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भाकृअनुप-राष्ट्रीय समेकित नाशीजीव प्रबंधन अनुसंधान संस्थान
ICAR-National Research Institute for Integrated Pest Management

NRIIPM

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From the Director's Desk ....



Integrated Pest Management (IPM) is a sustainable approach to crop protection that promises minimizing crop damage, reducing reliance on chemical pesticides, and promotes environmental health. As the name implies it is summation of biological, cultural, mechanical, host resistance and chemical methods, providing multiple options for pest management. Despite its advantages, the adoption of IPM in India remains low due to a range of technical, socio-economic and institutional constraints. Among these, the **unavailability of quality IPM inputs** is one of the most critical barriers affecting widespread adoption.

IPM inputs are a very important component of IPM modules which include biologicals, botanicals, cultural/physical tools and environmentally safe chemical pesticides. Studies across different regions in India consistently report that farmers face difficulty in accessing these inputs when required. This problem is more acute in remote and rural areas where supply chains for, such specialized inputs are weak or underdeveloped. Besides, presence of spurious/substandard inputs is another problem, as a result, farmers fail to get desired results using such low-quality inputs. This leads to a loss of confidence in IPM practices, prompting them to revert to conventional chemical pesticides. Although chemical pesticides available in the market may also sometimes be spurious or substandard, farmers tend to rely more on them due to their wider availability, the perception of quicker and more reliable results. Many IPM components, such as pheromone traps or microbial pesticides, although are relatively inexpensive compared to conventional pesticides, farmers may find it economically risky to invest in these inputs. The problem is further compounded by lack of technical guidance. Farmers often lack awareness about where to procure quality IPM inputs and how to use them effectively. Therefore, creating awareness about the quality IPM inputs, their usage and technical guidance related to it will not only empower the farmers but will increase their confidence in IPM.

To meet these challenges ICAR-NRIIPM, New Delhi has taken up initiative for research, development, production, distribution and creating awareness about the quality IPM inputs. The endeavour has resulted in development of laboratories for mass production and formulation of microbial biocontrol agents, botanical biopesticides, predators and parasitoids and mechanical

devices for pest management. This initiative supported by the research activities being conducted for development of novel bioformulations and devices will pave way for effective implementation of IPM at national level. ICAR-NRIIPM has extensively advocated for the 'IPM umbrella' under its leadership to bring together all stakeholders on the same platform. The efforts of the institute for production and distribution of IPM inputs be a milestone in the journey of dissemination of IPM to grassroot levels. Next step will be to converge ICAR institutes, state departments, SAUs, KVKs, NGOs and other stakeholders by capacity building and technology transfer for scaling up of the efforts of the institute. While, IPM holds great promise for sustainable agriculture in India, its adoption is severely constrained by the unavailability and poor accessibility of quality IPM inputs. Addressing this issue requires strengthening input production systems, ensuring quality control, improving distribution networks, and enhancing extension services. Without resolving these input-related constraints, the large-scale adoption of IPM in India will remain a challenge. For which our coordinated and sustained efforts with all stakeholders are essential to unlock the full potential of IPM in the country.

New Initiatives

Botanical Biopesticide Laboratory

A dedicated botanical biopesticides laboratory has been established to support both research and mass production activities for its distribution in IPM programmes. The facility is equipped with essential instruments including a homogenizer, oil press machine, grinder, and packaging unit, enabling efficient processing of plant-based materials. This laboratory is designed to facilitate the extraction and formulation of botanical oils along with the production of oil cakes and other biopesticide derivatives. These products are known for their eco-friendly pest control properties and play a vital role in sustainable agriculture. In addition to production work, the laboratory will also cater for scientific research activities focused on the development and evaluation of botanical biopesticides. It supports experimental trials, formulation refinement and quality assessment, contributing to the advancement of IPM strategies. The laboratory is also utilized for studying the efficacy, stability and application methods of various plant-derived compounds, aiming to enhance their field performance. The laboratory also promotes capacity building by training students and extension personnel in biopesticide technology.



Botanical Biopesticide Laboratory

(Dr. SM Haldhar)

Chrysoperla Mass Rearing Laboratory

Chrysoperla is a beneficial insect, and its larvae are highly effective predators, feeding intensively on the eggs and immature stages of numerous soft-bodied insects pests. These include various species of aphids, thrips, whiteflies, leafhoppers, mealybugs and eggs of moths. ICAR-NRIIPM has successfully developed a mass rearing facility for *Chrysoperla*, which is being effectively utilized for research, training and extension activities. The facility enables the large-scale production of quality predators, which are used in IPM programs to promote sustainable and eco-friendly agriculture.



Chrysoperla rearing laboratory

(Dr. Ajanta Birah & Dr. Rakesh Kumar)

Trichogramma Mass Rearing Laboratory

ICAR-NRIIPM has developed a dedicated mass-rearing facility that supports the large-scale production



***Trichogramma* Mass Rearing Laboratory**

of Trichogramma, an important egg parasitoid used in the management of Lepidopteran pests. *Trichogramma* effectively parasitizes the eggs of major insect pests such as rice yellow stem borer, leaf folder, sugarcane borers, cotton bollworms, and various vegetable fruit borers. The facility utilizes *Corcyra cephalonica* as a factitious host for the mass production of *Trichogramma*. The infrastructure enables the production of high-quality Trichocards on a large scale, which are widely deployed in Integrated Pest Management (IPM) programs.In addition, the facility serves as a key platform for advancing biological control research, including the standardization of rearing techniques and evaluation of field performance. It also plays a crucial role in capacity building by providing hands-on training to farmers, students, extension personnel, and other stakeholders, thereby strengthening their skills and awareness in eco-friendly pest management practices.

(Dr. SK Singh & Dr. Anoop Kumar)

Microbial Biocontrol Agents Mass production laboratory

A laboratory facility for research and mass production of Microbial Biocontrol Agents is developed. The laboratory is equipped with facilities for quality mass production of microbial biocontrol agents in a short time (2-7 days). Two incubation rooms (one for fungal and other for bacterial antagonists) with racks are developed where pure cultures of microbials are maintained in trays. Low-cost medium with the locally available substrates/ nutrients is refined for mass production of *Trichoderma* spp., *Beauveria* spp., *Metarhizium* spp. *Bacillus* spp. and *Pseudomonas fluorescens*. In this growth medium, profuse sporulation of the fungal and bacterial biocontrol agents up to ($\times 10^{12}$) is observed. The duration for incubation to reach optimum sporulation is about 5-7 days in case of fungal biocontrol agents and 2-3 days in case of bacterial biocontrol agents. Approximately 4500 litres of liquid formulation of microbials produced in the laboratory were distributed to various KVKs and SAUs under various projects and schemes till December, 2025. Besides, mass production research related activities like optimization of medium for increasing sporulation, screening different microbials for mass production on low-cost medium, etc. are also being carried out in the laboratory. The laboratory presents a model set up for low-cost mass production of microbial biocontrol agents, which can be adopted by SHGs, FPOs, entrepreneurs interested to dwell into the area of microbial biocontrol agents.



Microbial biocontrol agents mass production laboratory

(*Dr. Rekha Balodi, Dr. PN Meena & Dr. Raman Thangavelu*)

Molecular Plant Pathology Laboratory

A dedicated molecular plant pathology laboratory has been established to facilitate advanced research in the isolation, identification and characterization of plant pathogens and beneficial microorganisms. The laboratory is well-equipped with essential instruments including thermocycler (PCR), Realtime PCR, Gel Documentation system, ELISA washer and reader, BOD incubator, laminar airflow unit, hot air oven, precision weighing balance, refrigerated centrifuge, gel electrophoresis unit, ultra-low temperature freezers (-20°C and -80°C), ice flaking machine and lyophilizer. The primary focus for the laboratory shall be development of rapid and reliable diagnostic kits for the detection of economically important plant pathogens infecting crops such as pulses, oilseed, tomato, onion, garlic, etc. These kits will facilitate early detection and timely management of different diseases, thereby minimize crop losses and improve productivity. The facility is also utilized for the isolation of diverse beneficial plant rhizospheric and endophytic micro-organism (bacteria and fungi). These isolates are being screened for their antagonistic potential against major plant pathogens. At present, the laboratory is actively engaged in developing effective microbial consortia targeting major diseases of pulses and oilseed crops. These consortia aim to provide sustainable and eco-friendly disease management strategies by enhancing plant health and suppressing pathogens through synergistic microbial interactions. Overall, the laboratory serves as a comprehensive platform for integrating classical and molecular approaches in plant pathology, with a strong emphasis on sustainable agriculture and biocontrol-based disease management.



Molecular Plant Pathology laboratory

(Dr. Meenakshi Arya & Dr. Manoj Choudhary)

Development of IPM module for sustainable production of Gundu malligai (Jasmine, *Jasminum s*ambac Ait.) at Madurai District, Tamil Nadu

A survey was conducted in jasmine growing villages and had discussion with collaborating centres to formulate

the IPM project. On 4 August 2025 a meeting was held in the presence of Director, ICAR-NRIIPM; Director, (CPPS) TNAU; Dean, AC&RI (Madurai); Head of the Department (Agril. Entomology), AC&RI (Madurai); Professors from Agril. Entomology & Pathology, AC&RI (Madurai), scientists from ICAR-NRIIPM, New Delhi; DDH & ADHs, of State Department of Horticulture, Madurai, T.N. & In-charge KVK, Madurai. In the meeting, thorough discussion was made with respect to importance of the jasmine crop, major pests, pesticide spray, formulation of IPM project & collaborators etc.

During survey the scientists visited two villages i.e., Eliarpatty village of Thiruparangundram Block of Madurai and Nakkalapatty village, Usilampatty Block of Madurai where major pests infestation of mites (35-40%), budworm (20-30%), blossom midge (20-30%), thrips (3-5%), leaf webber (2-4%), melaybug (2-5%), wilt (15-20%), etc. were observed.



Visit of scientists to Jasmine growing areas at Madurai District, Tamil Nadu

(Dr. D. Raghavendra)

Dissemination of IPM package in mustard-based cropping system through IPM model village approach

A new institute project through IPM model village approach was initiated at village Bagar Rajput, Ramgarh, Alwar, Rajasthan in collaboration with SKNAU-KVK, Navgaon, Alwar during Rabi 2025-26. The project was in farmers' participatory mode with an aim to develop IPM model village for mustard crop. At the beginning of the season, scientist-farmer interaction meeting was held for collection of baseline information.



Scientist-farmer interaction meeting

(Dr. MS Yadav and Team)

IPM in cotton at Jalna, Maharashtra

An initiative under the project on "Refinement, validation and promotion of pest management strategy in *Bt* cotton for central zone" in farmers' participatory mode, covering 25 acres area with the collaboration of Krishi Vigyan Kendra, Jalna, Maharashtra. Scientists have visited Jalna, Sawargaon Hadap on 24 July 2025 for discussion regarding IPM trial also visited Wanadgaon, Hiwara Roshangaon and Kacharewadi of Jalna district of Maharashtra. An interactive meeting with farmers was also conducted in Sawargaon Hadap village in which 45 farmers participated, and farmer field school were also conducted in Hiwara Roshangaon with 17 farmers and 4 farm women and in Kacharewadi village with 18 farmers. Awareness was created on major pests, natural enemies & their identification through NPSS and management through IPM practices. Farmers do not have any knowledge about IPM. Usually, farmers carry out 8-16 sprays (average 13) of pesticides in cotton crop season. Farmers usually apply tank mix of two insecticides along with some growth hormone and foliar fertilizers. Scientists also visited Sawargaon, Hadap village on 30 October 2025 and conducted farmer field school, in which 56 farmers participated, and they showed their happiness by adopting IPM, where pink bollworm incidence was very less with adoption of SPLAT technology. Scientists advised all the farmers to adopt SPLAT along with ecological engineering, marigold as border crop and cowpea and pigeon pea as intercrops for conservation of beneficial fauna.



Scientist-farmer interaction meeting

(Dr. Ajanta Birah & Dr. Mukesh Khokhar)

IPM model village at Karaikal, Puducherry

IPM in Rabi rice in Puthakukudy village of Karaikal, Puducherry was initiated during September 2025 in 20 acres with the participation of 20 farmers in collaboration PAJANCOA, Karaikal, Puducherry to develop model IPM village for which an MOU has been signed between ICAR-NRIIPM, New Delhi and PAJANCOA, Karaikal, Puducherry. The baseline information of the village indicated that the rice is grown during three seasons *viz.* (i) Samba (August – February), which is the most dominant season in Karaikal. Farmers typically start preparing fields and sowing in late August or September. This long-duration crop takes advantage of the Northeast Monsoon; (ii) Kuruvai (June – October), which is traditionally a short-duration crop grown during the Kharif season. However,

its cultivation has decreased recently due to uncertainty in canal water supply, often leaving fields fallow during this period and (iii) Thaladi (October/November – March), which is a second crop often planted immediately after the Kuruvai harvest. Flood-tolerant varieties like KKL(R) 4 are specifically recommended for this season to withstand monsoon submergence. During the baseline survey it was observed that, YSB, Leaf folder, gall midge BPH, ear head bug and red mite are the major insect pest problems. Among diseases, false smut, BLB, blast, brown spot, sheath blight, grain discoloration and leaf streaks are the prevailing diseases in the area. It was also found that false smut was a serious disease in Samba Masuri BPT 5204 since last three years. Farmers depend upon pesticides dealers for pest management advisory. About 75 % of the farmers followed rice –cotton cropping system and 25% are following rice-rice cropping system.



Farmers Meeting at Puthakukudy, Karaikal, Puducherry

(Dr. R. Thangavelu & Dr. Anoop Kumar)

IPM model village at Aurangabad, Maharashtra

The IPM model village programme was initiated at Boregaon, Aurangabad, Maharashtra, focusing on horticultural crops (sweet orange and mango) and cotton, with the objective of promoting Integrated Pest Management (IPM) technologies. This initiative was undertaken in collaboration with Krishi Vigyan Kendra, Aurangabad-1, and Marathwada Agricultural University (MAU), Parbhani, Maharashtra, to demonstrate and encourage the adoption of eco-friendly pest management practices among farmers. The programme was implemented at Boregaon village in Aurangabad district, covering a total area of 100 acres, with 25 acres allocated to each sweet orange, mango, cotton, and pigeon pea crops. The activity was carried out during the period from October to December, 2025, focusing on the adoption of need-based IPM interventions such as pest monitoring, use of microbial consortium, neem oil, yellow and blue sticky traps, pheromone traps, fruit fly trap, agro-ecological engineering, SPLAT technique and judicious use of pesticides. Through field demonstrations, farmers' ghosti, farmer field school, farmer interactions, and regular advisory services, the initiative aimed to enhance crop productivity, reduce the indiscriminate use of chemical pesticides, and promote sustainable integrated pest management practices in both horticultural and field crops.

(Drs. PN Meena, Dr. D. Raghavendra & Dr. Ajanta Birah)

Research Highlights

Validation and promotion of IPM in basmati and traditional rice

IPM in basmati rice was validated during Kharif 2025 in 30 ha area in village Chitbhawan (26.792329, 79.080863) of District Etawah Uttar Pradesh with the participation of 12 farmers in basmati rice variety PB1692. IPM fields recorded 35 % reduction in yellow stem borer (*Scirpophaga incertulas*) with mean incidence of 4.8% in IPM and 7.39 % in FP. Similarly, >40 % reduction in brown plant hopper (BPH) was observed in IPM over FP. BPH appeared in the 38th SMW with peak incidence of 18 hoppers/hill in IPM and 29 hoppers/hill in FP during 40th SMW. The incidence of leaf folder remained below ETL in both IPM and FP. Among diseases, bacterial leaf blight was the major one, which was significantly low in IPM (1.85%) compared to FP (12.7%). Sheath blight appeared in 36th SMW and reached its peak of 2.5 % in IPM and 10.5 % in FP during 39th SMW. Bakane disease was negligible in IPM whereas in FP maximum incidence was 0.43 %. Spider population per hill was significantly ($p<0.05$) higher in IPM (2.5) compared to FP (0.58). IPM implementation resulted in significant reduction in number of pesticides applications (33 %), pesticides active ingredient (65.9%), increase in gross income (20 %) increase in net profit (>17000/ha) compared to FP. The yield and B-C ratio was higher in IPM (37.5 q/ha, B:C 1.81) compared to FP (31.25 q/ha, B:C 1.44).



Demonstration of seedling root dip method

(Dr. Anoop Kumar, Dr. Rakesh Kumar & Dr. Mukesh Khokhar)

Large scale demonstration of biocontrol-based module in rice

Large scale demonstration of biocontrol based IPM module (BIPM) in basmati rice was carried out at farmers' field in the village Bambawar, District GB Nagar (UP) in 10 ha area and compared with farmers practice (FP). The incidence of insect pests and diseases was significantly (p=<0.001) low in BIPM compared to FP. The infestation of yellow stem borer (YSB) (*Scirpophaga incertulas*) at tillering and vegetative stage was closed to ETL (5 % dead heart). However, after ear emergence (90 DAP), YSB infestation was high and crossed ETL (2% white ear) with significantly high infestation in in FP fields (15.5 %) compared to BIPM (5.2 %). Leaf folder attack was also low (3.7 to 9.7% leaf damage) with no significant difference in BIPM and FP. Bacterial leaf blight was the major disease recorded at 60 DAP with incidence of 6.9% in FP fields and zero in BIPM, whereas at 90 DAP it increased upto 15.4% in FP and 2.5 % in BIPM. Bakane disease incidence was also significantly lower in BIPM (0.10%) compared to FP (0.5-0.75). Population of spider was significantly higher in BIPM (2.5-3.7/hill) compared to FP (0.5 to 1.4/hill). The yield and BC ratio was also high in BIPM (41 q/ha, 1.75) compared to FP (37 q/ha, 1.51) along with significantly higher population of natural enemies spider in BIPM (2.5-3.7/hill) compared to FP (0.5 to 1.4/hill).

(Dr. Anoop Kumar & Dr. Mukesh Khokhar)

Validation of IPM for major pests of Mango at Marathawada region, Maharashtra

An institute project was initiated in collaboration with KVK Aurangabad during January 2025 at Aurangabad district (Maharashtra) in 5 villages *viz*, Paithan, Dhangaon, Wadhawali, Pachalgaon and Goregaon covering 25 acres. Population dynamics of major pests of mango were recorded from 31 to 52 SMW of 2025. The average population of major pests are summarized below. More no. webs per direction (leaf Webber) was noticed in UC (untreated control) (2.90) followed by FP (farmers practice) (1.83) and least was in IPM (0.43). Shoot borer infestation was also highest in UC (3.72/5) followed by FP (2.56/5 tender shoots) and lowest was in IPM (0.83/5 tender shoots). The population dynamics of ash weevil was less in IPM (5.39/10 cm shoot) followed by FP (8.67/10 cm shoot) and highest in UC (12.81/10 cm shoot). Similarly, in case of leaf cutting weevil, IPM recorded lowest population with 0.89/10cm shoot followed by FP with 2.69/10 cm shoot and UC with 3.67/10 cm shoot and thus there was 75.74% reduction of insects pests over control. Among the natural enemies, coccinellid population was more in case of UC (2.83/m^2) followed by IPM (1.58/ m^2) and lowest was in FP (0.96/ m^2). Similarly, chrysoperla population was highest in UC (3.3/ m^2) followed by IPM (1.81/ m^2) and lowest in FP (1.14/ m^2). Highest no. of spiders was also observed in UC (3.62/ m^2) followed by IPM (2.45/ m^2) and lowest was in FP (1.61/ m^2). The incidence of dieback also was low in IPM (8.8%) followed by FP (23.2%) and highest was in UC (34.3%). Highest incidence of gummosis was noticed in UC (31.3%) followed by FP (21%) and lowest was in IPM (6.2%).

(Dr. D. Raghavendra & Dr. PN Meena)

IPM in sugarcane

A field survey was carried out across different villages of Uttar Pradesh through direct interactions with farmers. The observations revealed notable pest and disease incidence in sugarcane: early shoot borer (24–27%), top shoot borer (36–40%), leaf hopper (7–12 adult/nymph per plant), red rot (15–20%) and pokha boeng (11–15%). Field IPM validation trial in sugarcane crop was carried out at Mandora village of Meerut district, Uttar Pradesh during 2025 in 400 ha with the participation of more than 600 farming families. The sugarcane IPM Model Village programme at Mandora effectively combined biological, botanical, and technological inputs to manage pests and diseases. A total of 800 litres of Tricho+Bacil consortium was applied across 400 acres, targeting red rot and pokkah boeng while improving soil health. For insect pests, 370 litres of IPM-Azad and 200 units of IPM-Trigourd herbal soap were distributed to control early shoot borer, top borer, and leaf hopper, 500 Trichocards against borer eggs, 350 traps for early shoot borer and 400 traps for top shoot borer installed. Modern technology was integrated through drone spraying over 200 acres, ensuring uniform application and efficiency. The seasonal incidence of top shoot borer showed a gradual increase from May to July, peaking during SMW 27–29, before declining towards the end of October. Across all stages, IPM plots consistently recorded the lowest infestation (≤2.86 per 10 plants; ≤27.14%), while FP plots showed moderate levels, and untreated controls reached the highest incidence (up to 7.86 per 10 plants; 74.29%). These results clearly demonstrate that IPM strategies effectively suppressed top shoot borer populations, delayed pest buildup, and maintained incidence compared to FP and untreated plots. Red rot and pokha boeng disease incidence was minimal in IPM plots (generally <12%), compared to much higher levels in FP and control plots. Overall, the results clearly demonstrate that IPM strategies are highly effective in reducing pest and disease pressure in sugarcane, delaying pest buildup, and sustaining crop health.



Demonstration of drone in sugarcane field at Mandora village, Meerut, UP

(Dr. SM Haldhar & team)

IPM strategies for field pea

The project activities on implementation of IPM strategies for field pea are ongoing at KVK Jalaun and Jhansi (BUAT, Banda). During the second fortnight of December 2025, a severe infestation of pod borer (*H. armigera*) and *Ascochyta* blight were observed in a large area of field pea. Farmers sprayed NSKE 5% or neem formulation of 1500 ppm at weekly interval and done mass collection of adult moths using pheromone traps @ 14/ha. For the *Ascochyta* blight and powdery mildew disease management, application of sulphur 80% WDG was done. Pheromone traps and bird perches (@ 50/ha) were installed in adopted farmers' fields, and pheromone lures were replaced after 25 days. ICAR-NRIIPM supplied the Trichogel formulation of *Trichoderma asperellum* (ITCC No. 12187.25) for seed treatment. Foliar application of Trichogel by some farmers showed promising efficacy against Ascochyta blight, powdery mildew, and rust in field pea. Consequently, an average yield of 62 q/ha was obtained, with the produce fetching an average market price of ₹2,500 per quintal.

(Dr. Jitendra Singh)

IPM strategies for Pigeon pea

Validation, refinement, and dissemination of IPM modules against major pigeon pea pests were initiated in a farmers' participatory mode across 30 ha in collaboration with KVK Aurangabad, Maharashtra. IPM fields recorded the lowest leaf webber population (2.68 larvae/webbed leaf/plant) and ash weevil incidence (3.0 adults/plant), compared to farmer practice (6.7 larvae and 3.90 adults/plant) and control (8.7 larvae and 6.30 adults/plant). Similarly, wilt (16.4%) and Phytophthora blight (8.4%) incidences were minimized under IPM, against higher levels in farmer practice (29.5% & 15.8%) and control fields (45.6% & 21.6%).

IPM in Sweet orange

IPM strategy in sweet orange was validated across 25 acres in three villages of Aurangabad, Maharashtra. Thrips, leaf miner, and ash weevil populations were lowest under IPM (9.02, 3.13, 9.93) compared to farmer practice (11.84, 5.06, 15.19) and control (14.65, 7.97, 18.11). Disease severity of dieback (19.06%) and sooty mould (12.22%) was significantly reduced under IPM. Farmer practice (25.87%, 17.67%) and control fields (30.91%, 23.07%) recorded much higher incidences..

(Dr. PN Meena and Dr. D. Raghavendra)



Scientist-Farmer interaction

Evaluation of bio-active molecules against storage insects

The project was undertaken to evaluate the prophylactic efficacy of selected contact insecticides against major stored-grain insect pests. Binary mixtures of insecticides,namely imidacloprid 17.1% SL, emamectin benzoate 5% SG, spinosad 45% SC, spinetoram 11.7% SC and isocycloseram 17.1% SL were tested for their contact toxicity under *in vitro* conditions. The bioassays were conducted against adult stages of *Tribolium castaneum* (red flour beetle), *Rhizopertha dominica* (lesser grain borer), *Sitophilus oryzae* (rice weevil) and *Lasioderma serricorne* (cigarette beetle). In binary mixtures, insecticides were combined at equitoxic ratios. Mortality observations were recorded at 24, 48 and 72 hours after treatment under controlled conditions of 27–30°C temperature and 60–65% relative humidity. The results revealed a pronounced synergistic effect in the binary mixtures compared to the individual insecticides. For instance, the LD_{50} value of imidacloprid against *R. dominica* (surface treatment) decreased from 397 ppm when applied alone to 110 ppm when combined with spinosad, while the LD_{50} value of spinosad was reduced from 225 ppm to 60 ppm in the mixture. Similar synergistic interactions were observed across other insecticide combinations tested. The results indicate binary insecticide combinations can provide more effective prophylactic control of stored-product insects, offering advantages such as reduced application rates, improved pest management efficiency and potential mitigation of resistance development.

(Dr. Sumitra Arora)

IPM in rainy season cauliflower crop

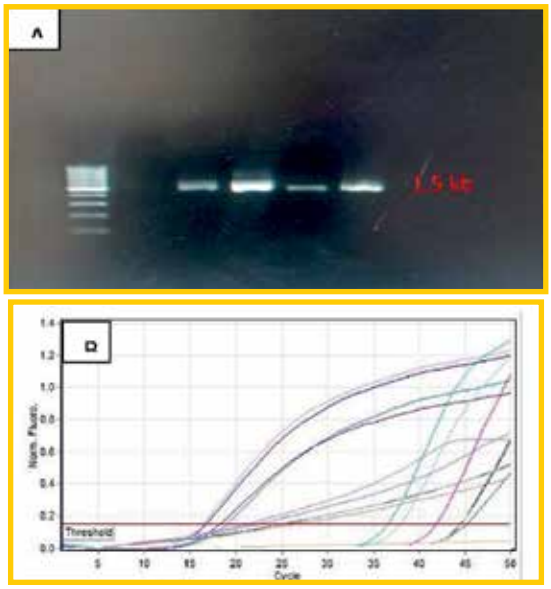
The IPM technologies validated were disseminated in rainy season cauliflower during 2025-26 in 200 acres to the villages namely viz. Uncha Majra, Narhera, Bhora Kalan, Bhora Khurd, NuPadamka anddamka and Panch gaon of district Gurugram, Haryana (Hub of rainy season cauliflower production). Farmers were also trained how to prepare raised bed nursery, usage of *Trichoderma* in nursery and main field crop. They were also trained to identify the pests infesting rainy season cauliflower and beneficial natural enemies. Cultural and mechanical methods of pest management were also advocated and demonstrated to the farmers from time to time. Demonstration on seed treatment and seedling root dip treatment with *Trichoderma*, usage of pheromone traps against harmful insects, field sanitation and weed removal

were also conducted before the farmers. They were also trained on need based application of label claimed safe pesticides.

(Dr. SP Singh)

Fungicides and bactericides resistance evaluation in major diseases and their management

The project was focused on assessing the development of chemical resistance in key plant pathogens and exploring viable alternative control measures. This project specifically targets several economically important diseases, including bacterial blight of rice caused by *Xanthomonas oryzae* pv. *oryzae*, bacterial wilt of tomato caused by *Ralstonia solanacearum*, Sclerotinia wilt of chilli caused by *Sclerotinia sclerotiorum*, and Gummosis affecting bottle gourd. The core methodology involves collecting infected samples, isolating the causative pathogens in pure culture, and subsequently testing their sensitivity against a range of commonly utilized fungicides and bactericides. This year, 15 bacterial strains, including isolates of *X. oryzae* and *R. solanacearum*, have been tested for their resistance profiles against copper-based compounds (Copper sulfate, copper hydroxide) and the antibiotic streptomycin. Four distinct bacteriophages



Use of PCR based marker for identification of bacteria using PCR (A) and qPCR (B)

were isolated obtained from the rice bacterial blight samples and these phages are being specifically evaluated as potential biological control agents against the *Xanthomonas* strains that have already demonstrated resistance to copper and conventional antibiotics. With regard to fungal resistance assessment component, the identification of different fungal species responsible for Sclerotinia wilt and bottle gourd Gummosis is currently underway.

(Dr. Manoj Choudhary)

Multifunctional microbial consortia for major insect pests and diseases in pulses and oilseeds

A diverse collection of 87 rhizospheric and endophytic bacterial isolates was established and systematically evaluated for their potential to suppress major soil-borne pathogens affecting pulses and oilseed crops. Each isolate was assigned a number (NRIIPM-B-1 to NRIIPM-B-87) and maintained as a pure culture to ensure consistency in downstream analyses. Preliminary screening revealed few isolates exhibiting strong antagonistic activity against key pathogens such as *Fusarium* spp., *Sclerotium* spp., and *Macrophomina phaseolina*, indicating their potential as effective biological control agents. Based on their performance, the most promising isolates (NRIIPM-B-5, NRIIPM-B-6, NRIIPM-B-13, NRIIPM-B-25, NRIIPM-B-48, NRIIPM-B-67) were selected for long-term preservation and further detailed characterization. These isolates demonstrate notable inhibitory effects (87 to 94%) on pathogen growth under *in vitro* conditions. Morphological observations showed colony diversity, while biochemical profiling revealed important plant growth-promoting and biocontrol-related traits, including nutrient mobilization and production of metabolites associated with pathogen suppression. Molecular identification through 16S rRNA gene sequencing is being pursued to accurately classify these isolates and establish their phylogenetic relationships. Furthermore, selected high-performing isolates are being assessed for their mutual compatibility with the objective of developing effective microbial consortia. Such consortia hold significant promises for integrated and sustainable disease management strategies in pulses and oilseed cropping systems, particularly under field conditions where multiple stresses and pathogens coexist. Further, efforts are being undertaken to isolate more rhizospheric and endophytic bacterial isolates so as to have more effective isolates against pulse pathogen.

(Dr. Meenakshi Arya)

Meeting and Events

Kisan Diwas

ICAR–NRIIPM, New Delhi, celebrated Kisan Diwas on 23 December 2025 by organizing a Farmers' Training Programme on "Role of Predators, Biopesticides, and Microbials in Pest Management" under Swachhta Pakhwada. The programme featured lectures by experts on eco-friendly pest management, practical lab and field visits showcasing IPM techniques, and distribution of microbial consortia to over 70 farmers. Hon'ble Agriculture Minister Shri Shivraj Singh Chauhan addressed farmers virtually, highlighting government schemes, while Dr. S.K. Singh, Principal Scientist (Ag. Entomology), emphasized the vision of Viksit Bharat–GRAM. The event reinforced



Demonstration of eco-friendly IPM practices

sustainable farming practices, modern technology adoption, and farmer empowerment, with enthusiastic participation from staff and farmers alike.

Launch of 'Sugarcane-Based IPM Model Village at Mandora, UP': A Milestone Towards Sustainable Agriculture

The sugarcane-based IPM Model Village was inaugurated in Mandora, Meerut district on 28 November 2025, under the auspices of ICAR-NRIIPM, New Delhi. Dr. R. Thangavelu, Director, ICAR-NRIIPM, in his inaugural speech, emphasized the importance of biological pest management in sugarcane and highlighted the role of this model village. The Chief Guest, Dr. Poonam Jasrotia, ADG (PP & B), ICAR, New Delhi, commended the initiative, noting its potential to serve as a replicable model for other sugarcane-growing regions. She encouraged farmers to adopt biological practices and expressed gratitude to the scientists for their dedicated efforts. Farmers received specially designed IPM kits containing diverse biological components for sugarcane pest management. During the programme, 200 liters of IPM-Azad (Neem oil 1000 ppm); 200 Trichocards for egg parasitism of top borer; 200 pheromone traps each for early shoot borer and top shoot borer; 200 kg of IPM-Soilsan (Neem cake) for soil health and disease management; 200 IPM-Trigourd herbal soaps for plant protection; 400 liters of consortium (*Trichoderma asperellum* + *Bacillus* sp); 50 cards of *Chrysoperla* eggs for biological control; 200 units of Chlorantraniliprole (60 ml) as a modern insecticide option; 200 booklets on sugarcane IPM for farmer guidance and 200 IPM kit bags for safe storage and easy use were distributed. This comprehensive kit provided farmers with integrated, eco-friendly, and practical solutions for managing sugarcane pests.



Launch of IPM village at Mandora, Meerut, UP

Constitution Day

The ICAR–NRIIPM, New Delhi, celebrated Constitution Day on 26 November 2025 with enthusiasm and respect for constitutional values. The programme began with the collective reading of the Preamble, reaffirming commitment to justice, liberty, equality, and fraternity. Dr. Raman Thangavelu, Director, emphasized the theme "Hamara Samvidhan, Hamara Swabhiman" and the importance of nurturing national pride. A lecture from Dr. A.K. Kanojia, highlighted the historical background, guiding principles and citizens' responsibilities in upholding democracy. The event concluded with a collective pledge by staff members to uphold and promote constitutional ideals in both professional and personal life.



Constitution Day pledge by staff

Pradhan Mantri Kisan Samman Nidhi

ICAR–NRIIPM, New Delhi, organized the live telecast of the 21st instalment of PM-Kisan Samman Nidhi Yojana on 19 November 2025 at Jakholi village, Sonipat, with wide participation from farmers, women, youth, experts, and local representatives. Leaders and scientists emphasized pesticide-free, sustainable farming, IPM practices, and eco-friendly technologies, while over 200 farmers received microbial consortia to improve soil health. The programme highlighted financial support, modern techniques, and sustainable agriculture which are the key drivers of farmer empowerment.



Live telecast of PM-Kisan Samman Nidhi Yojana

Research Advisory Committee (RAC) meeting

The 24th Research Advisory Committee (RAC) meeting of ICAR-NRIIPM, Rajpur Khurd, Maidan Garhi, New Delhi was held on November 11-12, 2025. The meeting

was chaired by Dr. Vijay Singh Thakur, Hon'ble Chairman, RAC & Former Vice Chancellor, Dr. YSPUHF, Nauni, Solan. The members of RAC, scientific and technical staff of ICAR NRIIPM, New Delhi participated in the meeting. RAC, complemented the Institute for complying with the RAC recommendations given during October 2024 meeting, released Newsletter and urged scientists to continue hard work to spread IPM technology across the country.



Release of Newsletter by Research Advisory team

Vande Mataram celebrations

The ICAR–NRIIPM, New Delhi, celebrated 150 Years of Vande Mataram — a national commemorative initiative honoring the enduring spirit of Vande Mataram and its pivotal role in India's history. All staff members participated in the celebration with great enthusiasm and patriotic fervor.

Rashtriya Ekta Diwas-National Unity Day

ICAR–NRIIPM, New Delhi, observed Rashtriya Ekta Diwas on 31st October 2025 to mark the 150th birth anniversary of Sardar Vallabhbhai Patel. Dr. R. Thangavelu, Director, ICAR-NRIIPM emphasized Patel's vision of national integration under the theme *"Ek Bharat, Aatmanirbhar Bharat"* and the staff members took the unity pledge and the programme included a symbolic Unity Race and an interactive session on Patel's legacy, reinforcing the institute's commitment to unity, self-reliance and nation-building.



Unity pledge on National Unity Day by staff

Pradhan Mantri Dhan-Dhaanya Krishi Yojana (PMDDKY)

ICAR–NRIIPM, New Delhi, hosted a vibrant outreach programme on 11 October, 2025, celebrating the launch of PMDDKY. With 150 farmers from UP and Haryana in attendance, the event spotlighted sustainable farming, bio-pesticides, and innovative pest management tools like drones and the NPSS App. Experts addressed key pest challenges in crops like sugarcane, rice, vegetables and mustard, while concerns about insect pests and disease problems and shown interest in IPM adoption. The programme featured live demos, tech showcases and distribution of biocontrol consortia worth 1 lakh—marking a powerful step toward eco-friendly agriculture.



Celebration of Outreach Programme on PMDDKY

Swachh Bharat Abhiyan at ICAR-NRIIPM

ICAR-NRIIPM, New Delhi, organized a Swachh Bharat Abhiyan under the "*Swachhta Hi Seva Campaign*" from 17 September to 01 October, 2025, culminating in a valedictory event on 3 October, 2025. The initiative aimed to reinforce national sanitation goals by engaging institute staff and the local community in hygiene-focused activities. It successfully promoted awareness and recognized outstanding community efforts in sanitation.



Swachh Bharat Aabhiyan

Vigilance Awareness Week (VAW)-2025

ICAR-NRIIPM observed Vigilance Awareness Week 2025 from 27 October to 2 November, 2025 on the theme 'Vigilance Our Shared Responsibility'. Activities included integrity pledge, e-pledge, quiz, essay competition, and a lecture-cum-workshop to promote integrity and curb corruption. The programme began with staff and school children taking the pledge, followed by competitions on 28 October, 2025. Shri Vivek Purwar (CAO, ICAR-NAARM) delivered a lecture on vigilance management, while Dr. Niranjan Singh, Vigilance Officer, addressed the gathering. Director Dr. R. Thangavelu emphasized the need for honesty, ethics, and a corruption-free environment for nation building.



Vigilance Awareness oath by staff

Celebration of Independence Day

ICAR–NRIIPM, New Delhi celebrated the 79th Independence Day with great joy and enthusiasm. Dr. Raman Thangavelu, Director, unfurled the National Flag which was followed by National Anthem and the ICAR song. Dr. R. Thangavelu, in his address, paid tribute to the sacrifices of our soldiers and urged the staff to uphold the spirit of patriotism. He also highlighted the achievements of the Institute and shared insights on the concept of the IPM Village and encouraged the scientists to ensure the utilization of effective quality IPM inputs in their research and dissemination activities.



Celebrations of Independence Day

Farmers field School (FFS)/ Farmers' interaction/Critical input distribution/ Field Day/ Demonstration

S. No	FFS/ Farmers' interaction/Critical input distribution/ Field Day/ / Demonstration	Date	Place	Farmers
1	Live demonstration of use of *Trichoderma* in FYM, seed treatment and seedling dip	02-07-2025	Uncha Majra, Narhera, Bhora Kalan, Bhora Khurd, Nurpur, Bas Padamka, Panch Gaon, Gurugram (Haryana)	60
2	Distribution of critical IPM inputs to manage the pests in cauliflower	17-07-2025	Uncha Majra, Narhera, Bhora Kalan, Bhora Khurd, Nurpur, Bas Padamka, Gurugram (Haryana)	70
3	Demonstration of seedling root dip treatment with *Pseudomonas* for rice IPM	21-07-2025	Chitbhawan, Etawah (UP)	15
4	FFS on IPM in sweet orange, pigeonpea and mango	24-07-2025	Pachalgaon, Vahegaon & Vadavalli villages, Aurangabad (Maharashtra)	50
5	FFS on IPM for sucking pests in cotton crop	27-07-2025	Hiwada Roshangaon, Sawargaon Hadap, Jalna (Maharashtra)	84
6	Farmers' meeting on insect pests infesting cauliflower and their management	08-08-2025	Uncha Majra, Narhera, Bhora Khurd, Nurpur, Gurugram (Haryana)	60
7	Sucking pest management in tomato	25-08-2025	Ramgadi, Bulandshahr (UP)	32
8	Kisan Goshthi for cauliflower	27-08-2025	Bhora Kalan and Nurpur villages of district Gurugram (Haryana)	10
9	Demonstration of biocontrol-based pest management in rice	08-09-2025	Bambawar, GB Nagar (UP)	15
10	Demonstration on use of drone in sugarcane	9 to 10-09-2025	Mandora, Meerut (UP)	48
11	IPM interventions for groundnut farmers	11-09-2025	Bhrari, Jhansi (UP)	32

S. No	FFS/ Farmers' interaction/Critical input distribution/ Field Day/ / Demonstration	Date	Place	Farmers
12	Biointensive management for Bakane disease in rice	11 -09-2025	Chitbhawan, Etawah (UP)	10
13	Demonstration on installation of Tricho cards in sugarcane fields	16-09-2025	Mandora Village, Meerut (UP)	60
14	Yellow sticky trap demonstration in tomato	26-09-2025	Ahroli and Bhatpura, Bulandshahr (UP)	50
15	Mass multiplications technique for disease management in mustard	27-09-2025	Baslambi, Gurugram (Haryana)	40
16	Mass multiplications technique for disease management in mustard	29-09-2025	Bagad Rajput, Alwar (Rajasthan)	100
17	Kisan Gosthi for IPM in cole crops	30-09-2025	Uncha Majra, Gurugram (Haryana)	65
18	FFS on IPM for mango, sweet orange and pigeonpea	03-10-2025	Pachalgaon, Vahegaon & Vadavalli, Aurangabad (Maharashtra)	75
19	Farmer Scientist interaction on Drone demonstrations in sugarcane	03-10-2025	Mandora, Meerut (UP)	53
20	Importance of sanitation and cultural practices in rice	07-10-2025	Bambawar, GB Nagar (UP)	25
21	Drone demonstrations in sugarcane	13-10-2025	Mandora, Meerut (UP)	50
22	Importance of raised bed planting in cole crops	17-10-2025	Uncha Majra, Gurugram (Haryana)	65
23	Application of pheromone traps and tricho cards in sugarcane	29-10-2025	Mandora, Meerut (UP)	50
24	Pink bollworm management in cotton crop	30-10-2025	Sawargaon Hadap, Wanadgaon, Jalna (Maharashtra)	93
25	IPM in sweet orange, pigeonppea and mango	30-10-2025	Pachalgaon, Vahegaon & Vadavalli villages, Aurangabad (Maharashtra)	90
26	Demonstration of *Trichoderma* and *Bacillus* based liquid biocontrol consortia	06 to 07-11-2025	Dhikoli, Jhansi (UP)	44
27	Importance of Bioagents and biopesticides in sugarcane	12-11-2025	Mandora, Meerut (UP)	200
28	Demonstration of IPM-TriBac consortia in sugarcane	28-11-2025	Mandora, Meerut (UP)	300
29	IPM in Tomato & demonstration of IPM-TriBac consortia	05-12-2025	Bulandshahr (UP)	75
30	IPM in mustard and demonstration of multiplication of IPM-TriBac consortia	06-12-2025	Baslambi, Gurugram (Haryana)	32
31	Post harvest pest management in rice	29-12-2025	Chitbhawan, Etawah (UP)	10
32	IPM in mustard and demonstration of multiplication of IPM-TriBac consortia	31-12-2025	Bagad, Rajput, Alwar (Rajasthan)	40

Training/ Exposure visit

Exposure Visit at TNAU, Coimbatore, TN for initiating predator rearing

An exposure visit to the Tamil Nadu Agricultural University (TNAU), Coimbatore, Tamil Nadu was undertaken during 05-07 August 2025 by Dr. Ajanta Birah and Dr. Rakesh Kumar with the objective of gaining practical insights into mass production and utilization of biocontrol agents. During the visit, interactions were held with Dr M. Murugan, Head, Department of Agricultural Entomology, Centre for Plant Protection Studies, TNAU and Dr Y. S. Johnson Thangaraj Edward, In-charge, Biocontrol Laboratory. Special emphasis was given to the predator laboratory, where large-scale mass production of Chrysopids and Coccinellids are being carried out. The team also visited the Corcyra mass production laboratory, where Corcyra is reared on a large scale for feeding Chrysopids and for preparation of Trichocards. Detailed exposure was provided on insect rearing techniques, environmental regulation, sanitation practices and preparation of Chrysopa cards and Coccinellid rearing. The exposure visit proved highly beneficial in enhancing technical knowledge and understanding of large-scale biocontrol agent production systems.

Exposure-cum-training programme on Arbuscular Mycorrhizal (AM) fungi at Bengaluru, Karnataka

Dr. PN Meena participated in exposure-cum-training programme conducted from 08-10 September 2025 at the Centre for Natural Biological Resources and Community Development, Bengaluru, Karnataka. A series of specialized hands-on training sessions were organized focusing on various aspects of Arbuscular Mycorrhizal (AM) fungi. The exposure visit covered the extraction and enumeration of AM spores using the wet sieving and decantation method, enabling to understand the fundamental techniques for isolating spores from soil samples. Multiple advanced methodologies were also demonstrated, including the estimation of infective propagule numbers of AM fungi through the Most Probable Number (MPN) method, the establishment of AM culture from a single spore using the funnel technique, and quantification of mycorrhizal colonization in plant roots to assess the extent of fungal association. Training was also provided for spore staining method for determining spore viability, as well as the pot culture technique for mass multiplication of AM fungi, which is crucial for large-scale application in sustainable agriculture. This comprehensive training programme provided practical exposure and technical expertise essential for the effective utilization of AM fungi in plant health management and soil fertility enhancement.

Training on Microbial Biopesticides at Hyderabad, Telangana

Dr. Mukesh Kumar Khokhar participated in a 10-day intensive hands-on training programme on "Mass Production and Quality Control of Microbial Biopesticides" organized by ICAR–Indian Institute of Oilseeds Research, Hyderabad, Telangana during November 10–19, 2025. The programme provided comprehensive exposure to advanced techniques and protocols involved in the large-scale production of microbial biopesticides, including strain selection, mother culture preparation, fermentation technologies, and formulation development.

Transfer of Technology

Display of IPM technologies by ICAR-NRIIPM, New Delhi

- 6th International Agronomy Congress held at CSIR-National Physical Laboratory, N. Delhi from 24-26 November 2025
- 2nd India Bio Energy & Tech Expo 2025 held at Yashobhoomi, IICC Convention Centre, Dwarka, New Delhi

Signing of Memorandum of Understanding (MoUs)

Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal, U.T. of Puducherry

ICAR-NRIIPM, New Delhi signed a MoU with PAJANCOA & RI, Karaikal, Puducherry on 1st August, 2025. The collaboration aimed at strengthening of research, validation, and promotion of Integrated Pest Management (IPM) practices in the region.

Rani Lakshmi Bai Central Agricultural University (RLBCAU), Jhansi

ICAR-NRIIPM, New Delhi signed a Memorandum of Understanding (MoU) with Rani Lakshmi Bai Central Agricultural University (RLBCAU), Jhansi on 18th August, 2025. The signing of this MoU will facilitate the promotion of students' training and quality postgraduate research, other research and extension activities in cutting-edge areas as both the institution have common research interests and allied activities. While NRIIPM is mandated to develop and disseminate ecologically sustainable IPM strategies through research, validation, and large-scale promotion, RLBCAU as a State Agricultural University is mandated to conduct region-specific research and undertake field-level demonstrations and capacity building for farmers.

Sri Karan Narendra Agriculture University, Jobner, Jaipur, Rajasthan

ICAR-NRIIPM, New Delhi signed a MoU with Sri Karan Narendra Agriculture University, Jobner, Jaipur, Rajasthan on 30 December, 2025. The collaboration aimed strengthening of research, dissemination and impact analysis of integrated pest management packages in mustard cropping system through IPM model village approach



MoU with PAJANCOA & RI, Karaikal, Puducherry



MoU with RLBCAU, Jhansi

Human Resource Development (HRD)

S.No.	Title of Lecture/ Program	Date	Name of the expert	Participants
1	Applications of vesicular arbuscular mycorrhizae (VAM) in plant protection (online)	12/08/2025	Dr. Joseph Bhagyaraj, Chairman, Centre for Natural Biological Resources and Community Development (CNBRCD), Bangaluru	22
2	Applications of genome editing and RNAi in plant protection	19/09/2025	Dr. Asokan R, Principal Scientist, ICAR-IIHR, Bengaluru	18
3	Exposure visit for sponsored training program on "Mass production of Bio-agents"	28/10/2025	Dr. Rajendra Singh, Prof. (Ag. Entomology), SVPUA&T, Meerut and Dr. Rekha Balodi, Scientist (Plant Pathology), ICAR-NRIIPM, New Delhi	20

Glimpses of activities under HRD



Online lecture by Dr. Joseph Bhagyaraj



Exposure visits for officials from SVPUA&T, Meerut, UP

(HRD Team, ICAR-NRIIPM, New Delhi)

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