	44.55	10.12	11.76
82	CAT 248	DN 290	38.53	102.08	49.51	1.79	23.56	9.44	4.71
83	CAT 2511	EC 467295	50.82	109.79	63.74	2.77	42.22	10.04	9.36
84	CAT 255	DS 203	52.50	107.85	80.99	4.04	57.69	8.69	10.44
85	CAT 259B	DS 327	48.10	109.51	69.21	2.85	47.35	9.03	11.46
86	CAT 2722	EC 481571	42.99	101.97	66.77	2.71	35.18	7.13	6.33
87	CAT 292	EC 109540	50.96	106.22	70.17	2.96	37.72	11.45	10.86
88	CAT 313A	EC 114573	52.79	109.71	72.00	3.49	44.96	8.57	7.86
89	CAT 326	EC 1619	52.93	111.22	65.22	2.91	38.74	10.07	8.73
90	CAT 3284	EC 602272	46.07	106.51	50.82	2.72	36.51	10.44	8.16
91	CAT 330	EC 171536	57.07	112.99	95.30	4.38	70.83	7.26	12.99
92	CAT 341	EC 175321	38.93	100.08	44.07	2.12	28.87	13.41	6.78
93	CAT 411A	EC 241778	49.79	107.99	76.79	3.22	50.39	10.02	13.75
94	CAT 411B	EC 241778	53.01	108.81	86.05	2.42	35.78	10.14	10.19
95	CAT 451	EC 242072	50.75	108.89	72.60	2.79	47.39	10.30	9.48
96	CAT 456	EC 242091	37.07	101.48	54.61	1.61	25.00	11.00	7.02
97	CAT 50	AGS 158	43.85	97.82	49.51	3.12	38.94	10.75	7.25
98	CAT 589	EC 251776	54.85	111.82	72.47	3.55	40.57	10.87	8.06
99	CAT 631	EC 280149	48.22	106.99	71.48	3.02	50.55	10.46	11.07
100	CAT 633	EC 287454	52.50	111.42	59.76	4.07	56.16	10.41	11.26
101	CAT 642	EC 287469	51.70	109.37	68.69	3.09	50.81	10.44	10.48
102	CAT 905	EC 39751	40.96	100.48	65.28	2.69	40.02	10.83	8.77
103	CAT 909	EC 41318	54.53	107.34	79.48	2.97	50.19	10.06	7.92
104	CAT 945B	EPS 472	44.87	105.39	54.54	3.43	33.21	10.24	7.33
105	CAT 954B	G 110	50.39	108.48	42.83	2.76	35.49	12.60	7.49
106	CAT 992	GPC 32	50.96	111.22	69.67	4.05	45.97	11.17	10.17
107	EC 34092	EC 34092	34.45	94.97	33.95	2.00	19.54	8.40	3.34
108	EC 34395	EC 34395	38.45	92.87	32.45	2.30	21.44	11.87	4.12
109	EC 456566	EC 456566	48.53	106.51	53.91	2.40	31.93	11.50	7.04
110	EC 456610	EC 456610	54.96	111.05	93.77	3.94	63.63	9.24	9.32
111	EC 456613	EC 456613	54.82	109.05	86.13	3.47	64.05	7.78	9.67
112	EC 456647	EC 456647	44.25	95.37	68.60	2.36	39.28	13.52	9.32
113	EC 457157	EC 457157	44.53	101.91	59.93	2.58	30.52	11.33	6.29
114	EC 685256	EC 685256	41.73	101.25	42.87	2.52	22.20	11.36	5.33
115	EC 934413	EC 934413	53.62	110.94	91.55	3.44	45.07	8.58	8.33
116	GP 448	GP 448	50.10	112.51	65.00	2.90	50.10	9.54	8.46
117	TRAIT SP. HARDER	TRAIT SP. HARDER	53.85	114.37	74.48	3.27	41.66	12.35	9.73
118	JS 2	JS 2	51.45	108.68	66.72	3.02	43.86	9.37	7.53
119	JS 20-80	JS 20-80	44.73	102.97	71.54	3.05	46.77	11.23	8.72
120	CAT 1204	KB 17	50.82	107.65	70.11	2.60	46.74	8.85	10.12
121	PS 1343	PS 1343	44.39	106.51	52.64	3.43	41.27	7.04	6.59
122	UPSL 229	UPSL 229	50.85	111.79	79.75	3.01	42.66	10.26	8.34
123	UPSL 293	UPSL 293	58.10	116.57	81.33	3.75	58.16	8.44	7.45
124	UPSL 595	UPSL 595	56.82	116.26	86.18	3.03	47.01	9.87	9.49
125	WT 169	WT 169	57.30	114.82	80.99	3.43	41.22	6.92	6.59
Checks									

1	Shivalik	Shivalik	55.00	129.40	57.20	2.80	17.00	13.64	20.02
2	Palam Early Soya-1	Palam Early Soya-1	55.00	127.80	41.80	2.20	16.60	16.18	19.32
3	Him Soya	Him Soya	55.00	131.00	66.20	3.00	18.40	12.78	34.56
4	Hara Soya	Hara Soya	55.00	126.00	72.00	2.40	18.20	18.04	29.58
5	Himso-1685	Himso-1685	63.00	132.60	69.80	3.60	21.00	21.90	36.90
6	DSb - 21	DSb - 21	41.20	100.80	45.40	3.60	47.80	13.76	11.40
7	MACS 1188	MACS 1188	45.00	108.00	44.92	3.44	41.56	15.76	15.98
8	RKS 18	RKS 18	39.90	102.48	45.95	2.63	37.33	12.31	8.12
9	PS 1347	PS 1347	45.20	110.00	50.57	2.19	38.84	13.53	6.74
10	JS 335	JS 335	39.73	101.78	45.77	2.77	31.74	10.99	6.52
11	JS 95 60	JS 95 60	35.43	93.75	33.90	1.97	20.25	12.78	4.88
12	JS 97-52	JS 97-52	45.40	98.00	84.48	4.20	64.84	8.06	9.05
13	JS 20-34	JS 20-34	27.20	90.40	47.20	1.96	18.00	10.40	5.10
14	JS 93 - 05	JS 93 - 05	34.20	87.80	39.52	2.60	23.28	12.26	6.96
15	NRC 37	NRC 37	44.25	105.95	52.48	1.88	52.48	11.10	7.65
16	NRC 86	NRC 86	40.20	97.80	72.44	3.20	42.08	8.36	2.68
Mean			48.34	107.43	64.48	2.95	42.08	10.47	9.64
Min.			27.20	87.80	32.45	1.61	16.60	6.38	2.68
Max.			63.00	132.60	95.30	4.38	70.83	21.90	36.90

Promising Germplasm Lines Identified on the basic of Mean Performance across Locations

Table 2: Germplasm Lines with Early Flowering (< 38 Days)

ACCESSION NO.	Days to Flower
ICS 84/86-85B-41	36.99
EC 242091	37.07
EC 34092	34.45
JS 95 60	35.43
JS 20-34	27.20
JS 93 - 05	34.20

Table 3: Germplasm Lines with Early Maturity (< 95 Days)

ACCESSION NO.	Days to Maturity
EC 34092	94.97
EC 34395	92.87
JS 95 60	93.75
JS 20-34	90.40
JS 93 - 05	87.80

Table 4: Germplasm Lines with Height >85 cm

ACCESSION NO.	Plant Height
AGS 31	90.27
MACS 58 (S)	86.67
TGX 849-D-13-4	92.60
EC 171536	95.30
EC 241778	86.05
EC 456610	93.77
EC 456613	86.13
EC 934413	91.55
UPSL 595	86.18

Table 5: Germplasm lines with > 4 Branches/Plant

ACCESSION NO.	Branches /Plant
DS 203	4.04
EC 171536	4.38
EC 287454	4.07
GPC 32	4.05
JS 97-52	4.20

Table 6: Germplasm lines with > 60 Pods/Plant

ACCESSION NO.	Pods /Plant
TGX 849-D-13-4	64.96
WT 89	66.79
EC 171536	70.83
EC 456610	63.63
EC 456613	64.05
JS 97-52	64.84

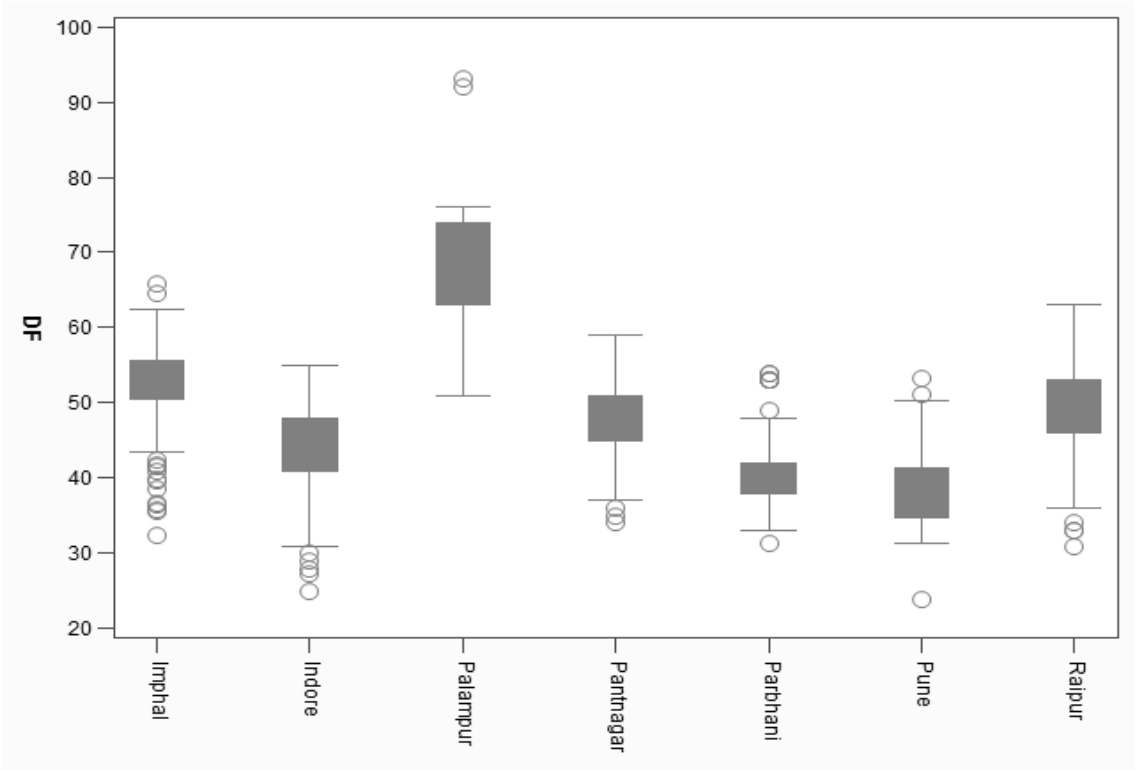
Table 7: Germplasm lines with > 13 g 100 SW

ACCESSION NO.	100 SW(g)
B 160-3	13.48
EC 175321	13.41
EC 456647	13.52
Shivalik	13.64
Palam Early Soya-1	16.18
Hara Soya	18.04
Himso-1685	21.90
DSb - 21	13.76
MACS 1188	15.76
PS 1347	13.53

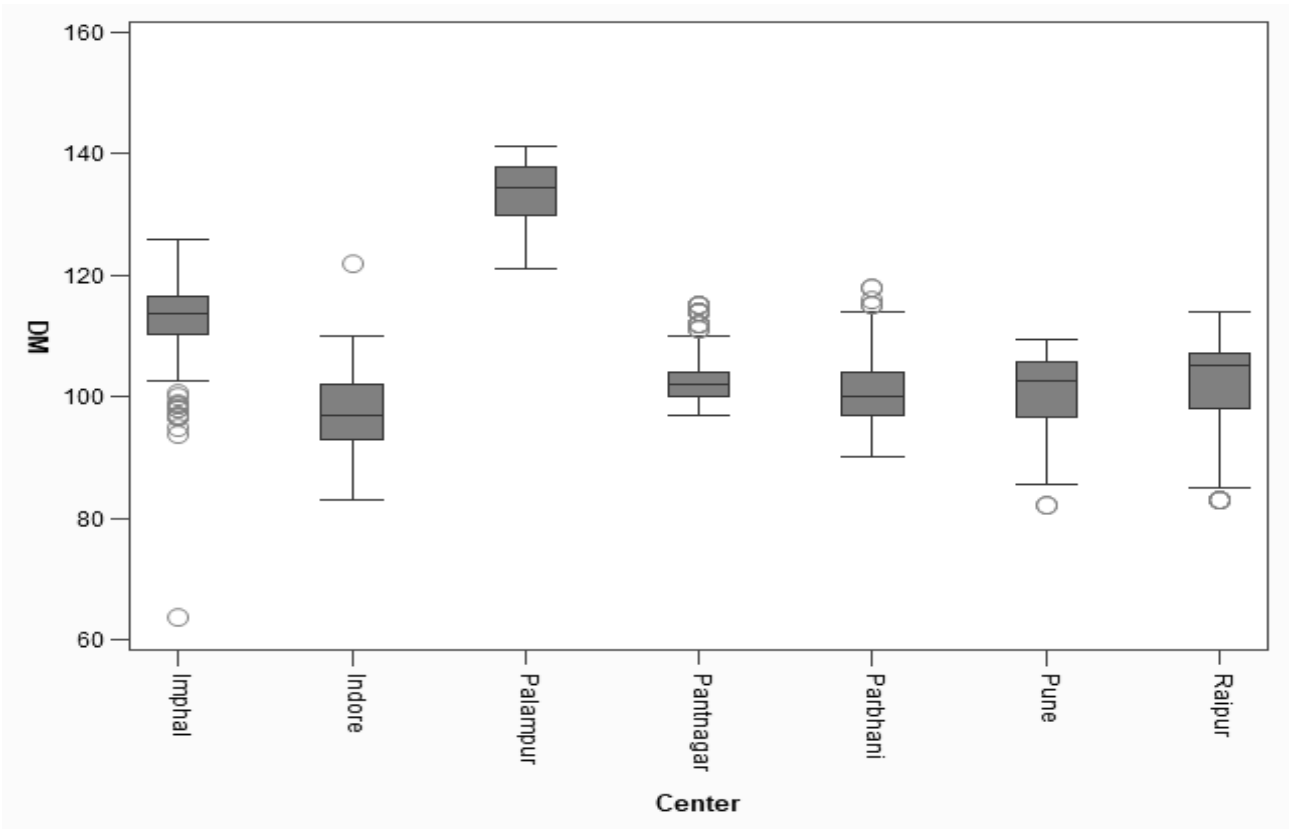
Table 8: Germplasm lines with > 13g Yield/Plant

ACCESSION NO.	Yield /Plant (g)
P 501	13.48
VLS 12	13.47
VP 1156	13.83
EC 241778	13.75
Shivalik	20.02
Palam Early Soya-1	19.32
Him Soya	34.56
Hara Soya	29.58
Himso-1685	36.90
MACS 1188	15.98

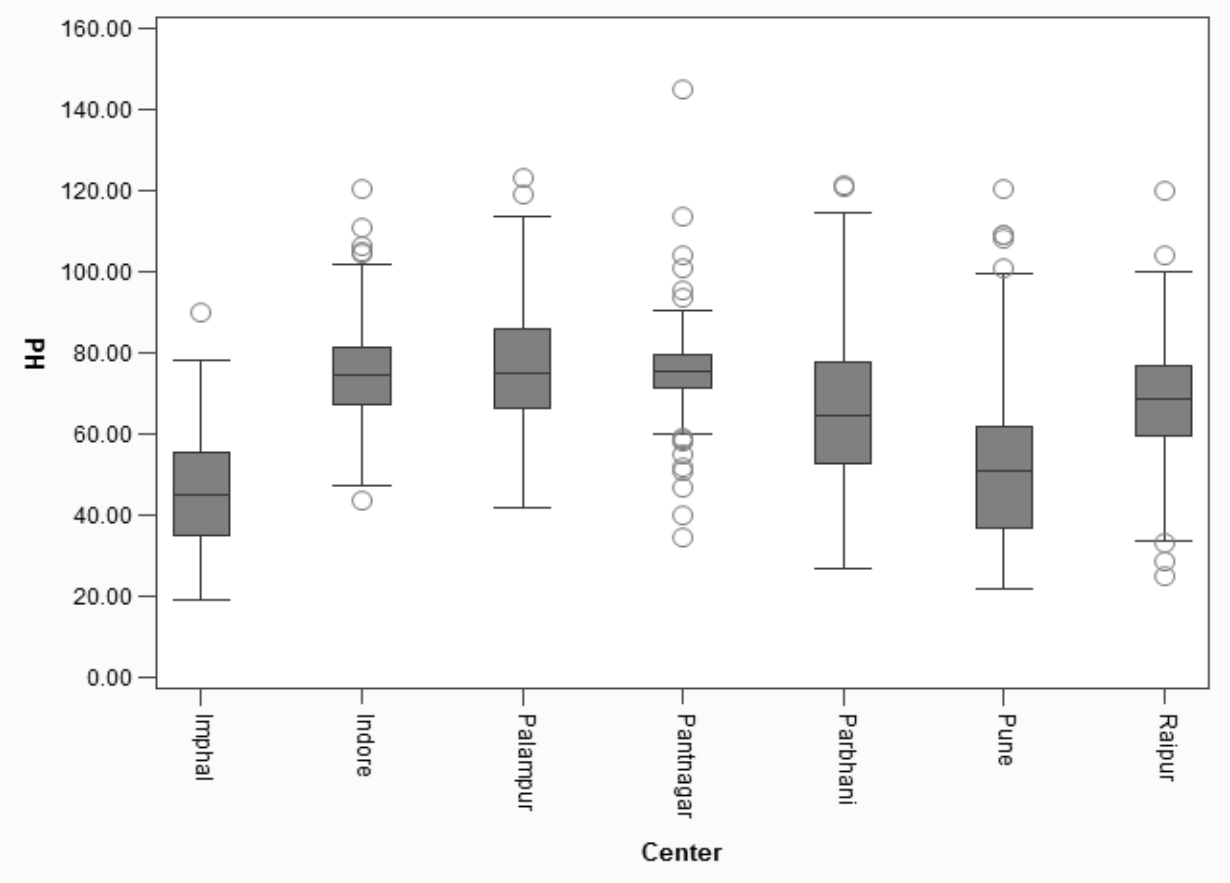
Boxplots of Days to Flowers by Locations



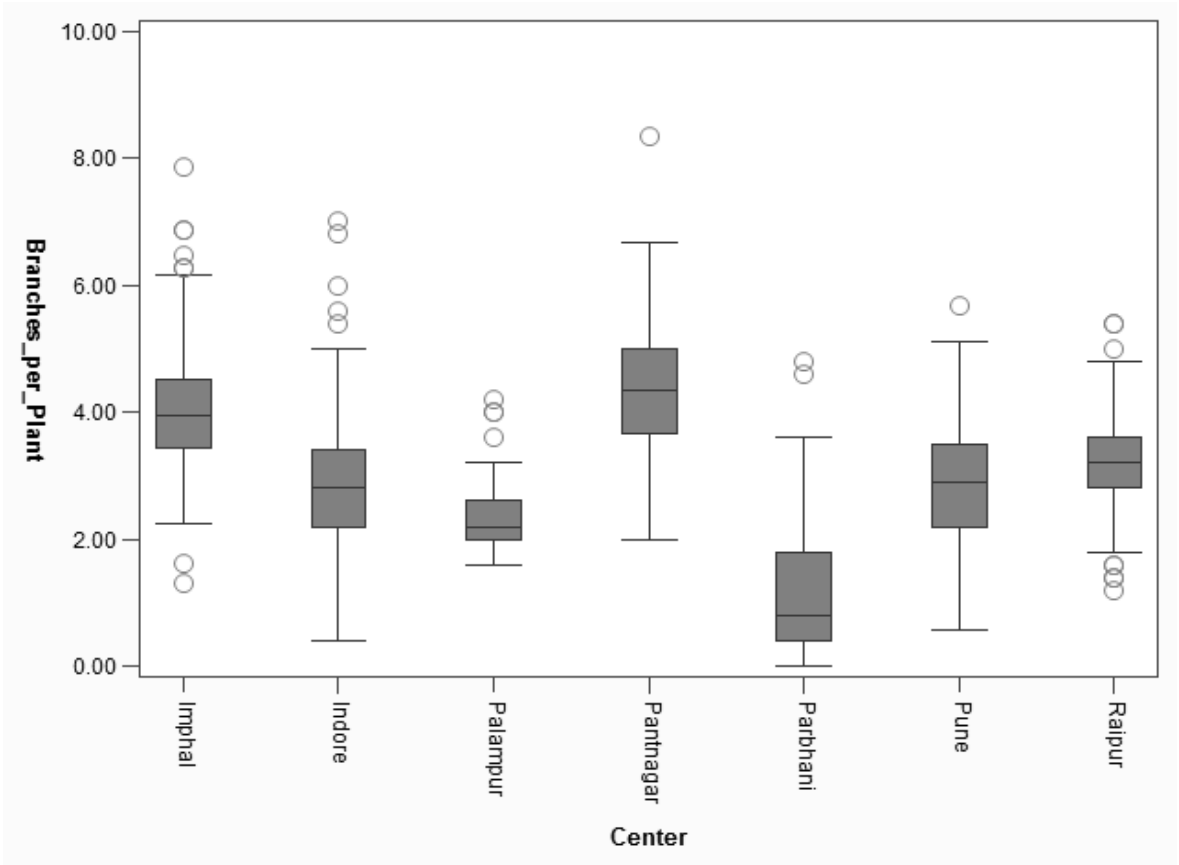
Boxplots of Days to Maturity by Locations



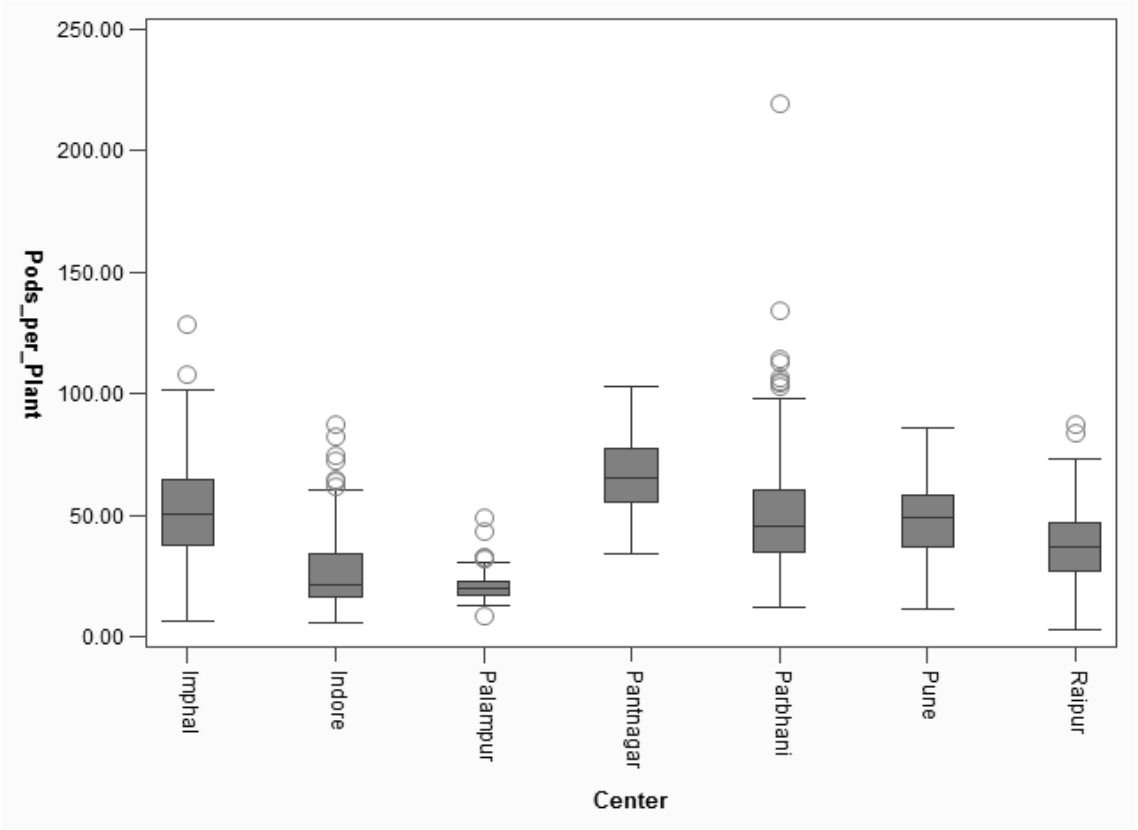
Boxplots of Plant Height by Locations



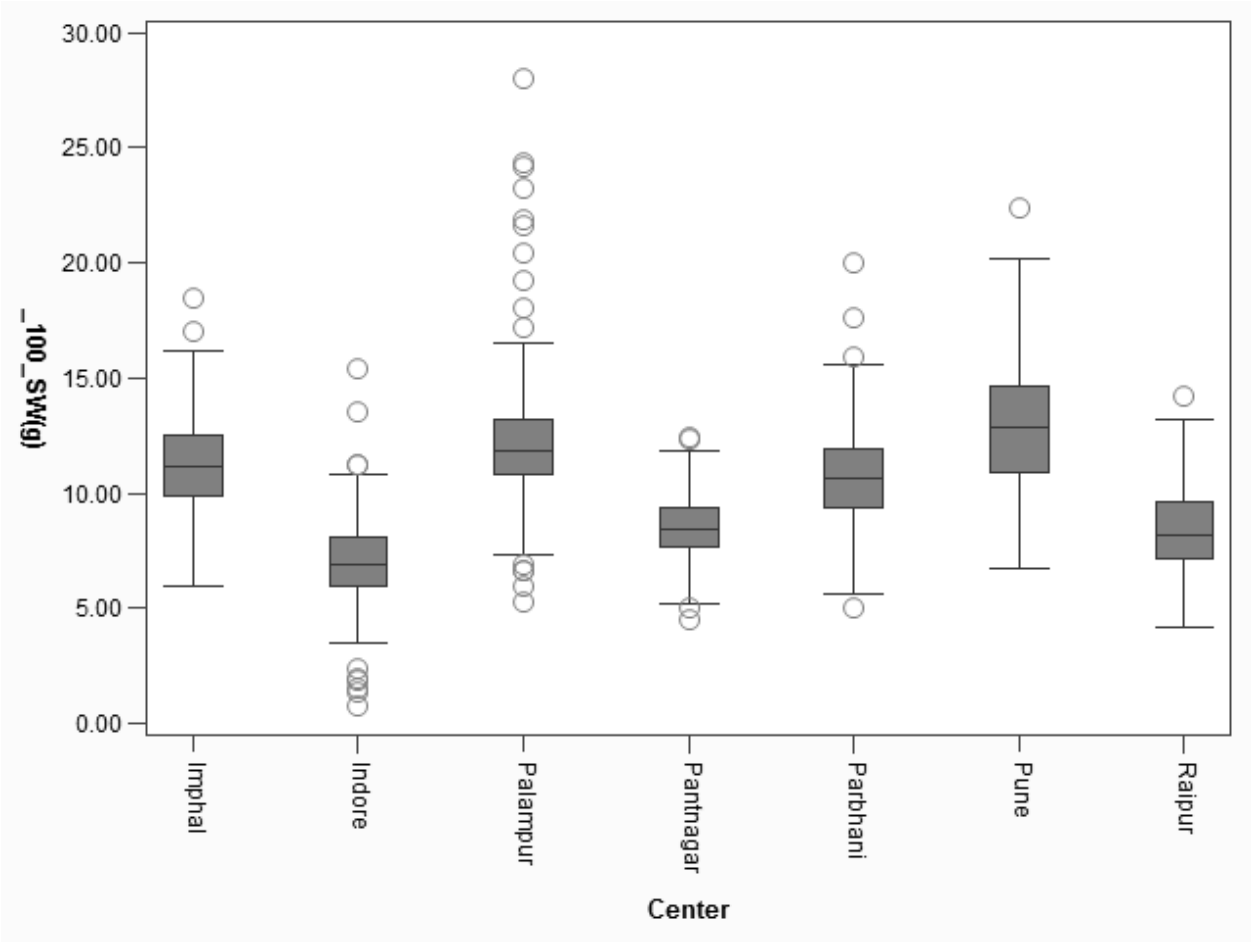
Boxplots of Number of Branches / Plant by locations



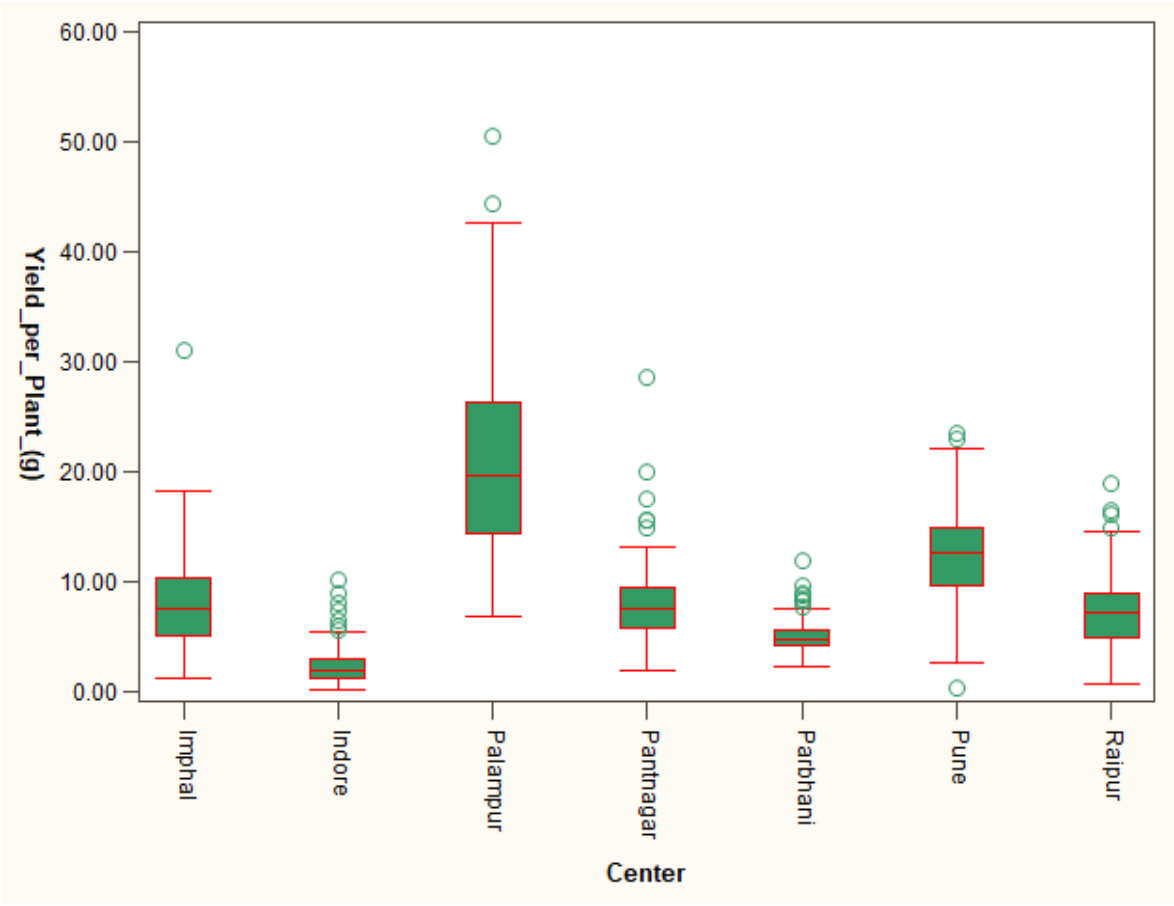
Boxplots of Pods / Plant by locations



Boxplots of 100 Seed Weight by locations



Boxplots of Yield/Plant by locations



OIL CONTENT (DRY WEIGHT BASIS) OF AVTII ENTRIES in AICRPS 2017*

CENTRAL ZONE

Jabalpur

S.N.	Entry	Oil (%)
1.	JS 95-60	16.69
2.	JS 20-34	17.56
3.	JS 335	18.75
4.	JS 93-05	17.49
5.	JS 97-52	17.46
6.	NRC 86	19.8
7.	RVS 2007-6	16.82

Prabhani

S.N.	Entry	Oil (%)
1.	JS 95-60	19.1
2.	JS 20-34	19.98
3.	JS 335	17.53
4.	JS 20-94	19.16
5.	JS 93-05	18.04
6.	JS 20-116	19.04
7.	JS 97-52	18.92
8.	NRC 86	19.89
9.	RVS 2007-6	19.07
10.	RSC 10-46	18.69

Kota

S.N.	Entry	Oil (%)
1	JS 95-60	16.89
2	JS 20-39	17.51
3.	JS 335	17.72
4	JS 20-94	17.28
5	JS 93-05	16.51
6	JS 20-116	17.15
7	JS 97-52	17.25
8	NRC 86	18.18
9	RVS 2007-6	16.25
10.	RSC 10-46	17.35

Morena

S.N.	Entry	Oil (%)
1.	JS 95-60	19.71
2.	JS 20-34	17.36
3.	JS 335	19.53
4.	JS 20-94	18.64
5.	JS 93-05	19.09
6	JS 20-116	18.04
7	JS 97-52	18.71
8	NRC 86	17.92
9	RVS 2007-6	19.67
10	RSC 10-46	19.70

Amrawati

S.N.	Entry	Oil (%)
1.	JS 95-60	19.42
2.	JS 20-34	17.38
3.	JS 335	19.77
4.	JS 20-94	19.34
5.	JS 93-05	19.23
6.	JS 20-116	19.27
7.	JS 97-52	16.12
8.	NRC 86	20.01
9.	RVS 2007-6	18.95
10.	RSC 10-46	18.11

From Sehore only one replicate was received. Hence, not analysed.

NORTH PLAIN ZONE

Ludhiana

S.N.	Entry	Oil (%)
1.	PS 1092	20.17
2.	PS 1572	19.24
3.	PS 1347	19.49
4.	SL 1074	20.6
5.	SL 1028	20.37
6.	SL 688	20.55
7.	PUSA 9712	20.44

New Delhi

S.N.	Entry	Oil (%)
1.	PS 1092	19.27
2.	PS 1572	18.29
3.	PS 1347	16.81
4.	SL 1074	18.81
5.	SL 1028	19.71
6.	SL 688	17.88
7.	PUSA 97-12	18.36

Pantnagar

S.N.	Entry	Oil (%)
1.	PS 1092	17.39
2.	PS 1572	16.24
3.	PS 1347	18.99
4.	SL 1074	19.78
5.	SL 1028	20.49
6.	SL 688	20.29
7.	PUSA 97-12	18.67

NORTH HILL ZONE

Majhera

S.N.	Entry	Oil (%)
1.	PS 1092	19.18
2.	VLS 63	19.76
3.	VLS 59	19.98
4.	VLS 89	19.46

Almora

S.N.	Entry	Oil (%)
1.	PS 1092	19.38
2.	VLS 63	20.11
3.	VLS 59	19.50
4.	VLS 89	20.65

Seeds received from Palampur and Bajura were severely infested with storage pests; hence, not analysed.

EASTERN ZONE

Dholi

S.N.	Entry	Oil (%)
1.	JS 335	20.48
2.	JS 20-116	20.73
3.	JS 97-52	20.39
4.	RVS 2010-1	20.79
5.	RSC 10-52	19.97
6.	RSC 10-71	21.34
7.	RKS 18	20.67

Raipur

S.N.	Entry	Oil (%)
1.	JS 20-116	17.20
2.	RVS 2010-1	16.26
3.	RSC 10-52	16.63
4.	RSC 10-71	17.15

Bhawanipatna (Orissa)

S.N.	Entry	Oil (%)
1.	JS 335	20.70
2.	JS 20-116	19.16
3.	JS 97-52	21.06
4.	RVS 2010-1	18.94
5.	RSC 10-52	17.91
6.	RSC 10-71	20.22
7.	RKS 18	19.23

NORTH EASTERN HILL ZONE

Imphal

S.N.	Entry	Oil (%)
1.	JS 335	17.91
2.	JS 97-52	17.77
3.	JS 20-116	18.04
4.	RKS 18	18.28
5.	PS 1556	16.19

Biswanath Chariali

S.N.	Entry	Oil (%)
1.	JS 335	20.90
2.	JS 97-52	20.01
3.	JS 20-116	20.94
4.	RKS 18	20.78
5.	PS 1556	20.73

*Estimation was carried out using NIR after calibrating the system with samples of known values of oil content determined through wet chemistry. Values given are mean of two replicates only. Packets found opened and seeds were mixed were not analyzed.

Oil estimation done by :

Dr. Vineet Kumar,
Principal Scientist (Biochemistry)
ICAR-IISR Indore

National Hybridization Programme

A. **New hybridizations and Identification of true F_1 plants**

A total of 178 crosses received from various centres viz., IISR Indore (119), CAU, Imphal (6), IARI (1), UAS Dharwad (4), Pant nagar (3), Ludhiana (2), Pune (10), Almora (2), Palampur (3), Sehore (6), Parbhani (5) and Bengaluru (17) were planted at UAS Bengaluru for identification of true F_1 plants from these 178 crosses. The details of the crosses were presented in Table 1.

Table 1. Summary of new crosses attempted from different centres during Kharif 2017

Sl. No	Cross combinations	Sl. No	Cross combinations
1. ICAR-IISR Indore (119 crosses)			
1	JS 20-98 × AK 887	37	RVS 2001-18× EC 572086
2	EC55878 × JS 20-29	38	JS 97-52 × EC 572086
3	EC 39230 × JS 20-29	39	(23-2D × 450) × EC 572086
4	EC34087 × JS 20-29	40	EC 572154 × DS 3106
5	AGS 25 × PP6	41	EC 572154 × EC 572086
6	AGS 25 × 2911 (NRC 121)	42	JS 97-52 × EC 572154
7	MAUS 81 × NRC 121	43	11-5-B × DS 3106
8	JS 90-41 × NRC 121	44	PS 1029 × DS 31-05
9	(958 × 11-5B) × JS 90-41	45	PI 416937 × F5-54
10	AGS 25 × DT 21	46	F5-54 × PI 416937
11	DT 21 × F5-54	47	(20-34× 23-2D) × 416937
12	(CAT 3293 × JS 90-41) × F5-54	48	JS 20-98 × PI 416937
13	F4-53 × (CAT 3293 × JS 90-41)	49	PI 416937 × EC 771186
14	SL 96 × AGS 25	50	JS 2034 × EC 771186
15	AGS 25 × G 27	51	JS 90-41 × EC771186
16	(C1 SEL × ADT 1) × G27	52	(55-8-3 X 97-52) × 90-41
17	ADT 1 × AGS 25	53	SL 958 ×MACS 450
18	JS 97-52 × AGS 25	54	SL 958 × SL 96
19	SL 958 × JS 97-52	55	SL 958 × (SL 958 × 450)
20	SL 958 × AGS 25	56	SL 958 × 335
21	MACS 13 × AGS 25	57	11-5B × (JS 335× YOUNG)
22	PUSA 12 × AGS 25	58	11-5B × (JS 335 × PI 416937)
23	11-5-B × EC 771172	59	JS 97-52 × 11-5B
24	PS1029 × DS3106	60	SL 958 × 11-5B
25	DS 3106 × JS 20-34	61	SL 958 × EC 572154
26	DS 3106× EC 572086	62	SL 958 × JS 20-34
27	(F5-54 × SL 958) × JS20-98	63	SL 958 × (20-34×23-2D)
28	(F5-54 × 958) × EC 572086	64	SL 958 × 20-29
29	EC572086 × (958× 450)	65	SL 958 × NRC 86
30	(F5-54 × SL 96) × EC 572086	66	EC 572154 × (SL 958 × 450)
31	(SL 955 × 20-34) × EC572086	67	70-4 × EC 572154
32	EC572086 × (SL 955× 20-34)	68	(958 × F5-54) × EC 572154
33	(97-52×23-10E) × EC 572086	69	(SL 958 × PP6) × EC 572154
34	(97-52 × 23-11A) × EC 572086	70	F5-54 × EC 572154
35	(NRC 37 × 97-52) × EC 572086	71	JS 20-98 × PS 1029
36	EC 572086 × RVS 2001-18	72	JS 20-34 × PS 1029

Sl. No	Cross combinations	Sl. No	Cross combinations
73	JS 20-98 x JS 20-34		
74	EARLY F_2 (958× PP6) x JS 20-98	**2. CAU, Imphal (6 Crosses)**	
75	55-8-3 x (PP6 x 90-41)		
76	14-5C × CAT 255	1	EC 383165 x CAU SLC
77	14-5C × 34D × CAT 2511	2	EC 383165 x JS 335
78	EC 77147 × RVS 2001-18	3	EC 383165 x DSb-19
79	EC 771172 × RVS 2001-18	4	DSb-19 x JS 335
80	RVS 2001-18 × EC 572154	5	DSb-19 x SQL-37
81	70-4 × RVS 2001-18	6	JS 335 x SQL-37
82	EC 572154 × RVS 2001-18	**3. IARI, New Delhi(1 Cross)**	
83	EC 39172 × RVS 2001-18	1	SL 1074 X DS 3105
84	CAT 2803 × RVS 2001-18	**4. UAS Dharwad (4 Crosses)**	
85	RVS 2001-18 × G 27	1	DSb 31 x DT 21
86	RVS 2001-18 × AK 887	2	DSb 23 x DT 21
87	JS 20-34× AK 887	3	DSb 21 x DT 21
88	JS 20-34 × RVS 2001-18	4	DSb 21 X AGS 25
89	EC 39028 × RVS 2001-18	**5.Pant Nagar (3 Crosses)**	
90	AGS 328 × RVS 2001-18	1	AGS 25 x JS 335
91	EC 55878 × RVS 2001-18	2	CM 60 x JS 335
92	JS 20-34 × EC 57019	3	DT 21 x PS 1592
93	(23-34× 23-2D) × (C1SEL× G29)	**6.Ludhiana (2 crosses)**	
94	(55-8-3× 97-52) × 90-41	1	SL 979 x EC 538828
95	JS 20-34× JS 97-52	2	SL 979 x EC 100027
96	JS 97-52 × JS 95-60	**7.Pune(10 Crosses)**	
97	JS 97-52 × NRC 121	1	MACS 1188 x EC 103332
98	(20-34×97-52) ×(C1SEL×G29)	2	MACS 1188 x EC 103332
99	EC 55878 × 2911	3	MACS 1188 x EC 103332
100	(JS 335 × PI 416937) × NRC121	4	MACS 1188 x EC 251396
101	(JS 71-05 × 90-41) × NRC 121	5	MACS 1188 x EC 251396
102	(NRC 37 × JS 335) × NRC 121	6	MACS 1188 x EC 251396
103	CAT 2911 × JS 2029	7	MACS 1188 x EC 251396
104	EC 572154 × 2911	8	DT 21 x EC103332
105	EC 34087 × 2911	9	DT 21 x JS 9305
106	JS 21-08 (IVT-2) × NRC 121	10	EC 251396 x JS 93-05
107	CAT 2803 × 2911	**8.Almora (2 Crosses)**	
108	CAT 3106 × 2911	1	VLS-63 x PS 1098
109	JS 71-05×(704×71-05) ×71-05	2	VLS 47 x EC 34057
110	JS 335×(JS 335×PI416937)	**9.Palampur (3 Crosses)**	
111	[(AGS 25× PK472)] × PK472) ×PK472)	1	EC 34057 x HARASOYA
112	(NRC 37× 97-52) × NRC 121	2	HARASOYA x EC 34057
113	70-4×(K-16-F6-20-2D)	3	HIMSOYA x EC 34057
114	(YOUNG × 335) × (3293× 90-41)	**10.Sehore (6 Crosses)**	
115	107-70× 104-57rf	1	RVS 2011-2 x JS 95-60
116	(70-4×71-05) × 71-05	2	RVS 2011-2 x CODE 13
117	(CAT 3293× 90-41) ×PI 416937	3	JS 97-52 x KARUNE
118	JS 90-41 × PK 472	4	RSC 10-70 x NRC 105
119	YOUNG × KAERI 651-6	5	RVS 2007-6 x JS 20-116
		6	RVS 2007-6 x JS 20-34

11.Parbhani (5 Crosses)		12.Bengaluru (17 Crosses)	
1	MAUS 71 x EC 538828	1	CAT 3406 x SL 688
2	MAUS 158 x EC 538828	2	CAT 3406 x RKS 18
3	EC113778 x NRC 37	3	JS 20-41 x RKS 18
4	MAUS 162 x EC 107407	4	JS 20-41 x SL 688
5	JS 20-29 x MAUS 612	5	JS 20-41 x TAMS 98-2
		6	PS 1556 x TAMS 98-2
		7	MAUS 2 x TAMS 98-2
		8	MAUS 2 x SL 688
		9	MAUS 2 x KDS 753
		10	CAT 3406 x KDS 753
		11	SL 958 x KDS 753
		12	SL 958 x SL 688
		13	SL 958 x RKS 18
		14	SL 958 x TAMS 98-2
		15	CAT 3406 x G 27
		16	PS 1556 x G 27
		17	PS 1556 x SL 688

B. Generation advancement at ICAR-IISR Indore

During Kharif 2017 ICAR-IISR received F_2 seeds derived from 47 cross combinations from offseason nursery, UAS Bengaluru which were raised and confirmed 38 crosses has true hybrid out of 47 crosses. In these crosses number of plants ranged from 80 to 5920 which will help in making desirable selections. The seeds of these crosses will be sent to all of centres this year for making location specific further selections. The details of the F_2 populations harvested are presented in Table 2.

Table 2. Details of the segregating population advanced to F_3 generations at ICAR- IISR Indore during Kharif 2017

Sl. No	Cross combinations	Population size (F_2)	Sl. No	Cross combinations	Population Size (F_2)
1	DSb 21 x SL 958	5920	20	JS 97-52 x Bragg	880
2	JS 97-52 x SL 688	3200	21	JS 97-52 x PS 1029	1200
3	Cat 3293 x JS 90-41	2400	22	Cat 3293 x NRC 2	880
4	PS 1029 x G 29	3120	23	Cat 3406 x DSb 21	720
5	SL 955 x MACS 450	1440	24	JS 97-52 x IVT 16	1120
6	JS 97-52 x SL 958	3360	25	SL 958 x JS 93-05	720
7	JS 97-52 x G 27	2000	26	JS 71-05x 70-A) x JS 71-05	640
8	JS 97-52 x PS 1029	3120	27	EC 546882 x MAUS 71	880
9	PS 1556 x DSb 21	2240	28	SL 958 x PS 1552	480
10	JS 97-52 x TAMS 98-21	2560	29	JS 97-52 x DSb 1	480
11	Cat 3406 x MACS 450	1520	30	MAUS 71 x AGS 25	400
12	JS 97-52 x IVT 2	1360	31	JS 97-52 x AGS 25	240
13	EC 546882 x MACS 450	2400	32	JS 97-52 x PS 1225	80
14	JS 97-52 x Durga	2000	33	PS 1556 x RSC 10-46	80
15	JS 97-52 x Ankur	960	34	EC 546882 x JS 97-52	160
16	MAUS 162 x AGS 25	720	35	Hara Soy x RSC 10-46	1600
17	MAUS 612 x AGS 25	960	36	SL 958 x MAUS 81	880
18	EC 546882 x MACS 450	640	37	JS 97-52 x 104-31	1520
19	JS 97-52 x NRC 37	1600	38	IVT-6 x Swarna Vasundhara	800

Compilation of Monitoring Reports (*kharif* 2017)

Team 1	**: Dr. M.P. Sharma, Dr. Rajkumar Ramteke, Dr. D.S. Meena,**
Centres:	**: Palampur, Ludhiana and Delhi**

Weather conditions at different centres during the season (date of monitoring):			
Parameters	**Palampur** (26.9.2017 **)**	**Ludhiana** (27 & 28.9.2017)	**Delhi** (26-9-2017)
Onset of monsoon	01.07.2017	End June	9 July 2017
Date of sowing	15.06.2017	June 6 onwards	07.07.2017
Rainfall distribution	+33.7 (above normal)	Erratic	Fairly good
Rainfall (mm)	2161.4	396.4 mm	1169.7mm
# Rainy days	113	24	32 (1st July onwards)
RH (%)	--	--	--
Solar Radiation	--	--	--

Conduct of Trials: (Allotted / Conducted)			
Discipline	**Palampur**	**Ludhiana**	**Delhi**
Plant Breeding	2 / 2	3 /3	3 / 3
Agronomy	2 / 2	4 / 4	2 / 2
Entomology	3 / 3	2 / 2	3 / 3
Pathology	8 / 8	4 / 4	3 / 3
Microbiology	--	4 / 4	4 / 4

Germplasm:			
	Palampur	**Ludhiana**	**Delhi**
Total collection	250	777	1089
# Acquired - From	125 from IISR; 23 from RVSKVV	57 from IISR, Indore; 2 from Dharwad	--
For Traits	--	YMV resistance, High yield, oil and oleic acid	--
How used	Evaluation and Hybridization	Screening for YMV and in Hybridization	--

Crosses made: (Parents / Pollinations)			
	Palampur	**Ludhiana**	**Delhi**
# Crosses	27 / 2082	15/ 50 each	11/50 each
Traits	**Not mentioned**	Yield, Oil, Protein, Food Grade, Earliness	Disease resistance, yield

Generation Advancement:			
	Palampur	**Ludhiana**	**Delhi**
Generations advanced	F1 to F6; 47 crosses	F2 to F6; 198 crosses; 1406 progenies	F1 to F5; 43 crosses; 1052 populations including 325 SPS, 450RILs and 2 mapping populations
Advanced generations received	--	10 from IISR and 9 from Dharwad	--

Seed Production Programme: (Variety / Target / Expected in q)		
Palampur	**Ludhiana**	**Delhi**
Breeder Seed:		
Hara Soya / 2 /5	SL 958 / 0/ 10	--

Shivalik /0/6 Palam Soya /0/8 Him Soya / 6 Him Palam Hara Soya-1/0/0.5 (Himso-1685)		
Nucleus Seed: Stage I + Stage II **(Variety / Target / Expected in kg)**		
Hara Soya / 0 /50 Shivalik /0/ 50 Palam Soya /0/50 Him Soya / 60 Him Palam Hara Soya-1/0/15 (Himso-1685)	SL 688 /60 /75 SL 525 / 60 / 75 SL 744 / 60 / 75 SL 958 / 90 / 135 SL 979/60/75 SL 955/60/75	Pusa 9712/200/200 Pusa 9814/100/100 Pusa 12/100/100 Pusa 05/100/100 Pusa 14/100/100

Front Line Demonstrations: (Allotted / Conducted / Visited by Team)		
Palampur	**Ludhiana**	**Delhi**
10 / 27 / 5	10/ 10 / 5	NA

Budget Utilization: AUC submitted		
Palampur	**Ludhiana**	**Delhi**
Yes	Yes	NA

Comments of Monitoring Team:		
Palampur	**Ludhiana**	**Delhi**
Very Good	**Very Good**	**Very Good**

Team 2	**: Dr. M.D. Vyas Dr. Manja Naik C., Dr. S.K. Lal,**
Centres:	**: Kota, Pantnagar, Almora and Majhera**

Weather conditions at different centres during the season (date of monitoring):				
Parameters	**Kota (**25.09.2017**)**	**Pantnagar (**27.09.2017**)**	**Majhera (9.10.2017)**	**Almora (09.10.2017)**
Onset of monsoon	22.06.2017	28/06/2017	--	03.07.2017
Date of sowing	04-09.07.2017	15/07/2017	--	12.06.2017
Rainfall distribution	Uneven	Normal	--	Distribution
Rainfall (mm)	498	1462.7	--	689.3
# Rainy days	24	52	--	39

Conduct of Trials: (Allotted / Conducted)					
Discipline	**Kota**	**Pantnagar**	**Majhera**	**Almora**	**Remarks**
Plant Breeding	4 /4	3 /3	2 / 2	2 / 2	All the trials have been conducted nicely and as per the Technical Programme
Agronomy	5 /5	5 /5	Nil	1/1	
Entomology	4 /4	5 /5	Nil	--	
Pathology	--	9 /9	Nil	4/4	
Microbiology	--	5 /5	Nil	--	

Germplasm:				
	Kota	**Pantnagar**	**Majhera**	**Almora**
Total collection	**300**	2614	NA	800
# Received - From	19 from Jabalpur, 19 from Sehore and 4 from Ludhiana	125 from IISR, Indore	NA	EC 34057
For Traits	High yield, YMV resistance, earliness	Earliness, high yield, resistance to BP, RAB and YMV	--	--
How used	5 selected for earliness and YMV resistance.	37 in breeding for high yield,	--	--

		resistance to biotic and abiotic stress and lodging, long juvenility, high oil/protein, plant ideotype.		

Crosses made: (Parents / Pollinations)				
	Kota	**Pantnagar**	**Majhera**	**Almora**
# Crosses	4 / 30 each	18 /200 to 250 each	NA	22 /80 per cross
Traits	Earliness, high yield, Multiple Disease Resistance	Earliness, BP, RAB and YMV resistant, yield etc.	--	High yield and adapted traits, Frog eye leaf spot resistance and earliness, Low linolenic acid, Black/Brown soybean Local Bhat types (Small &flat seeds)

Generation Advancement:				
	Kota	**Pantnagar**	**Majhera**	**Almora**
Generations advanced	F2 to F8; 568 crosses;	F1 to F9; 175 crosses; 2596 IPP's / 72 Bulk	NA	F1 to F6; 166 crosses; 389 populations
Advanced generations received	F_3 to BC_1F_3 involving 571 crosses	NIL	NA	F5 bulks from IISR, Indore

Seed Production Programme: (Variety / Target / Expected in q)			
Kota	**Pantnagar**	**Majhera**	**Almora**
Breeder Seed:			
RKS-45/510/250 JS 93-05/200/350 JS 95-60/120/155 RKS-24/320/500 JS 20-34/200/200 RKS-18 /1/0	PS 1042/ 1 / 5 PS 1347/ 12 / 25 PS 1225/ 23 / 65	NA	VLS 63 / 5.50 /5.50 VLS 65 / 6.50 /6.50
Nucleus Seed: Stage I + Stage II			
JS 93-05/ 0 /5 JS 95-60 / 0 /5 RKS-45/ 0 /5 RKS-24 / 0 /5 JS 20-34/ 0 /5	PS 1347, PS 1042 PS 1092, PS 1225,PS 19,PS 20,PS 21,PS 22, PS 23	NA	VLS 63 / 0.50 / 0.50 VLS 65 / 0.80 / 0.80

Front Line Demonstrations: (Allotted / Conducted / Visited by Team)				
Kota	**Pantnagar**	**Majhera**	**Almora**	**Remarks**
20/20/5	10 /10 / 5	NA	5/5/5	At Almora center, FLDs are conducted in 1.26 ha area including 62 farmers.

Budget Utilization: AUC submitted			
Kota	**Pantnagar**	**Majhera**	**Almora**
Yes	Yes	Yes	NA

Overall comment of Monitoring Team			
Kota	**Pantnagar**	**Majhera#**	**Almora**
Good	Excellent	Very Good	Good

 # Since no breeder has been posted by the University (GBPUA & T), the breeding trials are being planted and looked after by an Entomologist. The team suggests that the Coordinating Unit may write to the University for posting a breeder at the Station. Kota center needs to strengthen the breeding programme.

Team 3	**Dr. Kamendra Singh, Dr. KP Singh**
Centres:	**Sehore, Jabalpur and Morena**

Weather conditions at different centres during the season (date of monitoring):			
Parameters	**Jabalpur** (24-25.09.2017)	**Sehore** (22.09.17)	**Morena** (20.09.2017)
Onset of monsoon	23.06.2017	18.06.17	01.07.2017
Date of sowing	26-06-2017	22.06.17	03-07-2017
Rainfall distribution	Uneven	Uneven	Uneven
Rainfall (mm)	1007.1 mm	944.8mm	300.8 mm
# Rainy days	55	49	15

Conduct of Trials:			
Discipline	**Jabalpur**	**Sehore**	**Morena**
Plant breeding	3 / 3	4 / 4	3 /3
Agronomy	--	4 / 4	--
Entomology	--	5 / 5	--
Plant Pathology	8 / 8	7 / 7	--
Microbiology	--	3 / 3	--

Germplasm:

	Jabalpur	**Sehore**	**Morena**
Total Collection	452	400	36
Received from	125 lines from IISR, Indore	01 from IISR, Indore and 3 from **Sehore??**	26 lines from IISR, Indore
For traits	Yield, earliness and diseases resistance	Disease resistance &high yield	Drought tolerance, earliness and YMV resistance
How used	--	--	Screening and evaluation resistance

Information on Crosses Made :(Parents/pollinations)

	Jabalpur	**Sehore**	**Morena**
#Crosses	32 /25 to 50 each	15/ 30 to 40 each	8/100 each
Traits	Earliness, Yield and disease resistance	Earliness, high Yield and disease resistance.	YMV, Early maturity, tolerant to drought & multiple disease resistant

Information on Generation Advancement:

	Jabalpur	Sehore	Morena
Generation Advanced	F_2-F_{12}, 160 crosses of different generations. 1402 IPP's & 47 Bulk	F2-F8; 59 crosses of different generation and 1520 No. of lines	F3-F6; 55 crosses and 110 lines

Seed Production Programme: (Variety/ Target / Expected (q)

	Jabalpur	Sehore	Morena
Breeder seed:	JS 20-69/1000/700 JS 20-29/3000/2200 JS 97-52/300/40 JS 90-98/--/50	RVS 2001-4/75/55 JS 95-60/225/160 JS 93-05/100/55 JS 335/100/60 JS 20-29 /75/55	JS 95-60/90/80 RVS2001-04/75/60
Nucleus seed	**Nucleus seed Stage-I** JS 20-69/30/1.5 JS 20-29/44/1.25 JS 97-52/7.5/0.5 JS 95-60/1.8/0.2 JS 20-98/12/1.25 JS 20-34/-/0.4 JS 93-05/-/0.2 JS 335/-/0.2 **Nucleus seed Stage-II** JS 20-69/30/22 JS 20-29/44/25 JS 97-52/7.5/2 JS 95-60/1.8/0.2 JS 20-98/12/10	RVS 2001-4/--/1.8 JS 95-60/--/1.6 JS 20-34/--/0.5 JS 20-29/--/0.5 JS 20-98/--/0.4 RVS 18/--/0.4 RVS 24/--/0.4	NIL

Front Line Demonstrations: Allotted/conducted/visited by team

Jabalpur	Sehore	Morena
NA	10/10/7	NA

Budget utilization: AUC Submitted

Jabalpur	Sehore	Morena
Submitted	Submitted	Submitted

Manpower : (Technical/Non technical)

Manpower	Jabalpur	Sehore	Morena
Sanctioned	2-Scientists 2-TA	5-Scientists 5-TA	2- Scientist 2 - TA
In position	2-Scientists 1-TA	5-Scientists 5-TA	1- Scientist

Overall specific comments of the monitoring team about the performance of the centre:

Jabalpur	Sehore	Morena
Very Good	Satisfactory	Very Good

Team 4	**: Dr. Sanjay Gupta, Dr. Rakesh Verma**
Centres:	**: Amravati, Nagpur, Raipur and Ranchi**

Weather conditions at different centres during the season: (Date of Monitoring)				
Parameters	**Nagpur**	**Amrawati**	**Raipur**	**Ranchi**

	(24.09.2017)	(25.09.2017)	(26.09.2017)	(27.09.2017)
Onset of monsoon on	11.6.2017	23.06.2017	10.06.2017	23.06.2017
Sowing commenced on	2-3.7.2017	24.06.2017	26.06.2017	27.06.2017
Rainfall Distribution	--	Erratic rain	Normal	Uneven
Rainfall (mm)	973.6	583.3	689.2	1261
Rainy days (no.)	41	34	42	37

Conduct of Trials:					**Remarks**
Discipline	**Nagpur**	**Amrawati**	**Raipur**	**Ranchi**	.
Plant Breeding	3 / 3	3 / 3	3 / 3	2 / 2	
Agronomy	--	4 / 4	6 / 6	4 /4	
Entomology	--	3 / 3	2 / 2	--	
Pathology	--	7 / 7	?????	--	
Microbiology	--	--	-	--	

Germplasm:				
	Nagpur	**Amrawati**	**Raipur**	**Ranchi**
Total collection	03	1074	300	538
# Received - From	2 from IISR Indore	01 from Pantnagar	125 from Indore	Nil
For Traits	Early, High yield	Resistance to biotic stress	Part of core collection	--
How used	Crossing programme	Crossing programme	Not mentioned	--

Crosses made: (Parents / Pollinations)				
	Nagpur	**Amrawati**	**Raipur**	**Ranchi**
# Crosses	7/116	18 /???	60/ 50 pollinations per cross combination	Crossing programme affected due to heavy rains during flowering
Traits	--	Early, YMV resistant, RR & RAB Resistant	Multiple disease resistance	Yield improvement, earliness and disease tolerance

Generation Advancement:				
	Nagpur	**Amrawati**	**Raipur**	**Ranchi**
Generations advanced	NA	F1 to F8: 48 crosses and 386 populations	F1 to F7 : 194 crosses; 865 IPPs, 215 Bulks and 696 SPP	F3 to F7; 15crosses; 1590 IPPs
Advanced generations received	--	--	--	--

Seed Production Programme: (Variety / Target / Expected in q)			
Nagpur	**Amrawati**	**Raipur**	**Ranchi**
Breeder Seed:			
NA	JS 335/500/650 JS 93-05/200/100	CG Soya-1 /20/20 JS 97-52/300/330 JS 93-05/300/300	JS 97-52/10/12
Nucleus Seed: Stage I + Stage II			
NA	JS 335/--/0.50 JS 93-05/--/0.50	JS 97-52/18/18 JS 93-05/15/15 CG SOYA-1 /2/2	BS 1 / 0.30 / 0.40 BS-2 / 0.30 / 0.40

Front Line Demonstrations: Allotted / Conducted / Visited by Team			
Nagpur	**Amrawati**	**Raipur**	**Ranchi**
NA	20/20/12	10 /10 / 5	10 /20 / 5

Budget Utilization: AUC submitted			
Nagpur	**Amrawati**	**Raipur**	**Ranchi**
Yes	Yes	Yes	Yes

Manpower : (Technical/Non technical)

Manpower	**Nagpur**	**Amrawati**	**Raipur**	**Ranchi**
Sanctioned	Need based testing centre	3 Scientists 3 TAs	2 Scientists 2 TA	2 Scientists 2 Technical
In position		3 Scientists 2 TAs	2 Scientists 0 TA	2 Scientists 1 Technical

Overall specific comments of the monitoring team about the performance of the centre:

Nagpur	**Amrawati**	**Raipur**	**Ranchi**
Very Good	Good	Good	**Average**

Team 5	: **Dr. Philips Vergese, Dr. H.R. Chaudhary,**
Centres:	**: Jalna, Parbhani and Adilabad**

Weather conditions at different centres during the season:			
Parameters	**Adilabad (12.09.2017)**	**Parbhani (**11.09.2017**)**	**Jalna (10.09.2017)**
Onset of monsoon	04.06.2017	04.06.2017	15.06.2017
Date of sowing	24.06.2017	14-20.06.2017	5.7.2017
Rainfall distribution	Erratic	Erratic with uneven	Erratic
Rainfall (mm)	874.2	665.3	348
# Rainy days	40	34	11

Conduct of Trials:			
Discipline	**Adilabad**	**Parbhani**	**Jalna**
Plant Breeding	1 / 1	4 / 4	3 / 3
Agronomy	3 / 3	--	--
Entomology	--	4 / 4	--
Pathology	--	--	--
Microbiology	--	--	--

Germplasm:			
	Adilabad	**Parbhani**	**Jalna**
Total collection	100	403	NA
# Received - From	--	125 from Indore	NA
For Traits	Not mentioned	High yield, earliness, non shattering, biotic and abiotic stress resistance.	NA
How used	Not mentioned		NA

Crosses made: (Parents / Pollinations)			
	Adilabad	**Parbhani**	**Jalna**
# Crosses	Not mentioned	40 /940	NA
Traits	--	High seed yield, early to medium maturity, pest, disease and drought tolerance, non shattering	NA

Generation Advancement:			
	Adilabad	**Parbhani**	**Jalna**

Generations advanced:	F1 to F5; 49 crosses; 500populations	F1 to F7; 158 crosses	NA
Advanced generations received	--	312 progenies from IISR, Indore	--

Seed Production Programme: (Variety / Target / Expected in q)		
Adilabad	**Parbhani**	**Jalna**
Breeder Seed:		
JS 335 /300/500 JS 93-05/100/0* * Non-receipt of seed	JS 93- 05/300/200 JS 95-60 /150/0* JS 20-29/70/0* MAUS 71/651/1700 MAUS 162/650/700 MAUS 158/663/1400 MAUS 612/08/400 * Because of non-receipt of Nucleus seed from RVSKVV and JNKVV.	NA
Nucleus Seed: Stage I + Stage II		
JS 335 /15/15 Basara/18/18	MAUS 1 /25/30 ; MAUS 2 /25/30 ; MAUS 32 /25/30; MAUS 61 /25/30 MAUS 61-2 /25/30 ; MAUS 71 /25/30 MAUS 81 /25/30 ; MAUS 158 /25/30 MAUS 162 /25/30 ; MAUS 612 /25/30	--

Front Line Demonstrations: Allotted / Conducted / Visited by Team		
Adilabad	**Parbhani**	**Jalna**
10 / 10 / 5	25/25/7	NA

Budget Utilization: AUC submitted		
Adilabad	**Parbhani**	**Jalna**
Yes	Yes	--

Manpower : (Technical/Non technical)

Manpower	**Adilabad**	**Parbhani**	**Jalna**
Sanctioned	2 Scientists 2 TAs	2 Scientists 2 SRAs	Need based testing centre
In position	2 Scientists 2 TAs	2 Scientist 2 SRAs	

Overall specific comments of the monitoring team about the performance of the centre:

Adilabad	**Parbhani**	**Jalna**
Very Good	**Very Good**	**Excellent**

Team 6	**: Dr. Amar Singh, Dr. P. Sudhagar,**
Centres:	**: Pune, Sangli, Ugar Khurd**

Weather conditions at different centres during the season:			
Parameters	**Sangli (05.10.2017)**	**Ugarkhurd (6.10.2017)**	**Pune (3-4.10.2017)**
Onset of monsoon	25.06.2017	25.6.2017	15.6.2017
Date of sowing	16.07.2017	25.7.2017	01.7.2017
Rainfall distribution	uneven	Uneven	Uneven
Rainfall (mm)	475	497.25 mm	439.7
# Rainy days	30	36	25

Conduct of Trials:			
Discipline	**Sangli**	**Ugarkhurd**	**Pune**
Plant Breeding	1 / 1	--	3 / 3
Agronomy	--	--	3 / 3
Entomology	--	--	--
Pathology	2 / 2	4 / 4	--
Microbiology	--	--	--

Germplasm:			
	Sangli	**Ugarkhurd**	**Pune**
Total collection	125	--	607
# Received - From	Nil	--	125 from IISR, Indore
For Traits	Yield, longevity and rust tolerance	--	Earliness, Yield
How used	--	--	--

Crosses made: (Parents / Pollinations)			
	Sangli	**Ugarkhurd**	**Pune**
# Crosses	07/300	--	22/ 1200
Traits	Rust tolerance, seed longevity, yield and photo in-sensitivity	--	Earliness, High oil, High Yield, Null Trypsin, Null Lipoxygenase and Rust resistance

Generation Advancement:			
	Sangli	**Ugarkhurd**	**Pune**
Generations advanced:	F3 to F7; 449 IPPs	--	F1 to F76; 283crosses; 3148 populations

Seed Production Programme: (Variety / Target / Expected in q)		
Sangli	**Ugarkhurd**	**Pune**
Breeder Seed:		
NA	**NA**	JS 335 / 50 / 55 MACS 1188 / 225 / 370 MACS 1281 /50/60
Nucleus Seed: Stage I + Stage II		
Phule Kalyani (DS 228) JS 335, JS 93 05 Phule Agrani (KDS 344) P. Sangam (KDS 726) KDS 753 P. Warna (KDG 128) P. Morna (KDG 123) KDG 160	NA	**Stage-I (IPPs):** JS 335 /194 lines / 75kg MACS 1281 /203 lines/80kg MACS 1188/205 lines/100kg **Bulks:** JS 335 /-- / 5 q MACS 1281 /-- /5 q MACS 1188/--/10 q

Front Line Demonstrations: Allotted / Conducted / Visited by Team		
Sangli	**Ugarkhurd**	Pune
25/23/7	100 / Nil / -- (Late onset of monsoon)	20 / 19 / 8

Budget Utilization: AUC submitted		
Sangli	Ugarkhurd	Pune
NA	NA	Yes

Manpower : (Technical/Non technical)

	Sangli	**Ugarkhurd**	**Pune**
Sanctioned	--	--	3 Scientists, 3 TAs
In position	--	--	2 Scientists, 3 TAs

Overall specific comments of the monitoring team about the performance of the centre:

Sangli	Ugarkhurd	Pune
Very Good	Good	**Excellent**

Team 7	**: Dr. A.N. Sharma, Dr. S.D. Billore,**
Centres:	**: Dharwad, Bangalore and Coimbatore**

Weather conditions at different centres during the season:			
Parameters	**Coimbatore (18-19.9.2017)**	**Bangalore (23-24.9.2017)**	**Dharwad (21-22.9.2017)**
Onset of monsoon	29.6.2017	01.06.2017	15.07.2017
Date of sowing	5.07.2017	06.07.2017	16.07.2017
Rainfall distribution	Late onset /Erratic	Late and erratic	Highly erratic
Rainfall (mm)	268.4	723.04	422.6
# Rainy days	15	46	37

Conduct of Trials:			
Discipline	**Coimbatore**	**Bangalore**	**Dharwad**
Plant Breeding	1 / 1	2 / 2	1 / 1
Agronomy	3 / 3	3 / 3	4 / 4
Entomology	--	4 / 4	5 / 5
Pathology	--	--	9 / 9
Microbiology	--	--	3 / 3

Germplasm:			
	Coimbatore	**Bangalore**	**Dharwad**
Total collection	400	65	342
# Received - From	125+3 from IISR, Indore and 1 each from Pantnagar, Ludhiana and Dharwad	--	08 (2 each from Ludhiana and Pune, 3 from Indore and 1 from Jabalpur)
For Traits	High yield, Long Juvenile, YMV tolerance, early maturity and pod blight resistance	--	Earliness, Rust and YMV Resistance, High yield
How used	Evaluation, multiplication and MAGIC population	--	Used in breeding programme

Crosses made: (Parents / Pollinations)			
	Coimbatore	**Bangalore**	**Dharwad**
# Crosses	**10 / 1468**	**5 / Not mentioned**	8 /1311
Traits	High temperature tolerance ,Early maturing, Nodulation, Powdery mildew tolerance, Adoptability	High seed yield Profuse podding Test weight and YMV	YMV resistance Earliness, and Rust resistance

Generation Advancement:			
	Coimbatore	**Bangalore**	**Dharwad**
Generations advanced:	F1-F7; 10 crosses; 186 IPPs	F2-F5, 39 crosses	F1 to F6; 66 crosses; 547 IPPs

Seed Production Programme: (Variety / Target / Expected in q)		
Coimbatore	**Bangalore**	**Dharwad**
Breeder Seed:		
NA	JS 335 / 200 / 200 JS 95-60 /100 / 10	JS 335 /1500/1450 JS 93-05 /1200/1160 DSb 21 /625 /550
Nucleus Seed: Stage I + Stage II		
NA	Karune/5/5 q MAUS 2/2/2 q KBS 23/2/2 q JS 335 / 0.5/0.5 q	DSb 21 /6/4 q (I) JS 335 /6/4 q DSb 21 /16 /15 q (II)

Front Line Demonstrations: Allotted / Conducted / Visited by Team		
Coimbatore	**Bangalore**	**Dharwad**
10 / 10 / 05	10 / 10 / 5	10 / 10 / 5

Budget Utilization: AUC submitted		
Coimbatore	**Bangalore**	**Dharwad**
Yes	Yes	Yes

Manpower : (Technical/Non technical)

	Coimbatore	**Bangalore**	**Dharwad**
Sanctioned	2 Scientists 2 TAs	3 Scientists 3 TA	4 Scientists 4 TAs
In position	2 Scientists 2 TAs	3 Scientists 3 TA	4 Scientists 4 TAs

Overall specific comments of the monitoring team about the performance of the centre:

Coimbatore	**Bangalore**	**Dharwad**
Good	Satisfactory	Very Good

Team 8	**: Dr. S.C. Saxena, Dr. A.K. Singh,**
Centres:	**: Vishwanath Chariali, Imphal, Medziphema and Umiam (Barapani)**

Weather conditions at different centres during the season:				
Parameters	**Imphal (19-20.9.2017)**	**Medziphema (25-26.9.2017)**	**Umiam (23.09.2017)**	**Biswanath Chariali (21.09.2017)**
Onset of monsoon	NA	31.05.2017	NA	1.6.2017
Date of sowing	--	From last week of June	27.06.2017 08.07.2017	17.07.2017
Rainfall distribution	--	Abundant	--	Uneven
Rainfall (mm)	1202	1476.4	--	603
# Rainy days	91	61	--	38

Conduct of Trials:					**Remarks**
Discipline	**Imphal**	**Medziphema**	**Umiam**	**Biswanath Chariali**	At Imphal center, Agronomy trial ASP-6 was not conducted as the Hydrogel was not responding due to high rainfall area. At Umiam, AVT-II was not conducted due to non-receipt of entries JS 20-116 and PS 1556.
Plant Breeding	4 / 4	--	3 / 2	3 / 3	
Agronomy	4 / 4	4 / 4	--	--	
Entomology	4 / 4	2 / 2	--	--	
Pathology	--	5 / 5	--	3/3	
Microbiology	--	--	--	--	
Food Tech	3 / 3	--	--	--	

Germplasm:				
	Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Total collection	372	Nil	Nil	97
# Received - From	364 from Indore, 1 from Bangaluru, and 7 local collections.	Nil	--	19 From IISR Indore, 11 Local collection
For Traits	Vegetable type, Bold seedednes6	Nil	--	Tolerance under water saturated condition, disease resistance, seed longevity yield
How used	6 lines being used in Crossing programme	Nil	--	Evaluation in progress

Crosses made: (Parents / Pollinations)				
	Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
# Crosses	6/ 260	Nil	--	**Not mentioned**
Traits	Yield	Nil	--	High yield, disease resistance, earliness, high germinability
Generation Advancement:				
	Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Generations advanced:	2 crosses; 23 segregating lines, 15 F5 lines	Nil	--	F1-F7, 11 crosses, 94 families/ plants

Seed Production Programme: (Variety / Target / Expected in q)				
	Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Breeder Seed:				
	NA	NA	NA	NA
Nucleus Seed: Stage I + Stage II				
	NA	NA	NA	NA

Front Line Demonstrations: Allotted / Conducted / Visited by Team			
Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
15 / 15 /5	10 / 10 /5	NA	NA

Budget Utilization: AUC submitted			
Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Yes	Submitted	NA	Yes

Manpower : (Technical/Non technical)

	Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Sanctioned	4 Scientists, 4 TA	2 Scientists, 2 TA	--	2 Scientists, 2 TA
In position	4 Scientists, 4 TA	2 Scientists, 2 TA	--	2 Scientists, 2 TA

Overall specific comments of the monitoring team about the performance of the centre:

Imphal	**Medziphema**	**Umiam**	**Biswanath Chariali**
Good	Good	Satisfactory	Satisfactory

Imphal center has made good utilization of TSP fund by conducting 4 training programmes in the selected Tribal districts involving 120 farmers. Medziphema center also conducted production technology demonstrations at 4 locations involving 17 farmers.

Appendix –VI

Pedigree of Entries Included in Coordinating Breeding Trials

Sl. No.	Name of Entry	Pedigree
01	NRC 128	JS 97-52 X PBM-1-1-9-2-6-1
02	RVS 2011-3	JS20-29 x JSM 275
03	DSb 34	D Sb 23-2 X JS 95-60
04	MAUS 725	JS 93-05 x MAUS 71
05	SL 1068	SL 755 x SL 525
06	JS 21-15	JS 97-52 x JS 92-12
07	AUKS 174	JS 93-05 X EC 394839
08	NRC 137	JS 97-52 X NRC 37
09	VLS 95	VL Soya 2 X JS 98-63
10	CSB 10084	Co Soy 3 X AGS 27
11	MACS 1493	EC 241780 X MACS 330
12	JS 21-17	SL 738 x JS 95-60
13	NRC 130	EC 390977 X EC 538828
14	TS 53	Punjab-1 X EC34160
15	RVS 2011-4	JSM 226 x JS 20-34
16	SL 1123	Selection from AGS 751 (a vegetable line from Taiwan)
17	BAUS 102	JS 97-52 X Bragg
18	MACS 1575	PI 542044 X JS 93-05
19	MAUS 731	MAUS 47 x MAUS 61
20	NRC 132	JS97-52 X PI086023
21	VLS 94	VL Soya 59 X VS 2005-1
22	AMS 2014-1	AMS 99-33 X H6P5
23	KDS 1095	JS 95-60 x AMS 1
24	NRC 133	JS97-52 X PI542044
26	AMS 100-39	Mutant of JS 93-05
27	NRC 136	JS 97-52 X NRC 37
28	RVS 2011-1	JS20-63 x JS 95-60
29	CSB 10112	(CO (SOY) 3 X Bragg)
30	PS 1613	PS 1225 x PS 1042
31	NRC 131	EC 390977 X EC 538828
32	KDS 992	JS 93-05 x EC 241780
33	RSC 11-07	MACS 1336 x MAUS 504
34	NRCSL 1	JS335 X SL525
35	PS 1611	PS 1092 x VLS 47
36	RSC 11-03	JS 335 x PK 1024
37	NRC 134	NRC7 X AGS191
38	NRC 129	EC 538828 X NRC7
39	RVS 2011-2	JS20-63 x JS 95-60
42	SHALIMAR SOYBEAN	Selection from local landrace genotype AGR/538

STATEMENT SHOWING CONTACT PERSONS AT COORDINATING UNIT, IISR INDORE AND STAFF POSITION OF AICRP ON SOYBEAN

A. Coordinating Unit

ICAR-Indian Institute of Soybean Research, Indore-452 001

S.No.	Name	Designation	Contact No.& E-mail
1.	Dr. V.S. Bhatia	Director	09303224211 (M) 0731-2760987 (R) dsrdirector@gmail.com
2.	Dr. A.N. Sharma	Principal Scientist (Entomology)	09425958694 (M) 0731-2471807 (R) amarnathsharma2@gmail.com
3.	Dr. S.D. Billore	Principal Scientist (Agronomy)	09977763727 (M) 0731-2700059 (R) billsd@rediffmail.com
4.	Dr. Sanjay Gupta	Principal Scientist (Plant Breeding)	07415105890 (M) sanitaishu@gmail.com
5.	Dr. M.P. Sharma	Principal Scientist (Microbiology)	09926012261 (M) 0731-6562647 (R) mahaveer620@gmail.com
6.	Dr. G.K. Satpute	Senior Scientist (Genetics & Plant Breeding)	09425079866 gksatpute@yahoo.co.in
7.	Dr. Mrinal.K.Kuchlan	Scientist (Seed Technology)	09009562694 (M) mrinal.kk@gmail.com
8.	Shri. Ravindra Kumar	Finance & Account Officer	0731-2437946 raviazad1971@gmail.com

B. STAFF POSITION AICRP ON SOYBEAN

1. GBPUA&T, PANTNAGAR-263 145 (UTTARAKHAND) -MAIN CENTRE								
1	**2**	**3**	**4**	**5**	**6**	**7**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on May, 2017**	**Name (appointed / adjusted) AICRP soybean**	**Discipline/ subject**	**Date of joining the present post / project**	**Contact no. (Residence, office & Mobile, FAX & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and Email**
Scientist								
Plant Breeder (S-2) (12000-18300)	Associate Professor (37400-67000)+9000	1	131356.00	Vacant form April 2017 likely to be fill up shortly	Genetics & Plant Breeding	June, 2013		Dr. Pushpendra, Professor, G&PB / PI, Programme coordinator, Soybean 05944-234441 (O), 05944-233216 (R), 9756681711 (M), Pushpendra_sb@yahoo.co.in Dr. Kamendra Singh Professor, G&PB and Soybean Breeder 05944-234441(O), 233246 (R), 9997706784 (M), singh.kamendra@rediffmail.com Dr. P. S. Shukla Professor, G&PB/ Jt. Director, BSPC 9412141008 (M), 05944-234441(O) ps.shukla@rediffmail.com Dr. S. C. Saxena, PI Professor, Agronomy 9412121148 (M), 05944-234139 (R), drscsaxena@rediffmail.com Dr. Ajay Kumar Srivastava, Assistant Professor, Agronomy 9412925737 drajaysrivastava@gmail.com Dr. Narendra Kumar, PI Professor, Soil Science 05944-233292 (R), 9410334284 (M), nks5278@rediffmail.com Dr. K.P. Raverkar, Professor, Soil Science 9412364837 (M), kraverkar@gmail.com Dr. K. P. Singh, Professor 9412142537 (M), kpsingh.gbpuat@gmail.com
Agronomist (S-2) (12000-18300)	Professor (37400-67000)+10000	1		Vacant Since December 2015 Likely to be filled up	Agronomy	-		
Microbiologist (S-2) (12000-18300)	Associate Professor (37400-67000)+9000	1	135298.00	Vacant form April 2017 likely to be fill up shortly	Microbiology	June, 2013		
Jr. Entomologist (S-1) (8000-13500)	J. R. O. (15600-39100)+7000	1	84582.00	Dr. Neeta Gaur **(Appointed)**	Entomology	17.5.2006	9457407231 (O) 05944-233737 (R) Neetagaur_ento@rediffmail.com	
Jr. Plant Pathologist (S-1) (8000-13500)	J.R.O. (37400-67000)+10000	1	84582.00	Dr. S. K. Mishra	Plant Pathology	June, 2013		

Technical Staff (T-4)								
5500-9000	(9300-34800)+4600		67240	Dr. A.K. Singh		08.06.2006		
	(9300-34800)+4600		67240	Dr.(Mrs). Renu Singh		28.06.2007		
	(9300-34800)+4600		67240	Dr. H. R. Jaiswal		July 2017	9897165967	
	(9300-34800)+4600		50421	Dr. M.K.Gupta		04.12.1992	09412120628	
	(9300-34800)+4600		67240	Dr. Dalchand		June 2011	09410238211	

2. INDIAN AGRICULTURAL RESEARCH INSTITUTE, NEW DELHI – 110 012 (ICAR INSTITUTE BASED CENTER) –MAIN CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
-	Principal Scientist 37000-67000			Dr. S. K. Lal (Center I/c)	Genetics & Plant Breeding	NA		9968063221 sklal@iari.res.in sklal68@gmail.com	
	Principal Scientist 37000-67000			Dr. A. Talukdar	Genetics & Plant Breeding	NA		akshayassam@hotmail.com 09810879176 (M)	
-	Head of the Division 37000-67000			Dr. K. Annapurna	Microbiology	NA		09868422180 (M) annapurna96@yahoo.co.in	
	Principal Scientist			Dr. Anirban Roy	Plant Pathology	NA		011-25848418 (O) 9560083999 anirbanroy75@yahoo.com	
-	Senior Scientist			Dr. Anchal Dass	Agronomy	NA		011-25841488 (O); 08527759564 (M) anchal_iari@rediffmail.com	
-	Senior Scientist 37000-67000			Dr. Sachin Suresh Suroshe	Entomology	NA		08527759200 (M) 011-25781482 (O) sachinsuroshe@gmail.com	

3. RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, RAK COLLEGE OF AGRICULTURE, SEHORE-446 001 (M.P.) -MAIN CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col. 5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
Senior Scientist (Breeding) [37,400-67,000 + 9,000 AGP]	Principal Scientist	1	189355	Dr. S.R. Ramgiry (Center I/c)	Breeding	3.1.2006	--	08982305368 sr.ramgiry57@gmail.com	
Senior Scientist (Pathology) [37,400-67,000 + 9,000 AGP]	Principal Scientist	1	187244	Dr. M. Saxena	Pathology	4.9.2015	--	09425079059 molysaxena@yahoo.com	
Senior Scientist (Agronomy) [37,400-67,000 + 9,000 AGP]	Principal Scientist	1	191814	Dr. M.D. Vyas	Agronomy	22.7.2009	--	09425080108 vyasmd@rediffmail.com	
Senior Scientist (Entomology) [37,400-67,000 + 9,000 AGP]	Principal Scientist	1	188086	Dr. N. Khandwe	Entomology	5.8.2006	--	09826685106 nandakhandwe@rediffmail.com	
Senior Scientist (Microbiology) [37,400-67,000 + 9,000 AGP]	Senior Scientist	1	182657	Dr. R.C. Jain	Microbiology	21.8.2012	--	09826449874 rcj2011@gmail.com	
Technical Staff	**5**								
Tech. Asstt.	Tech. Asstt.	1	73000	Mr. P.K. Sharma		25.9.2014	--		
Tech. Asstt.	Tech. Asstt.	1	67281	Mr. Trilochal Singh		10.4.2001	--		
Tech. Asstt.	Tech. Asstt.	1	45268	Mr. M.P. Naiyak		10.4.2001	9893712579		
F.E.O.	F.E.O.	1	39243	Mr. Laxman Malviya		6.5.2012	--		
F.E.O.	F.E.O.	1	38533	Mr. P.S. Maravi		8.9.2008	--		

4. **AGRICULTURE UNIVERSITY, KOTA, BORKHERA FARM, BARAN ROAD KOTA-324001 Rajasthan**									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017 (Rs.)**	**Name**	**Discipline/ subject**	**Date of joining the present project and Post**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist (3 Post)									
Senior Scientist (Entomology) [37,400-67,000 + 9,000 AGP]	**1**	Professor [37,400-67,000 + 10,000 AGP]	1,86,526/	Dr. H. R. Chaudhary (Center I/c)	Entomology	16.05.2011	-	0744-2844369 (Telfax) 0744-2326673 (R) 09460677775 (M) arskota@hotmail.com	-
Senior Scientist (Agronomy) [37,400-67,000 + 9,000 AGP]	**1**	Assistant Professor [15600-39100 + 7,000 AGP]	92,536/-	Dr. D. S. Meena (I/c AICRPS)	Agronomy	22.08.2005	-	09414893694 (M) dsmeena1967@gmail.com maenads 1967@yahoo.co.in	-
Assistant Professor [15600-39100 + 6,000 AGP]	**1**	Assistant Professor [15600-39100 + 6,000 AGP]	76,978/-	Dr. Bharat Lal Meena	Plant Breeding	10.08.2017	-		-
Technical Staff (3 Post)									
Tech. Asstt. .(T4) (9300-34800) 4200	**1**	Tech. Asstt. .(T4) (9300-34800) 4800	54,511/-	Smt. Chaman Kumari Jadon	Agronomy	30.06.2007	-	09829260404 (M)	-
Tech. Asstt./ (A.A.O.) (9300-34800) 4200	**1**	Tech. Asstt. (A.A.O.) (9300-34800) 5400	85,053	Shri A. K. Sharma	-	18.01.2010	-	09414331137 (M)	-
Tech. Asstt. .(T4)	**1**	-	-	-	-	-	01..03.2017	-	-

5. DR.PDKV, REGIONAL RESEARCH CENTRE, MORSHI ROAD, AMRAVATI-444 603 (MAHARASHTRA)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present project and Post**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist (3 Post)									
Scientist (Plant Breeding) [15,600-39,000 + 6,000 AGP]	1	Jr. Plant Breeder 22220/- G.P.-6000	72434/-	Dr. G.D.Chandankar (Center I/c)	Plant Breeding	07.07.2012	Nil	Mo. 08275553087 e-mail- gchandankar@rediffmail.com gchandankar2007@hotmail.com	Dr. S.S. Munje , Jr. Entomologist,looking additionally the Entomological Research Trials Mo.No.09423682629 , E –mail ID- shyammunje@yahoo.com and Dr.P.V.Patil , Assistant Breeder, ,looking additionally the Charge of SPO . Mo.No.09860206349, E –mail ID- drpvpatil@gmail.com
Scientist (Agronomist) [15,600-39,000 + 6,000 AGP]	1	Jr.Agronomist 22220/-- G.P.-6000/-	73643/-	M.S. Dandge	Agronomy	10.07.2012	Nil	Mo. 09657725820 e-mail- msdandge@rediffmail.com	
Scientist (Agronomist) [15,600-39,000 + 6,000 AGP]	1	Jr. Plant Pathologist 15600/- G.P.-6000	51432/-	D. L. Wasule	Plant Pathology	23.03.2017	Nil	Mo. 09970011942 e-mail- dhirajwasule@yahoo.com	
Technical Staff (3 Post)									
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	Agril.Asstt 8120/- GP-2400/-	38318/-	**U.S.Tarale**	-	10.06.2015	Nil	-	-
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	**Vacant**	-	**Vacant**	-	-	2 posts lying Vacant since the sanction of posts.	-	-
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	**Vacant**	-	**Vacant**	-	-		-	-

6. AGHARKAR RESEARCH INSTITUTE, G.G. AGARKAR ROAD, PUNE- 411 004 (M.S.)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5,**
Scientist (3 Posts)									
Scientist (Entomology) (15600-39100 + 6000 AGP)	1						Vacant since 19 Jan., 2017		-
Scientist (Plant Breeding) (15600-39100 + 6000 AGP)	1	Scientist D & Soybean Breeder (15600 -39100) Basic 27990 + GP=7600	1,02,321	Dr. Philips Varghese (Center I/c)	Plant Breeding	27.06.2017/ 03/09/1997	-	020-25325061 (O), 020-25870065 (R), 020-25651542 (Fax), 09423014578 (M) philipsv@gmail.com philipsv@aripune.org	
Scientist (Agronomy) (15600-39100 + 6000 AGP)	1	Scientist C & Soybean Agronomist (15600 -39100) Basic 20440 + GP=6600	79,578	Mr. S.A. Jaybhay	Agronomy	27.06.2017/ 17.11.2011	-	020-25325053 (O) 07588559910 (M) 020-25651542 (Fax) santoshagricos@gmail.com sajaybhay@aripune.org	
Technical Staff (3 Posts)									
Technical Assistant (T4) (9300-34800 + AGP 4200)	1	Technical Officer A (9300 -34800) Basic 12940 + GP=4600	45,036	Mr. B.D. Idhol	-	25.11.2016/ 25.11.2010	-	02112-282164 (O), 09767573184(M), bdidhol@aripune.org	
Fieldman (T1) (5200-20200) (GP=2000)	1	Technical Assistant B (9300 -34800) Basic 13475 + GP=4200	45,618	Mr. B.N. Waghmare	-	01.07.2014/ 25.04.1997	-	02112-282164 (O) 09762502294 (M) balasahebpulje@gmail.com	
Fieldman (T1) (5200-20200) (GP=2000)	1	Lab. Asst. C (5200 -20200) Basic 10345 + GP=2800	34,224	Mr. D.H. Salunkhe	-	19.05.2015/ 19.05.2005	-	02112-282164 (O) 09970840176 (M) dsalunkhe8878@gmail.com	

7. UNIVERSITY OF AGRICULTURAL SCIENCES, MAIN AGRICULTURAL RESEARCH STATION, KRISHI NAGAR DHARWAD-580 005 (KARNATAKA)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017**	**Name**	**Discipline/subject**	**Date of joining the present post and project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col., with phone (Office, Residence, Mobile) Fax and e-mail**
Scientist (4 Post)									
Senior Scientist (Plant Breeding) (37,400-67,000+9,000 AGP)	1	Principal Scientist (Plant Breeding) (Rs.37400-67000+ AGP 10000)	Rs.1,92,258	Dr. G. T. Basavaraja (Center I/c)	Breeding	08.06.1998	-	0836-2446556. Extn.2214280(O) 09141388524 (M) Fax: 0836-2748377 basavarajagt@uasd.in	Dr. G.K. Naidu I/C Breeder (Soybean Seed Proeuction) Seed Unit, UAS, Dharwad 09448829556 (M)
Scientist (Agronomy) (15,600-39,000+6,000 AGP)	1	Jr. Agronomist (Agronomy) (Rs.15600-39100+ AGP 6000)	Rs.65,807	Dr. Sangshetty	Agronomy	20.09.2017	-	0836-2446556. Extn.2214280(O) 09741058053 (M) Fax: 0836-2748377 sangu_agr@yahoo.com	
Scientist (Entomology) (15,600-39,000+6,000 AGP)	1	Jr. Entomologist (Entomology) (Rs.15600-39100+ AGP 6000)	Rs.65,807	Dr. R.Channakeshava	Entomology	02.03.2017	-	0836-2446556. Extn.2214280(O) 09900934831 (M) Fax: 0836-2748377 channakeshavar@gmail.com	-
Scientist (Plant Pathology) (15,600-39,000+6,000 AGP)	1	Jr. Pathologist (Plant Pathology) (Rs.15600-39100+ AGP 8000)	Rs.88,784	Dr. Shalini Huilgol	Pathology	23.06.2017	-	0836-2446556. Extn.2214280(O) 09740264000 (M) Fax: 0836-2748377 sagarshalini@uasd.in	Dr. Shamarao Jahagirdar PI Plant Pathology 09740641068 (M) shamaraoj@gmail.com
Technical Staff (4 Post)									

Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	Technical Assistant (Rs.9300-34800+ AGP 4200)	Rs. 37,415	Mrs. Sheela Duddagi	Plant Breeding	01-07-2015	-	0836-2446556. Extn.2214280(O) 07204392351 (M) Fax: 0836-2748377 sheelavd.sheela@gmail.com	-
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	Technical Assistant (Rs.9300-34800+ AGP 4200)	Rs. 42,103	Mr. C.J. Kumar	-	-		-	-
Fieldman (T1) (5200-20200) (GP=2000)	1	Lab. Asst. (Rs.16000-29600)	Rs.46,785	Mr. T.M. Nadaf	-	23-7-2016	-	0836-2446556. Extn.2214280(O) 9900335264 (M)	-
Fieldman (T1) (5200-20200) (GP=2000)	1	Field Asst. (Rs.16000-29600)	Rs. 40,950	Mr. B.S. Shyagoti	-	01-04-2013	Working arrangement in U.A.S. Dairy, Dharwad	-	-

8. University of Agricultural sciences, GKVK, Bengaluru-560 065 (Karntaka)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of Posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July 2017**	**Name**	**Discipline/ Subject**	**Date of joining the present Project/t pos**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, Fax) & Email ID**	**Name of the scientists with designation and discipline working on soybean other than mentioned in col.4 with phone(Office, residence, mobile) Fax and E-mail**
Scientists (3 post)									
Senior Scientist (Plant Breeding) [37,400-67,000 + 9,000 AGP]	1	Professor (Plant Breeding) (37,400-67,000 + 10,000 AGP)	1,88,725/-	Dr. Jayarame gowda (Center I/c)	Plant Breeding	21.09.2015	-	(O)080-23625462 (M)09880062030 Fax: 080-23330206, 080-23330277 Email: jgowda139@gmail.com	-
Senior Scientist (Agronomy) [37,400-67,000 + 9,000 AGP]	1	Senior Scientist (Agronomy) (37,400-67,000 + 9,000 AGP)	1,84,309/-	Dr. M. Chandrappa	Agronomy	01.08.1998	-	(O)080-23625462 (M) 09986858158 Fax: 080-23330206, 080-23330277 Email:chandrappa.m@rediffmail.com	-
Scientist (Entomology)	1	Professor (Entomology)	1,64,634/-	Dr. C. Manja Naik	Entomology	11.12.2008	-	(O)080-23625462 (M) 09480773978	-

[15,600-39,100 + 6000 AGP]		(37,400-67,000 + 10,000 AGP)						Fax: 080-23330206, 080-23330277 Email:naik_196710@yahoo.com	
Technical staff (T-4 & T-1) 3 post									
Technical Assistant (T4) (9,300-34,800) GP 4,200	1	Technical Assistant (9,300-34,800) GP 4,200	32,500/-	K. Nataraj	Seed Science & Technology	01.07.2015	-	(O)080-23625462 (M) 08147129773 Fax: 080-23330206, 080-23330277 Email: natarjk@gmail.com	-
Technical Assistant (T4) (9,300-34,800 GP 4,200	1	Technical Assistant (9,300-34,800) GP 4,200	32,500/-	G. T. Santhosh kumara	Agril. Microbiology	02.09.2013	-	(O)080-23625462 (M) 09535590316 Fax: 080-23330206, 080-23330277 Email: santhugt@gmail.com	-
Field Assistant (T1) (5,200-20,200) GP 2000	1	Field Assistant (19,000-34,500)	47,871/-	B. M. Shankaraiah	-	09.10.2010	-	(O)080-23625462 (M) 09449065463 Fax: 080-23330206, 080-23330277	-

9. DEPARTMENT OF CROP IMPROVEMENT, CSK HPKV, PALAMPUR-176 062 (H.P.)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact No. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientists		2							
Assistant Soybean Breeder [15,600-39,100 + 6,000 AGP]	Principal Scientist (Plant Breeding) [37,400-67,000 + 10,000 AGP]	1	5,92,713	Dr. (Mrs.) Vedna Kumari (Center I/c)	Plant Breeding	08.01.2014	N. A.	01894-230391 (O) 094181-12681 (M) Fax : 01894-230406 drvedna@gmail.com	1.Dr. Naval Kishore, Scientist (Plant Breeding),CSK HPKV, Hill Agricultural Research & Extension Centre, Bajaura, Distt. Kullu, 175 125 (HP) 094180-67729 (M) naval13a@gmail.com
Assistant Scientist (Plant Pathology) [15,600-	Senior Scientist (Plant Pathology) [37,400-	1	4,77,346	Dr. Amar Singh	Plant Pathology	27.01.2011	N.A.	01894-230326 (O) 094181-49782 (M) singhamar008@gmail.com	2. Dr. Janaradhan Singh Principal Scientist (Agronomy) Dept of Agronomy, Forages & Grassland Manag., CSK

39,100 + 6,000 AGP]	67,000 + 9,000 AGP]								HPKV, Palampur, 176 062 (HP) 094189-27836 (M) singhjdr@rediffmail.com 3. Dr. Surjeet Kumar Professor (Entomology), Dept. of Entomology, CSK HPKV, Palampur 176062 094181-53087 (M) skumarhpau@gmail.com
Technical Staff		2							
Technical Assistant [10,300-34,800+ 5,000 GP]	[15,600-39,100 + 7,800 GP] [10,300-34,800 + 5,000 GP]	1	87,618 1,70,841	Mr. Dina Nath Sh. Dharam Singh	- -	1.4.2017 to 23.3.2017 25.3.2017	N.A. N.A.	- 9805180608	- -
Technical Assistant [10,300-34,800 + 5,000 GP]	Technical Assistant Gr.-I (Farm Manager) [10,300-34,800 + 5,000 GP]	1	3,27,545	Sh. Mohinder Verma	-	01.05.2016	N.A.	-	-

10. VIVEKANANDA PARATIYA KRISHI ANUSANDHAN SANSTHAN, ALMORA-263601 UTTARAKHAND (ICAR INSTITUTE BASED CENTER) –SUB CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
-	Scientist (15,600-39,100 + 6,000)	-	-	Dr. Anuradha Bhartiya (Center I/c)	Plant Breeding	21.04.2009	-	05962-241005, Extn.219 (O) 05962-241250, 231539 (Fax) 09410560611(M) anuradhagpb@gmail.com	

-	Sr. Scientist (15,600-39,100 + 8,000)	-	-	Dr. K.K. Mishra	Plant Pathology	01.02.2011	-	9411195453 (M) 05962-231539 (Fax) mishrakkpatho@gmail.com	
-	Sr. Scientist (15,600-39,100 + 8,000)	-	-	Dr. Sher Singh	Agronomy	23.03.2012	-	05962-241005 Extn.306 (O) 05962-241250, 231539 (Fax) 09456158263 (M) shersingh76@gmail.com	

11. PUNJAB AGRICULTURAL UNIVERSITY LUDHIANA – 141004 (PUNJAB) – SUB CENTRE

1	2	3	4	5	6	7	8	9	10
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
Asstt. Plant Breeder (15,600-39,100) + GP 6,000	Sr. Breeder (37,400-67,000) + GP 10,000	1	1,44,440	Dr. B.S. Gill (Center I/c)	Plant Breeding	Joined as Asstt. Plant Breeder on 22.1.1997, promoted to Sr. Breeder on 23.1.2012	-	09872163567 (M) gbalwinder@hotmail.com	Dr. (Mrs) Jagmeet Kaur (Sr.Physiologist) 09888034979 (M) jagskaur@gmail.com Dr. (Mrs) Poonam Sharma (Microbiologist) 09915004976 (M) poonam1963in@yahoo.co.in Dr. Guriqbal Singh (Agronomist) 0161-2251362 (R) singhguriqbal@rediffmail.com Dr (Mrs) Asmita Sirari Asstt. Plant Pathologist 0161-2401960-413(O) asmitasirari@gmail.com Dr Ravinder Singh Sr. Entomologist 097800-29107 (M) ravindergurvara@pau.edu Dr GK Taggar, Asstt. Entomologist
Asstt. Agronomist (15,600-39,100) + GP 6000	Asstt. Agronomist (15,600-39,100) + GP 6000	1	84,700	Ms. Harpreet Kaur	Agronomy	28.01.2010	-	08146080300 (M) hkmand@rediffmail.com	
Technical Staff									
Tech. Asstt. (10,300-34,800) + GP 3800	Beldar (4900-10,680) + GP 1900	1	39,919	Shri. Sita Ram	-	01.03.2013	-		
Field man (10,300-34,800) + GP 3200	Field man (10,300-34,800) + GP 3750	1	52,213	Shri Balwant Singh	-	01.11.2014	-		

									098144-22183 (M) gauravtaggar@pau.edu Dr (Mrs) Sunita Sharma (Biochem) 09876130110 (M)

12. CENTRAL AGRICULTURAL UNIVERSITY, IROISEMBA IMPHAL-795004 (MANIPUR) –SUB CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col. 5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
Jr. Plant Breeder (15600-39100)	Jr. Plant Breeder (18320+ 6000)	1	70780	Dr. Heisnam Nanita Devi (Center I/c)	Plant Breeding	30-08-2011	-	08974057246 (M) 09436412625 (M) heisnamnanita@rediffmail.com 0385-2410415	-
Jr. Entomologist (15600-39100)	Jr. Entomologist (20520+ 6000)	1	76648	Dr. Nilima Karam	Entomology	30-08-2011	-	08974715757 (M) nilikaram@gmail.com 0385-2410415	-
Jr. Food Scientist (15600-39100)	Jr. Food Scientist (21990+ 6000)	1	80552	Dr. L. Sophia Devi	Food Technology	30-08-2011	-	09856939623 (M) rush2sophia@gmail.com 0385-2410415	-
Jr. Agronomist (15600-39100)	Jr. Agronomist (20520 + 6000)	1	76648	Dr. Toijam Sunanda Devi	Agronomy	30-08-2011	-	09856117141 (M) sunandabckv@gmail.com 0385-2410415	-
Technical Staff									
Field man **(5200-20200)**	Field Man **(6560+ 1900)**	4	28730	H. Sarat Singh	-	19-12-2012	-	09862879541(M)	
	Field Man **(6560 + 1900)**		28730	N. Daya Singh	-	20.12.2012	-	09774941381(M) dayaningthoujam@yahoo.com	
	Field Man **(6310 + 1900)**		27216	K.Lalit Singh	-	03-01-2014	-	09436683166(M)	
	Field Man **(6310 + 1900)**		27216	H. Subhaschandra Singh	-	12-03-2014	-	09612003374(M)	

13. AAU, BN College of Agriculture, Biswanath Chariali 784176, Biswanath (Assam)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of post**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientists									
Scientist (2 posts) Scientist (Plant Breeding) [15,600-39,100 + 6000 AGP]	1	Principal Scientist (Plant Breeding) (37,400-67,000) Grade pay: 10000	192133.00	Dr. J. Bhuyan (Center I/c)	Plant Breeding	01.07.2006	-	03715-222130 (O), 03715-222130 (Fax), 09435486922 (M) jbhuyan_2006@redffmail.com jbhuyan.2012@gmail.com	-
Scientist (Plant Pathology) [15,600-39,100 + 6000 AGP]	1	Principal Scientist(Plant Pathology) (37,400-67,000) Grade pay: 10000	200924.00	Dr. K.K. Das	Plant Pathology	01.07.2006	-	09435535633 (M) kkdasbc123@gmail.com	-
Technical Staff (2 posts)									
Field Assistant (T1) (5,200-20,200) GP 2000	1		-	-	-	-	Vacant since 1/4/13		
Field Assistant (T1) (5,200-20,200) GP 2000	1						Vacant since 7/11/13		

14. ICAR RESEARCH COMPLEX FOR NEH REGION, UMIAM – 793 103, MEGHALAYA (ICAR INSTITUTE BASED CENTER) –SUB CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
-	-	-	-	Dr. Amit Kumar (Center I/c)	Plant Breeding	-	-	amit4118@gmail.com 8974630789	-
-	-	-	-	Dr. P. Baiswar	Plant Pathologist	-	-	pbaiswar@yahoo.com 9436107733	-

15. SCHOOL OF AGRICULTURAL SCIENCES AND RURAL DEVELOPMENT, NAGALAND UNIVERSITY, MEDZIPHEMA – 797 106 (NAGALAND)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist - 2									
				Dr. Amarendra Kumar Singh (Center I/c)		26-04-2010		09436075153 (M) 08974055853 (O) aksingh_1967@yahoo.com	Dr. Imtinaro Ao Assistant Professor Entomology 09436006730 (M) imtinaro2012@yahoo.com
Jr. Scientist (Plant Pathology)	Jr. Scientist (15600-39100)	1	Rs. 86657/-	Dr. Sunil Kumar	Plant Pathology	12-04-2011		09402682097 (M) sksunilphd@gmail.com	
Jr. Scientist (Agronomy)	Jr. Scientist (15600-39100)	1	Rs. 83326/-	Dr. Engrala Ao	Agronomy	20-03-2013		09436824141 (M) engraao@yahoo.in	
Technical Staff (T-4) – 2									
Technical Assistant	Techncal Assisant 5200-20200)	1	Rs. 26905/-	Mr. Talososang Amri		24-07-2012		08731821798 (M)	
Technical Assistant	Technical Assistant 5200-20200)	1	Rs. 26905/-	Mr. Imliakum Ao		25-07-2012		09612304897 (M)	

16. Birsa Agricultural University, Kanke, RANCHI-6									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of post**	**Gross salary as on July, 2017**	**Name**	**Discipline / subject**	**Date of joining the present post/project**	**If post is vacant, date from which it is lying vacant**	**Contact No.**	**Name of scientist with designation & discipline working on soybean other than mentioned in col. 5 with phone**
Scientists									
Jr. Scientist	Jr. Scientist-cum-Asstt. Prof.(15,600-39,100) GP-7000/-	1	88588/-	Dr. (Mrs.) Nutan Verma (Center I/c)	Plant breeding	01.06.2012	-	09279324334 (M) nvbau2006@yahoo.co.in	
Jr. Scientist	Jr. Scientist-cum-Asstt. Prof.(15,600-39,100) GP-6000/-	1	79667/-	Dr. Arvind Kumar Singh	Agronomy	24.07.2004	-	09431315705 (M) aksbau@gmail.com	
Technical Staff									
Technical Asstt.	Field overseer (9300-34800) GP-2400/-	1	51548/-	Sri S.K Jamahir		01.08.2007	-	09798534619 (M)	
STA	Vacant	-		-		-	1		

17. INDIRA GANDHI AGRICULTURAL UNIVERSITY, RAIPUR-492 012 (C.G.)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present project and Post**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist(2Post)									
Scientist (Agronomy) [15,600-39,100 + 6,000 AGP]	01	Principal Scientist 37400-67000+ AGP 10000 (Promoted in the scheme)	1,62,280/=	Dr. Rajendra Lakpale (Center I/c)	Agronomy	15.7.2003	-	Phone- 0771-2442667 (O), 2444770 (R) Mobile- 9424229384, 7089891574 E-Mails- rlakpale@gmail.com, rlakpale@hotmail.com	1. Dr. S. B Gupta Professor & Head Deptt of Agricultural Microbiology Mobile- 78030-13547 Phone (O)- 0771-2442581 E-mail- sbgupta_igau2002@yahoo.co.in 2. Dr R K Dantre Principal Scientist (Plant Pathology) Department of Plant Pathology Mobile- 94242-14723 Phone (O)- 0771-2444204 ravikantdantre@yahoo.com 3. Dr Y.K.Yadu Principal Scientist (Entomology) Mo. 94255-10737
Scientist (Plant breeding) [15,600-39,100 + 6,000 AGP]	01	Scientist 15600-39000 +AGP 7000	71,394/=	Mr Sunil Kumar Nag	Plant Breeding	2.11.2010	-	Phone- 0771-2442352 (O), Mobile- 9926159853, 9691021610 E-Mail- nagsk_igkv@yahoo.com	
Technical Staff (2Post)									
Field Assistant (T1) (5,200-20,200) GP 2000	02						Vacant (Since inception of project)		

18. JNKVV, KRISHINAGAR, ADHARTAL, JABALPUR-482 004 (M.P.)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**No. of posts**	**Existing post with pay scale and grade pay**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present project and Post**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist (2 Post)									
Sr. Scientist (Plant Breeding) 37400-67300 + AGP 9,000	1	Pr. Scientist (Plant Breeding)		Dr. A.N.Shrivastava	Plant Breeding	up to 30.06.2017		09229474253 ans_jnkvv@rediffmail.com	
Senior Scientist (Plant Breeding) [37,400-67,000 + 9,000 AGP]	1	Senior Scientist		Dr. M..K.Shrivastava (Center I/c)	Plant Breeding	From 10-08-2017	Filled	M. 09827256494 07987299126 shrivastava.manoj03@gmail.com	
Scientist (Plant Pathology) [15,600-39,100 + 6,000 AGP]	1	Scientist 15600-39100+ AGP 6000		Mr. P. K Amrate	Plant Pathology	19-05-2017	Filled	08224821863 pawanamrate@gmail.com	
Technical Staff (2 Post)									
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	9300-34800+ AGP 4200	46084	Dr. Stuti Mishra	Technical Assistant	up to 04.08.2017	Vacant	09993287250 stuti.curious@gmail.com	
Technical Assistant (T4) (Rs.9300-34800+ AGP 4200)	1	9300-34800+ AGP 4200	46084	Mr. Dinesh Kumar Pancheshwar	Technical Assistant	01-03-2013	Filled	09981099167 dinesh11pancheshwar@gmail.com	

19. MARATHWADA AGRICULTURAL UNIVERSITY, PARBHANI-431 402 (MS.) -SUB CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.4, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
Soybean Breeder (37,400-67,000)	Soybean Breeder & Officer Incharge (37400-67000 + AGP 9000)	1	Rs.1,06,137/-	Dr. S.P. Mehtre (Center I/c)	Agril. Genetics & Plant Breeding	12/09/2014	--	09421462282, 07588156210 shivaji_pmehtre@rediffmail.com Fax.- (02452)220121	NA
Jr.Entomologist (15,600-39,100)	Jr.Entomologist (15600-39100+ AGP 6000)	1	Rs.59,596/-	Dr. D.G. More	Agril. Entomology	31.08.2009	--	09405473998, 7588082165 (M) daya_more@rediffmail.com	
Technical Staff (T-4)									
Senior Research Assistant (9,300-34,800)	Senior Research Assistant (9300-34800+ AGP 4400)	1	Rs. 50,009/-	Shri D.T. Pawar	Plant Breeding	21.06.2010	1	09422176738(M) rameshpwr267@gmail.com	NA
Senior Research Assistant (9,300-34,800)	Senior Research Assistant (9300-34800+ AGP 4400)	1	-	Smt.A.A. Joshi	Food Science	14/07/2015	21/10/2014	09637240406 joshianuprita.2009@gmail.com	NA

20. PJTSAU - Agricultural Research Station, Adilabad, Telangana State									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col. 5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientists									
Scientist (Agronomy) ₹ 15,600 – 39100 + 6000 AGP	Senior Scientist (Agronomy) ₹ 15,600 - 39100 + 8000 AGP Pay: ₹ 31890 + 8000 (Stage-III)	1	₹ 97,514.00	Dr. Sreedhar Chauhan (Center I/c)	Agronomy	23.07.2013	-	08732-226863 (O) 094411 67821 (M) chauhan.sreedhar@gmail.com	-
Scientist (Plant Breeding) ₹ 15,600 – 39100 + 6000 AGP	Scientist (Plant Breeding) ₹ 15,600 - 39100 + 6000 AGP Pay: Rs. 21300 + 6000 (Stage-I)	1	₹ 66,716.00	Dr. M. Rajendar Reddy	Plant Breeding	24.07.2017	-	08732-226863 (O) 09704134304 (M) rajendar0536@gmail.com	
Total:		**2**							
Technical Staff									
AEO ₹ 17890-53950/-	AEO 17890-53950/25140 + 300/- (TI) Pay: ₹ 25,140.00	1	₹ 34,618.00	Sri Sk. Eesa	Intermediate	21.09.2016	-	08732-226863 (O) 99499 40584 (M)	-
AEO ₹ 17890-53950/-	AEO ₹ 15,000.00	1	₹ 20,117.00	Sri R. Naveen	Diploma in Agriculture	06.04.2017	**	08732-226863 (O) 078938 96654 (M) ramellynaveen@gmail.com	
Total:		**2**							

21.TAMIL NADU AGRICULTURAL UNIVERSITY,COIMBATORE-641003 (T.N) - SUB CENTRE									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col. 5, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
Plant Breeder (Scientist)	15600+39100 GP6000	1	568205	Dr. R.Sudhagar (Center I/c)	Plant Breeding & Genetics	22.01.2014		9842256972 genesudha@gmail.com	Professor and Head Department of Pulses, TNAU, Coimbatore – 641003 Office phone No. 0422-2450498 Mail.ID: pulses@tnau.ac.in
Agronomist (Scientist)	15000+39100 GP6000	1	675070	Dr.S.Sanbagavalli	Agronomist	12.06.2014		9443766767 sanbagavallitnau@gmail.com	
Technical Staff (T-4)									
Technical Staff	9300+34800 GP 4200	1	218990	Tmt.S.Devika		01.10.2012	-	9952349592	
Technical Staff	5200+20200 GP 2000	1	261225	Th.L.Aravamuthan		06.01.1997	-	9489345611	

22. RVSKV Zonal Agricultural Research Station Morena – 476001 (M.P.)									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Approved post by the council with pay scale	**Existing post with pay scale and grade pay**	**No. of posts**	**Gross salary as on July, 2017**	**Name**	**Discipline/ subject**	**Date of joining the present post / project**	**If the post is vacant, date from which it is lying vacant**	**Contact no. (Residence, Office & Mobile, FAX) & Email ID**	**Name of the scientists with designation & discipline working on soybean other than mentioned in col.4, with phone (Office, Residence, Mobile) Fax and E-mail**
Scientist									
-	Prin. Scientist	-	-	Dr. V.K. Tiwari (Center I/c)	Plant Breeding			9425407723 07532234426 vkt786@rediffmail.com	

Statement of the Scientists working for AICRP on Soybean at need based testing Centre

1. GBPUA&T, Regional Research Station, Majhera, P.O. Garampani Dist- Nainital, Uttarakhand – 263135			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1	Dr. Anjuli Agrawal	Officer Incharge (Biochemistry)	(O) 05942-245538 (M) +917500241431 E-mail : oicmajhera@gmail.com
2	Dr. J.P. Purwar	J.R.O. (Entomology)	(O) 05942-245538 (M) +919411324356 E-mail : jp_purwar@rediffmail.com

2. CSKHPKV, Hill Agricultural Research and Extension Centre, Bajaura-175125, Distt. Kullu, Himachal Pradesh			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. Naval Kishore	Scientist (Plant Breeding)	09418067729 (M) E-mail – naval13@gmail.com Fax- 01905 287236
2.	Sh. Ramesh Kumar	Field Assistant	--

3. Rajendra Agricultural University, Tirhut College of Agriculture, Dholi-843 121, (Muzaffarpur) , Bihar			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. Anil Pandey	Univ. Prof.(Plant Breeding & Genetics) -cum-Chief Scientist & Team Leader (Oilseeds)	E-mail- aniltcadholi@gmail.com Mobile No. 09934019564 Fax: 06274-240266/24025
2.	Dr. Vikram Bharati	Jr. Agronomist (S.F.)	E-mail- vbharatiagro@gmail.com Mobile No.09471645321
3.	Dr. Ashim Kumar Mishra	Jr. Pathologist (Spices)	E-mail- ashim_sigatoka@yahoo.com Mobile No. 09973218436

4. OUA&T, Reginal Research and Technology Transfer Station , Bhawanipatna, Arkabahalipada Farm, Bhawanipatna – 766001, Kalahandi, Odisha			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No.**
1.	Sri. B.S. Nayak	Associate Director of Research Agronomy	(O) : 06670-230274 (M) : 09437321675 E-mail : bsnayak2007@rediffmail.com
2	Dr. Gouranga Charan Mishara	Sr. Scientist Agronomy	(O) 06670-230274 (M) 09337749182 E-mail : gcmishra8@gmail.com
3	Susanta Kumar Mohanty	Junior Breeder (Plant Breeding and Genetics)	(O) 06670-230274 (M) 09437124090 E-mail : susantamohanty.2008@rediffmail.com

5. PDKV, Department of Agricultural Botany, College of Agriculture, Nagpur-440001			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No.**
a)	Shri S.K.Dhapke	Assistant Professor	0721-2522255 (O) 09011020342(M) s.dhapke@rediff.com

6. Mahyco Life Sciences Research Centre, Maharashtra Hybrid Seed Co. Ltd. , P.O. Box No. 75 Jalna -431203,			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
a)	Mr. George Thomas,	Research Scientist, Oilseeds Breeding Group	09420460172 (Mobile) 02482-262002 (Fax) 02482-262471,262475(O) george.thomas@mahyco.com

7. R & D Unit, The Ugar Sugar Woks Ltd., Ugar-khurd, Karnataka-591316			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
a)	Mr.Jagadish S.Patwardhan	Deputy Manager R & D.	08339-272230 (Ext-214) **(O)**, 9900559159 **(M)** Fax-08339-272232 jagadish.kulkarni@ugarsugar.com jagdishpatwardhan@yahoo.com helpdesk@ugarsugar.com
b)	Mr. R.D.Patil	Agronomist	7259186041 **(M)** helpdesk@ugarsugar.com
c)	Mr.B.B.Patil	Circle Superintendent	7259020396 **(M)** helpdesk@ugarsugar.com

8. MPKV, Agricultural Research Station, Mahatma Phule Krishi Vidyapeeth, K. Digraj-416305 Distt. Sangli (M.S.)			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
a)	Dr. D.K. Kathamale	Officer Incharge	0233-2437288 (O), 0233-2437275 (Fax), 0233-2326661 (R), 09405267061 (M) kathmaledk@rediffmail.com kathmaledk@gmail.com
b)	Dr. M.P. Deshmukh	Assistant Prof. Of Botany (Plant Breeding)	0233-2437288 (O), 0233-2437275 (Fax), 0233-2332886 (R), 09423185603 (M) 09422210476 (M) drmpdeshmukh@gmail.com

9. Zonal Agricultural Research Station (Sub-montane Zone), Shenda Park, Kolhapur-416 012, Maharashtra			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. C.T. Kumbhar	Assistant Professor (Plant pathology)	**Telephone No.:** Office: 0231-2692416 Residence: 0231-2320266 **Mobile No.:**08483897248, 09766746666 **Fax:** 0231-2693017 **E-mail ID:** chandrakumbh@yahoo.com

10. UAS, Raichur, ARS, Bidar-585401 Karnataka			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. Sidramappa	Assistant professor (Plant Breeding)	09900875348 (M) E-mail- siddugpb@yahoo.co.in
2.	Dr.Shobharani M	Agril. Entomology	srani_ent@yahoo.co.in

11. TRIBAL RESEARCH CUM TRAINING CENTRE, ANAND AGRICULTURAL UNIVERSITY, DEVGADH BARIA – 389 380, DIST : DAHOD (GUJARAT)			
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. G. J. Patel	Asso. Res. Scientist (Agron)	9825930039 girish_agri2005@yahoo.co.in
2.	Prof. D. B. Parmar	Assi. Res. Scientist (Plant Breeding)	9725017818 dhirajsinh@aau.in
Technical Staff (T-4)			
1.	Mr. S. M. Asari		9909592408 shivrambhai@aau.in
2.	Mrs. R. S. Thakor		7567720400 rekha@aau.in
3.	Mr. Kinjal Suthar		9408932895 kinjalsuthar55@yahoo.com
4.	Mr. D. B. Ramjiyani		9428774964 dweep90@hotmail.com
5.	Ms. Dipti Patel		9825475520 dipti@aau.in

12.	**Research Scientist Agricultural Research Station Junagarh Agricultural University Keria Road 365601 Amreli- Gujarat.**		
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. Viren Akbari	Assistant Research Scientist, Plant Breeding	09558458537 virenakabari@jau.in

13.	**Wheat Research Center Lokbharti, village - Sanosara, Taluqa - Sihor, Dist- Bhavnagar, Gujarat -364230**		
1	**2**	**3**	**4**
Sr. No.	**Name of the scientist**	**Designation with discipline**	**Telephone No. (Office, Residence, Mobile, Fax, E-mail)**
1.	Dr. C. P. Singh	Plant Breeding	09727765645 singh.cp70@gmail.com

Appendix-*VIII*

STATEMENT SHOWING RELEASE OF GRANT TO THE AICRP ON SOYBEAN CENTRES DURING 2016-17

S.No.	Name of the centre	No. of Scientist	Budget				
			Pay	TA.	R. cont.	TSP	Total Bud.
1	2	3	4	5	6	7	8
(A) Other than NEH							
1	RVSKVV, SEHORE	5	11230000	75000	938000		12243000
2	UAS, DHARWAD	4	6500000	100000	750000		7350000
3	ARI, PUNE	3	4000000	50000	500000		4550000
4	GBPUA&T, PANTNAGAR	5	7000000	30000	750000		7780000
5	UAS, BANGALORE	3	6100000	30000	375000		6505000
6	MAU, PARBHANI	2	2845000	17750	375000		3237750
7	ARS, KOTA	3	6000000	90000	563000		6653000
8	PAU, LUDHIANA	2	3875000	28500	375000		4278500
9	TNAU, COIMBATORE	2	3000000	20000	250000		3270000
10	ANGRAU,ARS, ADILABAD	2	2500000	28500	281250		2809750
11	CSKHPKV, PALAMPUR	2	4000000	19500	281250		4300750
12	BAU, RANCHI	2	3000000	20000	250000		3270000
13	JNKVV, JABALPUR	2	4000000	38000	375000		4413000
14	IGKV, RAIPUR	2	2600000	20000	300000		2920000
15	PDKV, AMRAVATI	3	2850000	34000	500500		3384500
16	MORENA	2	1500000	33750	187500		1721250
17	ICAR-IARI, NEW DELHI	0	0	0	0		0
18	ICAR- VPKAS, ALMORA	0	0	0	0		0
19	ICAR RE NEH, Barapani	0		75000	55500		130500
	Need Based requirement	0		0	751325		751325
	Total (A)	**44**	**71000000**	**710000**	**7858325**	**0**	**79568325**
(B) NEH							
20	COA, MEDZIPHAMA	2	2600000	100000	300000		3000000
21	AAU, BISWANATH CHARIALI	2	2100000	90000	300000		2490000
22	CAU, IMPHAL	4	5300000	200000	600000		6100000
	Total (B)	8	**10000000**	**390000**	**1200000**	**0**	11590000
Tribal Sub Plan		0	**0**	**0**	**0**	**653500**	**653500**
	Grand Total (A+B+C)	**52**	**81000000**	**1100000**	**9150000**	**653500**	**91811825**