



# ICAR-NATIONAL INSTITUTE OF BIOTIC STRESS MANAGEMENT

Baronda, Raipur - 493 225, Chhattisgarh

## From The Director's Desk

### Prediction model for pests and diseases

Unlock the future of farming with PREDICT: Precision Readings and Early Detection of Invasive Crop Threats. Prediction models in agriculture are tools that use data and algorithms to predict the occurrence, spread and potential impact of various biotic stresses on crops. These cutting-edge models transform how we combat pests and diseases, ensuring crops survival. By integrating Artificial Intelligence and real-time data analytics, prediction model can provide a proactive approach, minimizing damage due to biotic and abiotic stress and maximizing yield. These models will help us to step into the new era of smart agriculture where predicting and preventing infestations is just the beginning—PREDICT is our on-field guardian, optimizing crop health and securing our green gold.

Predictive analytics is propelled by the utilization of predictive modeling. It is primarily a strategy rather than a procedure. Predictive analytics and machine learning are closely interconnected, as predictive models generally use a machine learning algorithm. The major advantages of prediction model can be abbreviated as PCCTD which stands for Precision Agriculture, Cost effectiveness, Crop health improvement, Timely intervention and Data driven decisions.

ICAR-NIBSM aims to develop a predictive model to study the population dynamics of major insect pests and diseases affecting paddy and maize crops in the Chhattisgarh region. Given the critical importance of these crops to the region's agriculture and the increasing threats posed by climate change, this project will leverage advanced data science techniques, including Artificial Neural Networks (ANN) and



Convolutional Neural Networks (CNN), to predict pest and disease outbreaks with greater accuracy and reliability.

The project is expected to deliver a robust predictive model that can predict pest and disease outbreaks in paddy and maize crops with high accuracy. This model will be invaluable for farmers and agricultural stakeholders in the Chhattisgarh region, enabling timely and targeted interventions to mitigate the impacts of these biotic stresses. Additionally, the insights gained from this project will contribute to the broader understanding of how climate change influences pest and disease dynamics in agricultural systems. Balancing these factors can maximize the benefits contributing to sustainable and resilient agricultural systems.

(P. K. Ghosh)

Director and Vice-Chancellor

## Research Highlights

### AGRICULTURAL BIOTECHNOLOGY

#### Gene function analysis and mitigation strategies for biotic stresses

(Ashish Marathe, P. N. Sivalingam, Vinay Kumar, Mallikarjuna, J.)

In order to edit two key genes (Flavonone-3-hydroxylase and Flavone synthase) involved in flavonoid synthesis, soybean (cv. JS-335) was transformed with recombinant constructs containing the gRNA scaffold and Cas9 gene, through cotyledonary node method. T<sub>0</sub> plants were regenerated on modified medium containing 2 mgL<sup>-1</sup> IBA, 0.2 mgL<sup>-1</sup> GA<sub>3</sub>, and 6 mgL<sup>-1</sup> D, L-Phosphinothricin (Fig. 1). The putative transformants were



Fig 1. Regeneration of T<sub>0</sub> soybean plants on modified medium

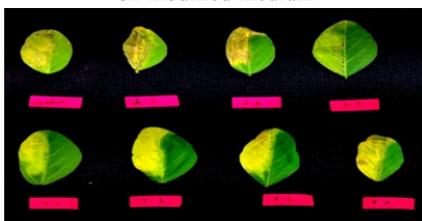


Fig 2. Herbicide (D,L-Phosphinothricin) effect observed 7 days after painting soybean leaves

hardened and screened with herbicide brushing assay to confirm integration of herbicide resistance gene (Fig. 2)

#### Gene introgression for multiple stress tolerance in rice

(Vinay Kumar, P. N. Sivalingam, Mallikarjuna, J., S. K. Jain)

The rice lines were generated through gene introgression in IRBB66 background to introduce genes for multiple stresses namely BLB-BPH and Blast disease in different gene combinations (*Xa4*, *xa5*, *xa7*, *xa13*, *xa21*, *Bph9*, *Pita*, *Bph3*, *Pi54*). Crossed progenies were raised in the field as well as in pots. Individual plants from different cross combinations were tagged for DNA isolation and PCR based detection of presence of resistance gene(s) using gene linked markers and continuing generation advancement. The developed lines can be useful as pre-breeding line for breeding of multiple stress tolerance in rice.

#### Molecular mechanisms in crops, resistant to biotic stresses

(Vinay Kumar, P. N. Sivalingam, Ashish Marathe)

Bacterial endophytes play a crucial role in plant growth promoting activities (PGP) and imparting resistance against fungal pathogens. Tripartite (Chickpea-endophyte-*Sclerotium*) interaction studies showed the up-regulated expression of defense related specific genes namely NAC TF, CDPK and LoX N3 at an early stage, while chitinase expression was higher at 72 hours in endophytes bio-primed plants as compared to the control (without endophytes) plants, suggesting of their role in imparting resistance phenomenon. Histochemical assay confirmed the

pathogen induced expression guided by the isolated promoter region of chickpea. Higher expression of GUS reporter genes observed in leaf samples were collected 36 hrs post inoculation using *F. oxysporum* and *Sclerotium rolfsii* pathogen.

### Silicon mediated defenses in rice against yellow stem borer (Mallikarjuna, J., Vinay Kumar)

Comparative transcriptome sequencing was conducted to decipher the genes involved in the silicon mediated defense against yellow stem borer (YSB) in rice. Reference mapping with *Oryza* genome revealed the up and down-regulated genes and metabolic pathways across the various treatments namely MAPK cascade, CADP kinases, Oxylipin, jasmonate, terpenoid and ethylene pathways. The differentially expressed genes were identified (Fig. 3). Group of genes differentially expressed in silicon treated plants were MAPK kinase, Protease inhibitors genes, Receptor like kinases and MYB transcription factor. Tissue culture experiments were initiated for the optimization of plant regeneration and transformation protocols for functional validation of DEGs gene function in rice (Fig. 4).

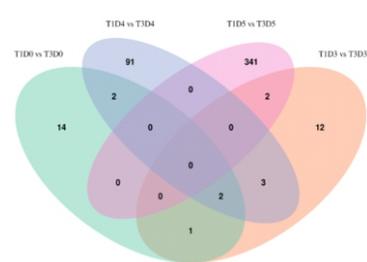


Fig 3. Venn diagram showing differentially expressed genes (common and Exclusive DEGs) among the treatments T1(Si+, pest+), T2(Si-, pest+), T3(Si+, pest-), T4(Si-, pest-)



Fig 4. Initiation of callus for optimization of tissue culture protocol in rice

### Rhizospheric microbiome diversity in emerging agricultural production systems (Lata Jain, Vinay Kumar, S.K. Sharma)

#### Identification of unculturable microbes using Metagenomics

For unculturable microbes identification through metagenomics approach, the rhizospheric soil and root tissues of all the three season crops of maize based CA field of DWR were processed for full-length (V1-V9 region) 16s rRNA amplicon sequencing using PacBio Sequel II platform. Identified taxa were agglomerated to the different taxa levels and used for making barplots using the R package phyloseq. Soil samples were found to have more microbial diversity and abundance as evident by the rarefaction curve (Fig. 5). Alpha diversity indices were less than 500 for Chao1 and less than 4 for Shannon in root samples compared to 1000-4000 for Chao1 and more than 4 for Shannon in soil samples (Fig. 6).

The predominant phylum in both soil and root includes Proteobacteria,

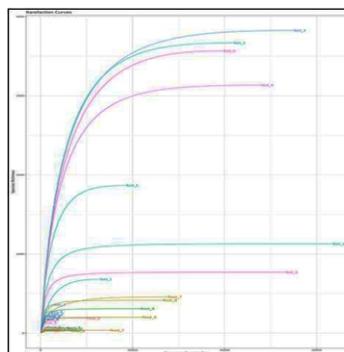


Fig 5. Rarefaction curve showing the microbial species richness of soil and root samples

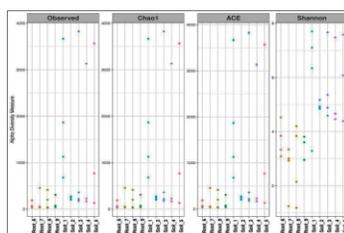


Fig 6. Alpha diversity among the samples soil and root samples of CA system

Bacteroidetes, Acinetobacteria, Firmicutes and Cyanobacteria. However, Microbial phyla taxa identified through the analysis are all widely present in soil, including species from the Acidobacteria, Planctomycetes, Chlorflexi, Nitrospirae, Armatimonadetes and Entotheonellaeota are more prevalent in soil (Fig. 7,8). The multidimensional scaling ordination plots using different ordination methods representing relationships between samples for beta diversity study showed mainly three cluster groups indicating dissimilarity between the clusters (Fig. 9). The result suggested that the microbial population found among different samples of conventional and zero tillage showed considerable variation.

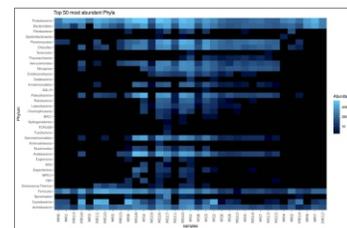


Fig 7. Top 50 abundant Phyla in soil and root samples of conventional tillage (sample no. 1-8) and zero tillage (sample no. 9-16) of maize based conservation field. Whereas, sample 17-19 are bulk soil sample of uncultivated field

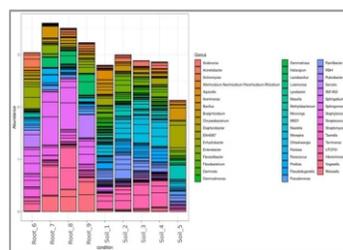


Fig 8. Top 50 abundant genera in soil and root samples of conventional tillage (bar no 1, 4, 6 and 9) and zero tillage (bar no. 2, 3, 7 and 8) of maize based conservation field. Whereas, soil 5 is bulk soil sample of uncultivated field

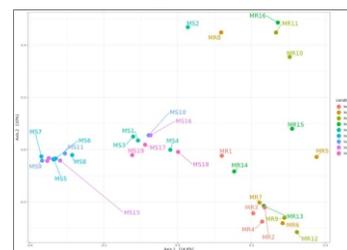


Fig 9. MDS Ordination plot with cluster grouping showing beta diversity between the soil and root samples of conventional tillage and Zero-tillage in CA system

## CHEMICAL ECOLOGY

### Promising volatiles for key pests of crops

(R. K. Murali Baskaran, Yogesh Yele, K. C. Sharma)

#### Whitefly (*Bemesia tabaci*)

Volatile profiles induced by whitefly in cowpea, greengram, blackgram and soybean were studied. Fourteen volatiles which occurred majorly in all the profiles were selected to identify useful volatiles which repel or disturb the life cycle of whitefly. In no-choice tests, treatment of soybean plants with 500 ppm of Eicosane and Squalane reduced the settlement of whitefly adults for feeding by 60% and 55%, respectively 48 hr after treatment while, there was no reduction in settlement in ethyl acetate and control. In choice test, Squalane and Eicosane treatment in soybean seedlings at 500 ppm repelled whitefly from settlement and feeding by 74.34% to 83.4% at 24 hr and 40.43% to 46.81% at 48 hr after treatment, respectively.

#### Fall armyworm (*Spodoptera frugiperda*)

Feeding of fall armyworm on semi-synthetic diet treated with Cyclohexane and Eicosane at 500 ppm reduced its relative growth rate (RGR) from 27.51% to 34.58%, relative consumption rate (RCR) from 52.30% to 54.54% and approximate digestibility (AD) from 49.02% to 52.62%.

#### Chickpea pod borer (*Helicoverpa armigera*)

Topical application of Azulene and Eicosane at 500 ppm on 35<sup>th</sup> and 45<sup>th</sup> days after sowing of chickpea reduced the population of pod borer larvae by 41.18% and 44.11%. Foliar application of Azulene and Eicosane at

500 ppm in chickpea reduced the pod damage by 26.89% and 26.37%, respectively.

**Nano-formulation of maize fall armyworm sex pheromone**  
(R. K. Murali Baskaran, K. Subaharan)

Evaluation of nano-formulation of sex pheromone of maize fall armyworm in *rabi* 2023-24 indicated that a total of 44 male adults were caught by nano-formulation which was 3.18 folds higher than the existing pheromone (rubber septa).

**BIOLOGICAL CONTROL**

**Efficacy of octadecane gel against yellow stem borer in direct sown rice**  
(R. K. Murali Baskaran, J. Sridhar, K. C. Sharma, Lata Jain)

Application of octadecane gel 500 ppm, 24 h after the releases of *Trichogramma japonicum* reduced the dead heart and white ear symptoms induced by rice yellow stem borer, ranging from 30.91 to 33.48% with CB ratio of 1:1.55.

**Multi-location testing of NIBSM Bacillus thuringiensis 18 against chickpea pod borer**  
(R. K. Murali Baskaran, Lata Jain, J. Sridhar, K. C. Sharma)

During *rabi* 2022-23, Assam Agricultural University, Jorhat evaluated and reported that two rounds of spraying of *Bacillus thuringiensis* NIBSM Bt 18 (1% talc @ 10 g/L) at fortnightly interval at pod initiation and pod formation stage of chickpea reduced the population of pod borer by 82.61% and pod damage by 49.33%, with increase of grain yield of 20.56%. SKUAST, Jammu reported that NIBSM Bt 18 (1% talc @ 10 g/L) reduced the population of pod borer by 64.37% and pod damage by 70.29%, with increased grain yield of 36.92%. During *rabi* 2023-24, *Bacillus thuringiensis* NIBSM Bt 18 (1% talc @ 10 g/L) was supplied to IGKV, Raipur, Chhattisgarh; Assam Agricultural University, Jorhat; Anand Agricultural University, Anand; SKUAST, Jammu; Punjab Agricultural University, Ludhiana; MPUAT, Udaipur and College of Agriculture, Tripura for field evaluation for the second year.

**Antimicrobial resistance profile of bacterial pathogens of cattle mastitis of Chhattisgarh**  
(Soumya Dash, Binod K. Choudhary, Mamta Choudhary, Lata Jain)

Milk samples were collected from 84 lactating cattle from three districts viz. Raipur, Bilaspur and Durg of Chhattisgarh state. A total of 124 bacterial isolates were obtained from 45 mastitis milk samples and 16S rRNA sequencing revealed the presence of 42 different pathogens to cause mastitis in cattle. The predominant pathogens to cause mastitis in cattle were *Escherichia coli* (16.94%), *Enterobacter cloacae* (8.06%) *Klebsiella pneumoniae* (7.26%), *Staphylococcus chomogenes* (7.26%), *Bacillus pumilus* (5.65%) and *Staphylococcus aureus* (4.84%), respectively. The antibiogram of the isolates depicted the high rate of resistance against Cephalosporin group of antibiotics viz. cefixime (87.1%), cefotaxime (82.2%) as well as fluoroquinolones viz ciprofloxacin (68.5%), while the pathogens showed highest susceptibility to Gentamicin antibiotic (68.5%) (Fig. 10).

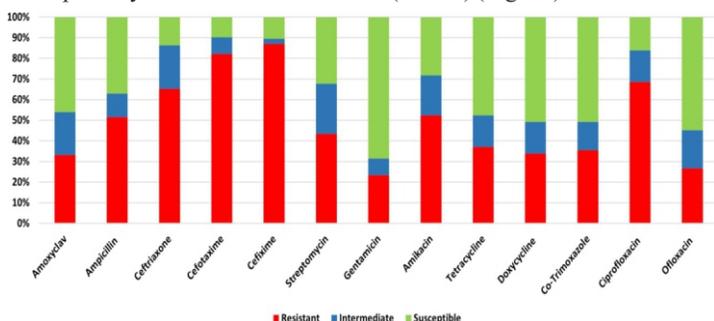


Fig 10. Phenotypic Antibiotic resistance profile of 124 mastitis causing pathogens in cattle

**AGRICULTURAL EXTENSION**

**Farmer FIRST Programme (FFP)**  
(P. Mooventhan, B. K. Choudhary, J. Mallikarjuna, G. L. Sharma, L. K. Verma, Gunjan Jha)

Under the crop-based module, finger millet (CG-Ragi-2), rice fallow pulses and oilseeds (Ratan, RVG-202, DRMR-31) and sesame were cultivated in 0.30 ha (3 families), 14.5 ha (42 families) and 0.2 ha, respectively. In horticultural module, cauliflower seedlings, grafted mango, papaya, and guava plants (162 families) and okra (1.75 ha; 15 farmers) were distributed for demonstration. In livestock module, hatchery units were used to hatch out 124 Kadaknath, quail, and duck eggs, besides demonstrating goat and livestock management. The enterprise module involved processing paddy, wheat, turmeric, pulses, and mustard, benefiting 12 families, and demonstrated mushroom production to SHGs. The NRM module demonstrated azolla production and Arka Microbial Consortium in vegetable crops to 13 families. ICT efforts including a WhatsApp group, Facebook page, and YouTube channel, reached 634 families with over 2120 messages. Additionally, 25 HRD programme were conducted to benefit 372 farmers.



Chickpea cultivation



Fruit crop saplings distribution



Millet cultivation



Capacity building programme



Hatchery unit



Goat farming

**Agripreneurship for Sustainable Agricultural Development: Technological and Institutional Innovations and Strategies**

(P. Mooventhan, Shravani Sanyal, Niranjana Prasad, Gunjan Jha)

Under the NASF project a training cum workshop titled "Agripreneurship for Sustainable Agricultural Development" was organized on 28.3.2024 at KVK Rajnandgaon in collaboration with NASF, ICAR-NIBSM. A total of 30



agripreneurs from Rajnandgaon and neighbouring districts of Chhattisgarh have attended the programme which focused on promoting local agripreneurs in Kadaknath farming and oyster mushroom cultivation.

## Institute Activities

### Republic Day (January 26, 2024)

Republic day was celebrated in the NIBSM campus on 26.1.2024. All JDs, Scientists, administrative staff and laborers were present during which National flag was hoisted and sweets were distributed to all. Cricket match was conducted between students and staff of NIBSM and prizes were distributed by the Director to the winners.



### National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability (February 28-29, 2024)

A National Conference “Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability” was conducted on 28-29.7.2024 at ICAR-National Institute of Biotic Stress Management, Raipur and Amity University Raipur in collaboration with ICAR-National Institute of Abiotic Stress Management, Baramati with six different themes. The conference was organized under the organizing committee chairman Dr. P. K. Ghosh, Director, ICAR-NIBSM, Raipur; and Prof. Piyush Kant Pandey, Vice Chancellor, Amity University, Raipur. Many dignitaries including Dr. S. Ayyappan, Former Secretary DARE & DG, ICAR, Dr. A.N. Mukhopadhyay, Former Vice Chancellor, Assam Agricultural University, Jorhat, Prof. Rattan Lal, distinguished University Professor of Soil Science, The Ohio State University, Columbus, USA, Prof. (Dr.) Deepak Pentel, Former Vice Chancellor, University of Delhi, New Delhi, Dr. T. K. Aadhya, Former Director, ICAR-NRRI, Cuttack, Dr. Swapan Datta, Former DDG (Crop Science), ICAR, New Delhi, Dr. N.K. Krishna Kumar, Former DDG (Horticulture), ICAR, New Delhi have participated in the conference.

The conference was registered with 291 participants in which 102 were delegates and faculties, 104 research scholar/students; 31 delegates from industries and 54 VIP/invited guests. During inauguration publications such as conference abstract, conference souvenir, ICAR- NIBSM: The First Decade Journey (2012-2023), and Technical bulletin: waste water treatment, commercial floriculture, leafy vegetables and cultivation and fish rearing by NIASM designed constructed wetland and integrated aquaponics system are released. In addition, establishment of Biotic Stress Management Society was also declared. The major



recommendations were (i) Crop simulation models, IoT, AI and Machine Learning to enhance forecast efficiency, real-time monitoring with precision (ii) Identification of research challenges in mitigation of climate change (iii) Policy decision on the climate driven biotic and abiotic issues (iv) Sources with slow disease development and associated QTLs and pyramiding of those QTLs.

### One-day nematode awareness day-cum-farmers training (March 08, 2024)

One day nematode awareness day-cum-farmers training was organised at Rajnandgaon in collaboration with KVK on 8<sup>th</sup> March, 2024. Dr. Mallikarjuna J., Principal Investigator (AICRP Nematodes) delivered lecture on identification, detection diagnosis, and integrated management of plant parasitic nematodes in different agricultural crops including cereals, pulses, vegetables, oil seeds and horticultural crops. More than 100 farmers benefited during the training and it was coordinated by Dr. Mallikarjuna J., in collaboration with KVK, Rajnandgaon.



### Inauguration of main gate and shopping complex of NIBSM (March 15, 2024)

NIBSM main gate was inaugurated and foundation stone of shopping complex of NIBSM was laid on 15.3.24 by the Hon'ble Director General and Secretary (DARE),



ICAR, New Delhi. Thereafter, DG, ICAR interacted with JDs, Scientists and students of the NIBSM.



### World Water Day (March 22, 2024)

World Water Day was organized on 22.3.24 with a focus on “Issues, Challenges and Way Farword” in which Dr. P. S. Brahmanand, Project Director, Water Technology Centre (WTC), ICAR-IARI, New Delhi had delivered a talk on “Accelerating the Sustainable Water Management Initiatives for Agricultural Sector in India: 10 Point Action Plan” virtually. Dr. P. K. Ghosh, Director and Vice Chancellor, NIBSM emphasized importance of water in saving life of living beings on this planet Earth in future decade. The programme was coordinated by Dr. Sushil K. Sharma, Principal Scientist, NIBSM, Raipur.

### World IP Day 2024: Intellectual Property Awareness Week (April 22-28, 2024)

ICAR-NIBSM, Raipur celebrated World Intellectual Property Day on 26.4.24 with a theme, “IP and the SDGs: Building Our Common Future with Innovation & Creativity”. Dr. A. Vidhyavathi, Professor, TNAU, Coimbatore and Coordinator of IPR Cell gave a talk on “Geographical Indications for Environmental Sustainability” with procedure for applying for GI protection of agricultural product. Dr. S.K. Jain, Principal Scientist & PI (NAIF) gave a brief account about the World IP Day and said that the IPs can be key contributor for the sustainable improvements. Dr. Ashish Marathe, Scientist & Co-PI, NAIF proposed the formal vote of thanks.



### International training on Building Community-driven Farm Schools, Indonesia (June 10-14, 2014)



took part in the training course. Dr. P. Mooventhan, Senior Scientist (Agricultural Extension) was the sole participant from India.

### Institute Research Committee meeting (11-13 June, 2024)

The 10<sup>th</sup> Institute Research Committee (IRC) meeting of the ICAR-NIBSM, Raipur was held during 11-13.6.2024 under the Chairmanship of Dr. P. K. Ghosh, Director, NIBSM, Raipur. The meeting was attended by all Joint Directors and scientists of

NIBSM. The achievements made during 2023-24 was presented by PIs of the on-going research projects, flagship programme, collaborative projects and externally funded projects. During the meeting, new project proposals were also presented by the scientists and discussion was also made on last RAC proceedings, resource generation, industry meet and commercialization etc.



### International Yoga Day (June 21, 2024)

ICAR-NIBSM, Raipur has organized 10<sup>th</sup> International Day of Yoga on 21.6.24 with the theme of "Yoga for self and society". More than 125 participants (including Joint Directors, Scientists, Admin Officers, Technical, Young professionals and Students) from ICAR-NIBSM have attended the programme. During this programme, Mr. Kaushal Kishore Gupta, Yoga Instructor gave a talk on the benefits of yoga to live a healthy life for self and for society. All participants performed various kinds of Yoga. The programme was coordinated by Dr. Lata Jain, Senior Scientist and Nodal officer, International Yoga Day.



### SCSP Activities

(Pankaj Sharma, Mamta Choudhary)

ICAR - National Institute of Biotic Stress Management, Raipur has adopted 16 villages under Tehsil- Tilda, Kharora, Arang of Raipur district for the implementation of Scheduled Caste Sub-Plan during the year 2023-24 and 2024-25. Small agricultural equipment like multi-crop thresher, rotavator, diesel pump, flour mill, oil mill, small equipment and tools etc. were distributed to the beneficiary farmers. A total of 507 quintals of paddy seeds like Swarna, Dubraj Selection, Chhattisgarh Devbhog and Vikram TCR certified seeds were distributed to cover 1100 acres of farmer's field during *kharif* 2024. A vaccination camp was organized for the control of various diseases of cattle and goats. Coordinator Dr. Pankaj Sharma and Nodal Officer Dr. Mamta Choudhary were involved in various activities of SCSP.



### List of webinars/seminars organized by NIBSM during January to June 2024

(Vinay Kumar)

S. No.	Topic of seminar	Date	Delivered by institute scientist/international scientist
1.	Rust resistance genes in wheat: Discovery to deployment	08.04.2024	Dr. Harbans Singh Bariana, Adjunct Professor, Western Sydney University, Australia
2.	Smart Agriculture	31.05.2024	Dr. Radhika Trikhya, CEO, AWADH, IIT, Ropar
3.	Anti CRISPR Protein	31.05.2024	Dr. Ashish Marathe, Scientist (Plant Biochemistry)
4.	Targeting net-zero emissions and methane pledge- Global and Indian context	03.07.2024	Dr. Shravani Sanyal, Scientist (Environmental Science)

## Education

ICAR-NIBSM, Raipur started the academic programme in six Post Graduate disciplines during the academic year 2020-21 as a hub of IARI, New Delhi. The institute has also initiated the Under Graduate (UG) programme (B.Sc. Ag. Hons.) and Ph. D. programme from the academic year 2023-24 session. The Ph. D programme has been initiated in four disciplines namely Molecular Biology & Biotechnology, Agricultural Entomology, Plant Pathology and Microbiology. The admission process of IARI-NIBSM, Raipur Hub for UG, PG and Ph. D were completed for the session (2023-24) and total 29 UG students, 4 PG students (Agricultural Entomology, one PG student (Plant Pathology) and 3 Ph.D. students (Molecular Biology & Biotechnology and Agricultural Entomology) have been successfully admitted.

A series of student activities were carried out, including a sports event on the Republic Day (26.01.2024), students exhibition on 28.02.2024 and a fresher's party on 22.03.2024 and a half-day workshop titled "National Agriculture Mechanization Standards ecosystem" on 30.05.2024. Board of studies meeting (BoS) was held on 10.01.2024 and 18.04.2024 under the Chairmanship of Dr. P. K. Ghosh, Director, ICAR-NIBSM, Raipur, Convenor Dr. P. K. Agrawal, JD (Education) & Dean

and member secretary Dr. B. K. Choudhary, PS (UG Coordinator). Efforts are also undertaken for establishment of student's placement cell and others students related facilities and issues.



### List of NIBSM Scientists attended Pedagogy training on Enhancing Pedagogical Competencies for Agricultural Education

S. No.	Period	Organized by	Scientist (Dr.)
1.	29.1.24 to 2.2.24	NAAS, New Delhi	Binod K. Choudhary
2.	29.1.24 to 2.2.24	NAAS, New Delhi	Shravani Sanyal
3.	1.4.24 to 5.4.24	NAAS, New Delhi	Sandeep B Adavi
4.	1.4.24 to 5.4.24	NAAS, New Delhi	Priyanka Meena
5.	29.4.24 to 3.5.24	NAAS, New Delhi	Ashish Marathe

## Workshops/Symposium/Seminar/Conference/Training/other Fora

### Workshops/Symposium/Seminar/Conference/Training/other Fora organized

S. No.	Symposia/Seminar/Training organized	Period	Organized by	Scientist associated (Dr.)
1.	One day off-campus training cum exposure visit of beneficiary farmers to Krishi Vigyan Kendra and College of Agriculture, Bhatapara	24.1.24	ICAR-NIBSM	Vinay Kumar and Team
2.	One day educational visit of student of Kendriya Vidhyalaya, Kanker	5.2.24	ICAR-NIBSM	
3.	National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability	28-29.2.24	ICAR-NIBSM, ICAR-NIASM, Amity University Chhattisgarh	P. K. Ghosh and Team
4.	Three days training programme on "Imparting latest innovative agricultural technologies to the resource poor farmers for their enhanced livelihood and nutritional security"	12-14.3.24	ICAR-NIBSM	Vinay Kumar and Team
5.	Training cum distribution of Pusa Aqua ferti- seed drill, Seed storage bins and biofertilizers etc. to beneficiary farmers	29.3.24	ICAR-NIBSM	
6.	Nematode awareness day cum farmers training at KVK Rajnandgaon	8.3.24	ICAR-NIBSM, AICRP Nematodes	Mallikarjuna, J.
7.	Webinar on Intellectual Property Rights Filing Process	19.3.24	ICAR-NAIF	Ashish Marathe, S. K. Jain

### Workshops/Symposium/Seminar/Conference/Training/other Fora attended

S. No.	Symposia/Seminar/Training attended	Period	Organized by	Scientist associated (Dr.)
1.	Workshop "SRIJAN: Empowering ZTMCs/ ITMUs of ICAR Institutes"	17-19.1.24	IP&TM Unit of ICAR, New Delhi at NASC complex, New Delhi	S. K. Jain
2.	National Conference on Plant health for food security: Threats and Promises	1-3.2.24	Indian Phyto Pathological Society at ICAR- IISR Lucknow, UP	K. K. Mondal
3.	5 <sup>th</sup> National Conference (NBCS-2024) on "Oilseed Brassicas for Sustainability, Profitability and Nutritional Security"	7-9.2.24	Rajasthan Agricultural Research Institute (SKNAU), Durgapura, Jaipur	Pankaj Sharma
4.	11 <sup>th</sup> National Convention and National Webinar of the Society for Fertilizer and Environment	23-24.2.24	BCKV, Mohanpur, Nadia, West Bengal	Arkaprava Roy
5.	Two-day hands-on training session on "Screening Emerging Diseases and Insect Pests of Rice"	21-22.3.24	International Rice Research Institute (IRRI) in collaboration with Punjab Agricultural University (PAU), Ludhiana	Aswini Nunavath Niranjan Prasad H. P.
6.	Five days Hands on National Workshop on Next Generation Sequencing data analysis	23-27.4.24	Dept. of Microbiology, AIIMS, Raipur and State virus Research and Diagnostic Laboratories	Soumya Dash
7.	International Training Course on "Building Community-driven Farm Schools" (Project Code: 24-CP-32-GE-TRC-A)	10-14.6.24	Yogyakarta, Indonesia	P. Mooventhan

8.	National Conference on Expanding the Horizons of Microbial Research in Agriculture	11-13.6.24	ICAR-NBAIM, Mau	Sushil K. Sharma Niranjan Prasad
9.	31 <sup>st</sup> Zonal Workshop of KVKs	28-30.6.24	ATARI, Jabalpur	P. K. Ghosh P. Mooventhan

## Publications

### Research and Review papers

Choudhary, B. K., M. Choudhary, S. B. Barbuddhe and A. Shanker. 2024. Partial genomic characterization of *Chromobacterium piscinae* from India reveals multi drug resistance. Brazilian Journal of Microbiology 55: 1557-1567. (<http://doi.org/10.1007/s42770-024-01288-z>)

Dash S., M. Choudhary, R. Behera, A. Upadhyay, P. R. Shivhre and R. Rath. 2024. A review on genetic characterization of indigenous cattle breeds. Biological Rhythm Research 55(1): 1-15.

Dsilva, L. S. S. Dixit, A. Marathe, V. Kumar, P. N. Sivalingam, P. Kaushal and P. K. Ghosh. 2024. Identification and validation of chickpea (*Cicer arietinum* L.) Isoflavone synthase 1 (CaIfs1) promoter conferring pathogen-induced expression. Journal of Plant Pathology. (<https://doi.org/10.1007/s42161-024-01646-8>)

Goud, M.S., S. K. Sharma, L. L. Kharbikar, R. Prasanna, S. Sangwan, A. Dahuja and A. Dixit 2024. *Bacillus* species consortium with tryptophan-dependent and independent pathways mediated IAA production modulates soil biological properties, growth and yield of wheat. Plant and Soil. <https://doi.org/10.21203/rs.3.rs-3497867/v1>

Murali-Baskaran, R. K., J. Sridhar, K. C. Sharma, Lata Jain and P. K. Ghosh. 2024. Periodic colonization of *Trichogramma japonicum* for bio-control of yellow stem borer (*Scirpophaga incertulas*) in summer low land rice. Indian Journal of Agricultural Sciences 94(5): 36-40.

Saw, G., Mallikarjuna, J., R. K. Murali-Baskaran and N. Prakash 2024. Cultivars and method of application influences the effect of silicon on incidence and damage of phloem feeders, induction of defense reaction,

attraction of natural enemies and yield in black gram (*Vigna mungo* L.). Silicon. [doi.org/10.1007/s12633-024-03025-5](https://doi.org/10.1007/s12633-024-03025-5).

Thakur, S., S. K. Jain, V. Kumar, G. Prakash, J. Mallikarjuna and P. Kaushal. 2024. Phenotypic and Genetic variation studies in finger millet genotypes to blast disease caused by *Pyricularia grisea*. Plant Molecular Biology Reporter. <https://doi.org/10.1007/s11105-024-01436-7>

### Book

Murali-Baskaran, R. K., P. Mooventhan, P. N. Sivalingam, S. K. Jain, P. Kaushal, B. K. Choudhary and A. Dixit. 2024. ICAR-NIBSM. The First Decade Journey (2012-2023). ICAR-National Institute of Biotic Stress Management, Raipur, 1-102pp.

### Edited conference abstracts

Dixit, A., P. Meena, A. Sur, A. Meshram, K. K. Nayak, V. Balasubramanian, S. K. Sharma and P. Kaushal. 2024. Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability: Book of Abstracts. ICAR- National Institute of Biotic Stress Management, Raipur, and Amity University Chhattisgarh, Raipur, 303pp. (ISBN: 978-93-340-1039-8)

### NCBI Submissions

(Mallikarjuna, J., Vinay Kumar)

1. Registered Bio project with Genbank, NCBI titled " Transcriptome analysis of Rice under Silicon and Yellow Stem Borer (YSB) stress" and submitted Transcriptome data; Bioproject ID: PRJNA1080365.
2. Registered 16 Nos of BioSamples: NCBI accession numbers: SAMN42157379; SAMN42165432- SAMN42165446.
3. Registered 32 Nos of Sequence Read Archive (SRA) with NCBI Accession Numbers: SRR29649538- SRR29649567.

## Awards and Recognition

### Awards and Recognition received by NIBSM Scientists

S. No.	Awards/Recognition/Membership in Professional Societies	Year/ Period	Offered by	Scientist (Dr.)
1.	Fellow of Society for RM Research	2024	Society for Rapeseed- Mustard Research, ICAR-Directorate of Rapeseed-Mustard, Bharatpur, Rajasthan	Pankaj Sharma
2.	1 <sup>st</sup> Best Poster Award Theme: Recent trends in biotic stress management strategies	28-29.2.24	National Conference on Novel Strategies for mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability held at NIBSM, Raipur	Ch. Eshwar Sai prasad Ashish Marathe Vinay Kumar P.N. Sivalingam P. Kaushal
3.	1 <sup>st</sup> Best Poster Award Theme: Capacity building and policy issues in stress management			P. Mooventhan Uttam Singh
4.	2 <sup>nd</sup> Best Poster Award Theme: Novel approaches to understand and mitigate combined effects of abiotic and biotic stress			Aswini Nunavath
5.	Young Scientist Award	2024	Agri Meet Foundation, UP	

6.	Member in Food and Agricultural Department, GoI for revision of Requirements of Good Agricultural Practices-IndiaGap	2024	Food and Agricultural Department, GoI	R. K. Murali Baskaran, P. N. Sivalingam
7.	Outstanding Academic Performance in the Doctor of Philosophy Degree Programme	9.2.24	ICAR-IARI, New Delhi	Sandeep B Adavi
8.	Registered Biotic Stress Management Society ( <i>Jaivik Stress Prabandhan Sanstha</i> ) (CG/2024/0437711)	12.1.24	Deputy Registrar for Societies, Raipur Division, Chhattisgarh	P. K. Ghosh (President) K. K. Mondal (Vice-President) Sushil K. Sharma (Secretary) P. N. Sivalingam (Joint Secretary) K. C. Sharma (Treasurer) P. K. Sharma (President, Eastern Zone) P. Moventhan (Councillor, Eastern Zone)



## Special lecture delivered

S. No.	Title of lecture	Date/year	Delivered in	Delivered by (Dr.)
1.	Utilization of Bio pesticides and Biofertilizers for enhanced farm productivity	12-14.3.24	Imparting latest innovative agricultural technologies to the resource poor farmers for their enhanced livelihood and nutritional security	Vinay Kumar
2.	Sclerotinia rot management in oilseed Brassica	7.3.24	ICAR sponsored winter school, SDAU, Dantewada	Pankaj Sharma
3.	Utilization of wild relatives and land races as source of biotic and abiotic stress resistance in major field crops	29.2.24	National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability	Daisy Basandrai

## Joining and Relieving of Staff

### New joining in the institute - ICAR-NIBSM, Raipur

S. No.	Name	Designation	Date of Joining
1.	Sh. Pranshu Rathore	Administrative Officer	22-04-2024

### New joining as Technicians T-1 in the institute - ICAR-NIBSM, Raipur

S. No.	Name	Date of Joining	S. No.	Name	Date of Joining
1.	Sh. Sumesh Kumar	06-05-2024	5.	Sh. Deepak Kumar	14-05-2024
2.	Sh. Rahul Kumar Dewangan	08-05-2024	6.	Sh. Anshu Kumar	14-05-2024
3.	Sh. Shivam Kumar Pathak	08-05-2024	7.	Sh. Lalit Raghuvanshi	16-05-2024
4.	Sh. Milind Ranjitrao Kadu	13-05-2024	8.	Sh. Nitin	17-05-2024

### Relieving from the institute - ICAR-NIBSM, Raipur

S. No.	Name	Designation	Date of Relieving
1.	Dr. Pankaj Kaushal	Principal Scientist (Genetics and Plant Breeding)	01-04-2024