

अखिल भारतीय समन्वित सोयाबीन अनुसंधान परियोजना  
(भारतीय कृषि अनुसंधान परिषद्)

49वीं वार्षिक समूह बैठक  
बिरसा कृषि विश्वविद्यालय, रांची (झारखण्ड)  
मार्च 16–18, 2019

**All India Coordinated Research Project on Soybean  
(Indian Council of Agricultural Research)**

**49<sup>th</sup> Annual Group Meeting  
Birsa Agricultural University, Ranchi (Jharkhand)  
March 16-18, 2019**

कार्यवाही एवं तकनीकी कार्यक्रम (2019–20)  
***Proceedings and Technical Programme (2019-20)***



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# अखिल भारतीय समन्वित सोयाबीन अनुसंधान परियोजना

All India Coordinated Research Project on Soybean

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(Indian Council of Agricultural Research)

समन्वयन एकक

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## Acknowledgement

I am highly thankful to the Indian Council of Agricultural Research, New Delhi for granting permission to conduct 49<sup>th</sup> Annual Group Meeting of All India Coordinated Research Project on Soybean at Birsa Agricultural University, Ranchi from March 16-18, 2019.

All the research and development personnel of AICRP on Soybean are extremely obliged to Dr. Trilochan Mohapatra, Secretary, DARE, Govt. of India and Director General, ICAR for providing ceaseless guidance and direction for doing novel research and development of soybean in the country. I also sincerely thank Dr AK Singh DDG (CS), ICAR for his direction, timely help and support in conducting this Annual Group Meeting. Immense thanks are due to Dr P. Kaushal, Vice Chancellor, Birsa Agricultural University, Ranchi and Chairman of opening session for his luminous, inspiring and thought provoking inaugural address, chairing the Plannery Session and for enormous support which played a positive and crucial role in making the group meeting purposeful and successful. I gratefully acknowledge the gracious presence and help, guidance and support rendered by Dr P.K. Chakrabarty, Assistant Director General (PP&B and OP), ICAR during the Inaugural Session of the Annual Group Meeting and Chairing the Varietal Identification Committee meeting. I gladly place on record my heartfelt thanks to Dr D.N. Singh, Director Research, Birsa Agricultural University, Ranchi. Dr Z.A. Haider, the Organizing Secretary of the Group Meeting and his dedicated teams deserve sincere appreciation for their determined efforts in making flawless arrangements for success of the event.

I would also like to express thanks to all the Chairmen of the technical sessions for their valuable contributions in providing expert opinion and in formulating a sound technical programme of research for 2019-20. Thanks to all the rapporteurs, who recorded the proceedings of technical sessions. Determined and productive efforts and keen interest expressed by all the officials and staff of Birsa Agricultural University, Ranchi which made Annual Group Meeting a successful and crucial event are thankfully acknowledged. The active participation, deliberation, discussion, contribution, cooperation and interaction of all the delegates in the Group Meeting is duly recognized and highly appreciated.



(V.S. Bhatia)

Director

ICAR-Indian Institute of Soybean Research, Indore

अ. अनुशंसाएँ

**A. RECOMMENDATIONS**

## Recommendations

The recommendations made during 49<sup>th</sup> Annual Group meeting of AICRP on Soybean held at Birsa Agricultural University, Ranchi from March 16-18, 2019 are as follows:

- It was recommended that promotion criteria for entries would be 10% yield superiority over the best checks. These criteria would be applied from 2019 in all the trials.
- As per the Guidelines for testing crop varieties under AICRPs entries with quality traits should be at par with the best performing check
- In the newly constituted early maturity trial, JS 20-34 and JS 95-60 would be the checks and promotion criteria would be at par yield, per day productivity and up to 90 days of maturity. Entries with extra early maturity (< 85 days) marginally less yield as per the criteria.

Thrust areas for all the centres have been decided as follows.

|    |                  |                                                                                                                                     |
|----|------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <b>Sehore</b>    | 90 Days Maturity, Charcoal Rot , YMV                                                                                                |
| 2  | <b>Pune</b>      | Food grade soybean, earliness (95 days)                                                                                             |
| 3  | <b>Pantnagar</b> | Photo insensitivity, YMV, RAB                                                                                                       |
| 5  | <b>Delhi</b>     | Photo insensitivity, YMV, RAB, IBB                                                                                                  |
| 6  | <b>Parbhani</b>  | Stem fly, Girdle Beetle, 90 Days maturity, Long juvenility , Drought                                                                |
| 8  | <b>Indore</b>    | Drought, heat, water logging, CR, Anthracnose, 90 days, seed coat strength, vegetable and food grade soybean, Insect (Defoliators). |
| 9  | <b>Ludhiana</b>  | Photo insensitivity, YMV, RAB, IBB                                                                                                  |
| 10 | <b>Jabalpur</b>  | CR, YMV, RAB, 90 days maturity                                                                                                      |
| 11 | <b>Palampur</b>  | Up to 110 days maturity, vegetable types, FLS, Maize intercropping                                                                  |
| 13 | <b>Dharwad</b>   | Rust Resistance, YMV and identification of resistant sources for pod borer <i>Cydia ptychora</i> .                                  |
| 14 | <b>Almora</b>    | Black soybean with KTI free, FLS                                                                                                    |
| 15 | <b>Amaravati</b> | CR, 90 days maturity, Drought                                                                                                       |
| 16 | <b>Bangalore</b> | Off season nursery, Vegetable soybean,                                                                                              |
| 17 | <b>Raipur</b>    | Indian Bud Blight, Pod Blight, RAB , Soil acidity, drought tolerance                                                                |
| 18 | <b>Kota</b>      | 90 Days Maturity, Insect resistance (Girdle beetle and defoliators)                                                                 |
| 19 | <b>Imphal</b>    | Food usage                                                                                                                          |
| 20 | <b>K. Digraj</b> | Rust, Long juvenility                                                                                                               |
| 21 | <b>Jorhat</b>    | Water logging tolerance , soil acidity                                                                                              |
| 22 | <b>Ranchi</b>    | Soil acidity, drought tolerance, early maturity                                                                                     |
| 23 | <b>Morena</b>    | Drought                                                                                                                             |
| 24 | <b>Adilabad</b>  | Pre-harvest sprouting                                                                                                               |
| 25 | <b>Bidar</b>     | High yielding, early maturity                                                                                                       |

All the centres are to strictly take up the breeding programme in these areas. Crosses for the centres would be decided by the ICAR-IISR Indore and breeders are to develop sufficient number of F<sub>1</sub>s so as to have a population of at least 4000 F<sub>2</sub>. Their presentations in AICRP should be restricted to these thrust areas. F<sub>1</sub>s should reach UAS Bangalore by 10 December. Hot spots Ludhiana, Dharwad, Jabalpur, Amravati, Palampur and Almora would be utilized for screening of F<sub>2</sub>s and F<sub>3</sub>s.

- Jorhat and Umiam centres would screen lines for water logging tolerance.
- NRC 132, a null lox 2 entry in AVTII, would be evaluated for reduced beany flavor along with other entries and checks. PI Food Technology and Dr Neha Pandey from ICAR-IISR would take up the experiment.

- All the AVT I entries and checks of Eastern and Central Zone would be tested for oil content. Samples must reach ICAR-IISR by 1<sup>st</sup> December.
- Entries for estimation of oil (AVT II) by 1<sup>st</sup> December and for sucrose content (AVT I) samples must reach ICAR-IISR Indore as soon as drying of seeds.
- Seed of IVT entries and checks must reach ICAR-IISR Indore by 5 April.
- Mandasaur centre has been included in AICRP Plant Breeding Trials.
- Soybean genotype SL 1104 can be used as source for antixenosis resistance. This genotype should be used for incorporating antixenosis resistance against defoliators in breeding programmes.
- Bt 127 SC formulated by an ICAR Institute (IIOR, Hyderabad) from indigenous strain and would be very cost effective. Promotion of such bio-control products developed by public R&D set up should be encouraged.
- Seed treatment with pesticides (pre-mix Pyroclostrobin & Thiophanate Methyl) + (pre-mix Thiram and Carboxin) + Thiamethoxam) along with polymer coating can be done much before the actual sowing to suitably adjust within the narrow planting window.
- AMS MB 5-18, SL 958, DS 3050, JS 20-71 and MACS 1336 identified as resistant sources for Charcoal rot and DSb 32, DSb 23 for rust can be used as resistant sources in breeding programme.



ब. तकनीकी सत्र की कार्यवाही

**B. PROCEEDINGS OF TECHNICAL SESSIONS**

## **OPENING SESSION**

### **Proceedings of Inaugural Session**

The 49<sup>th</sup> Annual Group Meet of AICRP on Soybean was inaugurated by H<sup>o</sup>ble Vice Chancellor Dr. Parminder Kaushal on 16<sup>th</sup> March 2019. Dr. P.K. Chakraborty, ADG (PP and OP), ICAR was the chief guest. Gathering of about 200 participants included soybean scientists, representatives from soybean processing and seed industries, Deans, Directors and senior faculty of the university. Welcoming the dignitaries and the participants, Dr. D.N. Singh, Director Research, BAU, Ranchi gave a detailed account of developmental activities of the university and about the current situation of agriculture in general and soybean in particular in the state of Jharkhand. Dr. V.S. Bhatia, Director, IISR, Indore presented the current global and Indian scenario of soybean and research accomplishments of the AICRP on Soybean. He stated that although potential of successful soybean cultivation exists in Jharkhand, but due to lack of market farmers are not adopting soybean cultivation. He also mentioned the challenges being faced by soybean on account of climate change and increased incidence of insect-pests and diseases. Dr. P.K. Chakraborty, ADG, ICAR informed that 60 % of domestic edible oil demand is met through import costing the country Rs. 82,000 crores. Soybean contributes 10 % in meeting the domestic demand. He stressed upon minimizing the yield gaps by developing and promoting cost effective production and protection technologies and by producing good quality seed. He suggested several measures to reduce losses due to biotic factors which would save atleast 20-25 % of our crop produce. In his presidential address, Dr. P. Kaushal, H<sup>o</sup>ble Vice Chancellor, BAU, Ranchi appreciated the research accomplishments of the soybean scientists and advised them to put in more efforts in problem solving research. He highlighted the importance of microbial formulations and stressed upon exploiting their potential to enhance soybean productivity. In view of immense potential of soybean cultivation in Jharkhand Dr. Kaushal called upon the scientists to develop technologies and varieties especially suited to the environmental conditions of the state. At the end, Dr. Z.A. Haider, Head, Department of Genetics and Plant Breeding, BAU, Ranchi and the Organizing Secretary expressed gratitude to the dignitaries and thanked one and all for participation in the AGM.

**TECHNICAL SESSION**  
**PLANT BREEDING AND GENETICS RESOURCES**

- Chairman** : Dr PK Chakrabarty,  
ADG (PP&OP), ICAR, New Delhi
- Co-Chairman** : Dr D. N. Singh,  
Director Research, BAU, Ranchi
- Rapporteurs** : Dr S K Lal, ICAR-IARI, New Delhi  
Dr Manoj Srivastava, JNKVV, Jabalpur

Presentation & review of Coordinated Trials was made by Dr Sanjay Gupta, PI-Plant Breeding.

He informed the house that the five different trials, namely Grain soybean trial, Vegetable soybean trial, Multi-location germplasm evaluation, National Hybridization programme and off-season generation advancement programme were conducted during Kharif 2018.

Grain Soybean trial was conducted across all the six zones in 32 centers. Data was rejected from five centres (Umiam, Jorhat, Jabalpur Lok bharti and Devgarh Baria (Anand)). Chairman raised his concern on insensitivity of Devgarh Baria in conducting the trial.

**Initial varietal Trial (IVT)**

In North Hill Zone (NHZ) in IVT none of the entry was promoted to Advanced Varietal Trial-I (AVT-I). In North Plain Zone (NPZ) in IVT only one entry JS21-71 was promoted to AVT-I. In North Eastern Hill Zone (NEHZ) two entries MACS 1620 and MAUS 732 was promoted to AVT-I. In Eastern Zone (EZ) in IVT seven entries (PS 1637, MACS 1566, HIMSO 1689, RSC 11-17, MACS 1620, DSb 33, RSC 11-15) were promoted to AVT-I. In Central Zone (CZ) two entries RVSM 2011-35 and HIMSO 1689 were promoted to AVT-I. Dr Gupta underlined the need for early maturing varieties in CZ, as the farmers are not adopting varieties maturing in more than 90 days. Between the years 2005 to 2018, 477 entries were tested in IVT, out of which only 29 entries matured in 90 days and only one entry JS 20-34 (maturing in 88 days) was released. So there is a need to give special treatment to early maturing entries.

Dr DN Singh, Director Research, BAU and Co-Chairman of the session, raised his concern that why JS 335 is still the best variety. He suggested that the parents of JS 335 should be crossed and a larger F2 should be raised to identify better recombinant.

**Advanced Varietal Trial-I (AVT-I)**

In NPZ, three entries PS 1613, PS 1611 were promoted to AVT-II. In NEHZ, two entries PS 1613 and DS3108 were promoted to AVT-II. IN EZ, nine entries (NRC 128, NRCSL1, NRC 137, RSC 11-07, AMS 2014-1, NRC 132, RSC 11-03, MACS 1493) were promoted to AVT-I. In SZ only entry AMS 100-39 was promoted to AVT-I.. In SZ nine entries (NRCSL1, RSC 11-07, AMS 2014-1, NRC 132, MACS 1493, AMS 100-39, KDS

992, DSb 34, BAUS 102 and SKF-SP-11). Among EDV entries MACSNRC1667 yield at par with MACS 450. NRC 147 (high oleic acid) was promoted to AVT-I in EZ and SZ. In AVT II, in NPZ 92 entries), NEHZ 93 entries), EZ (2 entries), in CZ (3 entries) performed better than the best check.

Dr DN Singh, Director Research, BAU and Co-Chairman of the session, raised his concern that why there are only two or three entries in AVT-II trial. There is a need to strengthen the breeding programme so that a minimum of 8-10 entries reach AVT-II trial.

In Vegetable Soybean trial four entries were tested in NHZ (at 3 centers), CZ (at 4 centers) and SZ (at 3 centers). In NHZ data was received only from Almora centre and Harasoya was found to be the best among the four entries. In CZ and SZ Karune was the best entry.

Chairman and Co-chairman raised their concern on why the vegetable soybean trial failed at some of the centers. It emerged from the discussions that vegetable soybean has very large seed size and as a result their germinability was low.

In Multi-location germplasm evaluation, 105 germplasm lines were evaluated at NHZ (Palampur), NPZ (Pant nagar), NEHZ (Imphal), EZ (Raipur), CZ (Indore, Jabalpur, Parbhani) and SZ (Pune). Promising accessions for high yield (g/plant), early maturity, pods/plant and high 100-seed weight were identified. The promising entries will be used in the national hybridization programme. Dr Gupta informed the house that 110 crosses have been made and seeds of 110 crosses (F3) will be sent to all the centres.

Off-season generation advancement and national hybridization programme, concern was raised that many centers did not make the crosses they were allotted. In off-season generation advancement (F4-F6), Bangalore advanced 38 crosses, Dharwad 2 crosses, Imphal 10 crosses and Adilabad 5 crosses.

Dr Gupta informed the house that DNA fingerprinting work has been started at IISR, Indore and centres can send their entries for fingerprinting at IISR, Indore.

In the end Chairman, Dr PK Chakarbarty, said that all the point raised during the presentation will be taken care of during the formulation of technical programme. He also emphasized that centres doing good work should be incentivised and those not doing up to the mark should be de-incentivised. The session ended with thanks to the chairman.

**TECHNICAL SESSION  
PLANT BREEDING AND GENETICS RESOURCES**

**CENTRE-WISE PRESENTATION OF ONGOING PROGRAMME**

- Chairman** : Dr VS Bhatia,  
Director ICAR-IISR, Indore
- Co-Chairman** : Dr D. N. Singh,  
Director Research, BAU, Ranchi
- Rapporteurs** : Dr S K Lal, ICAR-IARI, New Delhi  
Dr Manoj Srivastava, JNKVV, Jabalpur

**Presentation of progress of breeding work at various cooperating centres**

Dr. Vedana Kumari from Palampur highlighted the objectives of the centre *viz.*, high yield, earliness (<120 days for inter crop with maize), vegetable type and multiple disease resistance. She informed about the genetic stocks (250) of soybean are being maintained by growing them in alternate years. 125 new germplasm lines received from IISR, Indore were evaluated. She highlighted various donors for different characters and resistant sources developed/identified for various diseases at the centre.

Dr. PS Shukla, from GBPUA&T, Pantnagar presented the ongoing breeding programmes. A total of 1319 genetic stocks of soybean were evaluated and 446 lines were deposited under mid-term storage. 135 RILs received from Indore were evaluated. A strong breeding programme has been taken up for incorporating resistance against YMV and combining the genes for resistance to YMV and rust. The work has also been initiated for the development of MAGIC population.

Dr S K Lal, from IARI, New Delhi centre highlighted the work being done at on breeding for early maturity, drought tolerance, salinity tolerance, water logging and inter-specific crosses. 1110 germplasm lines are being maintained.

Dr. B.S. Gill, PAU, Ludhiana highlighted the objectives of the centre which mainly includes breeding for high yield, null KTI and vegetable soybean. He informed that about 744 germplasm of soybean are being maintained. 250 new germplasm lines received from IISR, Indore were evaluated. He reported transfer of YMV resistance in popular soybean varieties from *G. max* and *G. soja*.

Dr Nutan Verma, from Ranchi centre highlighted her centre's objectives *viz.*, development of short and medium duration soybean varieties. 538 germplasm lines are maintained. Two varieties were released from SVRC (Birsa Soy Safed 2 and Birsa Soy 3).

Co-chairman, Dr DN Singh, Director Research, BAU suggested to give priority to breeding for acidity tolerance and early maturity besides breeding for abiotic and biotic stresses. He also suggested to strengthen the breeding programme.

Dr. S.K. Nag, IGKV, Raipur highlighted the objectives of the centre *viz.*, high yield, short and medium duration and multiple disease and insect-pest resistance. He reported breeding work of his centre which mainly includes fresh crosses attempted and handling of advanced segregating materials.

Dr. S.R. Ramgiri from Sehore, highlighted his centre's objectives *viz.*, development of short and medium duration soybean varieties suitable for mechanical harvesting. Seven hundred germplasm lines were maintained for various traits.

Dr. BL Meena, Kota Centre highlighted the objectives of the centre *viz.*, high yield, short and medium duration and multiple disease and insect-pest resistance. 128 germplasm lines are available at the centre. He reported breeding work of his centre which mainly includes fresh crosses attempted and handling of advanced segregating materials.

Dr. M. K. Shrivastava from Jabalpur centre highlighted his research work on the development of early maturity, high yielding, and charcoal rot resistant and YMV resistant genotypes of soybean. He also informed that charcoal rot resistance and YMV nursery is maintained at Jabalpur centre. Release proposal of two genotypes have been submitted to CVRC for release and notification.

At Dr Chandankar, from Amravati informed about the ongoing breeding programme. The major objectives of the centre are to develop early to medium maturity soybean genotypes with high seed yield and resistance to charcoal rot and YMV.

At VNMKV, Parbhani, Dr S.P. Mehtre informed about the ongoing breeding programme of the centre. Developing early to medium maturity soybean genotypes with high seed yield and resistance to various biotic and abiotic stresses. Charcoal rot is major problem at Amravati.

Dr. G. T. Baswaraja, UAS, Dharwad centre presented his research work on breeding for rust resistant varieties and combining rust and YMV resistance. He also informed about the incidence of pod borer. 528 germplasm lines are being maintained at the centre.

Dr Philips Verghees presented his research work and status of germplasm lines at ARI Pune. A total of 607 GP lines are available at the centre. 125 new germplasm lines were received from IISR during kharif 2018 were evaluated for 25 qualitative and quantitative characters. Three high oil content lines were identified. The work on KTI and low Liopxygenase were also undertaken.

Co-Chairman Dr DN Singh, suggested that breeding programme at Ranchi, Kota and Raipur should be strengthen, breeders should make less number of crosses but the F2 population size should be large.

Chairman Dr V. S. Bhatia at last, in his remarks appreciated work reported by breeders of different centers and emphasized that all the suggestion made should be taken care while making the technical programme.

## TECHNICAL SESSION NUCLEUS AND BREEDER SEED PRODUCTION

**Chairman** : Dr VS Bhatia,  
Director ICAR-IISR, Indore

**Rapporteurs** : Dr. Philips Varghese, ARI, Pune  
Dr. G.K. Satpute, ICAR-IISR, Indore

The session started with review of breeder seed production during Kharif 2018. Dr. M.K. Kuchlan, presented the figures for production of breeder seed of 34 varieties at various AICRP centres. He informed the house that last year was a good year for production of breeder seed. As per DAC indent of 14740 quintals of breeder seed, a total of 14865 quintal was produced.

Against the total DAC indent of 14740q, AICRPS centres were allotted a target of **19309.0** q for breeder seed production. The highest target of **2800** q was for JS 335 followed by **2130** q for JS 20-29 and **2130** q for JS 20-34.

A total production of **14865**q was achieved. This figure is 125 q more than the total indent. Two major varieties JS 20-29 and JS 20-34 had a deficit of 1966.6 and 1648.8 q over the indent.

The Chairman expressed satisfaction over the achievement of the target and congratulated all other centres for achieving the target. He also expressed concern over the shortfall of production of new varieties - JS 20-29 and JS 20-34. He stated that breeder seed being the sole responsibility of ICAR and SAUs we should make all out efforts to fulfill the country's demand of soybean seed.

The allocation for production of breeder seed during kharif 2019 was taken up. A total tentative indent of 16582 q has been received from DAC for 36 varieties. The total allocation of 18182 q has been made to different centres.

The session ended with thanks to the chairman.

### Final Allotment of Soybean Breeder Seed Production for Kharif 2019 at AICRP Soybean

| Sl. No. | Variety Name | Year | DAC Indent | Centre   | Allotment   |
|---------|--------------|------|------------|----------|-------------|
| 1       | JS 20-34     | 2015 | 3064.6     | JNKVV    | 1100        |
|         |              |      |            | Kota     | 800         |
|         |              |      |            | Udaipur  | 300         |
|         |              |      |            | RVSKVV   | 400         |
|         |              |      |            | Amravati | 200         |
|         |              |      |            | Parbhani | 200         |
|         |              |      |            |          | <b>3000</b> |
| 2       | JS-335       | 1994 | 2435       | RVSKVV   | 200         |
|         |              |      |            | Dharwad  | 600         |
|         |              |      |            | Amravati | 300         |

|    |                          |      |                |           |             |
|----|--------------------------|------|----------------|-----------|-------------|
|    |                          |      |                | Rahuri    | 500         |
|    |                          |      |                | Bengaluru | 300         |
|    |                          |      |                | Raichur   | 150         |
|    |                          |      |                | Adilabad  | 400         |
|    |                          |      |                | Shimoga   | 100         |
|    |                          |      |                | Pune      | 50          |
|    |                          |      |                |           | <b>2600</b> |
| 3  | JS 20-29                 | 2014 | <b>1840.8</b>  | JNKVV     | 200         |
|    |                          |      |                | RVSKVV    | 500         |
|    |                          |      |                | Kota      | 300         |
|    |                          |      |                | Udaipur   | 300         |
|    |                          |      |                | Lokbharti | 200         |
|    |                          |      |                | Parbhani  | 200         |
|    |                          |      |                | Raipur    | 300         |
|    |                          |      |                |           | <b>2000</b> |
| 4  | JS-93-05                 | 2002 | <b>1303</b>    | RVSKVV    | 300         |
|    |                          |      |                | Dharwad   | 500         |
|    |                          |      |                | Raipur    | 200         |
|    |                          |      |                | Amravati  | 200         |
|    |                          |      |                | Rahuri    | 100         |
|    |                          |      |                | Adilabad  | 50          |
|    |                          |      |                | Shimoga   | 100         |
|    |                          |      |                |           | <b>1450</b> |
| 5  | JS 20-69                 | 2016 | <b>1443.1</b>  | JNKVV     | 1200        |
|    |                          |      |                | RVSKVV    | 300         |
|    |                          |      |                | Parbhani  | 50          |
|    |                          |      |                | Raipur    | 50          |
|    |                          |      |                |           | <b>1600</b> |
| 6  | JS 95-60                 | 2007 | <b>1244.69</b> | RVSKVV    | 1000        |
|    |                          |      |                | Kota      | 60          |
|    |                          |      |                | HIL       | 300         |
|    |                          |      |                |           | <b>1360</b> |
| 7  | JS 20-98                 | 2018 | <b>1320.4</b>  | JNKVV     | <b>1330</b> |
| 8  | JS 97-52                 | 2008 | <b>93</b>      | Raipur    | 110         |
|    |                          |      |                | Ranchi    | 10          |
|    |                          |      |                |           | <b>120</b>  |
| 9  | DSb - 21                 | 2014 | 297            | Dharwad   | 325         |
| 10 | DSb 23                   |      | 28.9           | Dharwad   | 35          |
| 11 | RVS 2001-4               | 2014 | 864.1          | RVSKVV    | 900         |
| 12 | Raj Soya -18<br>(Pragya) | 2017 | 375            | RVSKVV    | 400         |
| 13 | RVS 2002-4               | 2017 | 800            | RVSKVV    | 900         |
| 14 | RKS-113                  | 2016 | 10             | Kota      | 15          |
| 15 | RKS 45                   | 2013 | 5              | Kota      | 5           |
| 16 | RKS-24                   | 2011 | 5              | Kota      | 5           |
| 17 | MAUS 158                 | 2010 | 423            | Parbhani  | 450         |
| 18 | MAUS-71                  | 2002 | 405            | Parbhani  | 425         |



|    |                   |      |                 |           |              |
|----|-------------------|------|-----------------|-----------|--------------|
| 19 | MAUS - 162        | 2014 | 228             | Parbhani  | 250          |
| 20 | MAUS-612          | 2018 | 183             | Parbhani  | 200          |
| 21 | NRC-86            | 2015 | 110             | Indore    | 125          |
| 22 | NRC-37            | 2001 | 55              | Indore    | 60           |
|    |                   |      |                 | Amravati  | 20           |
|    |                   |      |                 |           | <b>80</b>    |
| 23 | CG Soya 1         | 2018 | 95              | Raipur    | 110          |
| 24 | Basara            | 2017 | 100             | Adilabad  | 120          |
| 25 | MACS 1188         | 2013 | 20              | Pune      | 25           |
| 26 | MACS 1281         | 2016 | 15              | Pune      | 20           |
| 27 | Phule Kalyani     | 2006 | 32              | Rahuri    | 40           |
| 28 | Phule Sangam      | 2018 | 25              | Rahuri    | 30           |
| 29 | PS-1225           | 2009 | 14              | Pantnagar | 18           |
| 30 | PS-1347           | 2008 | 4               | Pantnagar | 5            |
| 31 | PS 1368           | 2013 | 2               | Pantnagar | 2            |
| 32 | Palam Soya        | 2005 | 15.6            | Palampur  | 18           |
| 33 | Hara Soya         | 2001 | 6.25            | Palampur  | 8            |
| 34 | Shiwalik          | 1990 | 2               | Palampur  | 2            |
| 35 | Pusa 12           | 2015 | 5               | IARI      | 5            |
| 36 | VL Soya-65        | 2010 | 4               | Almorah   | 4            |
| 37 | VL SOYA 63        | 2008 | 2               | Almorah   | 2            |
| 38 | VL 77             | 2016 | 4               | Almorah   | 4            |
| 39 | VLS 89*           |      | 1               | Almorah   | 1            |
| 40 | SL 958            | 2015 | 0.4             | Ludhiana  | 1            |
| 41 | Biirsa Soybean -1 | 1983 | 0.5             | Ranchi    | 1            |
| 42 | JS 10-98*         | 2017 | 5               |           |              |
| 43 | JS 61-24*         |      | 5.1             |           |              |
| 44 | JS 20-14*         |      | 9.9             |           |              |
|    |                   |      | <b>16901.34</b> |           | <b>17991</b> |

**\*No notification record is available for these varieties**

## **TECHNICAL SESSION**

### **AGRONOMY AND FRONTLINE DEMONSTRATIONS**

- Chairman** : Dr. Raghav Thakur,  
Head, Department of Agronomy, BAU, Ranchi
- Co-Chairman** : Dr. Niva Bara, Head,  
Department of Agricultural Extension, BAU, Ranchi
- Rapporteurs** : Dr. Sangshetty Balkunde, UAS, Dharwad  
Dr. D.S. Meena, AU, Kota

Principal Investigator (Agronomy) Dr. S. D. Billore, Principal Scientist, ICAR-IISR, Indore, presented the results of five agronomical trials and front line demonstrations conducted at 25 coordinating centers respectively during *Kharif* 2018.

#### **Presentation was followed by discussion**

Dr. V.S. Bhatia, Director, IISR and Dr. D.N. Singh, Director Research, BAU Ranchi suggested that the cost of any new molecules tested under AICRPs System must provide the economics of testing material.

Dr. Sanjay Gupta, Principal Investigator (Plant Breeding) suggested the row spacing instead of date of sowing may be tested in AVT-II entries.

The chairmen appreciated the presentation made by Dr. S. D. Billore, PI (Agronomy)

The session ended with vote of thanks

## TECHNICAL SESSION ENTOMOLOGY

**Chairman** : Dr. P.K. Singh,  
Head, Department of Entomology, BAU, Ranchi

**Rapporteurs** : Dr. Neeta Gaur, GBPUA&T, Pantnagar  
Dr. R. Channakeshava, UAS, Dharwad

At the outset, the session began with welcome address by the Chairman, Dr. P.K. Singh, invited Dr. A.N. Sharma, Principal Scientist & PI (Entomology) to present the research results of *kharif* 2018. Dr. A.N. Sharma presented the results of seven coordinated entomological experiments conducted at 12 coordinated centres. He mentioned that during the year, work on three main objectives *i.e.*, seasonal incidence of major insect pests, varietal screening for host plant resistance and management of insect pests were being taken up. He mentioned that a total of 21 insect pests were recorded on soybean from different coordinating centres. In North Plain Zone, whitefly, girdle beetle, *Spodoptera litura*, semilooper, stem fly and aphids, in North Eastern Hill Zone, pod borer, Bihar hairy caterpillar, leaf miner, stem fly, aphids, whitefly, girdle beetle, bean bug, semilooper and thrips, in Central Zone, stem fly, leaf roller, semilooper, *S. litura*, girdle beetle, pod borer, Bihar hairy caterpillar, leaf folder, whitefly and flea beetle, in Southern Zone, semilooper, stem fly, girdle beetle, *S. litura*, leaf folder and pod borer were the major pests of concern. Among the biological control agents, entomopathogenic fungus, *Beauveria bassiana* and *Nomurea rileyi* and bacterial infection indicated their potential in management of defoliators.

In field screening trials, Dr. Sharma mentioned that on the basis of last 3 years data 32 AVT entries have proved to be promising against the major insect pests of soybean in different centres. AMS-MB 5-18, DSb 32, NRC 127, DSb 28-03, RVS 2007-6 were identified as potential donor against pest complex. Similarly among 38 IVT entries screened at different centres, several entries were found to be promising against insect pests. AUKS 176, DS 3110, MAUS 732, RSC 11-15, RVS 2011-10, Himso 1689 and RVSM 2011-35 showed resistance against stem fly. CAUMS 1, RSC 11-17, NRC 146, DS 3109, RVS 2007-4, MAUS 734, MAUS 732, PS 1637 and KDS 1009 showed resistance against defoliators.

The results of experiments conducted on identification of defoliator resistance/non-preferred genotypes on the basis of approximate digestibility (AD), efficiency of conversion index (ECI), efficiency of conversion of digested food (ECD) and preference index (PI) indicated variation in genotypic response at 2 different centres. SL 1104 showed strong antixenosis at Pantnagar. Entries *viz.* KDS 921 and DSb 32 exhibited good level of antibiosis with relatively lower AD, ECI and ECD as compared to other genotypes in Dharwad.

Evaluation of Bt 127 SC strains against lepidopteran larvae conducted at 5 coordinated centres indicated Bt 127 SC to be significantly superior over control and on par with that of commercial formulation for management of soybean defoliators. However there was no significant difference in yield obtained with Bt 127 SC and commercial Bt Delfin.

Assessment of polymer coating on the efficacy of seed treating chemicals and inoculants was conducted at four coordinated centres. Effect of different treatments indicated that seed treatment with pesticides with polymer coating is effective in retaining their efficacy upto 30-45 days after sowing. The results indicated that seed treatment can be done well in advance to ensure hassle free sowing.

50 germplasm lines were evaluated at five different centers for resistance against major insect-pests. Among these lines, AMS 108, AMSS 34, EC 347464, EC 113778, EC 232019, Harder, JS 20-41, JS 20-48, JS 20-50, JS 20-51, JS 20-53, JS 20-55, JS 20-59, JS 20-61, JS 20-86, MAUS 142, PS 1423, SQL 31, SQL 32, and SQL 37 were identified as potential germplasm/breeding lines and will be further evaluated for insect resistance and yield at respective centers during *kharif* 2019.

Chairman opened the session for discussion and asked the method for screening of AVT entries for different insect pests at different locations. Dr. A.N. Sharma replied that, first we will search the hot spots for the particular insect pests and then based on the average population of such insects AICRPS method of categorization will be followed. Chairman asked for the method of observation to be taken for whiteflies in cages. Dr. A.N. Sharma replied that, whitefly population count should be taken on trifoliolate leaves and population will be recorded per plant basis.

The Chairman summarized and appreciated the presentation made by Dr. A.N. Sharma and session ended with vote of thanks to the Chairman.

#### **Recommendations:**

1. Soybean genotype SL 1104 can be used as source for antixenosis resistance. This genotype should be used for incorporating resistance against defoliators in breeding programmes.
2. Bt 127 SC formulated by an ICAR Institute (IIOR, Hyderabad) from indigenous strain and would be very cost effective. Promotion of such bio-control products developed by public R&D set up should be encouraged.
3. Seed treatment with pesticides with 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 maintaining desired plant population and ensuring good yields.

## TECHNICAL SESSION PLANT PATHOLOGY

- Chairman** : Dr. N. Kudada, Professor & Head,  
Department of Plant Pathology, BAU, Ranchi
- Rapporteurs** : Dr. Pawan K. Amrate, JNKVV, Jabalpur  
Dr. Laxman Singh Rajput, ICAR-IISR, Indore

At the outset, the session started with the welcome address by the Chairman. Dr. N. Kudada Professor and Head, Department of Plant Pathology, B.A.U, Ranchi, Jharkhand. Dr. Shamarao Jahagirdar, Principal Scientist and PI (Plant Pathology) presented the results of coordinated trials and appraised that nine Pathology field trials were conducted during *kharif* 2018 at 15 co-ordinated centres spread over five zones to generate the information on prevalence of diseases, their severity, sources of resistance to either a single disease or multiple diseases, screening of germplasm lines for identification of sources of multiple disease resistance, 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 of 18 diseases appeared across the country but only eight of them were wide spread occurring in three or more zones and four were zone specific. Two disease *viz.*, PB (Ct) and YMV were found in all the five zones which are the key diseases across the locations. Soybean genotypes belonging to IVT, AVT-I, AVT-II of different zones were evaluated for disease resistance. In IVT trial; entries PS 1637, GJS 3 and NRC 148 showed AR reaction over two locations for PB (ct) and DSb 33 showed HR reaction at Ugarkhurd and Dharwad. The entries DS 3109, SL 1191, NRC SL 2, KDS 1009 showed AR to CR at Jabalpur and Amravati centre.

In AVT I trials, two entries NRC 147 and VLS 94 showed AR reaction to FLS while entries RSC 11-07 and SL 1123 showed HR reaction at Palampur. The entry VLS 94 showed AR at Palampur and HR at Almora for FLS. At Pantnagar, the entry PS 1611 showed AR reaction to PB(Ct), BP and BLB while nine entries showed AR reaction for BP and 25 for BLB. The entries SL 1123, VLS 94 showed AR reaction for BP, BLB, HR for RAB and YMV across the locations. The entries AMS MB 2014-1, CSB 10112, NRC128, NRC 132 and PS 1611 showed AR/HR reaction at both Medziphema and Jorhat locations. At Jabalpur, the entries AMS 100-39, KDS 992, NRC 130, PS 1613 and VLS 94 showed AR reaction to CR, while at Dharwad, DSb 34 showed HR reaction at Dharwad and Ugarkhurd while MR at K. Digraj.

In AVT II, at Pantnagar, all the entries showed AR reaction for BLB except KDS 921, RSC 10-52, DS 3106 showed HR reaction to BLB. The entries DS 3106 and SL 1104 showed AR/HR reaction at two or more centres for YMV. The entries DS 3106, RSC 10-52 showed AR/HR reaction to RAB and PB(Ct) at Medziphema and Jorhat centers. Entry AMS MB 5-18 showed AR reaction to CR at Jabalpur. DSb 32, RSC 10-71 and SL 1104 showed AR reaction to TLS at Sehore center. DSb 32 showed HR reaction to rust at Dharwad, Ugarkhurd and K. Digraj whereas KDS 921 showed HR reaction at K. Digraj only.

In the previous year resistance sources, AMS MB 5-18 and MACS 1336 showed AR reaction for Charcoal rot at Amravati center. At Jabalpur, 11 lines maintained HR

reaction for CR. Dharwad center identified new sources of resistance to rust viz., EC 391336, EC 379152, EC 242104.

In evaluation of germplasm line for multiple disease resistance, the lines Trait Specific Harder (L.), EC 287754, AGS 102, JS 75-30 and EC 309537 showed resistant reaction for PB (ct) at three or more locations which can be used as sources in resistance breeding programme. In the bio-efficacy of Zillon against YMV 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 YMV 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. Further he also presented the influence of micro meteorological factors on development on the foliar fungal diseases and YMV at Dharwad, Palampur, Jorhat and Pantnagar.

The house suggested to develop forewarning system for location specific diseases. Dr A. N. Sharma suggested to workout economics involved with respect to use of Zillon in the management of YMV before final recommendation. Dr Sanjay Gupta informed that in screening of germplasm lines for multiple diseases resistance a separate set of the seed material will be supplied through respective breeders of their centers. The chairman appreciated the efforts made by Plant Pathology group for identification of resistant sources to various diseases and also suggested to further deposit as genetic stock at NBPGR, New Delhi and use this material in their resistant breeding programme. At the end chairman thanked the speaker for nice presentation & compilation and also the delegates for their active participation and interaction.

### **Recommendations:**

1. AMS MB 5-18, SL 958, DS 3050, JS 20-71 and MACS 1336 as resistant sources for CR, DSb 32, DSb 23 for rust can be used as resistant sources in breeding programme.
2. Use of polymer seed coating with (pre-mix Pyroclostrobin & Thiophanate Methyl) + (pre-mix Thiram and Carboxin) + Thiamethoxam be recommended for the management of location specific diseases.

## TECHNICAL SESSION MICROBIOLOGY

- Chairman** : Dr. Rakesh Kumar,  
Professor, Soil Science, BAU, Ranchi
- Rapporteurs** : Dr. K. P. Raverkar, GBPUA&T, Pantnagar

At the outset, the session began with the welcome address by Chairman.

- Dr. M. P. Sharma, P.I., Microbiology, Principal Scientist, IISR, Indore, presented the salient findings of the microbiological trials conducted during *Kharif* 2018 by all the centres. Dr. M. P. Sharma complimented all the centres for the successful conduct of the microbiological trials during the period 2018-19 as per the technical program. In MB-1 trial PI provided salient findings along with the role of ACC deaminase producing microbes and IAA production of fluorescent *Pseudomonas* strains. It was agreed that the twenty-six isolates of *Pseudomonas* isolated by the Pantnagar Centre should be screened on PEG first and then the potential isolates should be characterized for drought stress traits.
- The chairman Dr. Rakesh Kumar and the team felt that the MB-1 and MB-2 are of similar nature thus both should be merged. It was also agreed that all the centres should select potential isolates of *Pseudomonas* and *Rhizobium* showing resistance to PEG 20 or more and should be characterized for the various drought stress traits such as ACC deaminase, SOD, catalase and IAA production.
- Under MB-2a two promising strains of bradyrhizobia isolated from the drought tolerant varieties/ lines (*B. daqingense*, *B. liaoningense*) were evaluated under pot conditions with and without stress by formulating an experiment. Across the locations *B. daqingense* performed better and it should be continued.
- With respect to the MB-3 trial soybean yield was enhanced with AMF along with *Paenibacillus polymyxa* at farmers' field at 75% RDF. It was felt that this trial should be continued for one more year and observations to be recorded were fine tuned.
- Regarding the MB-4 trial, the AVT-II entries were evaluated against native homologous rhizobia based on nodulation parameters and leghaemoglobin content in nodules only at three zones. It was felt that the leghaemoglobin content along with the nodulation of AVT II entries should be considered. However, in some zones microbiologist is not present thus it was proposed to reinstate Raipur centre and add two more centres as voluntary centres to represent the microbiology in NHZ and NEHZ (AAS, Jorhat and VPKAS, Almora).
- To strengthen and to have quality work, P.I. stressed upon the need of allocation of additional contingency per trial to voluntary centres and regular centres which are performing excellently.
- The P.I. presented the prospects of PPFM in soybean. However, Dr. Annapurna suggested (HOD, Microbiology, IARI) that PPFM are being facultative microbes have greater role in rice, thus it should not be used in soybean.
- The P.I. on the behalf of team suggested that on the eve of 50<sup>th</sup> anniversary of IISR, Indore a 'Manual on Microbiological Methods' shall be published. The proposal was appreciated by the Chairman.

The session ended with thanks to the Chairman.

**TECHNICAL SESSION  
FOOD TECHNOLOGY**

**Chairman** : Dr. Rekha Sinha,  
Department of Home science, BAU, Ranchi

**Rapporteurs** : Dr. Pramod Rai, Department of Agricultural  
Engineering, BAU, Ranchi  
Dr. Md. Irfan Ahmad Ansari, Department of  
Agricultural Engineering, BAU, Ranchi

**Presentation of results of coordinated trials:** Dr. L. Sophia Devi, CAU, Imphal

**Suggestion by Chairman and house**

1. Analysis of cost economics of fermented soya product, extracted poly-glutamate & cookies.
2. Commercialization of fermented soya product, extracted poly-glutamate & cookies.
3. Development of soya milk from improved developed variety of soya bean to assess the level of beany flavor.



## PLENARY SESSION

### Proceedings of Plenary Session

The session was chaired by H<sup>ble</sup> Vice Chancellor Dr. P. Kaushal and Co-chaired by Director Research Dr. D.N. Singh with Director, IISR Dr. V.S. Bhatia acting as the convener. Rapporteurs of various technical sessions viz. Plant Breeding, Agronomy, Entomology, Plant Pathology, Microbiology and Seed Productions presented the proceedings and the Technical Programme for *kharif* 2019 season. Presenting the proceedings of the Varietal Identification Committee meeting, the Director, IISR Dr. V.S. Bhatia informed the house that out of 9 proposals, the committee identified 5 varieties for release and notification: SL 1104 for North Plain Zone, DSb 32 for North Eastern Hill Zone and RSC 10-52, MACS 1520 and AMS-MB 5-18 for Central Zone. Dr. D.N. Singh emphasized on solving the problems arising due to acidic soils and biotic-abiotic stresses. He also suggested including micro nutrients in Site Specific Nutrient Management (SSNM) and demonstrating soybean yield potential through FLDs with ICM approach. In his address the Chairman Dr. P. Kaushal stressed on the need of quality research. He said that this would be possible only when Scientists plan and manage their experiments and collect the data very carefully. He congratulated the breeders whose varieties were identified during this AGM, and hoped that some good varieties would be developed for Jharkhand also in coming years. At the end Dr. A.N. Sharma, I/c AICRPS expressed gratitude to the Vice Chancellor for accepting to organize the AGM at BAU and to the Director Research and his team for making all necessary arrangements for successful conduct of the AGM. Constant encouragement and support from Secretary, DARE and DG, ICAR, Dy. Director General (CS) and Asstt. Director General (PP and OP) was also thankfully acknowledged.

स. तकनीकी कार्यक्रम

**C. TECHNICAL PROGRAMMES**

### **C. Technical Programme of Research 2019-20**

The technical programmes of research of Plant Breeding & Genetic Resources, Agronomy & Frontline Demonstrations, Entomology, Microbiology, Plant Pathology and Food Processing and Value addition for 2019-20 were proposed after in-depth deliberations by the scientists of respective disciplines under the chairmanship of various subject experts who chaired respective technical sessions in the workshop. Pertinent suggestions emanated during the discussions in the technical sessions have been included. The proposed technical programmes were finalized in the plenary session after incorporating modifications /changes as suggested and agreed upon in the session.

## **(A) TECHNICAL PROGRAMME OF PLANT BREEDING FOR KHARIF 2019**

### **CO-ORDINATED VARIETAL TRIALS**

#### **A. NORTHERN HILL ZONE: No AVT I**

#### **B. NORTHERN PLAIN ZONE (NPZ): Pantnagar, Delhi and Ludhiana**

##### **Advanced Varietal Trial II (AVT-I+II)**

|                 |                                                 |
|-----------------|-------------------------------------------------|
| DESIGN          | R.B.D.                                          |
| GROSS PLOT SIZE | 12 rows, 5m long (5.4 x 5 m sq)                 |
| NET PLOT SIZE   | 10 rows, 4.8m long (4.5 x 4.8 m sq)             |
| REPLICATION     | Four                                            |
| LOCATIONS       | Pantnagar, Delhi, Ludhiana                      |
| ENTRIES         | JS 21-71, DS 3110, PS 1613*, PS 1611*, NRC 128* |
| CHECKS          | PS 24, PS 1347, Pusa 97-12, SL 958              |
| SEED            | 1.5 kg/entry/location                           |

**\*AVT II entries**

#### **C. NORTH EASTERN HILL ZONE (NEHZ): Jorhat, Imphal, Umiam**

##### **Advanced Varietal Trial I (AVT-I + II)**

|                 |                                          |
|-----------------|------------------------------------------|
| DESIGN          | R.B.D.                                   |
| GROSS PLOT SIZE | 12 rows, 5m long (5.4 x 5 m sq)          |
| NET PLOT SIZE   | 10 rows, 4.8m long (4.5 x 4.8 m sq)      |
| REPLICATION     | Four                                     |
| LOCATIONS       | R.B.D.                                   |
| ENTRIES         | MACS 1620, MAUS 732, PS 1613*, DS 3108*, |
| CHECKS          | JS 335, JS 97-52, RKS 113, RKS 18        |
| SEED            | 1.5 kg/entry/location                    |

**\*AVT II entries**

#### **D. EASTERN ZONE (EZ) : Bhawanipatna, Raipur, Ranchi**

##### **Advanced Varietal Trial I (AVT-I)**

|                 |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                           |
| GROSS PLOT SIZE | 8 rows, 5m long (3.6 x 5 m sq)                                                   |
| NET PLOT SIZE   | 6 rows, 4.8m long (2.7 x 4.8 m sq)                                               |
| REPLICATION     | Four                                                                             |
| LOCATIONS       | Bhawanipatna, Raipur, Ranchi, Dholi                                              |
| ENTRIES         | PS 1637, MACS 1566, Himso 1689, RSC 11-17, MACS 1620, DSb 33, RSC 11-15, NRC 148 |
| CHECKS          | JS 335, JS 97-52, RKS 18, RSC 10-46                                              |
| SEED            | 1.5 kg/entry/location                                                            |

##### **Advanced Varietal Trial II (AVT-II)**

|                 |                                     |
|-----------------|-------------------------------------|
| DESIGN          | R.B.D.                              |
| GROSS PLOT SIZE | 12 rows, 5m long (5.4 x 5 m sq)     |
| NET PLOT SIZE   | 10 rows, 4.8m long (4.5 x 4.8 m sq) |
| REPLICATION     | Four                                |
| LOCATIONS       | Ranchi, Raipur, Bhawanipatna, Dholi |

|         |                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------|
| ENTRIES | RSC 11-07, NRC 128, AMS 2014-1, NRC 136, MACS 1493, RSC 11-03, NRCSL 1, NRC 132, NRC 137, NRC 147 |
| CHECKS  | JS 335, RKS 18, JS 97-52                                                                          |
| SEED    | 1.5 kg/entry/location                                                                             |

**E. CENTRAL ZONE (CZ):** Jabalpur, Sehore, Parbhani, Amrawati, Kota, Jalna, Morena, Nagpur

**Advanced Varietal Trial I (AVT-I)**

|                 |                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                                              |
| GROSS PLOT SIZE | 8 rows, 5m long (3.6 x 5 m sq)                                                                      |
| NET PLOT SIZE   | 6 rows, 4.8m long (2.7 x 4.8 m sq)                                                                  |
| REPLICATION     | Four                                                                                                |
| LOCATIONS       | Amravati, Anand, Indore, Jabalpur, Kota, Morena, Nagpur, Parbhani, Sehore, Amreli, Lok Bharti       |
| ENTRIES         | RVSM 2011-35, Himso 1689, NRCSL 2, JS 21-72, NRC 148, NRC 146, NRC 138, MACSNRC 1575 (Repeat entry) |
| CHECKS          | NRC 86, JS 20-34, JS 20-98, JS 335, JS 97-52                                                        |
| SEED            | 1.5 kg/entry/location                                                                               |

**Advanced Varietal Trial I (AVT-I): Vegetable Soybean Trial**

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                          |
| GROSS PLOT SIZE | 14 rows, 5m long (6.3 x 5 m sq)                                                 |
| NET PLOT SIZE   | 12 rows, 4.8m long (5.4 x 4.8 m sq). 6 rows for seed and six rows for vegetable |
| REPLICATION     | Four                                                                            |
| LOCATIONS       | Indore, Amravati, Parbhani, Kota                                                |
| ENTRIES         | Karune                                                                          |
| CHECKS          | Harasoya, JS 95-60, JS 20-34                                                    |
| SEED            | 12 kg/entry/location                                                            |

**Advanced Varietal Trial II (AVT- II)**

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                                        |
| GROSS PLOT SIZE | 12 rows, 5m long (5.4 x 5 m sq)                                                               |
| NET PLOT SIZE   | 10 rows, 4.8m long (4.5 x 4.8 m sq)                                                           |
| REPLICATION     | Four                                                                                          |
| LOCATIONS       | Amravati, Amreli, Anand, Indore, Jabalpur, Kota, Lok Bharti, Morena, Nagpur, Parbhani, Sehore |
| ENTRIES         | AMS 100-39, NRC 130, NRC 131                                                                  |
| CHECKS          | JS 335, JS 97-52, NRC 86, JS 20-34                                                            |
| SEED            | 1.5 kg/entry/location                                                                         |

**F. SOUTHERN ZONE (SZ) –** Pune, K. Digraj, Bengaluru, Dharwad, Adilabad & Bidar

**Advanced Varietal Trial I (AVT-I)**

|                 |                                                     |
|-----------------|-----------------------------------------------------|
| DESIGN          | R.B.D.                                              |
| GROSS PLOT SIZE | 8 rows, 5m long (3.6 x 5 m sq)                      |
| NET PLOT SIZE   | 6 rows, 4.8m long (2.7 x 4.8 m sq)                  |
| REPLICATION     | Four                                                |
| LOCATIONS       | Adilabad, Bidar, Bengaluru, Dharwad, K.Digraj, Pune |
| ENTRIES         | DSb 33,MACSNRC1667 (Repeat)                         |

|        |                                  |
|--------|----------------------------------|
| CHECKS | KS 103, DSb 23, DSb 21, MACS 450 |
| SEED   | 1.0 kg/entry/location            |

#### **Advanced Varietal Trial I (AVT-I): Vegetable Soybean**

|                 |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                          |
| GROSS PLOT SIZE | 14 rows, 5m long (6.3 x 5 m sq)                                                 |
| NET PLOT SIZE   | 12 rows, 4.8m long (5.4 x 4.8 m sq). 6 rows for seed and six rows for vegetable |
| REPLICATION     | Four                                                                            |
| LOCATIONS       | Adilabad, Bengaluru, Pune                                                       |
| ENTRIES         | Karune                                                                          |
| CHECKS          | Harasoya (National Check), KDS 726 (SZ)                                         |
| SEED            | 12 kg/entry/location                                                            |

#### **Advanced Varietal Trial II (AVT- II)**

|                 |                                                                                                                |
|-----------------|----------------------------------------------------------------------------------------------------------------|
| DESIGN          | R.B.D.                                                                                                         |
| GROSS PLOT SIZE | 12 rows, 5m long (5.4 x 5 m sq)                                                                                |
| NET PLOT SIZE   | 10 rows, 4.8m long (4.5 x 4.8 m sq)                                                                            |
| REPLICATION     | Four                                                                                                           |
| LOCATIONS       | Pune, K. Digraj, Bengaluru, Dharwad, Adilabad and Bidar                                                        |
| ENTRIES         | NRC 147, DSb 34, MACS 1493, KDS 992, RSC 11-07, AMS 100-39, NRC SL 1, BAUS 102, AMS 2014-1, SKF-SP-11, NRC 132 |
| CHECKS          | DSb21, RKS 18, JS 335, JS 93-05                                                                                |
| SEED            | 1.5 kg/entry/location                                                                                          |

#### **G. INITIAL VARIETAL TRIAL (IVT) (ACROSS ZONES):**

|                  |      |                                                                                                  |
|------------------|------|--------------------------------------------------------------------------------------------------|
| DESIGN           |      | R.B.D.                                                                                           |
| PLOT SIZE        |      | 3 rows, 3m long (1.35 x 3 m sq)                                                                  |
| REPLICATION      |      | Three                                                                                            |
| <b>LOCATIONS</b> | NHZ  | Almora, Palampur, Majhera, Srinagar, Sopore                                                      |
|                  | NPZ  | Pantnagar, Delhi, Ludhiana                                                                       |
|                  | EZ   | Ranchi, Raipur and Bhawanipatna, Dholi                                                           |
|                  | NEHZ | Umiam, Imphal and Jorhat                                                                         |
|                  | CZ   | Jabalpur, Sehore, Parbhani, Amrawati, Kota, Morena, Anand, Amreli, Indore, Lok Bharti and Nagpur |
|                  | SZ   | Pune, K. Digraj, Bengaluru, Dharwad, Adilabad and Bidar                                          |
| SEED             |      | 8 kg/entry                                                                                       |
| <b>CHECKS</b>    |      | There will be following checks in each zone:                                                     |
|                  | NHZ  | VLS 59, <del>Palam Early Soya 1*</del> , VLS 89, PS 1556, VLS 63                                 |
|                  | NPZ  | PS 24, SL 958, SL 1074, PUSA 97-12                                                               |
|                  | EZ   | MACS 1460, JS 20-116, KDS 753, RSC 10-46                                                         |
|                  | NEHZ | KDS 753, MACS 1460, JS 20-116, RKS 113                                                           |
|                  | CZ   | NRC 86, JS 20-34, JS 20-98, RSC 10-46                                                            |
|                  | SZ   | MACS 1460, DSb 23, DSb 21, KDS 753                                                               |

**\*Seed not available with breeder, hence VLS 63 has been added in place of Palam Early Soya 1**

#### **Action:**

- ☐ All checks will be provided by the concerned breeder to IISR-Indore.

**Table 1: Centre wise entries for IVT Trial across zones. (Grain Yield)**

| S. No. | Name of the Centre | Name of the entry                                                                                                   |
|--------|--------------------|---------------------------------------------------------------------------------------------------------------------|
| 1.     | Palampur           | Himso 1690, Himso 1691                                                                                              |
| 2.     | Almora             | VLS 98, VLS 99                                                                                                      |
| 3.     | Ludhiana           | SL 1213, SL 1234                                                                                                    |
| 4.     | Pantnagar          | PS 1641, PS 1642                                                                                                    |
| 5.     | Delhi              | DS 1318, DS 1326, DS 1320                                                                                           |
| 6.     | Ranchi             | BAUS 103                                                                                                            |
| 7.     | Raipur             | RSC 11-20, RSC 11-22                                                                                                |
| 8.     | Jabalpur           | JS 22-01, JS 22-07                                                                                                  |
| 9.     | BARC               | TS 46, TS 107                                                                                                       |
| 10.    | Sehore             | RVS 2011-32, RVS 2011-76                                                                                            |
| 11.    | Parbhani           | MAUS 712, MAUS 717                                                                                                  |
| 12.    | Amravathi          | AMS 353, AMS 20-19                                                                                                  |
| 13.    | ARI, Pune          | MACS 1655, MACS 1639                                                                                                |
| 14.    | K. Digraj          | KDS 1099, KDS 1097                                                                                                  |
| 15.    | Indore             | NRC 154 , NRC 167 (Drought Tolerance), NRC 168 (Drought tolerance), NRC 163 (Drought tolerance), NRC 149 (High oil) |
| 16.    | Dharwad            | DSb 36, DSb 37                                                                                                      |
| 17.    | Kota               | AUKS 200, AUKS 218                                                                                                  |
| 18.    | Morena             | RVSM 2011-77                                                                                                        |
| 20.    | Mandsaur           | SKF 2036, SKF 6029                                                                                                  |
| 21     | Adilabad           | ASb 50, ASb 51                                                                                                      |
|        | <b>Total</b>       | <b>42</b>                                                                                                           |

**Entries for Early Maturing Trial for Central Zone**

|             |                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------|
| DESIGN      | R.B.D.                                                                                                     |
| PLOT SIZE   | 3 rows, 3m long (1.35 x 3 m sq)                                                                            |
| REPLICATION | Three                                                                                                      |
| LOCATIONS   | Jabalpur, Sehore, Parbhani, Amrawati, Kota, Morena, Anand, Amreli, Indore, Lok Bharti and Nagpur, Mandsaur |
| SEED        | 3 kg/entry                                                                                                 |
| CHECKS      | JS 20-34; JS 95-60,                                                                                        |

| S. No. | Name of the Centre | Name of the entry                                                                                                                                                                                                                                                                                                                                                                      |
|--------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | Pantnagar          | PS 1656                                                                                                                                                                                                                                                                                                                                                                                |
| 2.     | Delhi              | DS 1312, DS 1324,                                                                                                                                                                                                                                                                                                                                                                      |
| 3.     | Jabalpur           | JS 22-03, JS 22-04)                                                                                                                                                                                                                                                                                                                                                                    |
| 4.     | Pune               | MACSNRC 1710 (KTI free and extra early),                                                                                                                                                                                                                                                                                                                                               |
| 5.     | Mandsaur           | SKF 10-50, SKF 408                                                                                                                                                                                                                                                                                                                                                                     |
| 6.     | Kota               | AUKS 208, AUKS 202                                                                                                                                                                                                                                                                                                                                                                     |
| 7.     | Sehore             | RVS 2011-73                                                                                                                                                                                                                                                                                                                                                                            |
| 8.     | Almora             | VLS 100                                                                                                                                                                                                                                                                                                                                                                                |
| 9.     | Indore             | NRC 155, NRC 151 (lox 3 null), NRC 156, NRC 158, NRC 157, NRC 150 (High oil, lox 2 null), NRC 160 (Photoinsensitivity), NRC 161 (Long juvenility), NRC 162 (Photoinsensitivity), NRC 166 (Long Juvenility), NRC 164 (Long Juvenility), NRC 165 (Long Juvenility), NRC 159 (Mid-oleic), NRC 169 (Drought tolerance), NRC 152 (null KTI + null lox 2), NRC 153 (null lox 2 + null lox 3) |
|        | <b>Total</b>       | <b>28</b>                                                                                                                                                                                                                                                                                                                                                                              |

## Multi-location Germplasm Evaluation Trial

**Accessions:** 125

**Design:** Augmented

**Row length:** 3m

|                                                                                                  |                                                                                                     |                                                                                                     |                                                                                                      |                                                                                                       |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 1-25 Germplasm<br>3-4 zonal checks<br>(c1, c2, c3, c4, c5)<br>(Checks to be randomized in block) | 26-50<br>Germplasm<br>3-4 zonal checks<br>(c1, c2, c3, c4 c5)<br>(Checks to be randomized in block) | 51-75<br>Germplasm<br>3-4 zonal checks<br>(c1, c2, c3, c4 c5)<br>(Checks to be randomized in block) | 76-100<br>Germplasm<br>3-4 zonal checks<br>(c1, c2, c3, c4 c5)<br>(Checks to be randomized in block) | 101-125<br>Germplasm<br>3-4 zonal checks<br>(c1, c2, c3, c4 c5)<br>(Checks to be randomized in block) |
| Block 1                                                                                          | Block 2                                                                                             | Block 3                                                                                             | Block 4                                                                                              | Block 5                                                                                               |

### Characters

1. Days to flower,
2. Days to maturity,
3. Plant height,
4. Number of nodes/plant,
5. Number of pod cluster /plant,
6. pods/plant,
7. row yield 3 mt row,
8. yield/plant,
9. 100 seed weight

### Centres:

NHZ: Palampur

NPZ: Pantnagar

NEHZ: Manipur

Eastern Zone: Raipur

Central Zone: Jabalpur, Indore and Parbhani.

Southern Zone: Pune

**Checks:** Zonal Checks after every 5 rows of the accessions. Same checks are to be repeated in all blocks.

NHZ: VLS 59, VLS 63, PS 1556, Himso 1685, Harasoya

NPZ: SL 958, SL 955, SL 979, PS 24, PS 1347

NEHZ: MACS 1460, RKS 113, KDS 753, RSC 10-46, RVS 2010-1

Eastern Zone: MACS 1460, RKS 113, KDS 753, , RSC 10-46, CG Soya 1

Central Zone: : NRC 86, JS 20-34, JS 20-29, JS 20-69, JS 20-98.

Southern Zone: MACS 1460, KDS 753, DSb 23, DSb 21, MACS 1188

**Previous year checks are to be used.**



## Technical recommendations of Plant Breeding

- It was recommended that promotion criteria for entries would be 10% yield superiority over the best checks. This criteria would be applied from 2019 in all the trials.
- In the newly constituted early maturity trial, JS 20-34 and JS 95-60 would be the checks and promotion criteria would be at par yield, per day productivity and up to 90 days of maturity. Entries with extra early maturity (< 85 days) with marginally less yield would also be considered for promotion.
- Thrust areas for all the centres have been decided as follows.

|    |                  |                                                                                                                                                                                                                                |
|----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <b>Sehore</b>    | Up to 90 Days Maturity, Charcoal Rot , YMV resistance                                                                                                                                                                          |
| 2  | <b>Pune</b>      | Food grade soybean, earliness (95 days)                                                                                                                                                                                        |
| 3  | <b>Pantnagar</b> | Photo insensitivity; YMV and RAB resistance                                                                                                                                                                                    |
| 5  | <b>Delhi</b>     | Photo insensitivity; YMV, RAB and IBB resistance                                                                                                                                                                               |
| 6  | <b>Parbhani</b>  | Insect tolerance (Stem fly, Girdle Beetle), Up to 90 Days maturity, Long juvenility, Drought tolerance                                                                                                                         |
| 8  | <b>Indore</b>    | Abiotic stress tolerance (Drought, heat, water logging); Biotic stress tolerance (CR, Anthracnose, YMV), Early Maturity (up to 90 days), seed coat strength, vegetable and food grade soybean, Insect tolerance (Defoliators). |
| 9  | <b>Ludhiana</b>  | Photo insensitivity; YMV and RAB resistance                                                                                                                                                                                    |
| 10 | <b>Jabalpur</b>  | Up to 90 Days Maturity; Charcoal Rot , YMV and RAB resistance                                                                                                                                                                  |
| 11 | <b>Palampur</b>  | Up to 110 days maturity, vegetable types, FLS, Maize intercropping                                                                                                                                                             |
| 13 | <b>Dharwad</b>   | Rust and YMV Resistance; identification of resistant sources for pod borer <i>Cydia ptychora</i> .                                                                                                                             |
| 14 | <b>Almora</b>    | KTI free Black soybean, Frogeye Leaf Spot                                                                                                                                                                                      |
| 15 | <b>Amaravati</b> | Charcoal Rot resistance, Up to 90 days maturity, Drought tolerance                                                                                                                                                             |
| 16 | <b>Bangalore</b> | Off season nursery, Vegetable soybean,                                                                                                                                                                                         |
| 17 | <b>Raipur</b>    | Indian Bud Blight, Pod Blight and RAB resistance; Soil acidity and drought tolerance                                                                                                                                           |
| 18 | <b>Kota</b>      | Up to 90 Days Maturity, Insect tolerance (Girdle beetle and defoliators)                                                                                                                                                       |
| 19 | <b>Imphal</b>    | Food usage                                                                                                                                                                                                                     |
| 20 | <b>K. Digraj</b> | Rust resistance and Long juvenility                                                                                                                                                                                            |
| 21 | <b>Jorhat</b>    | Water logging and soil acidity tolerance                                                                                                                                                                                       |
| 22 | <b>Ranchi</b>    | Soil acidity, drought tolerance and early maturity                                                                                                                                                                             |
| 23 | <b>Morena</b>    | Drought tolerance and early maturity                                                                                                                                                                                           |
| 24 | <b>Adilabad</b>  | Pre-harvest sprouting,                                                                                                                                                                                                         |
| 25 | <b>Bidar</b>     | High yielding, early maturity upto 95 days                                                                                                                                                                                     |

- All the centres are to strictly take up the breeding programme in these areas. Crosses for the centres would be decided by the ICAR-IISR Indore and breeders are to develop sufficient number of F<sub>1</sub>s so as to have a population of at least 4000 F<sub>2</sub>. Their presentations in AICRP should be restricted to these thrust areas.
- F<sub>1</sub>s of NHP should reach UAS Bangalore by 10 December. Selected plants from NHP material must be sent to UAS Bangalore for off season generation advancement. Principal Investigator (Plant Breeding) must be informed for the material being sent to Bangalore for off season generation advancement so that necessary fund allocation from competent authority may be got approved.
- Hot spots Viz Ludhiana, Dharwad, Jabalpur, Amravati, Palampur and Almora would be utilized for screening of F<sub>2</sub>s and F<sub>3</sub>s of NHP and resistant material would be distributed to centres.
- Jorhat and Umiam centres would screen lines for water logging tolerance.
- NRC 132, a null lox 2 entry in AVTII, would be evaluated for reduced beany flavor along with other entries and checks. PI Food Technology and Dr Neha Pandey from ICAR-IISR would take up the experiment.
- All the AVT I entries and checks of Eastern and Central Zone would be tested for oil content. Samples must reach ICAR-IISR by 1<sup>st</sup> December.
- Entries for estimation of oil (AVT II) must reach ICAR-IISR Indore by 1<sup>st</sup> December and for sucrose content (AVT I) samples must reach ICAR-IISR Indore as soon as drying of seeds.
- Seed of IVT entries and checks must reach ICAR-IISR Indore by 5 April.
- Mandsaur centre has been included in AICRP Plant Breeding Trials.

**(B) TECHNICAL PROGRAMME OF AGRONOMY & FRONTLINE  
DEMONSTRATIONS FOR 2019**

**AGRON-1/19: Evaluation of AVT-II entries under different row spacing**

| <b>Zone</b>        | <b>Centre</b>                 |
|--------------------|-------------------------------|
| North plain        | Pantnagar, Ludhiana           |
| Central            | Sehore, Kota, Amravati        |
| Eastern            | Raipur, Ranchi, Bhawani Patna |
| Southern           | Dharwad, Adilabad, Pune       |
| North Eastern Hill | Imphal, Medziphema            |

**Treatments:**

**(A) Main plot : Row spacing (2)**

1. 30 cm
2. 45 cm

**(B) Entries**

| <b>Zone</b>             | <b>Entries</b>                                                                                                                |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| North Hill Zone         | Nil                                                                                                                           |
| North Plain Zone        | PS 1613, PS 1611, NRC 128, PS 1347 (C)                                                                                        |
| Central Zone            | AMS-100-39, NRC 130, NRC 131, NRC 86 (C), JS 20-34 (C)                                                                        |
| Southern Zone           | DSb 34, MACS 1493, KDS 992, RSC 1107, AMS 100-39, NRCSL 1, BAUS 102, AMS 2014-1, SKF-SP-11, NRC 147, MACSNRC 1667, DSb 21 (C) |
| Eastern Zone            | RSC 11-07, NRC 128, AMS 2014-1, NRC 136, MACS 1493, NRC 132, RSC 11-03, NRCSL 1, NRC 137, RKS 18 (C)                          |
| North Eastern Hill Zone | PS 1613, DS 1678, JS 335 (C)                                                                                                  |

**Design:** Split plot,      **Replication:** 3,      **Plot Size:** 3.6 x 6 m

**Observations:** Branches per plant, pods per plant, seed index, dry weight per plant 30, 45 and 60 DAS, CGR, RGR, seed yield kg/ha, straw yield kg/ha, harvest index, grain production efficiency (kg/ha/day) and RUE

**Note:** Concerned breeder will provide 4 kg seed of each entries upto 31<sup>st</sup> May, 2019.

**AGRON-2/15: Sustainable soybean production through crop diversification and tillage systems**

| <b>Zone</b>   | <b>Centre</b>              | <b>Variety</b> |
|---------------|----------------------------|----------------|
| North plain   | Pantnagar, Ludhiana, Delhi | PS 1347/SL 958 |
| Central       | Kota, Amravati             | JS 95-60       |
| North Eastern | Raipur, Ranchi             | JS 97-52       |
| Southern      | Dharwad, Adilabad          | DSb 21         |

**Treatments:**

**A. Tillage (2)**

1. Minimum tillage (Two cultivator)
2. Conventional tillage (Deep ploughing, two cultivator & planking)

**B. Crop rotation(4)****Kharif**

1. Soybean-soybean-soybean-soybean
2. Soybean-maize-soybean-maize
3. Soybean-soybean-maize-soybean
4. Soybean-soybean-soybean-maize

(**Rabi crops** – Wheat (Ludhiana, Pantnagar, Ranchi, Pune), Fallow (Bangalore), Chickpea-remaining centres)

**Design:** Strip plot,    **Replication :** 4    **Plot Size :** 3.6 x 6 m (fixed site)

**Observations:** Seed yield, straw yield, HI, SEY, Net Return, B:C ratio, initial N, P, K, N, P, K uptake, balance sheet of N, P, K, Organic carbon, physical properties (bulk density, WHC, porosity after four years)

**AGRON-3/18: System intensification for soybean productivity augmentation under Ridge Furrow Planting**

**Treatment:**

**Main Plot:** Variety (2)

| <b>Zone</b>        | <b>Centre</b>                         | <b>Variety</b>      |
|--------------------|---------------------------------------|---------------------|
| North plain        | Pantnagar, Ludhiana, Delhi            | PS 1092, SL 958     |
| Central            | Kota, Amravati, Sehore, Deogarh Baria | JS 20-34, RVS 24    |
| Eastern            | Raipur, Ranchi                        | JS 95-60, RSC 10-46 |
| Southern           | Dharwad, Adilabad                     | JS 93-05, MACS 1188 |
| North Eastern Hill | Imphal, Medziphema                    | JS 93-05, JS 97-52  |

**Sub-plot:** Plant Geometry (4)

- I.    45 × 5 cm
- II.   45 × 10 cm
- III.   45 × 15 cm
- IV.   45 × 20 cm

**Note:** The seed rate will be based on seed index and 70% germination basis.

**Design:** Split plot,    **Replication:** 3,    **Plot Size:** 3.6 x 6 m

**Observations:** Branches per plant, pods per plant, seed index, dry weight per plant 30 and 60 DAS, seed yield kg/ha, straw yield kg/ha, harvest index.

**AGRON-4/19: Evaluation of bio-efficacy of MACARENA (Bio-stimulant) along with herbicides on Soybean (Sponsored Trial-1<sup>st</sup> year)**

| <b>Zone</b>   | <b>Centre</b>          | <b>Variety</b> |
|---------------|------------------------|----------------|
| Central       | Sehore, Kota, Amravati | RVS 24         |
| North Eastern | Raipur                 | JS 97-52       |
| Southern      | Adilabad               | Basara         |

**Treatments:**

1. Sodium Acifluorfan (16.5%) + Clodinafop propargyl (8% EC) @ 1000 ml/ha + MACARENA @ 625 ml/ha
2. Imazethapyr 10% SL @ 1000 ml/ha + MACARENA @ 625 ml/ha
3. Fluazifop-p-butyl 13.4 EC @ 2000 ml/ha + MACARENA @ 625 ml/ha
4. Propaquizafop 2.5% EC + Imazethapyr 3.7% ME @ 2000 ml/ha + MACARENA @ 625 ml/ha
5. MACARENA @ 625 ml/ha
6. Two hand weeding at 20 and 40 DAS
7. Weedy check

**Design:** RBD,      **Replication:** 3,      **Plot Size:** 3.6 x 6 m

**Observations:**

- **Weed parameters:** Weed count (Monocot & Dicoat) and their dry weight 30 and 60 DAS, weed control efficiency 30 and 60 DAS
- **Crop parameters:** Plant dry weight (30, 60 DAS), Pods per plant, seed index (100 seed weight), Seed (kg/ha), straw (kg/ha), harvest index (%).
- **Economics:** Net return & B:C ratio

**AGRON-5/19: Evaluation of partial factor productivity for soybean (All Centres)**

| Zone               | Variety   |
|--------------------|-----------|
| North plain        | SL 958    |
| Central            | RVS 24    |
| Eastern            | RSC 10-46 |
| Southern           | MACS 1188 |
| North Eastern Hill | JS 97-52  |

**Treatments:**

1. Full package (Seed treatment, seed inoculation, RDF, weed management, insecticide, Ridge furrow)
2. Full package – seed treatment
3. Full package – seed inoculation
4. Full package – RDF
5. Full package – weed management
6. Full package – insecticide application
7. Full package – Ridge furrow

**Observations:** Pods per plant, seed index, seed yield kg/ha, straw yield kg/ha, biological yield, harvest index, economics.

**Formulae**

1. **Crop growth rate (CGR)** =  $1/p \times (W_2 - W_1) / T_2 - T_1$  (g/m<sup>2</sup>/day)
2. **Relative crop growth rate (RGR)** =  $(\log_{10} W_2 - \log_{10} W_1) / T_2 - T_1$  (g/g/day)
3. **Rainfall use efficiency (RUE)** kg/ha-mm = grain yield (kg/ha) / rainfall (mm) received during crop growing period.

## FRONTLINE DEMONSTRATIONS

### Allotment of FLDs at different AICRPS Centres for 2019-20

| S. No. | Centre                             | State            | No. of FLDs | Varieties                                      |
|--------|------------------------------------|------------------|-------------|------------------------------------------------|
| 1.     | Palampur (CSKHPKV)                 | Himachal Pradesh | 10          | Himso 1588, Hara Soya                          |
| 2.     | Pantnagar (GBPUA&T)                | Uttaranchal      | 10          | PS 1347, PS 1092, PS 1042, PS 1225, PS 19      |
| 3.     | Ludhiana (PAU)                     | Punjab           | 10          | SL 525, SL 688, SL 744                         |
| 4.     | Indore (IISR/AICRPS)               | Madhya Pradesh   | 50          | JS 20-29, JS 20-34, JS 20-69                   |
| 5.     | Sehore (RVSKVV)                    | Madhya Pradesh   | 10          | RVS 18, JS 20-34, JS 20-69, RVS 2001-4, RVS 24 |
| 6.     | Kota (MPUA&T)                      | Rajasthan        | 30          | RKS 113, JS 20-34, RKS 24, RKS 45              |
| 7.     | Parbhani (MAU)                     | Maharashtra      | 50          | MAUS 158, MAUS 162                             |
| 8.     | Amravati (PDKV)                    | Maharashtra      | 20          | JS 20-34, JS 93 05, JS 335                     |
| 9.     | Sangli (MPKV)                      | Maharashtra      | 25          | DS 228, KDS 344                                |
| 10.    | Dharwad (UAS)                      | Karnataka        | 10          | DSb 21, DSb 23-2                               |
| 11.    | Adilabad (ANGRAU)                  | Andhra Pradesh   | 10          | ASb 22, LSb 18                                 |
| 12.    | Medziphema                         | Nagaland         | 10          | JS 97-52, RKS 18                               |
| 13.    | Almora (VPKAS)                     | Uttarakhand      | 10          | VLS 49, VLS 65                                 |
| 14.    | Ugar Khurd (Ugar Sugar Works Ltd.) | Karnataka        | 50          | JS 93 05, DSb 21                               |
| 15.    | Raipur (IGKVV)                     | Chhattisgarh     | 10          | CG Soya 1, RSC 10-46, JS 97 52, JS 93 05       |
| 16.    | Ranchi (BAU)                       | Jharkhand        | 10          | BSS 2, JS 97 52, RKS 18                        |
| 17.    | Imphal (CAU)                       | Manipur          | 15          | RKS 18, DSb 19, MACS 1460, JS 335              |
| 18.    | SOPA, Indore                       | Madhya Pradesh   | 250         | JS 95 60, Ahilya 3, JS 93 05                   |
| 19.    | Soildaridad, Bhopal                | Madhya Pradesh   | 100         | JS 95 60, Ahilya 3, JS 93 05                   |
| 20.    | Srijan                             | Rajasthan        | 95          | JS 95 60, Ahilya 3, JS 93 05                   |
| 21.    | KVK, Bharuch                       | Gujarat          | 15          | JS 95 60, JS 93 05                             |
| 22.    | KVK Karda                          | Maharashtra      | 75          | MAUS -162, JS 93 05, AKS 311                   |
| 23.    | Dholi (RAU)                        | Bihar            | 15          | JS 97-52, RKS 18                               |
| 24.    | DevgrahBaria                       | Gujarat          | 10          | JS 95 60, JS 93 05                             |
|        | <b>Total</b>                       |                  | <b>900</b>  |                                                |

**Note:**

- (i) All the centres are requested to follow the location/zone specific recommended soybean production technology capsule as given below.
- (ii) FLDs should be conducted in one cluster (10 FLDs) and that is to be in one village for consecutive two years.
- (iii) If more than 10 FLDs allotted to any centre, they may increase the number of clusters in multiples of 10 FLDs.
- (iv) More than 10 years old varieties should be avoided in FLDs.

### Zone-wise Production Technology Capsule

| Input/practices                  | North Hill Zone<br>(HP, Hills of Uttarakhand)                                                                                                                                                                                                                                                                                                                                                                                        | North Plain Zone<br>(Punjab, Haryana, Delhi, NE Plains of UP, Western Bihar)               | Central Zone<br>(MP, Raj., Guj., Bundelkhand Region of UP, Western Maharashtra)            | Southern Zone<br>(Karnataka, TN, AP, Kerala, Southern parts of Maharashtra)              | North Eastern Zone<br>(Assam, W. Bengal, Meghalaya, Manipur, Nagaland, Eastern Bihar, Orissa, Chhatisgarh) |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1. Variety                       | As given (centre-wise) in allotment of FLD table in Proceeding and Technical Programme 2012-13                                                                                                                                                                                                                                                                                                                                       |                                                                                            |                                                                                            |                                                                                          |                                                                                                            |
| 2. Planting time                 | Last week of May to June end                                                                                                                                                                                                                                                                                                                                                                                                         | 15 <sup>th</sup> June to 5 <sup>th</sup> July                                              | 20 <sup>th</sup> June to 5 <sup>th</sup> July                                              | 15 <sup>th</sup> June to 30 <sup>th</sup> June                                           | 15 <sup>th</sup> June to 30 <sup>th</sup> June                                                             |
| 3. Planting                      | 45 x 5 cm                                                                                                                                                                                                                                                                                                                                                                                                                            | 45 x 5 cm                                                                                  | 45 x 5–8 cm                                                                                | 30 x 5 cm                                                                                | 45 x 5 cm                                                                                                  |
| 4. Plant population              | 0.4 million /ha                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.4 million /ha                                                                            | 0.4-0.6 million /ha                                                                        | 0.4-0.6 million /ha                                                                      | 0.4-0.6 million /ha                                                                                        |
| 5. Depth of sowing               | 3 to 5 cm                                                                                                                                                                                                                                                                                                                                                                                                                            | 3 to 5 cm                                                                                  | 3 to 5 cm                                                                                  | 3 to 5 cm                                                                                | 3 to 5 cm                                                                                                  |
| 6. Manure and Fertilizer (Kg/ha) | 10 t FYM/ha + 20:80: 20: 20 N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O:S kg/ha                                                                                                                                                                                                                                                                                                                                                | 5 t FYM/ha + 25:75:25:37.5:1.0 N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O:S:B kg/ha | 5 t FYM/ha + 20:60: 40: 20:1.0 N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O:S:B kg/ha | 5 t FYM/ha+20:80: 20: 30:0.5 N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O:S:B kg/ha | 5 t FYM/ha +25:100:50:50:2.0 N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O:S:B kg/ha                   |
| 7. Seed rate                     | 75kg/ha                                                                                                                                                                                                                                                                                                                                                                                                                              | 65 kg/ha                                                                                   | 65 kg/ha                                                                                   | 65 kg/ha                                                                                 | 55 kg/ha                                                                                                   |
| 8. In-situ moisture conservation | -                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bed planting 67.5 cm (2 rows per bed)                                                      | Conservation furrow each after 6 rows                                                      | Conservation furrow each after 3 rows                                                    | Ridge and furrow 60 cm                                                                                     |
| 9. Bio-regulator                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      | Cycocel @ 500 ppm at flower initiation                                                     | Cycocel @ 500 ppm at flower initiation                                                     | Ethrel @ 200 ppm or salicylic acid @ 50 ppm at pod initiation                            | Ethrel @ 200 ppm at flower and pod initiation                                                              |
| 10. Seed treatment               | Thiram 75 WP + Cabendazim 50 WP (2:1) @ 3 g/kg seed or Thiram + carboxin @ 2 g/kg seed or <i>Trichoderma viride</i> @ 4-5 g/kg seed for the management of seed and seedling diseases.                                                                                                                                                                                                                                                |                                                                                            |                                                                                            |                                                                                          |                                                                                                            |
| 11. Seed inoculation             | About 5 g/ kg seed <i>Bradyrhizobium japonicum</i> culture + PSB/PSM 5 g/ kg seed                                                                                                                                                                                                                                                                                                                                                    |                                                                                            |                                                                                            |                                                                                          |                                                                                                            |
| 12. Weed control                 | Two hand weedings at 20 and 40 DAS or Fluchloralin or Trifluralin @ 1 kg a.i./ha as pre-plant incorporation or Pendimethalin @ 1 kg a.i./ha or Metolachlor @ 1 kg a.i./ha or Clomazone @ 1 kg a.i./ha as pre-emergence or Imazethapyr @ 75 to 100 g a.i./ha or quizalofop ethyl @ 50 g a.i./ha or haloxyfop ethyl @ 100 g ai/ha or quizalofop-p-tefuryl @ 44.1 g ai/ha as post-emergence (15 –20 DAS) in 750 to 800 liters water/ha. |                                                                                            |                                                                                            |                                                                                          |                                                                                                            |

## (C) TECHNICAL PROGRAMME OF ENTOMOLOGY FOR KHARIF 2019

A list of major insect-pests occurring at different centres is given below and entomologists should report data of different experiments against these insect pests:

| Zone | Centre    | Major insect-pests                    |
|------|-----------|---------------------------------------|
| NHZ  | Palampur* | Bean bug                              |
| NEHZ | Imphal    | All defoliators, Aphids, Stem fly     |
| NPZ  | Delhi     | Stem fly, white fly/YMV               |
|      | Pantnagar | White fly, defoliators, girdle beetle |
|      | Ludhiana* | White fly                             |
| EZ   | Raipur*   | Major insect-pests                    |
| CZ   | Sehore    | Stem fly, defoliators, girdle beetle  |
|      | Kota      | Defoliators, girdle beetle            |
|      | Parbhani  | Stem fly, girdle beetle, defoliators  |
|      | Amrawati* | Stem fly, girdle beetle, defoliators  |
| SZ   | Dharwad   | Defoliators, pod borers               |

\* Need based Testing Centers

### ENT 1. Seasonal incidence of insect-pests and their bio-control agents

- i) **Fixed plot survey** : At research station. Any insect susceptible soybean variety should be planted in at least 100 sq m area, to record seasonal incidence of both major and minor insect-pests and report it SMW wise with dates.
- ii) **Production oriented survey** : At farmers' fields. Information on previous crop and farmers practices adopted should be recorded.

**Centres** : Delhi, Pantnagar, Sehore, Parbhani, Kota, Amrawati, Dharwad, Imphal

**Sampling/observation procedures:** Observations should be recorded at 7 days intervals starting from 7 days after germination (DAG) following a uniform procedure as described below for different insect pests:

- i) **Leaf damage:** Calculate leaf damage in 5 randomly selected plants on the basis of visual observations at flowering and at peak incidence of larvae.

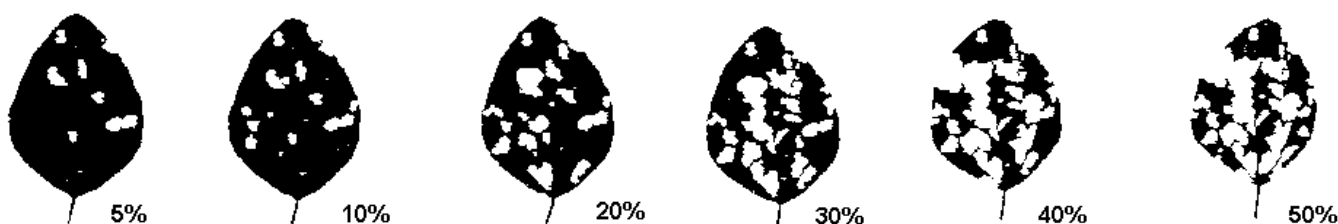
**Example:** Leaf damage in a plant having 10 leaves will be calculated as follows -

3 leaves with 10 percent damage ( $3 \times 10$ ) = 30

5 leaves with 30 percent damage ( $5 \times 30$ ) = 150

2 leaves with 50 percent damage ( $2 \times 50$ ) = 100

Average damage =  $(30+150+100)/10$  leaves = **28% Leaf damage**



| Defoliation | Resistance level       |
|-------------|------------------------|
| ≤1%         | Highly resistant       |
| 1–20%       | Resistant              |
| 21–40%      | Moderately resistant   |
| 41–60%      | Moderately susceptible |
| 61–80%      | Susceptible            |
| ≥80%        | Highly susceptible     |

- ii) **Defoliators and Bugs** : No. of larvae (**Spp. wise**) and bugs/m. Observations should be recorded at three places and mean should be reported in Nos. per meter. Dominant defoliators should be reported separately. Calculate the extent of defoliation as above.
- iii) **Leaf miner** : No. of larvae/plant in 10 plants. No. of leaflets and damaged leaflets be recorded and presented in percentage.
- iv) **Stem fly** : Seedling mortality - total number of plants and number of plants succumbed to stem fly infestation / m at 3 places per plot on 7-10 DAG. Express seedling mortality in per cent and give the mean. Stem tunnelling - Plant height and length of stem tunnelled in 10 plants at physiological maturity. Express stem tunnelling in per cent.
- v) **Whitefly, Aphids, Leaf hoppers and Mites** : No. of insects (nymphs and adults) on 3 leaves/plant (upper, middle and lower leaf) in 10 plants each.
- vi) **Girdle beetle** : Mark 1 meter area atleast at 3-5 places, depending upon the plot size and record number of total plants and girdled plants and present the data in per cent plant infestation. Label all the infested plants with date, in earmarked area and record number of plants showing typical 'cut-off' symptoms. Calculate percent damage out of total plants per meter (in earmarked area).
- vii) **Bio-control agents** : Collect 20 lepidopteran larvae from untreated soybean field at the interval of 10 days from their appearance. Put them in petri-dishes and report mortality (%) due to different bio-control agents (e.g. parasitoids and insect pathogens). Incidence of predators should also be recorded.

**Note:** Incidence of minor insects should also be mentioned. Variety used for this trial, date of sowing, date of germination and dates of observation should be indicated in the report. Meteorological data (on SMW basis) should be essentially appended.

### **IMPORTANT:**

#### **1. Submission of Weekly pest-status report**

Besides fixed plot survey and production oriented survey, the weekly pest status should also be recorded by keeping close liaison with Department of Agriculture officials and the farmers of the region. As per the instructions of ADG (PP), ICAR the **weekly pest status report** should be invariably E-mailed to PI (Entomology), ICAR-IISR, Indore ([amarnathsharma2@gmail.com](mailto:amarnathsharma2@gmail.com)) in following format:

| Name of AICRPS Centre: |            |          |                    |                              |                      |                              |                                    | Date:             |                 |                 |
|------------------------|------------|----------|--------------------|------------------------------|----------------------|------------------------------|------------------------------------|-------------------|-----------------|-----------------|
| Crop                   | Crop stage | Location | Major Insect-pests |                              | Major Plant diseases |                              | Other pests (Nema-todes, Rats etc) | Data collected by | Data checked by | Pest Advisories |
|                        |            |          | Name               | Status (Low, Medium, Severe) | Name                 | Status (Low, Medium, Severe) |                                    |                   |                 |                 |
|                        |            |          |                    |                              |                      |                              |                                    |                   |                 |                 |



## ENT 2. Field screening of AVT-I & II entries for resistance to major insect-pests

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Centres      | : Palampur, Delhi, Pantnagar, Ludhiana, Sehore, Parbhani, Kota, Amrawati, Dharwad, Imphal, Raipur, Bidar                                                                                                                                                                                                                                                                                                                                       |
| Treatments   | : Test entries of <b>all zones</b> with respective zonal checks, as per the technical programme of Plant Breeding. All entries should be grown in two sets, one with complete plant protection measures and other with no plant protection measures. All AVT test entries should be in alphabetical order followed by checks followed by entries found highly resistant, resistant, R-HY and S-HY (T) in previous years in alphabetical order. |
| Replications | : Two                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Design       | : RBD                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Plot size    | : 2 rows of 3 m length each                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Observations | : Incidence of major insect-pests be recorded only from unprotected set of entries, at their peak incidence. Grain yield (kg/plot) should be recorded from both treated and untreated sets of entries for analysis by <b>Maximin-Minimax method</b> . <u><b>For defoliators, entries should be rated based on defoliation ALSO as per the procedure given in Ent. 1.</b></u>                                                                   |

### Data analysis:

Categorize the entries as per AICRP method to identify resistant sources against specific insect-pests. Replace mean (X) with 26 % for stem fly. Entries with traces of insect population or very less damage need not be categorized. Categorize the entries into resistant groups against prevailing insect pest-complex according to the **maximin-minimax method** (Odulaja, A. and S. Nokoe.1993. *A maximin-minimax approach for classifying crop varieties into resistant groups based on yield potential and loss. Intl J. Pest Mgmt., 39:64-67*)

### IMPORTANT:

1. Entries categorized as highly resistant (HR) / resistant (R) during last two seasons against the major pests of the centre/zone must be included in AVT trial of 2019 and be reported with separate identity.
2. In case of non availability of any entry, concerned breeder should be requested timely to send the seed.

## ENT 3: Status of AVT-II entries for antixenosis and antibiosis against *S. litura*

**Centres:** Pantnagar, Dharwad, Indore

**Test Entries:** AVT-II entries of **ALL ZONES**. *All concerned breeders are requested to send atleast 200 g of their AVT-II entries directly to Entomologists of above THREE centres.*

Sow susceptible variety JS 335 in about 100 sq m area so that its leaves can be used for rearing of larvae for lab studies.

**Objective:** To assess the effect of selected soybean genotypes on the food consumption and its utilization by *Spodoptera litura* larvae and antixenosis response exerted by genotypes. Rationale of this study is that when larvae are exposed to resistant genotypes, their feeding capacity is adversely affected, which is ultimately reflected in their growth and development. Three utilization indices [Waldbauer (1968); Jacob and Chippendale (1971); Brewer and King (1978)] will be used as the indicators of response of *Spodoptera litura* larvae exposed to soybean genotypes : (i) the **Approximate Digestibility (AD)** is the measure of approximate percentage of food consumed that is utilized by the larvae; (ii) the **Efficiency of Conversion Index (ECI)** is an overall measure of ability of larvae to utilize the ingested food for their growth; (iii) the **Efficiency of Conversion of Digested food (ECD)** is the percentage of digested food that contributes to weight gain of the larvae. These three indices will be calculated as follows:

$AD = [(Fi - Wf) / Fi] \times 100$  ;  $ECI = (Wg / Fi) \times 100$  ;  $ECD = [Wg / (Fi - Wf)] \times 100$   
 where, Fi is weight of food ingested, Wf is weight of frass, and Wg is weight gain by larvae.

**Antixenosis** response exerted by the genotypes on defoliating larvae will be assessed by calculating the **Preference Index** (Kogan and Goeden, 1970).

**Preference Index, C** =  $2A / M + A$ , where, A = Dry weight of leaves of test genotypes eaten by larvae and M = Dry weight of leaves of susceptible check eaten by larvae.

## Methodology

**Test Insect:** *Spodoptera litura* larvae. Culture maintenance should be initiated well in advance so that sufficient larvae are available for the study. Pupae or egg masses of *S. litura* can be obtained on payment basis by sending a request to the Director, National Bureau of Agricultural Insect Resources (formerly PDBC), Pox Bag No. 2491, H.A. Farm Post Bellary Road, Bengaluru, Karnataka 560024. Price list is available at Bureau's web site <http://www.nbair.res.in>. E-mail: [nbair@icar.gov.in](mailto:nbair@icar.gov.in) / [nbair@icar.gov.in](mailto:nbair@icar.gov.in).

**Working conditions:** Preferably  $27 \pm 1^{\circ}C$ ,  $80 \pm 5\%$  RH

**Replications:** Three

**Dry weight of leaves:** Take fresh weight of 10 leaflets/genotype. Oven dry at  $50^{\circ}C$  for 15 minutes and weigh. Use this relation between fresh and dry weight of leaves for calculating **Fi** (i.e. food ingested).

**Dry weight of larvae:** Take fresh weight of twenty 3<sup>rd</sup> instar *S. litura* larvae. Oven dry at  $50^{\circ}C$  for 15 minutes and weigh. Use this relation between fresh and dry weight of larvae for calculating **Wg** (i.e. weight gain by larvae).

**Dry weight of frass:** Collect frass from each individual petri plate. Oven dry at  $50^{\circ}C$  for 15 minutes and weigh. Use the frass dry weight for calculating **Wf**.

### Antibiosis Studies:

Release FIVE 3<sup>rd</sup> instar, pre-weighed larvae in petri plates and provide pre-weighed leaves of soybean genotypes. After every 24 hr, remove the left over leaves and frass from the petri plates, oven dry them at  $50^{\circ}C$  for 15 minutes and weigh. Record the larval weight daily. Record the larval mortality, if any. Continue this process up to pupation. Record larval duration in days. Observe the pupae and report if there is any deformity. Record pupal duration in days. Place the pupae (genotype and replication wise separately) in oviposition jars, observe adult emergence and report deformities in adults, if any.

### Antixenosis Studies:

Place one pre weighed leaf (or a portion of leaf) of all the genotypes in circular manner in a petri plate having thin thermocol sheet at the base. Fix all the leaves with pin to ensure that they do not touch each other and are not displaced. Release TEN 3<sup>rd</sup> instar *S. litura* larvae at the centre of petri plate. After 8 hrs, remove the left over leaves of all the genotypes, oven dry at  $50^{\circ}C$  for 15 minutes and weigh. Calculate the weight of leaves eaten by larvae for all the genotypes. Use the fresh and dry weight relationship as described above. Maintain 5 replications in the experiment. Calculate the **Preference Index (C)** and classify the genotypes as follows:

| C value        | Antixenosis response |
|----------------|----------------------|
| 0.10 to 0.25   | Extreme antixenosis  |
| 0.26 to 0.50   | Strong antixenosis   |
| 0.51 to 0.75   | Moderate antixenosis |
| 0.76 to 0.99   | Slight antixenosis   |
| 1.00 or > 1.00 | Preferred host       |

### References:

- Brewer F D and E G King. 1978. Effects of parasitization by a tachinid, *Lixophaga diatraeae*, on the growth and food consumption of sugarcane borer larvae. *Ann. Entomol. Soc. Am.*, **71**: 19-22.
- Jacob D and Chippendale G M. 1971. Growth and Development of the southwestern corn borer, *Diatraea grandiosella* on a meridic diet. *Ann. Entomol. Soc. Am.*, **64**: 485-488.
- Kogan, M and Goeden, RD. 1970. The host plant range of *Lema trilineata daturaphila* (Coleoptera: Chrysomelidae). *Ann. Entom. Soc. Amer.*, **63**(4):1175-1180.
- Waldbauer G P. 1968. The consumption and utilization of food by insects. *Adv. Insect Physiol.*, **5**: 229-288.

#### ENT 4. Field screening of IVT entries for resistance to major insect-pests

**Centres** : Palampur, Delhi, Pantnagar, Ludhiana, Sehore, Parbhani, Kota, Amravati, Dharwad, Imphal, Raipur, Bidar  
**Treatment** : Test entries as per breeding programme with respective checks  
**Replications** : Two  
**Design** : RBD  
**Plot size** : 3 rows of 3 m length each  
**Observations** : On major insects as mentioned above + Grain yield (kg/ha). **For defoliators, entries should be rated based on defoliation ALSO in a separate column as per the procedure given in Ent. 1.**

**NOTE:** PI (Plant Breeding), IISR, Indore will arrange to send 200 g seed of each IVT entry to each entomologist / centre separately.

#### **AICRPS method of Categorization:**

HR = values < mean – CD at 1%.  
R = values between mean – CD at 1% & mean – CD at 5%.  
MR = values between mean – CD at 5% & mean  
LR = values between mean & mean + CD at 5%  
S = values between mean + CD at 5% and mean + CD at 1%  
HS = values > mean + CD at 1%.

**NOTE:** Centres must retain all IVT entries for further use in AVT next year.

#### ENT 5: Evaluation of germplasm lines at hot spots for resistance against major insect-pests

| Hot spots | Major insect-pests                                 |
|-----------|----------------------------------------------------|
| Imphal    | Bihar Hairy Caterpillar, other defoliators, Aphids |
| Ludhiana  | White fly / YMV                                    |
| Sehore    | Stem fly, defoliators, girdle beetle               |
| Kota      | Defoliators, girdle beetle                         |
| Dharwad   | Defoliators, pod borers                            |
| Indore    | Stem fly, defoliators                              |

**No. of lines** : As supplied to each of the above centers by PI, Plant Breeding, IISR, Indore  
**Plot size** : Single row of 3 m length (Non-replicated)  
**Observations** : On insects as specified above at peak incidence / infestation and **grain yield**. Date of observation and crop age should be mentioned in the report. Screening procedure should be same as in case of IVT and AVT entries.

**NOTE:** One row of susceptible check variety (preferably JS 335) should be planted after every 5 germplasm lines.

**NOTE:** Centres must retain all germplasm lines for further use.

#### ENT 6: Evaluation of promising genotypes for resistance against major insect-pests

**Centers** : Imphal, Ludhiana, Sehore, Kota, Dharwad, Indore  
**Design** : RBD  
**Replications** : Two  
**Plot size** : Three rows of 3 m length  
**Treatments** : Following IVT, AVT and Germplasm lines found promising during *kharif*-2018

**From Germplasm 2018:** AMS 108, AMSS 34, EC 347464, EC 113778, EC 232019, Harder, JS 20-41, JS 20-48, JS 20-50, JS 20-51, JS 20-53, JS 20-55, JS 20-59, JS 20-61, JS 20-86, MAUS 142, PS 1423, SQL 31, SQL 32, and SQL 37 = **20**

**From IVT-2018:** RSC 11-17, KDS 1009, JS 21-71, NRC 146, RVS 2011-10 = **05**

**From AVT-2018:** AMS 2014-1, DSb 34, RSC 10-70, SL 1072, MACS 1493, PS 1572, AMS-MB 5-18, DSb 32, NRC 127, DSb 28-03, RVS 2007-6 = **11**

#### **ENT 7: Management of major defoliators using microbial agents**

**Centers** : Imphal, Amravati, Parbhani

| <b>Treatment</b>                            | <b>Dose</b> | <b>Formulation<br/>ml/l water</b> |
|---------------------------------------------|-------------|-----------------------------------|
| 1. <i>Beauveria bassiana</i>                | 1 kg/ha     | 1 g/l                             |
| 2. <i>Metarhizium anisopliae</i>            | 2 kg/ha     | 4 g/l                             |
| 3. <i>Nomurea rileyi</i>                    | 2 kg/ha     | 4 g/l                             |
| 4. <i>Bacillus thuringiensis</i> commercial | 1 kg/ha     | 1 g/l                             |
| 5. Untreated check                          | -           | -                                 |

Variety : One susceptible variety

Treatment : Five (5)

Replications : Four (4)

Design : RBD

Plot size : 6 rows of 3 m length each

Observations : On species wise major defoliators/m row at 3 places/plot on 1 DBT, 3 and 7 DAT, per cent defoliation, Grain yield (to be reported in kg/ha)

No. of sprays : Three (3) Sprays : 1<sup>st</sup>: 15 to 20 DAG; 2<sup>nd</sup>: 35-40 DAG; 3<sup>rd</sup>: 55-60 DAG or coinciding with incidence of major insects.

**Note:** Above microbial agents should be procured from PCI Ltd.

#### **ENT 8: Integrated management of root rot complex and stem borers of soybean**

**Centers** : Amravati, Dharwad, Jabalpur, Pantnagar and Palampur

**Note:** Trail will be laid out by the pathologists and entomological observations will be made by entomologist as detailed in pathology technical programme.

**Instructions to Soybean Entomologists for uniformity in conduct of trials  
and reporting of data**

1. **Weather data** of entire crop season should be supplied with trial data.
2. **Survey:** Mention variety name, DOS, DOG and dates of observations. Data on major and minor insects should be submitted in the **format** given in Summary Tables of Experiments. In case of defoliators, larval population and extent of defoliation (%) at flowering and at peak incidence should be given. Observations on BCAs, both in field as well as under lab conditions should be reported. Associate with Agronomists for Field surveys and report insect situation in the region.
3. **Screening:** While reporting screening data of AVT entries, sort the test entries in alphabetical order followed by zonal checks as given in Technical Programme. Previous years' resistant entries should also be sorted alphabetically **but** should appear after zonal checks. **Use all zonal checks** also and indicate them with (C). Transformed values and the resistance categories may be given in the **same column** below the original values. In case of defoliators, larval population and extent of defoliation (%) should be reported.
4. Seeds of all IVT entries should be **retained**, so that they can be used next year if some of them get promoted to AVT or found resistant to insect(s).
5. **Summary:** A brief summary of results may be given for each trial. Please try to analyze the results critically and give your valuable interpretations. In case of unexpected results, please try to find out the possible reasons.
6. **For lab experiment (ENT. 3) on “Identification of defoliator resistant soybean genotypes”:** Take timely action for procurement of *Spodoptera litura* pupae or egg masses from NBAIR, Bangalore (if required).

## (D) TECHNICAL PROGRAMME OF MICROBIOLOGY FOR 2019

### **MB 1/16: Isolation and functional characterization of selected rhizobia/rhizobacteria for developing inoculants to mitigate abiotic stress in soybean**

**Centre:** Pantnagar, Delhi, Indore, Raipur, Ludhiana, Dharwad

**Traits:** ACC deaminase, PEG tolerance (upto 25% PEG), Catalase, Superoxide dismutase, IAA under *in vitro*. Selected PEG tolerant isolates will be evaluated for the above functional traits.

**Isolation:** Fluorescent pseudomonads and rhizobia will be isolated from rhizosphere soil and nodules respectively using specific media (KB, YEMA). The colonies exhibiting fluorescence under UV light would be isolated using Kings B media for the further investigations.

### **MB2a/18: Evaluation of promising soybean rhizobia for conferring drought tolerance in soybean under pot conditions (Ludhiana, Delhi, Pantnagar, Indore, Sehore, Raipur and Dharwad)**

This trial would be conducted in unsterilized soil in pots. Following treatments will be tested-

**Treatments:** 8 (4×2)

1. Un-inoculated control
2. Local rhizobial strain
3. *B. daqingense*
4. *B. liaoningense*

#### **Stress level**

1. No moisture stress
2. Stress at R5 stage for 10 days (by stopping irrigation) or until plants started showing wilting symptoms whichever is earlier

**Design:** Factorial CRD (4×2); **Replications** 6

#### **Observations:**

After stress (7-10 days of imposing stress treatments at R5 stage)

1. Nodule dry weight
2. Leghaemoglobin in nodules
3. Relative water content
4. Chlorophyll content and proline in leaves
5. Shoot and root dry weight
6. N and P uptake in roots and shoots

At harvest

7. N and P uptake in grains
8. Grain yield

Note: The sampling will be done before irrigation (after stress treatment at R5 stage).

Cultures for *B. daqingense* and *B. liaoningense* and protocol of proline and chlorophyll estimation in leaves will be supplied by Indore centre

**MB 3/14: Field evaluation of AMF and *Paenibacillus polymyxa* microbial combination at farmer's field**

**Centres:** Delhi, Indore, Pantnagar, Sehore, Raipur, Ludhiana and Dharwad  
Latest released soybean variety of that centre

**Locations:** 6 (six centers)

**Plot size:** one acre

**Treatments:** 02

1. *Paenibacillus polymyxa* (HKA 15)+AMF consortia at 75% RDF
2. Farmers practice

**Observations:**

1. Nodule number, nodule dry weight at 50 % flowering stage
2. Grain yield and B:C ratio

**Note:**

1. Seed (cultivar of the region) should be procured by the conducting centre
3. The cultures will be supplied by the Indore centre (AMF) and IARI centre (*Paenibacillus polymyxa* (HKA 15)).
4. Soil N and P has to be tested before demonstrating the trial.
5. Follow the farmers practice prevailing in that area in both the treatments

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

**Centres:** Pantnagar, Delhi, Indore, Sehore, Ludhiana and Raipur

| Zone | Entries |
|------|---------|
| NHZ  |         |
| NPZ  |         |
| NEHZ |         |
| EZ   |         |
| CZ   |         |
| SZ   |         |

Experimental design and replication: As per breeder's trial (Either take samples, whole plants with intact roots and soils, from breeder trials in triplicates or procure seeds from breeders to conduct trial separately in which case each entry should have 3 replications).

**Observations:**

1. Nodule number and nodule dry weight
2. Leghaemoglobin content in nodules at 50 % flowering stage.

**MB 5/15: Evaluation of Bradyrhizobial strains and their interactive effect on soybean varieties under elevated CO<sub>2</sub> and/temperature conditions (OTC)-Only at Dharwad centre**

**Treatments:**

Inoculations: 04 (three rhizobial strains (one each from south, central India (Indore strain) and north (IARI strain) and one uninoculated)

**Varieties:** 4 (Dsb-23-2, Dsb-21, JS 95-60, JS 335)

1. Elevated CO<sub>2</sub> (550 ppm)
2. Elevated Temp (+2°C over ambient)
3. 1+2
4. Ambient CO<sub>2</sub> & temperature
5. Reference ring

**Observations:**

1. Nodule number, nodule dry weight at 50 % flowering stage
2. Plant biomass and N content and chlorophyll in shoots and soil dehydrogenase activity (µg TPF/hr/g soil) in rhizosphere soils at 50% flowering stage.
3. PLFA profile and biomass in rhizosphere soil (soil samples to be drawn at pod filling stage, stored at -20 degrees Celsius until used and sent to ICAR-IISR, Indore for analysis)



## **(E) TECHNICAL PROGRAMME OF PLANT PATHOLOGY FOR 2019**

### **PP-1 Survey and surveillance for soybean diseases**

**Centres:** Almora, Amravati, Dharwad, Jabalpur, Jorhat, Kasbe Digraj, Medziphema Pantnagar, Palampur, Ranchi and Sehore

#### **Note:**

1. Disease score 0-9, and procedure given for calculating infection index (I.I.) at Appendix VII, pages 57-59 of "Technical Programme 2009-10" should strictly be followed.
2. Date of the appearance of disease and period of its rapid spread should be mentioned.
3. Previous crops to be recorded before soybean cropping.
4. Probable yield loss due to disease in the region should also be mentioned based on survey.
5. Pathogen of every disease should clearly be spelt out. Name and abbreviated form of diseases as given in page no. 35 of "Technical Programme 2009-10" should uniformly be followed.
6. Plant protection measures used by farmers to be recorded.
7. In case of viral diseases weed and insect population around the field and weather factors to be recorded.

### **PP-2: Trap nursery trial for disease incidence**

**Centres** : Almora, Amravati, Dharwad, Delhi, Indore, Jabalpur, Jorhat, Medziphema, Pantnagar, Palampur and Sehore

**Plot size** : Three rows of 3 m length

**Design** : R.B.D.

**Replications:** Two

**Treatments** : Varieties listed below

- |             |             |              |              |
|-------------|-------------|--------------|--------------|
| 1. JS 97-52 | 2. JS 95-60 | 3. JS 72-280 | 4. RKS 18    |
| 5. PK 262   | 6. PK 472   | 7. MACS 58   | 8. JS 93-05  |
| 9. Punjab 1 | 10. Bragg   | 11. Monetta  | 12. KHSb 2   |
| 13. NRC 7   | 14. VLS 58  | 15. JS 335   | 16. Shivalik |

#### **Observations:**

1. For root rot diseases exact value of % mortality should be mentioned. Additionally, % mortality should also be reflected in terms of 0-9 score to calculate infection index (I.I.) as mentioned at page 58 (Appendix VII, "Technical Programme 2008-09).
2. For diseases (foliar, cotyledonary spot (CS), PSS and viral diseases), scoring should be made in 9 scale as given in page 57; IB, C and D. Infection index should also be calculated. For foliar diseases observation is to be made on 10 plants/plot selected at random ignoring top 3 leaves.
3. Pathogen of every disease should clearly be spelt out.
4. Observations of important diseases will be recorded at initiation and at weekly interval.
5. To correlate with weather parameters and develop correlation coefficient and regression equations for various observed diseases.

**PP-3: Evaluation of breeding materials for resistant donor(s).**

**Centres:** Almora, Amravati, Dharwad, Delhi, Indore, Jabalpur, Jorhat, Kasbe Digraj, Kota, Ludhiana, Medziphema, Pantnagar, Palampur, Raipur Sehore and UgarKhurd(Glasshouse screening of AVT II entries for rust through artificial inoculation will be taken up at Dharwad center).

a. IVT -Non replicated 2 rows each x 5 m.

b. AVT-I

c. AVT-II

For b & c - Replicated 2 rows x 3 m (2 replications) under RBD.

**Note 1:** Seeds for the IVT trial will be supplied by the ICAR-IISR, Indore

**Note 2:** All the centres will evaluate the AVT-I & II entries of **all the zones**. Seeds of previous year IVT and AVT I can be utilized.

**Note 3:** AVT II entries will be evaluated under artificially inoculated conditions/hot spot locations for centre specific diseases as given below:

| S.N. | Centre             | Disease (s)              |
|------|--------------------|--------------------------|
| 1.   | RVSKVV, Sehore     | TLS, ALS YMV and CR      |
| 2.   | GBPU&T, Pantnagar  | RAB and YMV              |
| 3.   | VPKAS, Almora      | FLS                      |
| 4.   | UAS, Dharwad       | Rust CLS/PSS and PB(Ct)  |
| 5.   | K.Digraj           | Rust, PB(Ct)             |
| 6.   | JNKVV, Jabalpur    | CR, YMV and RAB          |
| 7.   | AAU, Jorhat        | Coll R, PB(Ct)           |
| 8.   | IGKVV, Raipur      | IBB, PB(Ct)              |
| 9.   | CSKHPKVV, Palampur | PB(Ct) and FLS           |
| 10.  | Medziphema         | Rust, PB(Ct), RAB        |
| 11.  | Ludhiana           | YMV, SMV                 |
| 12.  | UgarKhurd          | Rust, CLS/PSS and PB(Ct) |
| 13.  | Dholi              | YMV                      |
| 14.  | Amravati           | CR and YMV               |
| 15.  | Delhi              | YMV and BND              |
| 16.  | Indore             | PB(Ct), CR and SMV       |

**Note 4:** Pathologists should include susceptible checks for each disease as given below. However, more than one susceptible check should be used for each disease and their name should be mentioned. **In case of breeder's checks, use only zonal checks of your zone.**

| <u>Disease</u>          | <u>Susceptible checks</u> | <u>Breeder's checks</u>             |
|-------------------------|---------------------------|-------------------------------------|
| FLS                     | Shivalik/VLS 58/VLS 2     | Breeders checks of respective zones |
| Rust, YMV, Coll R & TLS | JS 335, JS 93-05          |                                     |
| BP and CR               | Punjab 1, MAUS 47         |                                     |
| SMV                     | JS 75-46, JS 335          |                                     |
| MLS and ALS             | JS 72-44, JS 335          |                                     |
| RAB and RRR             | Punjab 1/Bragg            |                                     |

|              |                  |  |
|--------------|------------------|--|
| Anth/PB(Ct.) | Bragg, JS335     |  |
| IBB          | NRC 37           |  |
| CLS/PSS      | JS 335, VLS 58   |  |
| BS           | JS 93-05, JS 335 |  |

**Note 5:** For IVT, AVT-I and AVT II, after every five entries one row of susceptible checks should be planted. The disease reaction should be given on 0-9 scale only. Classify the entries based on 0-9 scale. For virus disease (s) screening follow instruction given in note 9.

**PP-4: Performance of the previous year's resistant entries**

|     | <b>Centres</b>     | <b>Diseases</b>    |
|-----|--------------------|--------------------|
| 1.  | RVSKVV, Sehore     | TLS, PB(Ct) and CR |
| 2.  | GBPUA&T, Pantnagar | RAB and YMV        |
| 3.  | VPKAS, Almora      | FLS                |
| 4.  | UAS, Dharwad       | Rust and PSS       |
| 5.  | JNKVV, Jabalpur    | CR, YMV and RAB    |
| 6.  | Ugarkhurd          | Rust & Pod blight  |
| 7.  | IGKV, Raipur       | IBB and PB(Ct)     |
| 8.  | Amravati           | CR and YMV         |
| 9.  | Palampur           | FLS & PB (Ct)      |
| 10. | Ludhiana           | YMV                |
| 11. | K. Digraj          | Rust and PB(Ct)    |

Plot size should be maintained uniformly as 3 rows of 3 meter length at all centers (non replicated). The disease reaction should be given on 0-9 scale only. Classify the entries based on 0-9 scale. Each centre will identify AR or HR entries (MR, where AR or HR entries is not available) for the diseases as given above and maintain nursery under inoculated conditions. Each year variety identified as AR or HR in PP 3 (a,b,c) and germplasm trial material will be added to this nursery. Entry should be rejected after showing susceptibility with year of testing. {**Note 6 : Year of testing of the entry must be shown in bracket with the entry. The exchange of resistant material for YMV, PB(Ct), Rust, FLS, RAB and CR be taken up among the centers with intimation to PI (Plant Pathology)**}

**PP 5: Evaluation of germplasm lines for identification of multiple disease resistant sources**

**Centers:** Dharwad (Rust, PSS, PB(Ct)), Jabalpur (YMV, CR, RAB), Indore (PB(Ct), SMV,CR) Palampur (FLS, PB(Ct), BS), Pantnagar (YMV, RAB and PB(Ct))

**Design:** Augmented (2 lines x 3 m)

**No. of germplasm:** 50

**Observations:** The disease reaction should be given on 0-9 scale only. Classify the entries based on 0-9 scale.

**Note 7:** Seeds will be supplied from Germplasm Centre of ICAR-IISR, Indore

**PP 6/ENT 8: (2019): Integrated management of the root rot complex and stem borers of soybean**

**Locations:** Dharwad(Ugarkhurd), Amravati, Jabalpur, Pantnagar and Palampur

**Objective:** To develop integrated pest and disease management strategies against root rot and stem borer in soybean

**Variety:** JS 335

**Design:** RBD

**Plot size:** 5 rows of 3 mt length

**Replications:** Three

**Treatment Details:**

| Treatments      | Chemicals                                   | Formulation | Dosage (g/ml/kg seed) |
|-----------------|---------------------------------------------|-------------|-----------------------|
| T <sub>1</sub>  | Seed treatment (ST) with Carboxin + Thiram  | 75 % WP     | 3                     |
| T <sub>2</sub>  | ST with Trifloxystrobin + Penflufen         | 240 FS      | 1                     |
| T <sub>3</sub>  | ST with Thiophanate methyl + Pyroclostrobin | 500 FS      | 2                     |
| T <sub>4</sub>  | ST with <i>Trichoderma harzianum</i>        | -           | 10                    |
| T <sub>5</sub>  | ST with Thiomethoxam                        | 600 FS      | 2                     |
| T <sub>6</sub>  | T <sub>1</sub> +T <sub>5</sub>              |             | 3+2                   |
| T <sub>7</sub>  | T <sub>2</sub> + T <sub>5</sub>             | -           | 1+2                   |
| T <sub>8</sub>  | T <sub>3</sub> +T <sub>5</sub>              |             | 2+2                   |
| T <sub>9</sub>  | T <sub>4</sub> + T <sub>5</sub>             |             | 10+2                  |
| T <sub>10</sub> | Untreated control                           |             |                       |

**Note 8:** Spraying with chlorantroniprole 0.2ml/L at 15 and 35 DAS and Propiconazole 1ml/L at 35 & 45 DAS for treatment T<sub>1</sub> to T<sub>9</sub>.

**Observations to be recorded:** (1) % Field Stand, (2) % Root rot incidence, (3) % Stem tunneling, (4) % Girdling, (5) Plant ht (cm), (6) No. of branches per plant, (7) No. of pods per plant, (8) 100 seed weight (g), (9) Seed yield(q/ha)

**Note 9 : Methodology for recording virus disease severity.**

**Scale for classifying reaction of viral diseases under field conditions.**

- The percent disease incidence (percentage of number of infected plants over total number of plants in a given accession) and disease severity (number of leaves having symptom over total number of leaves in a single plant and averaged from 10 such plants).
- Based on the disease severity, symptom severity grades, designated with numerical values of 0-4 and a scale of response value (0-1) corresponding to such grades, the coefficient of infection (CI) will be calculated by multiplying the percent disease

incidence to the response value assigned for each severity grade following standard methodology

c.

| Symptoms                                           | Severity grade | Response value <sup>b</sup> | Coefficient of infection (CI) <sup>a</sup> | Disease reaction       |
|----------------------------------------------------|----------------|-----------------------------|--------------------------------------------|------------------------|
| Symptoms absent                                    | 0              | 0                           | 0-4                                        | Highly resistant       |
| Very mild symptoms upto 25% leaves                 | 1              | 0.25                        | 5-9                                        | Resistant              |
| Appearance of symptoms in 26-50% leaves            | 2              | 0.50                        | 10-19                                      | Moderately resistant   |
| Appearance of symptoms in 51-75% leaves            | 3              | 0.75                        | 20-39                                      | Moderately susceptible |
| Severe disease infection in symptoms (>75% leaves) | 4              | 1.00                        | 40-69                                      | Susceptible            |
|                                                    |                |                             | 70-100                                     | Highly susceptible     |

<sup>a</sup> CI  $\frac{1}{4}$  Percent disease incidence (any value between 0 and 100) \_ Response value.

<sup>b</sup> Response value is based on disease severity which is calculated on the basis of number of leaves showing symptoms in a single plant, not based on the types of symptoms or area covered by the symptoms.

(Singh, A.K. and Singh K.P., 2000, Screening for disease incidence of YVMV in Okra treated with gamma rays and EMS. *Veg. Sci.*, 27:72-75).

**(F) TECHNICAL PROGRAMME OF FOOD PROCESSING AND VALUE  
ADDITION OF SOYBEAN FOR 2019**

**Programme1:** To develop nutraceutical/functional food from fermented soybean

**Varieties:**

- 1) Small seeded (local)
- 2) JS-335

**Biochemical analysis:**

1. TPC
2. Total Protein

**Programme 2:** Effect of different soybean varieties on quality of soymilk production

**Varieties:**

- 1) NRC-132 (Lipoxygenase 2 free)
- 2) JS-335
- 3) Local variety

**Biochemical analysis:**

1. Lipoxygenase
2. Protein
3. Fat

**Programme 3: Formulation and development of soy okara (wet) cookies by blending with different levels of black scented rice flour**

**Varieties:**

- 1) JS-355

**Observation to be taken:**

- 1) Protein
- 2) Fat
- 3) Moisture
- 4) Sensory analysis
- 5) Cost benefit ratio

द. परिशिष्ट

**D. APPENDICES**

## Proceedings of Varietal Identification Committee (VIC) Meeting held on 16<sup>th</sup> March, 2019 during 49<sup>th</sup> Annual Group Meet of AICRP on Soybean at Birsa Agricultural University, Ranchi

A meeting of Varietal Identification Committee of AICRP on Soybean was held under the Chairmanship of Dr. P.K. Chakrabarty, Asstt. Director General (O&P), ICAR, Krishi Bhavan, New Delhi on 16<sup>th</sup> March, 2019 at Birsa Agricultural University, Ranchi. Dr V. S. Bhatia, Director ICAR-IISR, Indore was the Member Secretary of the Varietal Identification Committee. Following members were present:

1. Dr. P.K. Chakrabarty, Asstt. Director General (O&P), ICAR, Krishi Bhavan, New Delhi
2. Dr. D.N. Singh, Director of Research, Birsa Agricultural University, Ranchi (Jharkhand)
3. Shri D.N. Pathak, Executive Director, The Soybean Processors Association of India (SOPA), Scheme No.53, Near Malviya Nagar, A.B. Road, Indore-452008 (M.P.)
4. Dr. Jagdish Kumar, Vice President (R&D) Ruchi Hi-Rich Seeds Pvt. Ltd., 101, The Horizon, 11/5, South Tukoganj, Nath Mandir Road, Indore-452001 (M.P.)
5. Dr. A.K. Singh, Head, ICAR-Research Complex for Eastern Region, Ranchi
6. Dr. V.S. Bhatia, Director, ICAR-Indian Institute of Soybean Research, Indore (M.P.)
7. Dr. Sanjay Gupta, Principal Investigator (Plant Breeding), ICAR-Indian Institute of Soybean Research, Indore
8. Dr. A.N. Sharma, Scientist I/c AICRPS and Principal Investigator (Entomology), ICAR Indian Institute of Soybean Research, Indore
9. Dr. S.D. Billore, Principal Investigator (Agronomy), ICAR Indian Institute of Soybean Research, Indore
10. Dr. M. P. Sharma, Principal Investigator (Microbiology), ICAR Indian Institute of Soybean Research, Indore
11. Dr. Shamarao Jahagirdar, Principal Investigator (Plant Pathology), University of Agricultural Science, Main Agriculture Research Station, Dharwad

Varietal identification committee considered 9 proposals for identification of varieties. Following recommendations were made.

1. **SL 1104:** The entry has been evaluated for 3 years in AICRPS and has shown 17% yield superiority (2381 Kg/ha) over the best check PS 1347. It is highly Resistant for Pod blight & YMV and has shown strong Antixenosis against *S. litura*. It has higher nodules, nodule biomass and leghaemoglobin content in nodules over the check (PS 1347). SL 1104 has been **identified for North Plain Zone for release in the states of Punjab, Uttar Pradesh (except Bundelkhand region of UP) and Delhi.**
2. **DS 3106:** The candidate variety DS 3106 was considered for identification in North Plain Zone. Based on its inconsistent performance in breeding and agronomic trials and only 4.2% yield superiority over the best check PS 1347 the candidate entry was not identified for release.
3. **DSb 32:** The candidate variety DSb 32 was considered for identification in North Eastern Hill Zone. DSb 32 has been tested for 3 years in AICRP trials and shown 21.5 % yield superiority (1917 kg/ha) over the best check RKS 18 and has maintained its yield superiority status in agronomic trials also. The entry is highly resistant to rust & MR to PB(Ct) and has shown multiple insect resistance. DSb 32 has **been identified for release** to cultivate in the states of **Assam and North Eastern States.**
4. **RSC 10-71:** The candidate variety was considered for identification in North Eastern Hill and Eastern Zones. It has shown yield superiority of 16.7% (1842 kg/ha) in North Eastern Hill Zone and 15.5% yield superiority in Eastern Zone (1899 kg/ha) over the respective best checks. However, its performance was inconsistent in North Eastern Hill Zone and its reaction to pod blight was not confirmed in Eastern Zone. **The committee has recommended for its revaluation in North Eastern Hill Zone.** The committee has also recommended to ensure resistance to pod blight in Eastern Zone through artificial inoculation before submitting proposal for notification in the states of **West Bengal, Bihar, Jharkhand, Chhattisgarh, Orissa.**
5. **RSC 10-52:** The entry was considered for its identification in Eastern Zone and Central Zone. It has yield superiority of 13% (1858 kg/ha) over the best check in Eastern Zone and 8.9% (2054 kg/ha) in Central Zone. The entry has shown antibiosis against insects and resistance to Charcoal rot in Central Zone. **RSC 10-52 has been identified for release for cultivation in states of Madhya Pradesh, Bundelkhand region of UP, Rajasthan, Gujarat and Marathwada and Vidarbha region of Maharashtra.** However, its performance for pod blight has to be confirmed through artificial inoculation in Eastern Zone before submission of notification proposal for notification in the states of **West Bengal, Bihar, Jharkhand, Chhattisgarh, Orissa.**



6. **MACS 1520:** The candidate variety was considered for its identification in Central Zone. MACS 1520 has shown yield superiority (2208 Kg/ha) of 17.1% over the best check. It is resistant to Charcoal Rot and shows slight Antixenosis against *S. Litura*. Entry MACS 1520 has higher nodulation and leghaemoglobin content in nodules. MACS 1520 has been identified for release to cultivate **in states of Madhya Pradesh, Bundelkhand region of UP, Rajasthan, Gujarat and Marathwada and Vidarbh region of Maharashtra.**
7. **AMS-MB5-18:** The candidate variety was considered for its identification in Central Zone. The entry has yielded 8.5% higher (2044 kg/ha) than check variety NRC 86 in breeding trials. It is **highly resistant to Charcoal Rot**, shows multiple insect resistance and has slight antixenosis against *S. litura*. Entry AMS MB 5-18 has higher nodulation and leghaemoglobin content in nodules than check variety NRC 86. AMS-MB5-18 is identified for release for cultivation **in states of Madhya Pradesh, Bundelkhand region of UP, Rajasthan, Gujarat and Marathwada and Vidarbh region of Maharashtra.**

(P.K. Chakrabarty)  
Assistant Director General (O&P)  
ICAR, New Delhi

**MONITORING TEAMS FOR *KHARIF* 2019****Team 1****Centres: Delhi, Ludhiana, Palampur and Srinagar**

Dr Sanjay Gupta, PI-Plant Breeding, IISR, Indore-Team Leader

Dr MP Sharma, PI-Microbiology, IISR, Indore

**Team 2****Centres: Pantnagar, Almora and Majhera**

Dr SR Ramgiry, Soybean Breeder, CoA, Sehore-Team Leader

Dr Anirban Roy, Soybean Pathologist, IARI, New Delhi

**Team 3****Centres: Kota, Morena, Sehore and Jabalpur**

Dr SP Mehtre, Soybean Breeder, MAU, Parbhani-Team Leader

Dr Laxman Singh Rajput, Soybean Pathologist, IISR, Indore

**Team 4****Centres: Amravati, Nagpur, Raipur and Ranchi**

Dr Kamendra Singh, Soybean Breeder, GBPUAT, Pantnagar- Team Leader

Dr Arvind Kumar, Soybean Agronomist, BAU, Ranchi

**Team 5****Centres: Parbhani, Amreli, Anand and Bhavnagar**

Dr Manoj Srivastava, Soybean Breeder, JNKVV, Jabalpur -Team Leader

Dr R Channakeshava, Soybean Entomologist, UAS, Dharwad

**Team 6****Centres: Sangli, Ugar Khurd and Adilabad**

Dr Giriraj Kumawat, IISR, Indore - Team Leader

Dr PK Amrate, JNKVV, Jabalpur,

**Team 7****Centres: Pune, Dharwad and Bangalore**

Dr Onkarappa T, Soybean Breeder, UAS Bangaluru-Team Leader

Dr Rakesh Verma, Soybean Agronomist, IISR, Indore

**Team 8****Centres: Jorhat, Imphal, Medziphema and Umiam (Barapani)**

Dr AN Sharma, PI-Entomology-Team Leader

Dr SD Billore, PI-Agronomy, IISR, Indore

**Note:**

1. Monitoring teams shall use the proforma given in Appendix-III for monitoring report.
2. Monitoring teams should also monitor and report the sponsored field agrochemical testing trials, if any.

**MONITORING PROFORMA-2018**

|                           |                            |                            |                     |                        |                   |
|---------------------------|----------------------------|----------------------------|---------------------|------------------------|-------------------|
| <b>Centre</b>             |                            |                            |                     |                        |                   |
| <b>Date of monitoring</b> |                            |                            |                     |                        |                   |
| <b>Weather conditions</b> | <b>Onset of monsoon on</b> | <b>Sowing commenced on</b> | <b>Rainfall</b>     |                        |                   |
|                           |                            |                            | <b>Distribution</b> | <b>Total till date</b> | <b>Rainy days</b> |
|                           |                            |                            |                     |                        |                   |

**1. Evaluation of AICRPS Trials**

| <b>Discipline</b>  | <b>No. of trials allotted</b> | <b>No. of trials conducted</b> | <b>General maintenance</b> | <b>Specific comments of team</b> |
|--------------------|-------------------------------|--------------------------------|----------------------------|----------------------------------|
| 1. Plant breeding  |                               |                                |                            |                                  |
| 2. Agronomy        |                               |                                |                            |                                  |
| 3. Entomology      |                               |                                |                            |                                  |
| 4. Plant pathology |                               |                                |                            |                                  |
| 5. Microbiology    |                               |                                |                            |                                  |
| 6. Food Technology |                               |                                |                            |                                  |

**1.1 Discipline-wise evaluation****1.1.1 Name of discipline .....**

| <b>Trial / experiment</b> | <b>Crop stage</b> | <b>Conducted as per technical programme or any deviation ?</b> | <b>Specific comments of team</b> |
|---------------------------|-------------------|----------------------------------------------------------------|----------------------------------|
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |
|                           |                   |                                                                |                                  |

| <b>Sponsored / Station trials, if any</b> | <b>Objective(s)</b> | <b>Specific comments of team</b> |
|-------------------------------------------|---------------------|----------------------------------|
|                                           |                     |                                  |
|                                           |                     |                                  |
|                                           |                     |                                  |
|                                           |                     |                                  |

**2. Information on Germplasm**

Total germplasm collection é é é é é é é ..

Number of germplasm acquired during the year é é é é ..

**Germplasm received and used:**

| <b>Donor centre</b> | <b>No. of lines</b> | <b>Traits</b> | <b>No. of accession used in breeding programme (trait-wise)</b> | <b>Specific comments of team</b> |
|---------------------|---------------------|---------------|-----------------------------------------------------------------|----------------------------------|
|                     |                     |               |                                                                 |                                  |
|                     |                     |               |                                                                 |                                  |

**3. Information on Crosses made:**

| <b>Parents</b> | <b>Traits</b> | <b>No. of pollinations</b> | <b>Specific comments of team</b> |
|----------------|---------------|----------------------------|----------------------------------|
|----------------|---------------|----------------------------|----------------------------------|

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |

#### 4. Information on Generation Advancement:

Number of advanced generation received from various centres (centre-wise) : é é é é é  
 Generation advanced at the centre:

| Generation | No of crosses | No. of population | Trait | Specific comments of team |
|------------|---------------|-------------------|-------|---------------------------|
|            |               |                   |       |                           |
|            |               |                   |       |                           |

#### 5. Seed Production Programme:

| Breeder seed |            |                |                |                     |            |                           |
|--------------|------------|----------------|----------------|---------------------|------------|---------------------------|
| Variety      | Target (q) | Area sown (ha) | Date of sowing | Expected production | Crop stage | Specific comments of team |
|              |            |                |                |                     |            |                           |
|              |            |                |                |                     |            |                           |

| Nucleus seed              |            |                |                |                     |            |                           |
|---------------------------|------------|----------------|----------------|---------------------|------------|---------------------------|
| Variety stage I /stage II | Target (q) | Area sown (ha) | Date of sowing | Expected production | Crop stage | Specific comments of team |
|                           |            |                |                |                     |            |                           |
|                           |            |                |                |                     |            |                           |

#### 6. Front Line Demonstrations:

|              | FLD allotted | Number of FLD conducted | Number of FLD visited | General condition of FLDs | Specific comments of team |
|--------------|--------------|-------------------------|-----------------------|---------------------------|---------------------------|
| Full package |              |                         |                       |                           |                           |
|              |              |                         |                       |                           |                           |

#### 7. For regular centres:

Manpower: Sanctioned:

In position:

Financial: AUC Status -

#### 8. Overall Specific comments of the monitoring team about the performance of the centre

AICRPS I/c

Monitoring team members

## Uniform method of disease rating

Point scale (0 to 9) divided into 6 categories should be followed. General interpretation of the scale is as follows:

|   |   |                        |
|---|---|------------------------|
| 0 | = | Absolutely resistant   |
| 1 | = | Highly resistant       |
| 3 | = | Moderately resistant   |
| 5 | = | Moderately susceptible |
| 7 | = | Susceptible            |
| 9 | = | Highly susceptible     |

### Rating scales for different diseases

#### **I. Fungal/Bacterial diseases**

##### **(A) Charcoal rot/Collar rot/Rhizoctonia rot**

| <b>Rating</b> | <b>Description</b>      |
|---------------|-------------------------|
| 0             | No mortality            |
| 1             | 1% mortality            |
| 3             | 1.1 to 10% mortality    |
| 5             | 10.1-25% mortality      |
| 7             | 25.1-50% mortality      |
| 9             | more than 50% mortality |

##### **(B) Bacterial pustule/Rhizoctonia aerial blight/Cercospora leaf spot/Alternaria leaf spot/rust/Myrothecium leaf spot/Target leaf spot/Frogeye leaf spot**

| <b>Rating</b> | <b>Description</b>                                                                                                                    |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 0             | No lesions/spots                                                                                                                      |
| 1             | 1% leaf area covered with lesions/spots                                                                                               |
| 3             | 1.1-10% leaf area covered with lesions/spots, no spots on stem.                                                                       |
| 5             | 10.1-25% of the leaf area covered, no defoliation; little damage.                                                                     |
| 7             | 25.1-50% leaf area covered; some leaves drop; death of a Few plants; damage conspicuous.                                              |
| 9             | More than 50% area covered, lesions/spot very common on All plants, defoliation common; death of plants common; Damage more than 50%. |

##### **(C) Cotyledonary spot/Purple seed stain/ Pod blight**

| <b>Rating</b> | <b>Description (cotyledon/ seed area covered)</b>           |
|---------------|-------------------------------------------------------------|
| 0             | No lesions/spots/discoloration                              |
| 1             | 1% area covered with lesions/spots/discoloration            |
| 3             | 1.1-10% area covered with lesions/spots/discoloration       |
| 5             | 10.1-25% area covered with lesions/spots/discoloration      |
| 7             | 25.1-50% area covered with lesions/spots/discoloration      |
| 9             | More than 50% area covered with lesions/spots/discoloration |

#### **II. Viral diseases**

*Yellow mosaic/ Indian bud blight/Green or soybean mosaic*

| Rating | Description                                                                                                                            |
|--------|----------------------------------------------------------------------------------------------------------------------------------------|
| 0      | No symptoms on any plant                                                                                                               |
| 1      | Yellow mottle or necrotic mottle in up to 1% plants                                                                                    |
| 3      | Yellow mottle or necrotic mottle in traces on 1.1-10% plants                                                                           |
| 5      | Necrotic mottle/mild mottle/ Mild symptoms; 10.1-25% plants; no reduction in plant growth; no yield loss.                              |
| 7      | Yellow mottle symptoms not covering the whole leaf lamina on 25.1-50% plants; reduction in leaf and plant growth.                      |
| 9      | Yellow mottle symptoms on more than 50% plants; severe reduction in leaf and plant growth as well as pod formation and death of plant. |

### Calculation of Percent Disease Index (PDI)

The above rating scales or grades are utilized for the calculation of PDI using the following formula of wheeler.

$$\text{Percent disease index (PDI)} = \frac{\text{Sum of individual rating}}{\text{No. of leaves examined}} \times \frac{100}{\text{Maximum disease rating}}$$

Example:

|  |                |                |                |                   |                   |                   |                   |                   |  |  |
|--|----------------|----------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--|--|
|  |                |                |                |                   |                   |                   |                   |                   |  |  |
|  | R <sub>1</sub> | T <sub>1</sub> | P <sub>1</sub> |                   |                   |                   |                   |                   |  |  |
|  | (Rep.)         | (Treat.)       | (Plant)        |                   |                   |                   |                   |                   |  |  |
|  |                |                |                | (Leaves           | Grades)           |                   |                   |                   |  |  |
|  |                |                |                | L <sub>1</sub> -3 | L <sub>3</sub> -1 | L <sub>5</sub> -0 | L <sub>7</sub> -5 | L <sub>9</sub> -7 |  |  |
|  |                |                |                | L <sub>2</sub> -5 | L <sub>4</sub> -3 | L <sub>6</sub> -5 | L <sub>8</sub> -7 |                   |  |  |

$$\text{PDI} = \frac{(1 \times 0) + (1 \times 1) + (2 \times 3) + (3 \times 5) + (2 \times 7)}{10 \text{ (total no. of leaves examined)}} \times \frac{100}{9 \text{ (max. grade used in the rating scale)}}$$

$$[0 + 1 + 6 + 15 + 14]/9 \times 11.11$$

$$36/9 \times 11.11 = 44.44$$

Similarly calculate PDI for all the ten plants (R<sub>1</sub> T<sub>1</sub> P<sub>2</sub>, R<sub>1</sub> T<sub>1</sub> P<sub>3</sub> ..... R<sub>1</sub> T<sub>1</sub> P<sub>10</sub>) and make an average which gives the PDI of the particular treatment in a replication. Calculate similarly for the same treatment in other replications. Then go for statistical analysis after converting the PDI values by arc sine or angular transformations, if, required.

On the basis of PDI, the entry/variety can be classified as follows:

| Infective Index | Resistant category            |
|-----------------|-------------------------------|
| 0               | = Absolutely resistant (AR)   |
| 0.01 ÷ 11.11    | = Highly resistant (HR)       |
| 11.12 ÷ 33.33   | = Moderately resistant (MR)   |
| 33.34 ÷ 55.55   | = Moderately susceptible (MS) |
| 55.56 ÷ 77.77   | = Susceptible (S)             |
| 77.78 ÷ 100.00  | = Highly susceptible (HS)     |

(Test lines with Infective Index rating 0 to 11.11 are considered acceptable for a breeding programme, lines with rating 11.12 to 33.33 are acceptable only in exceptional cases when lines with rating 0 to 11.11 are not available, lines with rating higher than 33.33 are not acceptable).

### Scale for classifying reaction of viral diseases under field conditions.

Methodology for recording virus disease severity.

- The percent disease incidence (percentage of number of infected plants over total number of plants in a given accession) and disease severity (number of leaves having symptom over total number of leaves in a single plant and averaged from 10 such plants).
- Based on the disease severity, symptom severity grades, designated with numerical values of 0-4 and a scale of response value (0-1) corresponding to such grades, the coefficient of infection (CI) will be calculated by multiplying the percent disease incidence to the response value assigned for each severity grade following standard methodology

| Symptoms                                           | Severity grade | Response value <sup>b</sup> | Coefficient of infection (CI) <sup>a</sup> | Disease reaction       |
|----------------------------------------------------|----------------|-----------------------------|--------------------------------------------|------------------------|
| Symptoms absent                                    | 0              | 0                           | 0-4                                        | Highly resistant       |
| Very mild symptoms upto 25% leaves                 | 1              | 0.25                        | 5-9                                        | Resistant              |
| Appearance of symptoms in 26-50% leaves            | 2              | 0.50                        | 10-19                                      | Moderately resistant   |
| Appearance of symptoms in 51-75% leaves            | 3              | 0.75                        | 20-39                                      | Moderately susceptible |
| Severe disease infection in symptoms (>75% leaves) | 4              | 1.00                        | 40-69                                      | Susceptible            |
|                                                    |                |                             | 70-100                                     | Highly susceptible     |

<sup>a</sup> CI =  $\frac{1}{4}$  Percent disease incidence (any value between 0 and 100) × Response value.

<sup>b</sup> Response value is based on disease severity which is calculated on the basis of number of leaves showing symptoms in a single plant, not based on the types of symptoms or area covered by the symptoms.

(Singh, A.K. and Singh K.P., 2000, Screening for disease incidence of YVMV in Okra treated with gamma rays and EMS. *Veg. Sci.*, 27:72-75).

**ALL INDIA COORDINATED RESEARCH PROJECT ON SOYBEAN (ICAR)**  
**49<sup>th</sup> ANNUAL GROUP MEETING**  
**March 16-18, 2019 at**  
**Birsa Agricultural University, Ranchi, Jharkhand**  
**Venue: RAC, Auditorium**

**AGENDA**

|                                                                                            |                                                                                                                                  |                                                               |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 16 <sup>th</sup> March 2019 (Saturday)                                                     |                                                                                                                                  |                                                               |
| 09.00-10.00 hrs                                                                            | REGISTRATION                                                                                                                     |                                                               |
| 10.30 hrs                                                                                  | Malaya Arpan statue of Bhagwan Birsa Munda at RAC entrance                                                                       |                                                               |
| 10.35 hrs                                                                                  | Dignitaries take the seats                                                                                                       |                                                               |
| 10.36-10.45 hrs                                                                            | Birsa Kulgeet and i ICAR Song                                                                                                    |                                                               |
| 10.46 hrs                                                                                  | Welcome by presenting flowers                                                                                                    |                                                               |
| 10.47-10.50 hrs                                                                            | Lighting of Lamp                                                                                                                 |                                                               |
| 10.51-11.00 hrs                                                                            | Welcome                                                                                                                          | Dr. D.N. Singh, Director Research, BAU, Ranchi                |
|                                                                                            | Chairman                                                                                                                         | Dr. Parvinder Kaushal<br>Honðble Vice Chancellor, BAU, Ranchi |
| 11.01-11.25 hrs                                                                            | Brief Project report                                                                                                             | Dr. V.S. Bhatia, Director, ICAR-IISR, Indore                  |
| 11.26-11.40 hrs                                                                            | Remarks by Chief Guest                                                                                                           | Dr. P.K. Chakrbarty, ADG (PP&OP), ICAR                        |
|                                                                                            | Release of Publication(s)                                                                                                        |                                                               |
| 11.43-12.00 hrs                                                                            | Remarks by Chairman                                                                                                              | Dr. P. Kaushal, Honðble Vice Chancellor,<br>BAU, Ranchi       |
| 12.05-12.09 hrs                                                                            | Vote of thanks                                                                                                                   | Dr. Z.A. Haider, BAU, Ranchi                                  |
| 12.10 hrs                                                                                  | National Anthem                                                                                                                  |                                                               |
| 12.10-12.30 hrs                                                                            | TEA BREAK                                                                                                                        |                                                               |
| 12.30-13.00 hrs                                                                            | Research highlights and action taken report by -<br>Dr. V.S. Bhatia, Director, ICAR-Indian Institute of Soybean Research, Indore |                                                               |
| 13.00-14.00 hrs                                                                            | LUNCH                                                                                                                            |                                                               |
| 14.00-16.00 hrs                                                                            | TECHNICAL SESSION-I-A                                                                                                            |                                                               |
| Plant Breeding and Genetics Resources                                                      |                                                                                                                                  |                                                               |
| • Presentation & Review of Coordinated Trials-Dr. Sanjay Gupta, PI-Plant Breeding          |                                                                                                                                  |                                                               |
| • Centre-wise Presentation for Ongoing programmes.                                         |                                                                                                                                  |                                                               |
| Chairman                                                                                   | Dr. P.K. Chakrabarty, ADG (O&P), ICAR, New Delhi                                                                                 |                                                               |
| Co-Chairman                                                                                | Dr. D.N. Singh, Director Research, BAU, Ranchi                                                                                   |                                                               |
| Rapporteurs                                                                                | Dr. S.K. Lal, ICAR-IARI, New Delhi<br>Dr. Manoj Srivastava, JNKVV, Jabalpur                                                      |                                                               |
| 16.00-18.00 hrs                                                                            | Varietal Identification Committee Meeting                                                                                        |                                                               |
| 17 <sup>th</sup> March 2019 (Sunday)                                                       |                                                                                                                                  |                                                               |
| 09.00-12.00 hrs                                                                            | TECHNICAL SESSION-I-B                                                                                                            |                                                               |
| (i) Agronomy and Front Line Demonstrations                                                 |                                                                                                                                  |                                                               |
| • Presentation and reviews of results of Coordinated trials: Dr. SD Billore, PI-Agronomy   |                                                                                                                                  |                                                               |
| • Presentation and review of results of FLD: Dr. S.D. Billore                              |                                                                                                                                  |                                                               |
| Chairman                                                                                   | Dr. Raghav Thakur, Head, Agronomy                                                                                                |                                                               |
| Co-Chairman                                                                                | Dr.(Ms.) Niva Bara, Head, Extension, BAU, Ranchi                                                                                 |                                                               |
| Rapporteurs                                                                                | Dr. Sangshetty Balkunde, UAS, Dharwad<br>Dr. D.S. Meena, AU, Kota                                                                |                                                               |
| (ii) Entomology                                                                            |                                                                                                                                  |                                                               |
| • Presentation and reviews of results of Coordinated trials: Dr A.N. Sharma, PI-Entomology |                                                                                                                                  |                                                               |
| Chairman                                                                                   | Dr. P.K. Singh, Head, Dept. of Entomology, BAU, Ranchi                                                                           |                                                               |
| Rapporteurs                                                                                | Dr. Neeta Gaur, GBPUA&T, Pantnagar<br>Dr. R. Chennakeshava, UAS, Dharwad                                                         |                                                               |



|                                                                                                                                                                                           |                                                                                                                 |                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>(iii) Microbiology</b> <ul style="list-style-type: none"><li><b>Presentation and reviews of results of Coordinated trials: Dr M.P. Sharma, PI-Microbiology</b></li></ul>               |                                                                                                                 |                          |
| Chairman                                                                                                                                                                                  | Dr. Rakesh Kumar, Professor, Soil Science, BAU, Ranchi                                                          |                          |
| Rapporteurs                                                                                                                                                                               | Dr. K.P. Raverkar, GBPUA&T, Pantnagar                                                                           |                          |
| <b>(iv) Plant Pathology</b> <ul style="list-style-type: none"><li><b>Presentation and reviews of results of Coordinated trials: Dr. Shamarao Jahagirdar, PI-Plant Pathology</b></li></ul> |                                                                                                                 |                          |
| Chairman                                                                                                                                                                                  | Dr. N. Kudada, Head, Dept. of Plant Pathology, BAU, Ranchi                                                      |                          |
| Rapporteurs                                                                                                                                                                               | Dr. Pawan K. Amrate, JNKVV, Jabalpur<br>Dr. Laxman Singh Rajput, IISR, Indore                                   |                          |
| <b>(v) Food Technology</b> <ul style="list-style-type: none"><li><b>Presentation and reviews of results of Coordinated trials: Dr. L. Sophia Devi, CAU, Imphal</b></li></ul>              |                                                                                                                 |                          |
| Chairman                                                                                                                                                                                  | Dr.(Mrs.) Rekha Sinha, Head, Dept. of Food Technology, BAU, Ranchi                                              |                          |
| Rapporteur                                                                                                                                                                                | Scientist, BAU, Ranchi                                                                                          |                          |
| 12.00-13.00 hrs                                                                                                                                                                           | <b>TECHNICAL SESSION-II</b>                                                                                     |                          |
| <b>Nucleus and breeder seed production</b>                                                                                                                                                |                                                                                                                 |                          |
| Scenario of breeder seed production at various centres- Dr. Mrinal Kuchlan, ICAR-IISR, Indore                                                                                             |                                                                                                                 |                          |
| Formulation of the centre-wise, variety-wise breeder seed production programme as per DAC indent                                                                                          |                                                                                                                 |                          |
| Chairman                                                                                                                                                                                  | Dr. V.S. Bhatia, Director, ICAR-IISR, Indore                                                                    |                          |
| Rapporteurs                                                                                                                                                                               | Dr. Philips Verghese, ARI, Pune<br>Dr. Gyanesh Satpute, IISR, Indore                                            |                          |
| 13.00-14.00 hrs                                                                                                                                                                           | <b>LUNCH</b>                                                                                                    |                          |
| 14.00-15.00 hrs                                                                                                                                                                           | Felicitation of retiring Scientist & Annual GBM of Society for Soybean Research and Development                 |                          |
| 15.00-18.00 hrs                                                                                                                                                                           | Concurrent Technical Sessions                                                                                   |                          |
|                                                                                                                                                                                           | Formulation of centre-wise Technical Programme of research in each discipline for 2019-20                       |                          |
|                                                                                                                                                                                           | 1. Crop Improvement (Auditorium, BAU)                                                                           | - Dr. Nutan Verma        |
|                                                                                                                                                                                           | 2. Crop Production (Dr. R.B. Prasad Hall, GPB)                                                                  | - Dr. Arvind Kumar Singh |
|                                                                                                                                                                                           | 3. Crop Protection                                                                                              |                          |
|                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Pathology (Dean Conference Room)</li></ul>                                | - Dr. Savita Ekka        |
|                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Entomology (Model Class Room)</li></ul>                                   | - Dr. Rabindra Prasad    |
|                                                                                                                                                                                           | 4. Microbiology (Class Room, Soil Science)                                                                      | - Dr. N.C. Gupta         |
|                                                                                                                                                                                           | 5. Food Technology (Home Science)                                                                               | - Smt. Bindu             |
| <b>18<sup>th</sup> March 2019 (Monday)</b>                                                                                                                                                |                                                                                                                 |                          |
| 09.00-11.30 hrs                                                                                                                                                                           | Preparation, compilation and typing of proceeding of all technical sessions; and visit to University Facilities |                          |
| 11.30-13.30 hrs                                                                                                                                                                           | <b>PLENARY SESSION</b>                                                                                          |                          |
| Chairman                                                                                                                                                                                  | Dr. P. Kaushal, Hon'ble Vice Chancellor, BAU, Ranchi                                                            |                          |
| Co-Chairman                                                                                                                                                                               | Dr. D.N. Singh, Director Research, BAU, Ranchi                                                                  |                          |
| Convener                                                                                                                                                                                  | Dr. V.S. Bhatia, Director, ICAR-IISR, Indore                                                                    |                          |
| Presentation of summary recommendations and highlights of deliberations of different sessions by Chairman / Rapporteurs of different sessions.                                            |                                                                                                                 |                          |
| General discussion                                                                                                                                                                        |                                                                                                                 |                          |
| Chairman's closing Remarks                                                                                                                                                                |                                                                                                                 |                          |
| Vote of thanks                                                                                                                                                                            | Dr. A.N. Sharma, Scientist I/c. AICRPS & Principal Scientist (Entomology), ICAR-IISR, Indore                    |                          |
| 13.00-14.00 hrs                                                                                                                                                                           | <b>LUNCH BREAK</b>                                                                                              |                          |

**LIST OF PARTICIPANTS FOR THE  
XLIIX ANNUAL GROUP MEETING OF AICRP ON SOYBEAN**

**LIST OF PARTICIPANTS**

**INDIAN COUNCIL OF AGRICULTURAL RESEARCH, KRISHI BHAWAN, NEW DELHI - 110 001**

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5. Dr. Sanjay Gupta, Principal Scientist (PI-Plant Breeding)
6. Dr. M.P. Sharma, Principal Scientist (PI-Microbiology)
7. Dr. Vineet Kumar, Principal Scientist (Biochemistry)
8. Dr. G.K. Satpute, Senior Scientist (Genetics & Plant Breeding)
9. Dr. Shiva Kumar, Scientist (Plant Breeding)
10. Dr. Mrinal. K. Kuchlan, Scientist (Seed Technology)
11. Dr. Lokesh Meena, Scientist (Entomology)
12. Dr. Rakesh Verma, Scientist (Agronomy)
13. Dr. Laxman Singh Rajpoot, Scientist (Plant Pathology)
14. Dr. S.N. Verma, IISR, Indore
15. Dr. Avinash Kelanke, IISR, Indore
16. Dr. Jagdish Kumar, Vice President, RHSPL, Indore
17. Dr. D.N. Pathak, SOPA, Indore
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23. Dr. D.K. Shukla , Agronomy
24. Dr. Ajay Srivastava (Agronomy)
25. Dr. Neeta Gaur (Entomology)
26. Dr. S.K. Mishra , Plant Pathology
27. Dr. K.P. Singh (Plant Pathology)
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- 43. Dr. R.S. Ghawade, Jr. Scientist (Plant Pathology)
- 44. Dr. S.S. Nichal, Head, RRC
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OF KASHMIR, WADURA (J&K)**

76. Dr. M.N. Khan, Division of Genetics and Plant Breeding, Faculty of Agriculture

**AGRICULTURAL RESEARCH STATION, JUNAGARH AGRICULTURAL UNIVERSITY,  
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77. Dr. Viren Akbari, Research Scientist

**OTHER SCIENTISTS / PERSONNEL involved in Soybean research / extension activities**

78. Dr. C. P. Singh, Wheat Research Center, Lokbharti, Village - Sanosara, Taluqa - Sihor, Dist-Bhavnagar, Gujrat

79. Dr. Ashwani Kumar Lokbharti, Village - Sanosara, Taluqa - Sihor, Dist-Bhavnagar, Gujrat

80. Shri J.G. Manjappa,, Nuclear Agriculture Division, Bhaba Atomic Research Centre(BARC), Govt.

81. Dr. Ramraj Sen, IARI-CORC, Mandsuar

82. Dr. A.N. Srivastava, principal Scientist, Eagle seeds & Biotech

83. Dr. Ganjan J. Gora, Breeder, Basant Agrotech, Akola, MS

84. Dr.B. Deotale, Head R & D Basant Agrotech, Akola, MS

**List of Invitees from Host University-Birsa Agricultural University, Kanke,  
Ranchi- 834006 , ICAR Institute, Agric. Department, Jharkhand**

85. Dr. Pravinder Kaushal, Vice Chancellor, BAU, Ranchi

86. Dr. D.N Singh, Director of Research

87. Dr. Jaganaath Oraon, Director Extension Education

88. Dr. Z.A. Haider, DRI-cum-Dean-PGS

89. Dr. M. Mahto, Dean Forestry

90. Dr. Sohan Ram, Associate Director Extension Education

91. Dr. Sushil Prasad, Associate Director of Research

92. Dr. R. P. Singh, Director, Seed & Farm

93. Dr. D.K.Shahi, Chairman, SS&AC

94. Dr. Rakesh Sexena, Prof. ,SS&AC

95. Er. D.K.Russia, Head Agril. Engg.
96. Dr. A. Wadood, Chairman, Agril. Phy & Envi. Science.
97. Dr.P.K. Singh, Chairman, Entomology
98. Dr. M. Chakraborty, Agril. Statics
99. Dr. R. Thakur, Dean (Agril.)
100. Dr. Niva Bara, Head, Agril. Extn.
101. Dr. N. Kudada, Chairman, P.P
102. Dr. Rekha Sinha, Head, Home Science
103. Dr. Savita Ekka, Asstt. Professor , Deptt of Plant Pathology
104. Dr. Niraj Kumar, Asstt. Professor , Jr. Scientist, GPB
105. Dr. H.C. Lal, Asstt. Professor Deptt. of Plant Pathology
106. Dr. Binay Kumar, Asstt. Professor Deptt. of Entomology
107. Dr. Yogendra Prasad, Asstt. Professor, Deptt. of GPB
108. Dr. C.S. Singh, Asstt. Professor Deptt. of Agronomy
109. Dr. Sheela Barla , Asstt. Professor Deptt. of Agronomy
110. Dr. Pramod Rai, Asstt. Professor Deptt. of Agril. Engg.
111. Dr. S. Karmakar, Asstt. Professor Deptt. of Agronomy
112. Dr. Surya Prakash, Asstt. Professor , Deptt. of GPB
113. Dr. Kamleshwar Kumar, Asstt. Professor , Deptt. of GPB
114. Dr. Kusmakar Gautam, Asstt. Professor Deptt. of Ext. Edu.
115. Dr. (Mrs.) Supriya Supal Surin , Asstt. Professor , Deptt. of GPB
116. Dr. Shashi Kiran Tirkey, Asstt. Professor , Deptt. of GPB
117. Dr. Varsha Rani, Asstt. Professor , Deptt. of GPB
118. Dr. N.C. Gupta, Asstt. Professor Deptt. of Soil Sci.
119. Dr. Shashibhushan ,Asstt. Professor Deptt. of Soil Sci.
120. Dr. Asha Kumari, Asstt. Professor Deptt. of Soil Sci.
121. Dr. Krishna Prasad, Asstt. Professor , Deptt. of GPB
122. Dr. Arun Kumar, Asstt. Professor , Deptt. of GPB
123. Dr. Ashok Kumar Singh , Asstt. Professor Deptt. of Agronomy
124. Dr. Sushil Pandey, Asstt. Professor Deptt. of Agril. Engg.
125. Dr. Manoj Kumar Barnwal, Asstt. Professor Deptt. of Plant Pathology
126. Dr. C.S. Mahto, Asstt. Professor , Deptt. of GPB
127. Dr. Parwaiz Alam, Asstt. Professor Deptt. of Agronomy
128. Dr. Jaylal Mahto, Asstt. Professor , Deptt. of GPB
129. Dr. Veena Tudu , Asstt. Professor , Deptt. of GPB
130. Dr. Amarjeet Kumar, Asstt. Professor , Deptt. of GPB

**List of Invitees from Host University-Birsa Agricultural University, Kanke,  
Ranchi- 834006 , ICAR Institute, Agric. Department, Jharkhand**

131. Dr. Naiyar Ali, Asstt. Professor Agronomy
132. Dr. R.P. Manjhi Asstt. Professor Agronomy
133. Dr. Milan Chakravorty, Assoc. Professor, Entomology
134. Dr. S.K. Pal, University Professor, Agronomy
135. Dr. R.R. Upasani, Chief Scientist
136. Dr. Basant Jha, Asstt. Professor ,Deptt. of Extn. Edu.
137. Dr. Sudhir Kumar, Asstt. Professor Agronomy
138. Dr. Swati Shabnam, Asstt. Professor Agronomy
139. Dr. Saiyat Mishra, Asstt. Professor Horticulture
140. Dr. Poonam Horo, Asstt. Professor Horticulture
141. Dr. S.Sen Gupta, Asstt. Professor Horticulture
142. Dr.Sachinand Mahto, Asstt. Professor Horticulture
143. Dr. Rabindra Prasad, Senior Scientist, Entomology
144. Dr. Himanshu Dubey, Asstt. Professor , College of Biotechnology
145. Dr. Madhuparna Banerjee, Senior Scinetist , College of Biotechnology
146. Dr. Anita Pandey, Asstt. Professor , College of Biotechnology
147. Dr. Irfan Ansari, Asstt. Professor , Agrl. Engineering
148. Dr. Uttaam Kumar, Asstt. Professor , Agriculture Engineering

- 149. Dr. (Mrs.) Pragya Kumari, Asstt. Professor, Agro. Metrology
- 150. Dr. Ramesh Kumar, Chief Scientist, Agro Metrology
- 151. Dr. Arvind Kumar, Asstt. Professor , Soil Science
- 152. Sri. Bupendra Kumar, Asstt. Professor, Soil Science

## **INSTRUCTIONS FOR DOING ON-LINE DATA-ENTRY OF AICRPS PLANT BREEDING TRAILS DATA\***

1. On the desktop click the Internet explorer icon.
2. In the internet explorer type <http://www.nrcsoya.nic.in> and open this website.
3. In the home page of the official website, click on the hyperlink "AICRPS Data entry" available at the bottom.
4. Enter the username and the password as informed to you.
5. Now select the trail, character and start entering the final data for each and save every time by clicking the save button provided on the screen at the bottom.
6. Using the 5<sup>th</sup> step, repeat the data- entry for all the trials and characters and save it every time.
7. At last, view the data-entered and recheck it.

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\* In case of any difficulty/clarification please feel free to contact Mrs. Savita Kolhe, Scientist (Computer Application) at e-mail [savitasoham@gmail.com](mailto:savitasoham@gmail.com) or [savita\\_kolhe@rediffmail.com](mailto:savita_kolhe@rediffmail.com)