



भाकृअनुप - राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान

ICAR - NATIONAL INSTITUTE OF BIOTIC STRESS MANAGEMENT

Baronda, Raipur - 493 225, Chhattisgarh



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From the Director's Desk

Institute expresses gratitude to the authorities at headquarters for according generous sanction of Rs. 52.7 crore which sparked of construction of an administrative building with library and auditorium facilities, boys and girls hostels, an eco-friendly network of campus roads and landscape avenues. CPWD aims to complete these works by July 2019. NIBSM is entrusted with unique research mandate of devising novel mitigation measures of biotic stresses in the farming sector through revamping the inadequacy of the ongoing national programmes for assuring national food and nutrition security. For proper management of research programmes, and till various schools become active in functioning, four research programmes (divided into sub-programmes) have been formulated considering the thrust areas and the research mandate of the Institute. Research programmes which are being actively pursued are broadly titled as: Pest and pathogen genetic resources (PPGR) and their management, Molecular biology of biotic stress reactions, Genetic and genomic resources for stress tolerance and Strategic and adaptive research in biotic stress management. Hard efforts made under limited resources of this under developed institute led to attain tangible outcomes from experiments on characterization of viruses and virus-like-organisms affecting economically important crop plants, isolation and characterization of pathogens causing various diseases in animals and fishes, exploration of endophytes in legume crops (pigeonpea and *Lathyrus*) for enhanced nutrition and disease tolerance, development of super donors in rice carrying tolerance to multiple stresses (bacterial leaf blight, brown planthopper, blast), development of methodologies for estimating the crop losses due to different biotic stresses in rice crop, developing and testing the effectiveness of user friendly educational knowledge tools on biotic stress management in rice and *Lathyrus* and isolation and evaluation of native bio-control agents for the management of

lepidopteran pests. HRD and capacity building befitting modern global trends in biotic stress management is still another crucial component under the obligation of deemed university, the legal status bestowed on NIBSM. A proposal has been prepared to commence M.Sc. degree courses in selected disciplines of biotic stresses under the banner of ICAR-IARI, New Delhi. A MoU is in the offing with ICAR-IARI, New Delhi with proposition of starting educational activities in institute w.e.f. July 2019 when administrative block housing library and auditorium, school buildings, housing PG laboratories and classrooms and hostel buildings will be finally handed over by CPWD to ICAR. Two externally funded projects have also been bagged by the institute viz., All India Co-ordinated Research Project on nematodes in cropping systems and Socio-economic upliftment of tribal farmers through biotic stress management strategies in rice fallow pulse cropping system-An integrated farming approach under Farmer FIRST programme of ICAR.

Analysis of AICRIP reports for 50-60 years revealed that number of insect pests attacking rice crop has increased to 15 in 2015 from 3 in 1965. Some of the pests like leaf folder, brown planthopper and gall midge have attained major pest status over the years. Yellow stem borer was the major monophagous pest to till date in all the rice ecosystems. Among the diseases, sheath blight, leaf blast and bacterial blight were the major in different agro climatic zones of India. As part of technical programme, various germplasm lines of rice and different pulses were evaluated for their resistance against root-knot nematode. Mass rearing of *Corcyra cephalonica* is initiated to study the diversity of entomopathogenic nematodes of state. Isolation and identification of native bio control agents for the effective management of plant parasitic nematode has been



started. Bioassay of different isolates isolated from the rhizospheric soils of different crops against plant parasitic nematodes is in progress.

The 3rd meeting of Research Advisory Committee (RAC) of ICAR-NIBSM, Raipur was held on 20th December, 2017 at NCIPM, New Delhi and 7-8th June, 2018 at ICAR-NIBSM, Raipur, under the Chairmanship of Prof. Anupam Varma, former ICAR National Professor & INSA Senior Scientist, IARI, New Delhi with other RAC members. RAC alerted about the imminent dangers of bioinvasions or bioterrorism citing a glaring example of wheat blast episode during 2015-16. It was discussed in detail the recent bioinvasive incidences of South American tomato pin worm, western flower thrips, woolly aphid of sugarcane, breaking *Bt* resistance to pink bollworm, *Phakospora*

rust, *Ralstonia solanacearum*, *Burkholderia glummae*, T-4 race of Panama disease of banana and maize fall armyworm which have been noticed in Indian fields in the recent past. RAC advised ICAR-NIBSM to initiate research projects to work out mechanisms of emergence or entrance of such maladies to India as a precautionary measure to avoid their further build-up or entrance of many more other pests/diseases of such kind. RAC emphasized to initiate research projects on policies for strengthening internal and external quarantine for strengthening bio-security in India.


(Jagdish Kumar)
Director (Acting)

Research Highlights

Distribution of begomoviral disease incidence and vector population during summer 2018

(P. N. Sivalingam, Yogesh Yele, Vinay Kumar)

The experiment was conducted to understand the distribution and occurrence of begomoviral disease incidence in fourteen crop species belonging to *Leguminaceae*, *Cucurbitaceae*, *Solanaceae*, *Malvaceae* and *Amaranthaceae* and whitefly population during summer season 2018. Among the crop species, the yellow mosaic disease recorded maximum (100%) in mungbean and urdbean, followed by other crop species. However, whitefly population was found maximum in brinjal, followed by rice bean and cucumber. Interestingly no yellow mosaic symptom was recorded on rice bean (*Vigna umbellata*) though they are



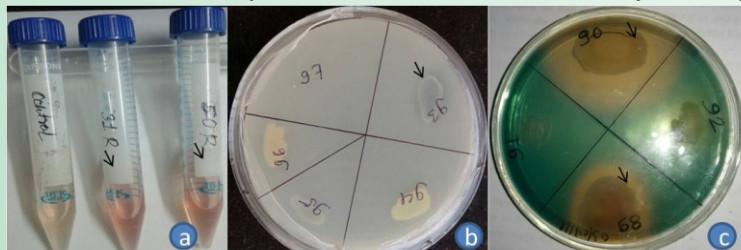
Fig 1. Field view of experiment- Urdbean with yellow mosaic (left) and rice bean with no symptoms (right)

found almost in all plants of mungbean and urdbean (Fig. 1). In addition to these, Amaranthus also did not show any phenotypic symptoms of begomovirus in the field. This suggests that rice bean, amaranthus could be non host to these viruses.

Bacterial endophytes having Plant Growth Promoting activities

(Vinay Kumar, Lata Jain, S. K. Jain)

Bacterial endophytes were characterized for their plant growth promoting activities such as Phosphate solubilising, Indole acetic acid production, DNase assay and other biochemical activities. Phosphorus is an essential macronutrient required for plant growth and development and involved in several metabolic pathways. To ensure its availability in soil chemical fertilizers are applied, however excess and repeated use of fertilizers leads to deterioration of soil quality. Phosphate solubilizing bacteria can be used as an alternative to chemical fertilizers as have ability to convert insoluble P to soluble P by releasing



IAA production assay Phosphate solubilizing activity DNase activity assay
Fig 2. Pictorial representation of Plant Growth Promoting activities of bacterial endophytes; (a) IAA production (b) Phosphate solubilizing activity (c) DNase activity; arrow indicates the positive activities of respective assays.

organic acids, chelation and ion exchange lead to increases in soil fertility in eco-friendly manner. A total of 32 bacterial endophytes isolated from rice were screened for their potential activities as phosphate solubilising, IAA production and DNase assay of which 9, 17 and 12 isolates were found positive, respectively. The isolates showing potential activities were belonging to the *Bacillus*, *Enterobacter* and *Klebsiella* species. The picture representing plant growth promoting activities of bacterial endophytes and their positive activities as indicated by arrow (Fig. 2).

Screening of wheat, chickpea and Lathyrus germplasm against biotic stresses

(K. C. Sharma, Sridhar, J., Mallikarjuna, J., Anil Dixit, S. K. Jain)

Field screening of more than 550 accessions of wheat, chickpea and *Lathyrus* was undertaken against insect-pests and diseases in 2017-18 rabi season. Among 218 accessions of wheat screened, 28 and 43 accessions were found to be highly resistant and moderately resistant to aphids, respectively based on aphid indexes (Painter et al., 1982, Wang et al., 2011). Four accessions of wheat showed very high resistance to pink stem borer whereas 20 accessions were found resistance. Among 241 chickpea accessions screened against pod borer (*Helicoverpa armigera*), none has shown resistant reaction, however, 53 accessions were categorized as least susceptible based on the per cent pod damage at maturity and remaining accessions were either moderately susceptible or highly susceptible. Twenty two chickpea accessions were found promising against root rot and wilt diseases as no incidence was observed in these accessions. Two different thrips species were observed in 110 accessions of *Lathyrus* planted for screening. Thirteen accessions were found to be moderately resistant in which leaf damage was also moderate.

Regression model for establishing relationship between yield and various biotic stresses in rice

(Mallikarjuna J., S. K. Jain, K. C. Sharma)

Relationship between all biotic stresses and yield was established by fitting multiple regression analysis to pooled data of three experimental years. The regression model for yield loss estimation due to various biotic stresses is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \dots + b_nX_n$$

⇒ Y = Dependent variable i.e Yield
⇒ a = Intercept
⇒ b = Coefficients
⇒ X = independent variables

The results revealed that the regression model was statistically significant ($P < 0.0001$) with R^2 value of 0.96 and coefficient of variation value at 3.76. The regression model developed for estimating the yield losses due to various biotic stresses is $\text{Yield} = 6.315 - 0.00897(\text{DI}) - 0.0927(\text{IP}) - 0.01752(\text{WD})$.

Management of the pink stem borer in wheat

(K. C. Sharma, Mallikarjuna J., Yogesh Yele)

Survey were conducted to record the status of wheat pink stem borer infestation in northern part viz., Surguja, Korba, Raigarh, Raipur, Ambikapur, Mainpat, Korba, Pathalgaon, Arang and Balodabazar of Chhattisgarh during *rabi* 2017-18. Pink stem borer infestation on wheat ranged from 1-10% at various places surveyed. Maximum infestation (10%) was recorded at Kharora, minimum at Ambikapur (1-2%) and no infestation were found at Konpa/ Arang block. Twenty one varieties and sixty four germplasm of wheat were screened against pink stem borer for their relative resistance to pink stem borer during Rabi 2017-18. Among varieties minimum infestation (2.2 %) were recorded in Agra Local while maximum (13.48%) infestation were recorded in GW273. It has been observed that early maturing accessions were found highly susceptible to pink stem borer. The effect of different levels of K and silica has been evaluated on the incidence of pink stem borer. Among all the treatments (K and silica) treatment T₀ (K₆₀ + Foliar Si (4 mL/L)) found effective in among all the treatments as minimum pink borer infestation (14% white ears) has been recorded. Significant effect of silica has been found on white ear, yield and number of grains/spikes and spike length, photosynthetic rate, transpiration rate, stomatal conductance, water use efficiency (WUE) and intercellular CO₂ concentration. Similarly significant effect of P levels has been found on photosynthetic rate, transpiration rate and WUE.

Developing and testing the effectiveness of interactive educational multimedia module on biotic stress management in rice and *Lathyrus*

(P. Mooventhan, Anil Dixit, R. K. Murali Baskaran)

Under this project, a teacher made Knowledge Test was developed with appropriate scaling procedure starting from selection of items, difficulty index, discrimination index, reliability measurement, validity measurement, measurement of knowledge gain through pre and post exposure to the treatments. The biocontrol agent, *Trichogramma* used as a content for Interactive Educational Multimedia Module (IEMM) for treatment. The pre-score was taken with the help of inbuilt knowledge test and subsequently the IEMM on *Trichogramma* was exposed to the respondents for post score evaluation. The difference between pre and post score evaluation is the knowledge gain of the individual which shows the effectiveness of the IEMM ultimately. The pre-knowledge level varies from 4.60% to 8.75%. The post knowledge level varies from

24.44% to 41.23%. The knowledge gain varies from 15.88 % to 33.74 % (Fig. 3).

Isolation of native bio-control agents for management of lepidopteran pests

(R. K. Murali Baskaran, K. C. Sharma, Sridhar J., Lata Jain)

Three wild/native population of *Trichogramma* spp. were recovered from low land rice (cv. MTU 1010) of NIBSM farm and farmer's field at Baronda village (21°15'N, 81°41'E) during summer 2018, using sentinel cards pasted with UV irradiated *Corecya cephalonica* eggs (Fig. 4,5).



Fig 4. Parasitized eggs

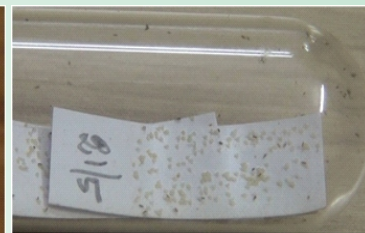


Fig 5. Foraging activity of native *Trichogramma* spp.

Out of 67 soil samples collected from various agro and forest ecosystems of Chhattisgarh, Tripura, Meghalaya and Assam, 21 were analysed using standard protocols to isolate native *Bacillus thuringiensis*. Around 60 *Bacillus* like organisms were isolated.

Optimization of time and number of release of *Trichogramma* spp. for management of rice stem-borer during summer 2018

(R. K. Murali Baskaran, K. C. Sharma, Sridhar J., Lata Jain)

Sequential release of egg parasitoid @ 6.25 cc/ha at weekly interval *ie.* three releases of *T. japonicum* on 14th, 21st and 28th day after transplanting (DAT), followed by three releases of *T. chilonis* on 28th, 35th and 42nd DAT was optimum to manage rice yellow stem-borer, resulting 8.32% dead heart and 1.84% white ear, in contrast to control with 15.59% and 3.26%, respectively.

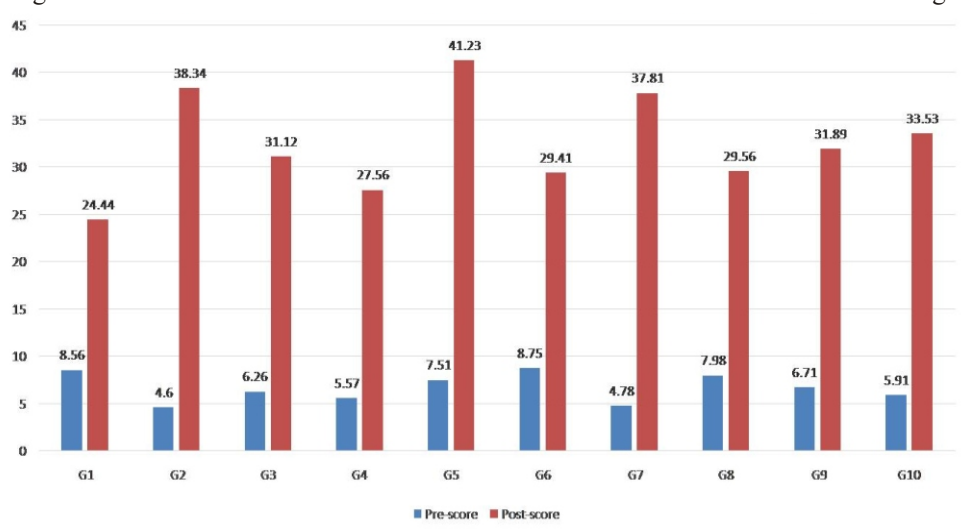
Socio-economic upliftment of tribal farmers through suitable agricultural enterprises integration in rice fallow pulse cropping system - A farmer participatory approach

(P. Mooventhan, Anil Dixit, K. C. Sharma, P. N. Sivalingam, Amit Kumar Gupta, Amit Dixit)

Under Crop Based Module (CBM), the interventions like line sowing of pigeonpea through Boramdev Seed Drill, establishment of Custom Hiring Centre (CHC) and seed treatment were demonstrated.

Under Horticulture Based Module (HBM), application of neem cake in Turmeric bed demonstrated and training on scientific cultivation of pumpkin were provided. Under Livestock Based Module (LBM), hatchery units was established for kadaknath eggs, awareness created on livestock vaccination schedule and construction of low-cost poultry shed for scientific kadaknath farming demonstrated. Under Natural Resource Management Module (NRMM), establishment of low-cost *Azolla* production units completed. Seventeen Farmer Interest Group (FIGs) created under different modules based on the interventions. Three front line demonstrations were conducted on pigeonpea line sowing, neem cake application in turmeric bed and handling of Happy seeder and Aqua-ferti seed drill operations. One representative farmers and scientist interaction was organised at ICAR-NIBSM campus on

Fig 3. Effectiveness of Interactive Education Multimedia Module on farmers' knowledge



13.04.2018. FFP team had a video conferencing session with tribal farmers of Kasdol block on 19.04.18 and feedback received from farmers through Farmer Communication Centre established at project site. Three Kisan Gosthis were organised on 28.06.2018 to discuss *kharif* crop plan and relevant activities. Individual technology inventories prepared under five different modules. Farming system research on tribal agriculture was conducted in 2016-18 and final report submitted to ICAR. Periodical farmer field schools were organized on rice fallow pulse production, kadaknath farming, goat farming, mushroom production, azolla production and drudgery reduction among farm woman.



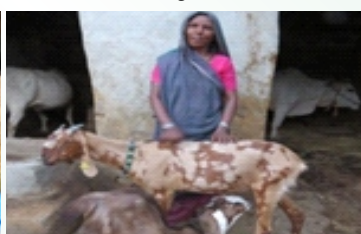
Farmer communication center



Video conferencing with tribal farmers



Low cost Azolla production



Goat farming



Vegetable production



Kadaknath farming



Line sowing of pigeonpea



Kisan gosthi



Agricultural film show



Farmer scientist interface

For wide use of the Foldscope as a research tool: Democratizing Science through a Major Twinning programme of the North East with other parts of India

(P. Moventhan and Mamta Choudhary)

Under this project, agriculturally important bio-control agent (*Trichogramma japonicum*), sections of *pneumonic* bovine lung cell, fern rhizome, *Spirogyra* (green algae) and transverse section of dicot

leaf seen through Foldscope and digitally documented. The digitally documented content published in the online platform (<https://microcosmos.foldscope.com/wp-admin/edit.php>) created for this project by the Foldscope Team, USA and DBT Government of India. Further, surveillance and minimising the risk of zoonotic diseases among tribal farmers will be done through Foldscope microscopy. It will be used to diagnosis the zoonotic organisms such as *Campylobacter*, *Salmonella*, *Listeria*, *Leptospirosis* and *Escherichia coli*.

Status of Biotic Stress and New Reports in Crops at Chhattisgarh

The status of pests and diseases on various agricultural and horticultural crops, prevailed during January to June 2018 in Chhattisgarh were documented and tabulated hereunder.

Crop	Biotic Stress	Scientific Name	Intensity
Summer rice	Yellow stem borer	<i>Scirpophaga incertulas</i>	15% dead heart 3% white ear
Wheat	Pink stem-borer	<i>Sesamia inferens</i>	10-17%
	Pyrilla	<i>Pyrilla perpusilla</i>	20 to 30 nymphs and adults/plant
	Loose smut	<i>Ustilago tritici</i>	Low
Urd bean	Foot rot	<i>Fusarium</i> spp.	Low
	Yellow mosaic	Begomovirus	12-90%
Mung bean	Whitefly	<i>Bemisia tabaci</i>	5-10/leaf
	Bihar hairy caterpillar	<i>Spilosoma obliqua</i>	Medium
	Whitefly	<i>Bemisia tabaci</i>	>5 /leaf
	Yellow mosaic	Begomovirus	28-40%
Chickpea	Powdery mildew	<i>Erysiphe polygoni</i>	10%
	Borer	<i>Helicoverpa armigera</i>	>50%
	Wilt	<i>Fusarium oxysporum f. sp. ciceris</i>	5-10%
	Collar rot	<i>Sclerotium rolfsii</i>	5-10%
Cowpea	Whitefly	<i>Bemisia tabaci</i>	< 5/leaf
	Yellow mosaic	Begomovirus	40-70%
Cow pea (long)	Yellow mosaic	Begomovirus	80%
Cow pea (short)	Yellow mosaic	Begomovirus	10%
Lathyrus	Thrips	<i>Thrips tabaci</i>	3-4/leaf
Lentil	Collar rot	<i>Sclerotium rolfsii</i>	5-10%
Dolichos bean	Yellow mosaic	Begomovirus	47%
Bottle gourd	Powdery mildew	<i>Pseudoperonospora cubensis</i>	< 20%
	Red pumpkin beetle	<i>Aulacophora foveicollis</i>	Low
Sponge gourd	Leaf miners	<i>Liriomyza trifolii</i>	Medium
	Leaf crinkle	Begomovirus	10%
<i>Solanum nigrum</i>	Mealybug	<i>Phenacoccus solenopsis</i>	100%
Cucumber	Mosaic	<i>Cucumber mosaic virus</i>	5%
	Whitefly	<i>Bemisia tabaci</i>	5/leaf
Bitter gourd	Leaf crinkle	Begomovirus	60-82%
Pumpkin	Yellow mosaic	Begomovirus	50%
Tomato	Early blight	<i>Alternaria solani</i>	20-30%
Chilli	Early blight	<i>Alternaria solanii</i>	20-30%
Brinjal	Collar rot	<i>Sclerotium rolfsii</i>	Low
	<i>Alternaria</i> leafspot	<i>Alternaria melonginae</i>	Low
Garden pea	Powdery mildew	<i>Erysiphe pisi</i>	20%
Papaya	Mosaic	Papaya ringspot virus	20-30%
	Leaf curl	Begomovirus	30-40%
Guinea grass	Mealybug	<i>Antonina</i> sp.	4 to 5 sacs/plant



Chilli leaf curl



Lentil collar rot and wilt



Potato *Sclerotium* rot



Guinea grass mealybug

New Reports of Biotic Stress

Emerging sugarcane leafhopper, (*Pyrilla perpusilla*) on wheat and oat

(Mallikarjuna, J., Yogesh Yele, S. K. Jain)

The heavy incidence of sugarcane leafhopper on wheat and oat was noticed at the time of survey performed during February 2018 in Ambikapur (N 22° 57' 39" E 83° 13' 54") of Chhattisgarh state. The incidence was in the range of 30-70 nymphs and 10-15 adults per tiller of wheat and oat plants.



Pyrilla infestation on oat

Institute Activities

3rd Research Advisory Committee meeting (June 07-08, 2018)

The second part of 3rd RAC meeting was held on June 07-08, 2018 at ICAR-NIBSM, Raipur, under the Chairmanship of Prof. Anupam Varma, former ICAR National Professor & INSA Senior Scientist, IARI, New Delhi. The meeting was attended by Prof. Dr. R. J. Rabindra, Ex Director, ICAR -NBAIR, Bengaluru; Dr. S. M. S. Tomar, Principal Scientist (Genetics) (retd.), ICAR-IARI, New Delhi; Dr. P. K. Chakrabarty, ADG (PP&B), ICAR; Dr. Jagdish Kumar, Director (Acting), Dr. Pankaj Kaushal, Joint Director (Research), ICAR-NIBSM, Raipur and Dr. P. N. Sivalingam, Senior Scientist cum Member Secretary (Acting), RAC, ICAR-NIBSM, Raipur. Before on-set of meeting, RAC members inaugurated newly established Insect Rearing and Screening facility and planted tree sapling. The RAC meeting started with welcome address by Dr. Jagdish Kumar, Director (Acting), followed by brief presentation about the background, genesis and synthesis of the ICAR-NIBSM Dr. Pankaj Kaushal, Joint Director



3rd RAC meeting



Inauguration of Insect Screening Facility

(Research) presented a comprehensive account on the ongoing research projects, salient achievements, future research plan, publications made during the year, recognitions earned by the NIBSM scientists *etc.* After detail discussion RAC recommends research programme to be carried out in the institute.

Visit of Special Secretary (DARE) and Secretary (ICAR) (April 13, 2018)

Shri. Chhabilendra Roul, Special Secretary (DARE) and Secretary (ICAR) visited ICAR-NIBSM on April 13, 2018 to monitor the progress of new building construction. He visited the construction site and discussed with CPWD officials on the progress made as per time schedule and financial management *etc.* Thereafter, the secretary inaugurated newly established Biotechnology Laboratory, a central facility in the auspicious presence of the Dr. Jagdish Kumar, Director (Acting), Dr. Pankaj Kaushal, Joint Director (Research), Dr. P. N. Sivalingam (Incharge Biotechnology Section) and scientists and staff of the institute and also interacted with Section In-charges and scientists on the research programme of the respective section and the adoption of various initiatives taken by ICAR.



Visit of DDG (HS & CS) to ICAR-NIBSM, Raipur (January 24, 2018)

Dr. A. K. Singh, DDG (HS & CS) visited ICAR-NIBSM, Raipur on January 24, 2018 and critically examined the maps of approved master plan and made on spot verification of all construction works. He met the officials of CPWD, Raipur and discussed about the sites for two schools. The morning session ended with the formal vote of thanks by Dr. P. Kaushal, JD (R), NIBSM. During afternoon session, the DDG interacted with scientists of NIBSM and visited various laboratories to know the progress of research. During the meeting, NIBSM Newsletter (July to December, 2017) was released by DDG.



On site visit in construction site

DDG examining pulse aphid culture

New record of bacterium in fish

5th Institute Management Committee meeting (March 17, 2018)

The 5th Institute Management Committee (IMC) meeting of the institute was held on March 17, 2018 under the Chairmanship of Dr. Jagdish Kumar, Director (Acting). The IMC members were Dr. K. N. Mohanta, Principal Scientist, ICAR-CIFA, Bhubaneswar (Odisha), Dr. A. K. Mukharjee, Principal Scientist, ICAR-NRRI, Cuttack (Odisha), Dr. D. K. Ghosh, Principal Scientist, ICAR-CCRI,

Nagpur (Maharashtra) and Sh. R. K. Chandrawanshi, Deputy Director of Agriculture, Chhattisgarh. Dr. Jagdish Kumar welcomed the gathering. Dr. P. Kaushal presented brief report on research highlights and research collaborations and extension and outreach activities of ICAR-NIBSM, Raipur. The member secretary presented the action taken report of 4th IMC. The proposed agendas items as per the council's guidelines were discussed in the meeting.



Republic Day (January 26, 2018)

The 69th Republic Day was celebrated in ICAR-NIBSM along with scientist, staff and farm workers.

International Yoga Day (June 21, 2018)

ICAR-National Institute of Biotic Stress Management, Raipur, (C.G) celebrated 'International Yoga Day' on 21st June 2018. All the scientists and staff members of the institute participated in the event and Yoga sessions organized as per the Common Yoga Protocol provided by Ministry of AYUSH, Government of India.



Demonstration of Yoga to Scientists and Staff of ICAR-NIBSM

Quinquennial Review Team (QRT)

The Quinquennial Review Team (QRT) for 2012-17 of ICAR-NIBSM was constituted with chairmanship of Dr. S. M. Paul Khurana. Dr. Vijay Singh Thakur, Dr. K. C. Bansal, Dr. T. P. Trivedi, Dr. P. S. Naik and Dr. Rajesh Rana are members and Dr. Anil Dixit as Member Secretary. In the preliminary meeting on May 02, 2018 with Dr. Anand Kumar Singh, DDG (CS & Horticulture), a brief account on the establishment, objective and mandate of the institute was explained. The DDG (CS) directed the QRT committee to visit DRDO, Leh, Ladakh, ICAR-CPRI, Shimla and ICAR- NIASM, Baramati before making the visit to ICAR-NIBSM. Accordingly, on June 01-02, 2018, the QRT visited University of Horticulture and Forestry, Solan, ICAR-CPRI, Shimla and ICAR-NIASM, Baramati.



QRT visit

Extension and Outreach Activities

Mera Gaon Mera Gaurav

The Mera Gaon Mera Gaurav (MGMG) teams of ICAR-NIBSM scientists provided information to the farmers of selected villages (15) on various aspects in a time frame through monthly visit, demonstrations, meetings/gosthis and mobile advisory and literature support every month. The selected villages (15) were visited for 40

times repeatedly in 16 visits and benefitted 474 farmers. Five farmers' meeting and two demonstrations has been organized. Scientific advisory on crop rotation, rice false smut and brown plant hopper (BPH) management and scientific method of paddy storage and rat control were also suggested to the beneficiaries.



Awareness on pests of crops



Interaction with farmers

One day training cum field visit for Training to Diploma course for Agricultural Extension Services (DAESI) (January 18, 2018)

One day training cum field visit for 40 DAESI trainees from Raipur, Dhamtari, Mahasamund and Gariaband districts was organized on January 18, 2018 at ICAR-NIBSM, Raipur. The training was inaugurated with introductory speech of Dr. P. Kaushal, Joint Director (Research) who explained the role of input dealers in biotic stress management. Also he emphasized that the input dealers must act as a bridge between farmers and scientists to solve the biotic stress related issues. The scientists of NIBSM delivered lectures on eco-friendly pest management methods and zoonoses.



Rashtriya Krishi Unnati Mela, Chhattisgarh (January 24-28, 2018)

ICAR-NIBSM has participated and erected a stall at "KRISHI SAMRIDHI" held at IGKV, Raipur with joint venture of State Government and State Agriculture University from 24-28th January 2018. The ICAR-NIBSM took active part in demonstrating the eco-friendly plant protection technologies to the dignitaries, farmers, woman self help group members, rural youths, school and college students. Approximately more than lakh farmers witnessed the five days Krishi Samaradhi Mela 2018 and around 800 farmers have registered and benefitted through visit of NIBSM stall.



SHG women participation



School children participation

Observing live telecast on Hon'ble Prime Minister's Interaction with farmers (June 20, 2018)

The Hon'ble Prime Minister Shri Narendra Modi interacted with the farmers across the country on June 20, 2018 between 9.30 and 11.00 am which was telecasted by the Doordarshan, DD Kisan and Aakashvani as live programme. During this event, the Prime Minister briefed the

agricultural scenario and developmental schemes, followed by interaction with farmers gathered at different centres across the country. In this connection, ICAR-NIBSM, Baronda, Raipur (CG) organized events at Bangoli, Adsena and Baronda village with 50 farmers to witness the live interaction of Prime Minister with farmers.



One day training cum field/lab visit for Rural Extension Officers (REOs)/State Agriculture Development Officers (June 01, 2018)

One day training cum field/laboratory visit for 49 Rural Extension Officers (REOs)/State Agriculture Development Officers from various districts of Chhattisgarh was organized on June 01, 2018 at ICAR-NIBSM, Raipur (CG). Dr. S. K. Jain and Dr. R. K. Murali Baskaran delivered lectures with special emphasis on the role of eco-friendly methods in IPM. The importance and management of zoonotic diseases was narrated by Dr. Lata Jain, Scientist (Vet. Microbiology) Dr. P. Mooventhan, Scientist (Extension) delivered a lecture on different modules (Crop, horticulture, livestock and NRM based) helpful in doubling farmer's income.



One-day training to REO/RDO

Infrastructure Development

Construction of NIBSM main buildings

With the administrative approval and expenditure sanction of Rs. 52.87 crores, the construction works of following buildings and development works started in the first week of January 2018

1. Administrative Building (G+2) including Library & Cafeteria block and auditorium and two School Buildings (G+1)
2. Boys & Girls Hostel
3. Development Works including levelling of the land, internal road and path, sewer line, water supply line, storm water drain, street lighting, underground sump, sewerage treatment plant and electricity substation etc.



Initial stage of building



Admin building (front view)



Admin building (side view)



Special Secretary (DARE) & Secretary (ICAR) visit to construction site



Biotechnology laboratory



Insect Screening Facility

Workshops/Symposia/Seminars/Training Organized

Organised training programmes on 1) scientific vegetable cultivation at Kharri and Kurraha villages of Kasdol block, Baloda bazar district on 18.01.18 2) One day training cum field visit for Training to Diploma course for Agricultural Extension Services (DAESI) on January 18, 2018 3) plant protection measures against major pest of vegetables and pulses at Bhamni village of Kasdol block, Baloda bazar district on 15.02.18 4) training cum demonstration on line sowing method of pigeon pea and scientific pumpkin cultivation at Kharri and Kurraha villages of Kasdol block, Baloda bazar district on 18.01.18 5) plant protection measures in *Lathyrus* and rice and use of *Tricho* cards at Telinsatti village of Dhamtari district on 18.02.18 6) pre and post knowledge test at Bendranawagaon and Telinsatti village of Dhamtari district on 28.05.18 and 7) One day training cum field/Lab visit for Rural Extension Officers (REOs)/State Agriculture Development Officers on June 01, 2018

Workshops/Symposium/Seminar/Conference/other fora attended

- Anil Dixit attended 48th Annual Group meeting of All India Co-ordinated research project on soybean during March 15-17, 2018 at IGKV, Raipur
- L. L. Kharbikar attended and presented a poster on 'In-silico identification of microRNA like RNAs and their regulating target functions in *Fusarium graminearum*' in Annual Young Scholars Conference 2018 (AYSC 2018) during February 23-24, 2018, held at Nagpur.
- P. Mooventhan attended 1) National level Foldscope's workshop on April 17, 2018 at ICGEB, New Delhi 2) Farmer FIRST's ZPMC (Zonal Project Monitoring Committee Meeting) on April 13, 2018 at ICAR-ATARI at Jabalpur 3) Farmer FIRST's PMC (Project Monitoring Committee Meeting) during May 28 & 29, 2018 at ICAR- IISWC, Deharadun.
- J. Mallikarjuna attended XX Biennial Group meeting of AICRP Nematodes at AAU, Anand during February 15-17, 2018.

Training attended

- P. N. Sivalingam attended the training programme on "Competency Enhancement Programme for Effective Implementation of Training Functions" by HRD Nodal Officers of ICAR during February 15-17, 2018 held at ICAR-NAARM, Hyderabad.

Publications

Research and Review Papers

1. Choudhary, B. K., M. Choudhary, B. C. Bera and S. B. Barbudde. 2018. Emergence of Multi-drug Resistant *Raoultella*

ornithinolytica associated with Indian Major Carp. Current Science 114(9): 1818-1821

2. Jain, L., V. Kumar, S. Chaturvedi, G. Roy and S. B. Barbuddhe. 2018. Seroprevalence of brucellosis in bovines of Chhattisgarh, India. Indian Journal of Animal Research, DOI: 10.18805/ijar.B-3492.
3. Jain, L., V. Kumar, S. Chaturvedi, G. Roy and S. B. Barbuddhe. 2018. Seroprevalence of infectious bovine rhinotracheitis in Chhattisgarh, India. Research Journal of Biotechnology 13(7):69-72.
4. Kharbikar, L. L., S. K. Nandanwar, A. S. Shanware, Yogesh M. Yele, P. N. Sivalingam and P. Kaushal and J. Kumar. 2018. Microbe-mediated salinity tolerance in plants. Nature Research Microbiology Community 87843 (31111):1-9.

Book Chapter

- Goel, R., V. Kumar, D. C. Suyal, Narayan and R. Soni. 2018. Toward the Unculturable Microbes for Sustainable Agricultural Production, pp. 107-123. In: Role of Rhizospheric Microbes in Soil (V. S. Meena, P. K. Mishra, J. K. Bisht and A. Pattanayak eds.), Springer publisher, Singapore, DOI:10.1007/978-981-10-8402-7_4

Abstracts

- P. Mooventhan, S. R. K. Singh, P. Venkatesan, Anil Dixit, K. C. Sharma, P. N. Sivalingam, Amit Kumar Gupta, Uttam Singh and Amit Dixit. 2018. Socio-economic upliftment of tribal farmers through suitable agricultural enterprises integration in rice fallow pulse cropping system - A farmer participatory approach, Abstract p. no. 415. In: Proceedings of International Conference on Invigorating Transformation of Farm Extension towards Sustainable Development: Futuristic Challenges and Prospects organized by Extension Education Society (EES), Tamil Nadu Agricultural University (TNAU), Coimbatore, held during March 9-10, 2018.

Extension folders

- Mooventhan, P., R. K. Murali Baskaran, Anil Dixit, K. C. Sharma, P. N. Sharma, P. N. Sivalingam, A. K. Gupta, Amit Dixit, Uttam Singh and Kanhaiya Jaiswal. 2018.
 1. टमाटर, भिंडी एवं मिर्च में फल छेदक प्रबंधन, No. 13
 2. चने के नाशीकीट एवं उसका प्रबंधन, No. 14
 3. ऑयस्टर मशरूम उत्पादन तकनीक, No. 15
 4. भंडारगृह / गोदामों में प्रमुख नाशीकीटों व चूहों का प्रबंधन, 16
 5. ट्राइकोकार्ड : नाशीकीट प्रबंधन में प्रभावी तकनीक, No. 17
 6. Integrated Rat Control, No. 18
 7. Gadgets in Storage Pest Management, No. 19
 8. Pests of Chili and Their Management, No. 20
 9. Pests of Cole Crops and Their Management, No. 21
 10. Pests of Brinjal and Their Management, No. 22
 11. Pests of Cucurbits and Their Management, No. 23
 12. Pests of Okra and Their Management, No. 24
 13. Pests of Tomato and their Management, No. 25
 14. Pests Management Traps, No. 26

e-Publications

- Farmer FIRST portal developed and posted online URL: (<http://farmerfirstnibsm.org/index.php>)

Awards/Recognition/Membership in Professional Societies

- Dr. B. K. Choudhary and Dr. Mamta Choudhary received Best Article Award for their article in a Hindi magazine "Jalchhari" published by ICAR-CIFE, Mumbai.
- ICAR-NIBSM, Farmer FIRST Project team (Dr. P. Mooventhan, Dr. Jagdish Kumar, Dr. Pankaj Kaushal, Dr. S.R.K. Singh, Dr. P. Venkatesan, Dr. Anil Dixit, Dr. K. C. Sharma, Dr. P. N. Sivalingam, Dr. Amit Kumar Gupta, Shri. Uttam Singh and Dr. Amit Dixit) received the Best Poster Award at International Conference on Invigorating Transformation of Farm Extension Towards Sustainable Development: Futuristic Challenges and Prospects, organised by Extension Education Society (EES), Tamil Nadu Agricultural University (TNAU), Coimbatore, during March 9-10, 2018.

Guest lectures

- Dr. Anil Dixit delivered lecture on Integrated weed management in field crops on June 26, 2018 for Diploma of Agricultural Extension for input dealers at SAMETI, Raipur.
- Dr. P. N. Sivalingam delivered lecture on "Research Methodology and Scientific Writing" on April 13, 2018 at Amity Institute of Biotechnology, Raipur to undergraduate and post-graduate students.
- Four lectures were delivered during one-day training programme organised by SAMETI, Raipur (CG) for REO/RDO on June 01, 2018, as given below.
 1. Concept and role of Integrated Pest Management in combating biotic stresses by Dr. S. K. Jain
 2. Eco-friendly management of insect-pests by Dr. R. K. Murali Baskaran
 3. Various zoonotic diseases- their impact on human health and its preventive measures by Dr. Lata Jain
 4. Agricultural mobile application available for farmers and producers for solving various biotic stress related problems and different modules helpful in doubling farmer's income by Dr. P. Mooventhan.

Dignitaries Visits

- Dr. A. K. Singh, DDG (Crop Science & Horticulture), ICAR, New Delhi visited on January 24, 2018
- Dr. A. R. Sharma, Former Director, DWR, Jabalpur visited on January 29, 2018
- Dr. Vishal Nath, Director NRC Litchi visited on April 06, 2018
- Dr. I. S. Solanki, ADG (FFC), ICAR visited NIBSM, Raipur (CG) on April 11, 2018
- Shri Chhabilendra Roul, Special Secretary (DARE) and Secretary (ICAR) and Shri V. P. Kothiyal, Director (Works), Works Division, ICAR, New Delhi visited on April 13, 2018
- Dr. P. K. Chakrabarty, ADG (PP&B), ICAR, New Delhi visited on June 08, 2018.