



राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान
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NEWS LETTER

AROUND THE WORLD



THEME ARTICLE

		
<i>Trogoderma granarium</i> – Khapra Beetle	Khapra Beetle- Larva	<i>Sitophilus oryzae</i> – Rice Weevil
		
<i>Rhyzopertha dominica</i> – Lesser Grain Borer	<i>Tribolium castaneum</i> – Red flour beetle	<i>Stegobium paniceum</i> – Drug Store Beetle
		
<i>Lasioderma serricorne</i> – Cigarette beetle	<i>Caryedon serratus</i> – Peanut Bruchid	<i>Callosobruchus maculatus</i> – Pulse Beetle

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SPECIAL EVENTS





From the Director General's Desk

Storage of food grains is an important component of food security. In India, about 40 million tonnes of food grains are stored as a buffer stock to manage any unforeseen eventuality. Stored grain pests cause both qualitative and quantitative loss in stored grains and at times may render the grains unfit for human consumption. In India, the surplus food grains are stored and maintained by Food Corporation of India, Central Warehousing Corporation, State Warehousing Corporations and Grained Marketing cooperatives. Though, India is surplus in cereal grain production, still it imports food grains every year to meet the domestic requirement. It is estimated that about 12 to 16 million tonnes of food grains are lost every year and insect pest infestation is one of the important factor in postharvest loss of grains. India is emerging as a leading exporter of cereal grains and tops in export of rice, wheat and maize every year. Stored grain pests not only affect the quality of the grain stored for food security but also adversely affect the export trade. Many countries impose stringent phytosanitary regulations to prevent the potential threat posed by Khapra Beetle (*Trogoderma granarium*) and mandate phytosanitary treatment with high dosage of Methyl Bromide fumigation. Many pests of quarantine significance such as *Sitophilus granarius*, *Prostephanus truncates* and many bruchids are not known to occur in India and efforts must be made to prevent their entry through bulk import of pulses into India wherein, the current theme article shows the importance of various techniques involved in detection and monitoring of stored grain pests.

The National Institute of Plant Health Management is organizing capacity building programmes in the area of Stored Grain Pests Detection, Identification and Management for various stake holders specifically Food Corporation of India, Central Warehousing Corporation, State Warehousing Corporation, Phytosanitary Certificate Issuing Authorities and Plant Quarantine Officials. Several programmes of various durations (*i.e.* 5 days and 15 days) are scheduled to promote the awareness and to develop skills on Detection, Identification and Management of Stored Grain Pests to ensure food security and promote safe exports. It is hoped that various functionaries from CWC, FCI, SWC, State Dept. officers, ICAR, Agri. University officials and Quarantine officials & Phytosanitary Certification Authorities take advantage of these programmes to equip themselves with skills and competency.

खाद्यान्नों का भंडारण खाद्य सुरक्षा का एक महत्वपूर्ण घटक है। भारत में, लगभग 4 करोड़ टन खाद्यान्न किसी भी आकस्मिक घटना के प्रबंधन के लिए बफर स्टॉक के रूप में संग्रहीत किया जाता है। भंडारित अनाज के कीट भंडारित अनाज में गुणात्मक और मात्रात्मक दोनों तरह के नुकसान का कारण बनते हैं और कई बार अनाज को मानव उपभोग के लिए अनुपयुक्त बना सकते हैं। भारत में, अधिशेष खाद्यान्न का भंडारण और रखरखाव भारतीय खाद्य निगम, केंद्रीय भंडारण निगम, राज्य भंडारण निगम एवं अनाज विपणन सहकारी समितियों द्वारा किया जाता है। हालांकि, भारत अनाज उत्पादन में अधिशेष है, फिर भी यह घरेलू आवश्यकता को पूरा करने के लिए हर साल खाद्यान्न आयात करता है। यह अनुमान लगाया गया है कि हर साल लगभग 12 से 16 मिलियन टन अनाज नष्ट हो जाता है और फसल के बाद अनाज के नुकसान में कीटों का प्रकोप एक महत्वपूर्ण कारक है। भारत अनाज के एक प्रमुख निर्यातक के रूप में उभर रहा है और हर साल चावल, गेहूं और मक्का के निर्यात में सबसे ऊपर है। भंडारित अनाज के कीट न केवल खाद्य सुरक्षा के लिए भंडारित अनाज की गुणवत्ता को प्रभावित करते हैं, बल्कि निर्यात व्यापार पर भी प्रतिकूल प्रभाव डालते हैं। कई देश खपरा बीटल (ट्रोगोडर्मा ग्रेनेरियम) द्वारा उत्पन्न संभावित खतरे को रोकने के लिए कड़े पादपस्वच्छता (फाइटोसैनिटरी) नियम लागू करते हैं एवं मिथाइल ब्रोमाइड धूमन की उच्च खुराक के साथ पादपस्वच्छता उपचार को अनिवार्य करते हैं। संगरोध महत्व के कई कीट जैसे कि साइटोफिलस ग्रेनेरियस, प्रोस्टेफेनस ट्रंकेटस एवं कई ब्रूकिड भारत में होने के बारे में नहीं जानते हैं एवं भारत में दालों के थोक आयात के माध्यम से उनके प्रवेश को रोकने के प्रयास किए जाने चाहिए, जिसमें वर्तमान विषय लेख भंडारित अनाज पीड़कों का पता लगाने एवं उनकी निगरानी करने में सम्मिलित विभिन्न तकनीकों के महत्व को दर्शाता है।

राष्ट्रीय पादप स्वास्थ्य प्रबंधन संस्थान विभिन्न हितधारकों के लिए विशेष रूप से भारतीय खाद्य निगम, केंद्रीय भंडारण निगम, राज्य भंडारण निगम, फाइटोसैनिटरी प्रमाणपत्र जारी करने वाले अधिकारियों एवं वनस्पति संगरोध अधिकारियों के लिए भंडारित अनाज कीट का पता लगाने, पहचानने एवं प्रबंधन के क्षेत्र में क्षमता निर्माण कार्यक्रम आयोजित कर रहा है। खाद्य सुरक्षा सुनिश्चित करने एवं निर्यात को बढ़ावा देने के लिए भंडारित अनाज पीड़कों की जांच, पहचान एवं प्रबंधन पर जागरूकता को बढ़ावा देने एवं कौशल विकसित करने के लिए विभिन्न अवधियों (अर्थात 5 दिन एवं 15 दिन) के कई कार्यक्रम निर्धारित किए गए हैं। यह आशा की जाती है कि सीडब्ल्यूसी, एफसीआई, एसडब्ल्यूसी, राज्य विभाग के अधिकारी, आईसीएआर, कृषि के विभिन्न पदाधिकारी, विश्वविद्यालय के अधिकारी, संगरोध अधिकारी एवं पादप स्वच्छता प्रमाणन प्राधिकरण इन कार्यक्रमों का लाभ उठाकर खुद को कौशल एवं क्षमता विकसित कर सकते हैं।

(Dr. Sagar Hanuman Singh IPoS)
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ADVANCED DETECTION TECHNIQUES IN MONITORING OF STORED GRAIN INSECTS

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Global food security is an important issue as the world's population is increasing rapidly and will reach over 9.1 billion by the year 2050 (FAO, 2014). About 20–40% post-harvest losses (PHL) occur during field and post-harvest operations, and among these losses 55% losses occur during storage (World Bank, 2011). Insect infestations in grain cause quantity and quality losses and lower crop values. Insects not only consume grain but also contaminate it with their metabolic by-products and body parts.

All types of food commodities like cereals, pulses, spices, oil seeds and other stored food products are prone to insect pest attack during storage. Following are the major pests of cereals, pulses, oil seeds, oil cakes, meals and dry fruits and nuts.

Common Insect Pests of Stored products	
Scientific name	Common name
Cereals	
<i>Trogoderma granarium</i>	Khapra Beetle
<i>Sitophilus oryzae</i>	Rice weevil
<i>Rhyzopertha dominica</i>	Lesser grain borer
<i>Tribolium castaneum</i>	Red flour beetle
<i>Oryzaephilus surinamensis</i>	Saw-toothed grain beetle
<i>Cryptolestes</i> spp.	Rusty grain beetles
<i>Sitotroga cerealella</i>	Angoumois grain moth
<i>Ephestia cautella</i>	Tropical warehouse moth
<i>Corcyra cephalonica</i>	Rice Moth
<i>Plodia interpunctella</i>	Indian Meal Moth
Pulses	
<i>Sitophilus oryzae</i>	Rice weevil
<i>Callosobruchus maculatus</i>	Cowpea beetle
<i>Callosobruchus analis</i>	Cowpea beetle
<i>Callosobruchus chinensis</i>	Adzuki bean weevil
Oil seeds, oil cakes, meals	
<i>Caryedon serratus</i>	Groundnut bruchid
<i>Oryzaephilus surinamensis</i>	Saw-toothed grain beetle
<i>Trogoderma granarium</i>	Khapra Beetle
<i>Corcyra cephalonica</i>	Rice Moth
<i>Plodia interpunctella</i>	Indian Meal Moth
<i>Ephestia cautella</i>	Tropical warehouse moth
Dry fruits and tree nuts	

<i>Oryzaephilus surinamensis</i>	Saw-toothed grain beetle
<i>Lasioderma serricorne</i>	Cigarette beetle
<i>Tribolium spp.</i>	Flour beetle
<i>Trogoderma granarium</i>	Khapra Beetle
<i>Plodia interpunctella</i>	Indian Meal Moth
<i>Ephestia cautella</i>	Tropical warehouse moth
<i>Stegobium paniceum</i>	Drugstore beetle
Spices	
<i>Lasioderma serricorne</i>	Cigarette beetle
<i>Stegobium paniceum</i>	Drugstore beetle
<i>Tribolium spp.</i>	Flour beetle

		
<i>Trogoderma granarium</i> – Khapra Beetle	Khapra Beetle- Larva	<i>Sitophilus oryzae</i> – Rice Weevil
		
<i>Rhyzopertha dominica</i> – Lesser Grain Borer	<i>Tribolium castaneum</i> – Red flour beetle	<i>Stegobium paniceum</i> –Drug Store Beetle
		
<i>Lasioderma serricorne</i> – Cigarette beetle	<i>Caryedon serratus</i> – Peanut Bruchid	<i>Callosobruchus maculatus</i> – Pulse Beetle

The stored grain pests become small in size, average adult size being 3-5 mm and are cryptic and therefore, they go unnoticed when present in low numbers. They are highly prolific in that several generations occur in a year.

Importance of pest detection

Detection of insect infestation in stored products plays an important role to ensure quality and prolonged shelf life of the grains. Inspecting for insect-damaged kernels is labour intensive and many infested kernels may be undetected where an immature insect has not emerged from the kernel. Grain inspectors at milling facilities need to know the quantity of hidden insect infestation so that loads with excessive infestations can be cleaned or diverted for other uses. Detection methods alert about presence of infestation in the storage premises or grain consignment and helps in decision making. Detection methods are useful in locating infestation, for early diagnosis of low level infestations and to ascertain the success of fumigation or other control measures undertaken. Early detection also helps to avoid scheduled or calendar fumigations and spray treatments and thus, reduce pesticide use or contaminants.

Detection methods

Accurate information about insect infestation can only be obtained by thorough and regular inspection and sampling procedures. This is imperative in formulating sound management decisions involving the adoption of any remedial action against these bio-deteriorating agents or the disposal of grain with due cognizance to the condition of both the commodity and the storage facility. Regular inspection will help in maintaining a good storage environment which is favorable to good grain quality by monitoring any significant build-up in pest populations, grain temperature, moisture migration, and grain residues. Exact and reliable detection and monitoring of stored grain insects in grain bulks is an essential part of commercial trading and research for pest management.

Several detection techniques have been developed for the internal and external detection of insects in stored food grains such as detection probe, staining of the kernel, Berlese funnel method, acoustic techniques, uric-acid method, X-ray imaging, nuclear magnetic resonance imaging, thermal imaging and solid-phase micro-extraction method. Some of these techniques are time-consuming, expensive, have potential health hazard, and less efficient. Manual sampling traps and probes are the most common methods used on farms, while manual inspection, sieving, and Berlese funnel method are used in grain storage and handling facilities. Monitoring of stored food grains is used to ascertain the trends in insect's number, insect's development stages or infestation level in a period of time. It also furnishes the insect's activity in respect to environmental conditions and determines the efficacy of insect pest management actions. To reduce these losses and to ensure the safe storage for sustainable agriculture production, there is a need to develop advanced insect infestation detection methods with higher sensitivity.

Conventional methods of insect detection:

Several conventional methods are used in grain storage establishments of which visual inspection, probe sampling, and insect trap method are popular. These methods are simple but time-consuming, labour-intensive and subjective. Some of the popular techniques are discussed in brief in the following sections.

Detection of insect presence

i) Visual Inspection – Normal visual inspection of storage facilities and stored grain is subjective in nature, and therefore any results can only be recorded in a descriptive way. Based on visual inspection, many observations can be made on the grain or stored products to find out whether the sample is infested or not

Symptoms caused by various stored grain pests		
Symptoms	Commodity	Causal agent
Exit Holes	Cereals	<i>Rhyzopertha dominica</i> , <i>Sitophilus</i> spp.
	Paddy	<i>Sitotroga cereallela</i>
	Pulses (whole)	<i>Callosobruchus</i> spp. , Other Bruchids
	Groundnut in Shell	<i>Caryedon serratus</i>
	Whole spices	<i>Stegobium paniceum</i>
	Cassava	<i>Lasioderma serricorne</i>
Eggs on grain surface	Pulses	Bruchid infestation, <i>Callosobruchus</i> spp.
Webbing and silken strands present	Cereals (whole and milled), oilseeds, oilcakes/meals	<i>Corcyra cephalonica</i> , <i>Ephestia cautella</i> , <i>Plodia interpunctella</i>
Pupal cases sticking to shells and gunny bags	Peanut in shell	<i>Caryedon serratus</i>
Exuviae or moulted cuticle /skin casts	Cereals	<i>Trogoderma granarium</i>

ii) Probe sampling and trap method

Probe sampling and sieving are the most widely used methods; however it is laborious and time-consuming. In this method, grains are drawn (0.5–1 kg) by probes from the stored bin. Sieves are used for screening the insects from the grains. Probes are kept in grain storage bins for long periods; an inspector manually removes it and visually inspects them, thus making it a time-consuming and sometimes difficult procedure. Various types of traps have been developed by TNAU, Coimbatore (India) (*Mohan and Rajesh 2016*). These devices are useful in timely detection and monitoring of insect infestation in stored food grains. Wandering of insects towards air is used as a concept to design.

Sampling and Sieving Method – These are the ancient and most popular and widely practiced methods. The aim of drawing random samples of the commodity is to determine the mean value and the variability of the level of infestation or contamination (% discoloured kernels) in any given situation. The method simply involves drawing grain samples 0.5-1.0 kg using trier or spear sampler from the consignment and bag stacks. The accuracy depends on the number of samples drawn and quantity of each sample and insect population density in the grain.

Physical traps – Insects will move around and fly in stored grains or storage premises in response to volatiles emitted by grains/food commodities, pheromones secreted by the adults and they also wander at random due to their innate behaviour of dispersal. This dispersal activity of insects has been exploited to detect and monitor the insects using appropriate devices known as insect traps. Traps help to avoid repeated sampling, which is labour intensive and time consuming. Following traps can be used for the early detection of stored grain pests –

a) Pitfall traps – Pitfall trap consists of a plastic jar with a mesh screen over the top. The traps can be fixed inside the grains lot on the surface layer of bulk storage. Insects such as saw toothed beetle crawling across the grain slip through the mesh into the trap and unable to escape.

b) Probe traps - Probe trap consists of a plastic cylinder perforated with approximately 2.8 mm holes that are angled down into the body of the traps where a funnel directs the captured insects into a collecting tube. The probe trap is

vertically inserted into the body of the traps where a funnel directs the captured insects into a collecting tube.

The probe trap need to be inserted vertically into the grain mass and left for a week or more. Insects in the deep layer of the grains crawl into the holes and fall into the collecting tube. They remain trapped inside, till the trap is pulled out of the grain and inspected. The probetraps are sensitive to Rusty grain beetle, red flour beetle and saw toothed beetle.

c) Multiple funnel trap – Multiple funnel trap consists a series of funnels fitted vertically one above the other without any food bait. It is useful to detecting/trapping beetle and moth pests showing flight activity. Lesser grain borer, red flour beetle and rusty grain beetle in cereal warehouses and moth pests in flour mill can be trapped efficiently.

d) Sticky traps – Adhesive and sticky traps have the surface, treated with sticky substances like petroleum jelly and polybutane gel. Sticky traps can be used for detecting and trapping flying insects including lesser grain borer, Rice moth, Angoumois meal moth, almond moth, Indian meal moth etc. Sticky traps in conjunction of food bait/attractants are highly efficient in locating and monitoring insect infestation in warehouses and other traditional storages.

e) Light traps – Stored grain pests (adults) are attracted by light of wavelength between 280 and 600 nm. Long wavelengths UV light (365 nm) and green light (500-560nm) is particularly attractive. A light trap consist a suitable light source and a container or sticky surface to catch and retain insects.



Different types of Traps for stored Grain Insects

f) Traps using food lures – Insect pests are attracted by volatile, deriving from stored commodities. This behavioural response has been taken advantage of, for detecting and monitoring insect pests, particularly beetles. The food attractant traps are useful and low cost material in detecting and monitoring both larvae and adults and are cheaper as locally available.

The two types of food lures are used in the traps

Broken grains – the broken grains of one or mixed type are used in cloth, jute or plastic bags. These baited bags are distributed around grain stacks and on the floor in warehouses. After a period of 1-2 weeks, the bags can be retrieved and insects trapped need to be counted. The bait bags need replacement once in 2 weeks, as they lose their attractiveness in due course.

Oil & distillates - Cereal (wheat germ oil), sesame oil, vegetable oils and distillates of locust bean deployed as a lures in the traps. Oat and corn oils has ability to attract the adults of *S. oryzae* and rice, soybean, wheat germ and corn oil are attractive to the adults of red flour beetle. Sesame oil and pumpkin seed are found more attractive in case of Khapra beetle larvae. These attractants are only fatty acids, which can be incorporated with pheromone traps and in physical traps for improved detection and monitoring.

Corrugated paper traps – Traps that contain corrugated cardboard are particularly effective at attracting wandering moth larvae. Corrugated paper acts as a refuge or hiding site for many of the crawling beetle pests and for the late larvae of *Ephestia* spp. which are about to pupate. The refuge seeking behaviour has been exploited in refuge traps. The trap efficiency gets boosted, when grain oils and /or pheromones were used as lures in these traps.



Corrugated paper traps

g) Pheromone traps - Pheromones are chemical substances secreted by insects as a part of their communication process. Mainly two types of pheromones are known to secrete by the insects

- i) Sex pheromones
- ii) Aggregation pheromones

All the moth pests and some of the beetles such as *Stegobium paniceum* and *Trogoderma* spp. release sex pheromones. However, most of the beetle pests, the males release aggregation pheromones, which attracts both males and females of the same species.

Commercial traps baited with pheromones include (Z, E)-7, 11-hexadecadien-1-ol acetate (or HAD) for *Sitotroga cerealella*, (Z, E) - 9, 12-tetradecadien-1-ol-acetate (or TDA) for the pyralids like *Ephestia* spp. and *Plodia interpunctella*, dominicalure for *Rhyzopertha dominica*, 1, 8 dimethyldecanal for *Tribolium* spp., serricornin for *Lasioderma serricornis* and stegobinone for *Stegobium paniceum*. The traps are used at an optimum height of 2-3 meters for every 14 metre for monitoring moth pests. The required trap density varies according to the pests to be detected and monitored.

Detection of insect density

a) Berlese funnel method: Grain samples are put in the funnel below the incandescent light for 8 h and a jar containing alcohol/water is used for capturing the insects. Funnels are equipped with screen bottom small enough to retain the grains and large enough to allow passage of the insects through it. It uses dry heat to remove the insects from the grains. Dry heat warms the grains and compels the insects to move opposite to heat in a funnel (*Neethirajan et al., 2007*).

b) Uric Acid Analysis method - Measurement of the uric acid contents in infested grains will give an indication of the past insect infestations which may have been concealed during processing. The method is only useful when population densities were high, in which case they were visibly obvious anyway. The quantity of uric acid excreted by insects

varies between species and life stages. Uric acid can be determined by colorimetric, fluometric, GLC, TLC, HPLC and enzymatic methods.

c) Insect Fragment count: In this method, insect fragments such as insect heads, cast skins and head capsules arising from live and dead insects are isolated from processed foods directly and from whole grains after grading /sorting and then counted. It is an accepted method in India (BIS, 1971). Whole grains are ground to a particle size of 1.5 mm so as to expose the internal infesters. After digesting the grain materials, the insect parts or fragments are trapped in a system consisting of an oil phase (mineral oil) and an aqueous phase (water). The oil globules extract and concentrate the light insect fragments. The trapped insect fragments in the oil phase are then removed by filtration and collected on a filter paper for microscopic examination.

Hidden Infestation Detection techniques (Chemical methods)

a) Staining techniques:

Egg-plug staining – Weevils (*Sitophilus* spp.) attacking cereals will deposit their eggs inside the grain and plug the holes by their mucilaginous saliva. The egg-plugs can be identified after staining the grains with suitable chemicals. The egg-plugs are stained cherry red by a 0.5% acid fuchsin solution or purple colour by 1% gentian violet solution. Soaking grains for a minute in 20 ppm aqueous solution of berberin sulphate, selectively stains eggs. The stained grains fluoresces greenish yellow, when observed under UV light of 366 nm wavelength. The intensity of infestation can be estimated by the number of egg-plugs observed.

b) Ninhydrin method –It is very useful method for the detection of hidden infestation. When the insect body fluid (haemolymph) comes in contact with a paper impregnated with ninhydrin (triketohydrindene hydrate), an orange dye, purple colour spots appear due to the reaction of free amino and keto acids in haemolymph with the dye. The indicator paper is impregnated with 0.3% ninhydrin in acetone. The grain sample is allowed to be crushed on the paper to facilitate contact of insect haemolymph with the dye in the paper. Following the reaction, the purple colour spots develop in less than one hour at 20-25⁰C.

c) Specific gravity method

In hidden infestation, the larva inside the grain feeds on the endosperm and creates a cavity and thus reduces the density of the grain. When a mixture of un-infested and infested grains is immersed in a salt solution of appropriate density for about 10 minute the un-infested grains sink to the bottom, while the infested grains float. The specific gravity method is suitable for the detection of internal infestation in whole grains. It is quick and requires very simple laboratory facilities but does not indicate the species or the specific life stage present inside the grains. Grains infested with egg and early larval stages do not float and therefore, cannot be detected. Hence, it underestimates the actual infestation level. This method is reported to be not suitable for hulled seeds such as barley, oats and rice and for large seeded grains like corn.

d) Cracking floatation method: Grains collected has to be coarsely grounded and immersed in a beaker with mineral oil and boiling water. The grains infested and containing immatures/adults will float on the solution.

e) Gelatinization method: Grains collected randomly has be boiled for 10 min in NaOH solution which turn the grains into translucent in which easily we can detect the presence of insects.

Modern methods of insect detection

The approach of modern methods in stored food grains may offer an easy, rapid solution to detect both internal and

external infestation even of low density, through less destruction of materials, so that decisive action can be taken as early as possible. Some of the technologies use sensors, cameras, microscope, radiation sources, volatiles, sound etc. as measures for insect detection. These methods need comparatively less labour than the conventional methods; however, the labor should be skilled enough to control the sophisticated equipment as per the protocols. These technologies can be grouped based on the properties employed for detection of insects viz., electrical conductivity, olfactory, response to electromagnetic-spectrum and acoustic signals. Details of the attempts made under these different categories are given in following sections.

i) Electronic nose (E-nose)

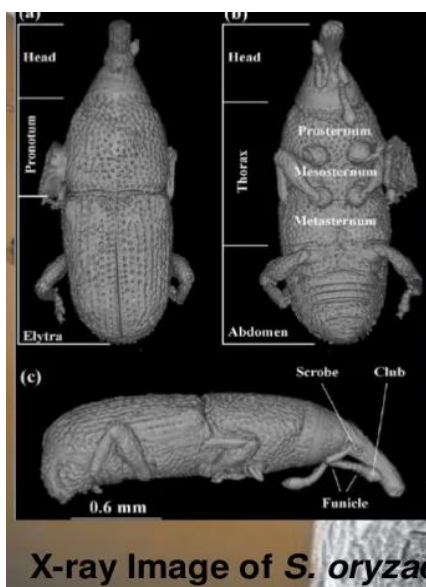
The intervention of divergent electronic nose (E-nose) sensor types and instruments, works on the principle of electronic aroma detection (EAD) (Wilson, 2012). E-nose consists of three parts: an odour sensor(s) set, a data pre-processor, and a data interpretation system. Sensor set detects the volatile compounds present in the headspace of stored food grains and reacts by changing the electrical properties. It is embedded with a predefined database to differentiate certain volatiles - e-nose used to discriminate between infested and non-infested samples.

Eg: Sample infested with Red flour beetles can be easily detected as the insects releases some quinone like substances into the commodity stored.



ii) X-ray technique (X-ray radiography)

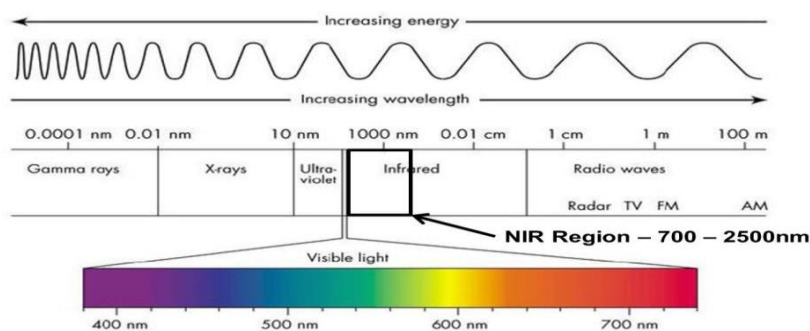
Soft X- ray is the only non-destructive direct method that can detect insect infestation in grain kernels. Hidden Infestation caused by Bruchids and riceweevil is significantly detected. Both living and dead insects can be detected by this method. However, the X-ray technique is not sensitive for egg and early larval instars. In this technique an expensive machine to generate the X-rays, films for exposure/automatic computer enabled software system and an expert to interpret the radiographs are the key requirement. The exposure and voltage vary according to commodity and the degree of penetration and contrast required. Grains having higher moisture need a higher voltage for the penetration of X-rays.



X-ray image of Rice weevil, *Sitophilus oryzae*

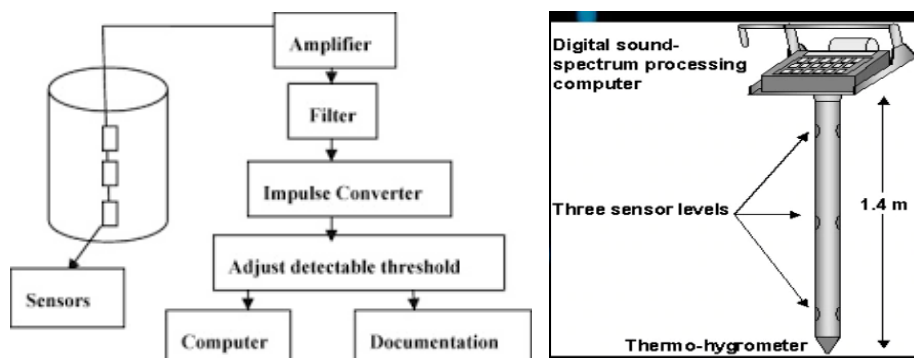
iii) NIR spectroscopy Method

It has evolved as a fast, reliable, accurate and economical technique available for compositional analysis of grains. This technique can be used for both qualitative and quantitative analysis. The NIR is based on the absorption of electromagnetic wavelengths in the range 700–2500 nm. The concentrations of constituents such as water, protein, fat, and carbohydrate can be determined using classical absorption spectroscopy. NIRS can differentiate insect species based on their absorbance characteristics because the cuticle of each insect species may have a unique chemical composition. This unique chemical composition causes molecules to vibrate at unique frequencies and absorb NIR energy corresponding to these frequencies and overtones of these fundamental frequencies.



iv) ELISA test – Enzyme linked immunosorbant assay (ELISA) is also one of the detection method which can be used to detect insect pest contamination in grains. This is a simple but highly sensitive method of detecting minute quantities of specific insect protein in grain and milled grain. Myosin a muscle protein is present in all life stages, except eggs of insects. The muscle protein myosin is easily extractable from infested grains. Myosin is not found in food grains and processed food. In this method, the mass of insect material (myosin content) present is correlated to the number of insects in the infested grains.

v) **Acoustic detection method** - Insects produce mechanical vibrations during their movement in stored grains. They also produce sound during feeding inside the grain (larvae) and outside the grains (adults and larvae). Insects developing inside food grains are also known to emit ultrasonic signals. These mechanical vibration, feeding noises and ultrasonic signals can be detected by using appropriate sensors (FleuratLessard et al, 2006).



vi) **Analysis of CO₂ production** – Insect produces CO₂ during the respiration. The amount of CO₂ produced in grains due to respiration of insects in 24 h has been considered to detect the presence of internal infestation in grains. The expected CO₂ level in un-infested dry grain of <14% moisture content is less than 0.25%. In a 24 h incubation period at 35⁰C, if the intergranular air contains beyond 0.3% CO₂, it indicates that the grain is infested. The CO₂ concentration is determined by instrumental methods using a gas chromatograph with TCD detector, interference refracto-meter or infra-red gas analyser. Demerit of this method is that, it is time consuming, less sensitive at low level infestation and is not applicable for grains with moisture content exceeding 14%. At higher moisture levels, grain alone evolves more CO₂. If the grain is infested only with eggs or early larval stages, detection is not possible because of their low respiratory activity.

vii) **Olfactory based methods:**

Solid Phase Micro-Extraction (SPME)

Odour detection techniques for insect infestation and grain quality evaluation are gaining popularity. In addition, this method facilitates early detection of infestation, storage age determination, varietal discrimination of foodgrains etc. SPME used the headspace techniques to isolate volatile compounds vaporized from samples, which was then condensed and finally evaluated by gas chromatography-mass spectrometry (GCMS) for quantification of volatiles. The efficiency and sensitivity of SPME method depend on extraction time and temperature. High temperature and long extraction time favor in the collection of more analytes (Laopongsit, Srzednicki, & Craske, 2014) detected the *T. castaneum* and *C. ferrugineus*. The distinct volatile compounds from infested wheat flour and wheat grain with the *T. confusum* and *S. granaries*, respectively by SPME clenched with gas chromatography-mass spectrometry. Larval and adult insects secreted distinct volatiles and these distinct volatiles were useful for early monitoring of infestation.

viii) **Electrically conductive roller mill method:** In this method principle of electrical conductance and compression force is used for infestation in stored foodgrains. In single kernel characterization system of two resistors and voltage-divider circuit, one kernel acts as a resistor. The conductance of kernels is inspected through the voltage during the crushing of kernels between the rolls. Presence of insects inside the kernel increases the kernel moisture content, which provides an easy discrimination of sound kernels from the infested kernel. This method is not suitable for detecting the insect eggs, immature larvae and dead insects in low moisture grains (Pearson and Brabec, 2007).

Conclusion

Increase in population has increased the demand for food grains and thus increasing the need for proper monitoring and good storage facilities. Though newer techniques for insect infestation have been continuously emerging, the feasibility of their application in industrial-scale is yet to be defined. Although probes and traps are the most commonly adopted technique worldwide, the availability of information on the species and stages of insects and their inability to detect hidden insects as well as application in inaccessible areas stand as major drawbacks in industrial scale. Techniques like soft x-rays, NIR, machine vision and ultrasonication aids in automation and saves time. But, they also have drawbacks like cost, other disturbances reducing the accuracy, possibility to detect only live or external infestation and so on. Molecular techniques have shown to have potential application in detection of insect infestation. Depending on the type of grain, type of pests, duration of storage, end use and other factors like feasibility, cost and the storage environment, appropriate detection technique can be adopted. Proper storage, maintenance and monitoring protocols ensure the quality of the grain and thus the security of the nation

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Around the World

Top Countries in Agriculture Production and Exports

Agriculture is one of the largest and most significant industries in the world, so every country is taking measures to increase export skills and phytosanitary measures levels which are the key for the security and health of a country's population. Food drives the world; apart from clean water, access to adequate food is the primary concern for most people on earth. With that in mind, the information was collected on which countries produce the most agricultural products, which countries export the most, and Countries around the world doing to increase their production levels are indicated below.

- Of the major cereal and vegetable crops, the United States, China, India, and Russia are the top producers.
- The United States is the top exporter of agricultural products with \$118.3 billion in exports as of 2019.
- To increase agricultural productivity, developed countries are turning to genetically modified seeds to increase yields.
- On the other hand, in countries where infrastructure is extremely under-developed, the focus of the government is to develop the infrastructure and encourage the use of fertilizers.

Of the major cereal and vegetable crops, the United States, China, India, and Russia frequently appear as top producers. There are other important crops, however. Millet is a major crop in much of Africa and Asia, and India and Nigeria are the leading producers. Likewise, barley, rye, and beans/pulses are not that important within the United States but are crucial crops in countries like Russia, Germany, and India.

Top Exporters

1. Indonesia

Indonesia is one of the leading agricultural exports by country 2022. It is the largest producer and exporter of palm oil. It produces about 46 million metric tons of palm oil and exports oil worth \$17 billion every financial year. The country can export such large quantities of palm oil because more than 90% of the world's palm oil trees are found in Indonesia and Malaysia.

2. United States

The United States is arguably a superpower in every sector, including the agricultural export industry. The country is a top exporter of soybeans. That's because the United States is the leading producer of soybeans globally. The nation is expected to ship about 2.15 billion bushels of soybeans outside its borders in 2022.

3. China

China is the largest producer and exporter of garlic. Garlic production in the Asian country contributes to more than 80% of global production. China produces more than 23 million tons of garlic every year. It mainly exports garlic to the United Arab Emirates, the United States, Vietnam, and Indonesia.

4. India

India is the largest rice exporter globally and has maintained the lead for more than five years now. India's agricultural exports rose by about 20% to \$50.21 billion during 2021-22 despite logistical challenges posed by the COVID-19 pandemic. Wheat exports jumped to \$2.2 billion in 2021-22 against \$567 million in the previous fiscal. Exports of rice were the top earner at \$9.65 billion among agri commodities during 2021-22, growing by 9.35% from the previous year; India exports its non-basmati rice to African and Asian countries. In contrast, its premium basmati rice is exported to the United States, the Middle East, and other nations in Europe and Australia.

5. Philippines

The Philippines is one of the largest exporters of bananas globally. Extensive banana production started in the Philippines in the late 20th century when the government permitted land sales to foreign investors who created enormous banana plantations. The nation produces millions of tons of bananas, which amount to more than \$1.5 billion every year.

6. Nigeria

Situated in western Africa, Nigeria is the top exporter of cocoa beans. The country produces about 270,000 thousand tons of cocoa beans every year. The main importers of Nigeria's cocoa beans are the Netherlands, Indonesia, and Belgium.

7. Iran

Iran is one of the biggest exporters of watermelon. By March 2022, Iran had already exported more than half a million metric tons of watermelon. Iran's large watermelon production is due to its warm weather, which is favorable for planting and harvesting the fruit. The leading importers of the Iranian watermelons are Armenia, Qatar, Kuwait, Iraq, and Oman.

8. Russia

When it comes to wheat, Russia is the largest exporter. The nation exports about 18% of all wheat in the international market. Wheat production in Russia peaked after the fall of the USSR. The new government promoted individual farming and allowed people to start large-scale wheat production.

9. Brazil

Brazil is known for its vast production of sugarcane. It is the largest exporter of sugarcane to the international market. It supplies more than 60% of the world's sugarcane every year. Large sugarcane production in the Latin country is promoted by mechanization, availability of many varieties, and government support through the issuance of incentives and farm products.

Almost every country wants to increase its agricultural productivity, but how they intend to go about that varies greatly with the country or region in question. In countries like the U.S., Canada, and Western Europe, there is very little land allowed to go to waste, and infrastructure like roads are well-developed. Likewise, irrigation is widespread, and farmers use fertilizer extensively. This has led many countries and farmers to turn to genetically modified seeds to increase yields and reduce the need for costly (and potentially polluting) fertilizer and herbicides. The picture is much different in Africa and much of South Asia. In these areas, infrastructure is extremely under-developed and simply getting crops to market (or inputs like fertilizer to the farms) can be a struggle. Likewise, irrigation infrastructure is lacking, leaving farmers much more exposed to the variability of weather. Not surprisingly, then, a large focus of governments in these countries is to try to build roads, improve access to water and encourage the use of inputs, like fertilizer.



Training Programs

Plant BioSecurity Division

The Plant Biosecurity Division has organized following training programmes during the months of **July-September, 2022**.

Capacity Building Programmes:

S. No.	Name of The Programme	Duration	Date	
			From	To
Plant Biosecurity Division (PBD)				
1.	Introduction to Plant Biosecurity and Plant Quarantine	5 Days	04.07.2022	08.07.2022
2.	Forced Hot Air Treatment	5 Days	18.07.2022	22.07.2022
3.	Pest Surveillance	5 Days	22.08.2022	26.08.2022
4.	Fumigation as a Phytosanitary Treatment (Methyl Bromide and Aluminium Phosphide)	15 Days	22.08.2022	05.09.2022
5.	Warehouse Management and Scientific Storage for Incharge/ manager/ Supervisors/ representatives of Warehouseman of The PACS	5 Days	22.08.2022	26.08.2022
6.	Training on Export and Import Guide	1 Days	14.09.2022	14.09.2022
7.	Awareness programme on Pest Free Area	3 Days	12.09.2022	13.09.2022
8.	Stored Grain Pest Management for Food Corporation of India (FCI) QC officials	5 Days	12.09.2022	16.09.2022
9.	Quarantine Pathogens: Seed Health Testing and Molecular Diagnostic Techniques.	5Day	19.09.2022	23.09.2022
10.	Warehouse management and scientific storage for the in-charges /Managers/ Supervisors/PACS representatives	5Day	26.09.2022	30.09.2022
Special programmes (Off Campus- APEDA Sponsored)				
11.	Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Manipur	1Day	12.09.2022	12.09.2022
12.	Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Nagaland	1Day	14.09.2022	14.09.2022

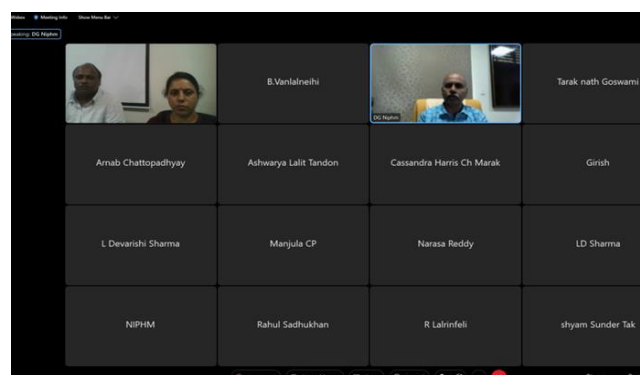
13.	Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Mizoram	1Day	16.09.2022	16.09.2022
14.	Awareness programme on Post Entry Quarantine for the officers of Horticulture Department of Himachal Pradesh	1Day	30.09.2022	30.09.2022
PBD Farmers Programme				
1.	Awareness training on WDRA and eNWR	1 Day	08.07.2022	08.07.2022
2.	Awareness training on WDRA and eNWR	1 Day	22.07.2022	22.07.2022
Vertebrate Pest Management (VPM)				
1.	Non-Insect Pest Management – Mites, crabs, snails, slugs and avian	3 Days	05.07.2022	07.07.2022
2.	Eco-friendly approaches for management of vertebrate pests in agriculture and horticultural ecosystem	5Days	18.07.2022	22.07.2022
3.	Certificate Course on Urban Integrated Pest Management	15 Days	03.08.2022	17.08.2022
4.	Rodent Pest Management	3 Days	22.06.2022	26.06.2022
VPM Farmers Programme				
1.	Vertebrate Pest Management	1 Day	06.07. 2022	06.07. 2022
2.	Rodent Pest Management	1 Day	08.07.2022	08.07.2022
3.	Vertebrate Pest Management	1 Day	17.08.2022	17.08.2022
4.	Vertebrate Pest Management	1 Day	18.08.2022	18.08.2022
5.	Vertebrate Pest Management	1 Day	19.08.2022	19.08.2022
6.	Farmers training on Wild Boar Management at Sillod Maharashtra	1 Day	22.09.2022	22.09.2022
7.	Farmers training on Wild Boar Management at Sillod Maharashtra	1 Day	23.09.2022	23.09.2022

A. DETAILS OF TRAINING PROGRAMMES (Govt. Officials & Private sector)

PLANT BIOSECURITY DIVISION

1. Introduction to Plant Biosecurity and Plant Quarantine: Plant Biosecurity has gained importance in recent years due to the increase pest incursions across the globe. The liberalization of world trade and increase in volume of agriculture trade in the international level has increased the risk and entry and establishment of exotic plant pests into the country. There is a dire need to promote safe trade at the same time safeguarding the nation’s rich biodiversity. The International trade in agriculture commodities is subjected to various phytosanitary regulations and measures. Awareness of stakeholders on plant biosecurity and plant quarantine is vital to safeguard Plant Biosecurity and to facilitate safe export of agricultural commodities.

To create awareness and build expertise among stakeholders, NIPHM has organized an exclusive online programme from 04th to 08th July, 2022 (5 Days) and was attended by 24 participants from different departments and states.



2. Forced Hot Air Treatment-Payment programme: NIPHM is the only Institute in India to offer a specialized training programme on Forced Hot Air Treatment (FHAT) for industry stakeholders. In this regard, a program of 5- Days was conducted from 18th-22nd July, 2022 at NIPHM, Hyderabad. The participants learnt the critical requirements for establishing FHAT facilities, calibration of sensors, placement of sensors, identification of coolest point, safety precautions, conducting the treatments, use of appropriate mark, audit protocols and record keeping in accordance with ISPM – 15 and NSPM – 9. The programme was attended by 47 participants from different states across the country.



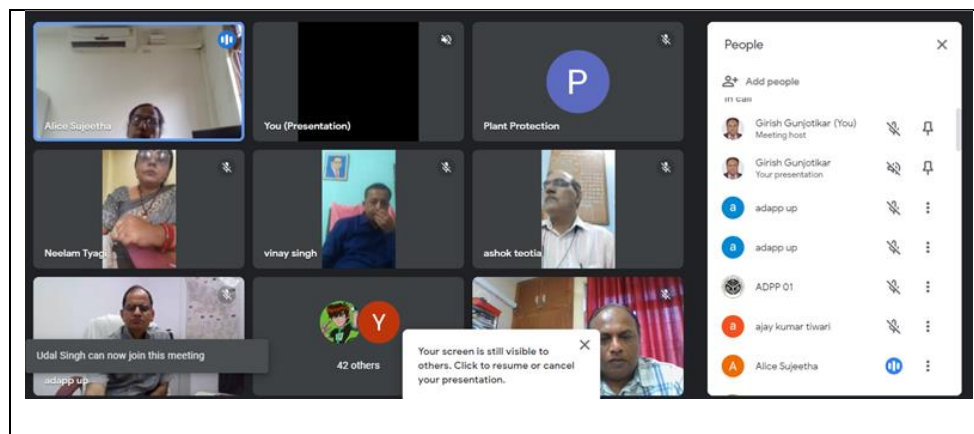
- 3. Pest Surveillance:** Pest Surveillance plays a substantial role in promoting plant health which has become a trade policy issue. Pest surveillance provides insights into the health status of a country's agriculture and strengthens the stakeholder's preparedness for preventive actions both in addressing the problems due to domestic pests of serious concern as well as in protection of native agricultural biodiversity from the incursion threats of exotic pests. Online/virtual training programme from 22nd – 26th August, 2022 has been organized in order to create awareness among stakeholders –Extension officers, Scientists from KVK, Universities etc. regarding surveillance which plays vital role in pest eradication and containment programmes. The programmes were attended by 24 officers.
- 4. Fumigation as a Phytosanitary Treatment (Methyl Bromide and Aluminium Phosphide):** One programme of 15 days was conducted from 22th August -05th September,2022 on payment basis and a total 22 participants were attended the programme. The participants got familiarized with physical and chemical properties of Phosphine and Methyl bromide, safety precautions to be followed while handling fumigants, mode of action of fumigants, principles of fumigation, monitoring the fumigant concentration, appropriate use and maintenance of fumigants and safety equipments. The participants were made to understand the guidelines laid in NSPM-11, 12 (MBr fumigation) and NSPM-22 (Phosphine fumigation) to conduct appropriate fumigation procedures as well as the accreditation procedure of fumigation operators prescribed by the DPPQ&S. The trainees gained hands-on practical experience in creating gas-tight enclosure, laying gas supply and monitoring lines, use of vaporizer, fan, leak detector and gas concentration monitor.



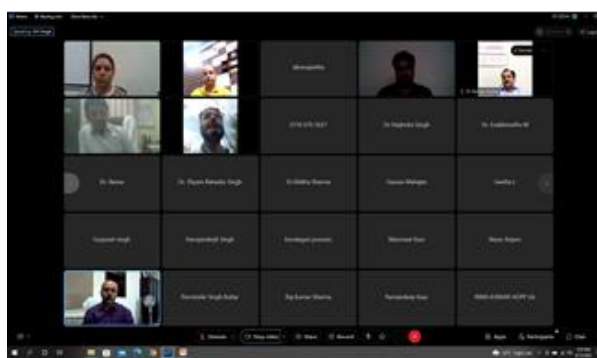
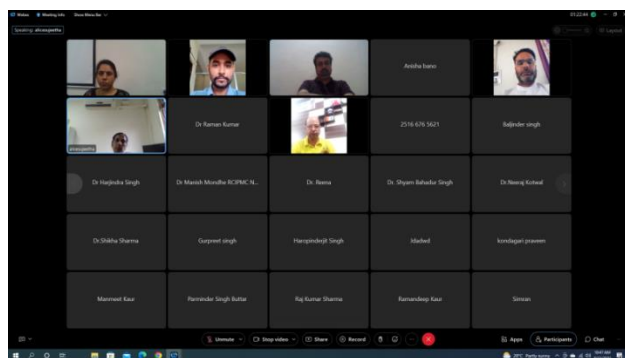
- 5. Warehouse Management and Scientific Storage for In-charge/ Manager/ Supervisors/ representatives of Warehouseman of The PACS:** The Programme was organized with an objective to create awareness and to train the officials involved in storage of food grains at warehouse level to understand the activities of WDRA and to improve the technical efficiency in maintenance of the grain storage and other technical quality control aspects at storage godowns with respect to Prophylactic and Curative treatments (Fumigation with ALP). Total 25 participants were attended the programme at NIPHM.



- 6. Training on Export and Import Guide:** One day online programme for Plant Protection Officers of Uttar Pradesh was conducted on 14.09.2022 with the main objective to explain the procedure of export of horticulture commodities from Uttar Pradesh. The program was attended by 56 PPOs and Additional Director and DD UP also attended training.



- 7. Awareness programme on Pest Free Area:** The Pest Free Area (PFA) is an element in the justification of phytosanitary measures taken by an importing country to protect an endangered area. The establishment and use of a PFA by a National Plant Protection Organization (NPPO) provides for the export of plants, plant products and other regulated articles from the country in which the area is situated (exporting country) to another country (importing country) without the need for application of additional phytosanitary measures when certain requirements are met. Thus, the pest free status of an area may be used as the basis for the phytosanitary certification of plants, plant products and other regulated articles with respect to the stated pest(s). Various aspects pertaining to Pest Free Area, Area of low pest prevalence, pest free production site etc. were discussed and explained during two days from 12th-13th September, 2022. Total 46 officers have attended the programme.



- 8. Stored Grain Pest Management for Food Corporation of India (FCI) QC officials:** Five days Training on Stored Grain Pest Management for Food Corporation of India (FCI), Quality Control officials was conducted during 12th - 16th September, 2022. Total 26 Participants were attended the programme from different states of the country.



9. Quarantine Pathogens: Seed Health Testing and Molecular Diagnostic Techniques: Eleven participants from government and private seed industry attended the training at NIPHM. The International organizations involved in seed movement, the plant quarantine system in India, plant quarantine procedures involved in export and import of seeds, seed health testing methods, detection methods used for the detection of fungi, bacteria and viruses of quarantine significance, molecular diagnostic techniques and advanced methods used for the detection of pathogens were covered.



10. Warehouse management and scientific storage for the in-charges /Managers/ Supervisors/PACS representatives: The Programme was organized from 26th-30th September, 2022 with an objective to create awareness and to train the officials involved in storage of food grains at warehouse level to understand the activities of WDRA and to improve the technical efficiency in maintenance of the grain storage and other technical quality control aspects at storage godowns with respect to Prophylactic and Curative treatments (Fumigation with ALP). Total 16 members (Maharashtra State Warehousing Corporation) are attending the programme.



SPECIAL PROGRAMMES (OFF CAMPUS)

Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Manipur, Nagaland and Mizoram: National Institute of Plant Health Management, Hyderabad, Telangana in collaboration with APEDA, New Delhi organised an one day training program at Krishi Vigyan Kendra, West Imphal, Manipur and Krishi Vigyan Kendra, Dimapur, Nagaland and KVK Lengpui, Mizoram on 12.09.2022, 14.09.2022 and 16.09.2022. Total 44, 45 and 46 participants were attended the programme in Manipur, Nagaland and Mizoram respectively.

11. Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Manipur



12. Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Nagaland



13. Export promotion of Agriculture and Horticulture Commodities in the North Eastern States for Mizoram



14. Awareness programme on Post Entry Quarantine for the officers of Horticulture Department of Himachal Pradesh: National Institute of Plant Health Management, Hyderabad, Telangana in collaboration with Directorate of Horticulture, Himachal Pradesh has organised an one day Awareness program on “Post Entry Quarantine” at Dr. Yaswant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh on 30.09.2022. A total of 44 officers from horticulture department were attended the program at YSP UHF Solan.HP

NIPHM Deputed faculty explained about the Plant quarantine system and import regulations of India (w.r.t. propagative material), Post Entry Quarantine Facility: types and operational requirements, Design and operation of post-entry quarantine & SOP for Inspection and PEQ requirements for import of propagative materials w.r.t. Himachal Pradesh.



Dr. RK Pruthi, IAS (Director, Horticulture) during inaugural address



बागवानी को दिए जाएं रोग मुक्त और स्वस्थ पौधे : पुथी

शिमला। बागवानी विभाग की ओर से शुक्रवार को नीणी विश्वविद्यालय में पोस्ट एंटी क्वारंटीन ऑफ फ्रूट प्लांट्स विषय पर एक दिवसीय कार्यशाला करवाई गई। कार्यशाला में बागवानी विभाग और नीणी विश्वविद्यालय के वैज्ञानिकों और अधिकारियों ने भाग लिया। इस मौके पर बागवानी विभाग के निदेशक डॉ. आरके पुथी बागवानी विभाग ने पोस्ट एंटी क्वारंटीन ऑफ फ्रूट प्लांट्स विषय पर करवाई कार्यशाला में मुख्य अतिथि मौजूद रहे। डॉ. पुथी ने कहा कि यह तय किया जाए कि बागवानी को विदेशों से आयातित रोग मुक्त और स्वस्थ पौधे दिए जाएं। बागवानी विभाग के संयुक्त निदेशक डॉ. डीआर शर्मा ने बताया कि कार्यशाला के दौरान नेशनल इंस्टीट्यूट ऑफ प्लांट हेल्थ मैनेजमेंट हैदराबाद के डॉ. एजी गिरीश और डॉ. ज्योति भारद्वाज ने महत्वपूर्ण जानकारी दी। कार्यशाला में डॉ. एचआर गीतम, डॉ. अनिल सूद, डॉ. इंद्र देव, महाप्रबंधक डॉ. सुभाष सहित मौजूद रहे। ब्यूरो

PBD (FARMERS PROGRAMMES)

1. Awareness training on WDRA and eNWR 08.07.2022
2. Awareness training on WDRA and eNWR on 22.07.2022

NIPHM is the premier Institute in India to offer specialized capacity building programs in the field of Plant Protection including warehousing and storage. WDRA is Warehousing Development and Regulatory Authority, a statutory authority under Dept. of Food and Public Distribution. With the objective to train the farmers, traders and millers, one day training programmes were organized for the farmers of Gaddipally, Suryapet District of

Telangana State on 08.07.2022 (attended by 50 farmers) and Central Warehouse, Suryapet District of Telangana State on 22.07.2022 (attended by 50 farmers). The farmers visited the WDR registered CWC warehouse at the training premise and explained about different aspects of public warehousing and benefits of NWR. WDR and NWR video in Telugu language was presented to the trainees



ధాన్యం నిల్వలపై అవగాహన కలిగి ఉండాలి

గిరిపర్తి జిల్లా కి దాన్యం నిల్వ చేయడంలో ప్రైవేటు క్యాన్సెల్లు తీసుకుంటే అవకాశం కలిగి ఉంటుంది. దాన్యం నిల్వ చేయడంలో ప్రైవేటు క్యాన్సెల్లు తీసుకుంటే అవకాశం కలిగి ఉంటుంది. దాన్యం నిల్వ చేయడంలో ప్రైవేటు క్యాన్సెల్లు తీసుకుంటే అవకాశం కలిగి ఉంటుంది.

పల్నాడు జిల్లా కి దాన్యం నిల్వ చేయడంలో ప్రైవేటు క్యాన్సెల్లు తీసుకుంటే అవకాశం కలిగి ఉంటుంది. దాన్యం నిల్వ చేయడంలో ప్రైవేటు క్యాన్సెల్లు తీసుకుంటే అవకాశం కలిగి ఉంటుంది.

శనివారం 09 జూలై 2022

గోదాముళ్లలో ధాన్యం నిల్వ యాజమాన్యంపై ప్రేక్షకులకు డిలీటర్లకు అవగాహన కార్యక్రమం

గోదాముళ్లలో ధాన్యం నిల్వ యాజమాన్యంపై ప్రేక్షకులకు డిలీటర్లకు అవగాహన కార్యక్రమం. గోదాముళ్లలో ధాన్యం నిల్వ యాజమాన్యంపై ప్రేక్షకులకు డిలీటర్లకు అవగాహన కార్యక్రమం.

VERTEBRATE PEST MANAGEMENT DIVISION

1. Non-Insect Pest Management – Mites, crabs, snails, slugs and avian: Online programme was organized from 5th to 7th July 2022. Total 35 participants were attended the training from various states (AP, Telangana, Maharashtra, Delhi, HP and Tamil Nadu). The topics covered are Biology and ethology of mites, carb, snail and slugs and birds their management practices.



- 2. Eco-friendly approaches for management of vertebrate pests in agriculture and horticultural ecosystem:** Training of five days duration was organised from 18.07.2022 to 22.07.2022. Total 39 Scientist and agricultural extension officers from various states attended the training. Various topics on Biology of wild boar, Nilgai, monkey, birds and its management techniques, Indian Wild Life Protection Act 1972 covered to the participants.
- 3. Certificate Course on Urban Integrated Pest Management- Payment Programme:** This Certificate course was organized for the structural pest management professionals from 03.08.2022 to 17.08.2022. Total 22 participants were attended the course from various states. The topics covered are Ecology and ethology of rodents, mosquitos, termites, cockroaches, bedbug and flies etc. and their management practices. In addition to that topic such as safe and judicious use of pesticides, Care, handling and maintenance of pesticide application equipment, Food safety & standards in food processing industries and urban weed management etc. were also covered to give the in-depth sight of the pest management.



- 4. Rodent Pest Management:** Training to Agricultural Extension officers and scientists of SAUs, ICAR was organized from 22.08-2022 to 26.08.2022 through virtual mode. Total 24 officers from AOs/ ADAs/ Scientists from SAUs were trained on various aspects such as major rodents pests in agricultural and horticultural ecosystem, biology and morphology of rodents, breeding profile of rodents, rodent borne diseases, non-chemical and chemical management of rodent pest etc.

VPM- FARMERS PROGRAMME

- 1. Farmers Programme on Rodent Pest Management** was organized on 08.07.2022 at KVK, Gaddipally and attended by 50 farmers
- 2. Farmers Programme on Rodent Pest Management** was organized on 22.07.2022 at Suryapet, Telangana and attended by 50 farmers.
- 3. Farmers programme on Vertebrate Pest Management at Marayur, Kulachavayal (Idduki District, Kerala) and T. Meenachipuram, Thevaram (Theni District, Tamil Nadu):** Three farmer programmes on Vertebrate Pest Management in association with Magasool Trust- NGO of Tamil Nadu in Kerala and Tamil Nadu were organized during the month. Total 91 (35+25+31) progressive farmers from different villages were trained in these programmes. The programmes covered the following skill development exercises: Biology and Management of wild boar, Biology and Management of Peafowl, Integrated management on rodent pest management and other vertebrate pest management (Nilgai and Elephant).
- 4. Farmers programme on Vertebrate Pest Management at Marayur (Idduki District, Kerala)**



- 5. Farmers programme on Vertebrate Pest Management at Kulachavayal (Idduki District, Kerala)**



- 6. Farmers programme on Vertebrate Pest Management at T. Meenachipuram, Thevaram (Theni District, Tamil Nadu)**



7. **Farmers training on Wild Boar Management at Sillod Maharashtra on 22.09.2022-** Total No. of participants were 67 for the programme
8. **Farmers training on Wild Boar Management at Sillod Maharashtra on 23.09.2022-** Total No. of participants were 118 for the said programme.

Forthcoming Programmes of PBD & VPM (October-December, 2022)

Division	Name of the programme	No. of Days	From	To
PBD	Irradiation as a Phytosanitary Treatment	03 Days	17.10.2022	19.10.2022
	Invasive alien species: Introduced and Emerging Pests	03 Days	09.11.2022	11.11.2022
	Advance techniques for identification of Quarantine Pests	05 Days	14.11.2022	18.11.2022
	Fumigation as a Phytosanitary Treatment (Methyl Bromide and Aluminium Phosphide)	15 Days	14.11.2022	28.11.2022
	Forced Hot Air Treatment (FHAT)	05 Days	12.12.202	16.12.2022
VPM	Vertebrate Pest Management – Wild boar, Monkey and Birds	03 Days	11.10.2022	13.10.2022
	Rodent Pest Management in Grain Storage	05 Days	14.11.2022	18.11.2022
	Certificate Course on Urban Integrated Pest Management	15 Days	01.12.2022	15.12.2022

Plant Health Management Division

PHM Division Training Programs

S No	Name of the programme	No. of Days	From	To
I. Officers programme				
1.	Production Protocol for Bio control agents (Predators, parasitoids, microbial bio pesticides & Bio fertilizers)	21	29.06.2022	19.07.2022
2.	Plant Health Management in Tobacco crop	02	12.07.2022	13.07.2022
3.	Program Title: Production protocol for biofertilizers and biocontrol agents(e-ITEC-I)	05	25.07.2022	29.07.2022
4.	Study on Impact of Indiscriminate use of Pesticides and Fertilizers in Agriculture	05	01.08.2022	05.08.2022
5.	Production protocol for predators and parasitoids'	05	05.09.2022	09.09.2022
6.	On-Farm Production of Bio-control Agents and Microbial Bio-pesticides	12	12.09.2022	23.09.2022
7.	Sustainable soil Management Practices to increase crop Productivity(e-ITEC-II)	05	19.09.2022	23.09.2022
8.	Plant Health Management in Protected Cultivation	05	26.09.2022	30.09.2022
II. Farmers training programme				
1.	Farmers training on Biofertilizer and Biopesticides –application methods	01	01.07.2022	-
2.	Good Agricultural practices	04	26.07.2022	29.07.2022
3.	On-farm production of bio-control agents	01	03.09.2022	-
4.	Plant Parasitic Nematodes and their Management in Horticultural Crops	01	14.09.2022	-
5.	Training cum Demonstration on usage of Bio-fertilizers and Bio-pesticides in FCV tobacco	01	12.09.2022	-
6.	Training cum Demonstration on usage of Bio-fertilizers and Bio-pesticides in FCV tobacco	01	13.09.2022	-
7.	Farmers training on on-farm production of bio-fertilizers and bio-control agents	03	26.09.2022	28.09.2022
III. Webinars/Workshop				

1	Evolving Support Systems for Bio-input Resource Centre enterprises	03	05.09.2022	07.09.2022
IV.	Students training programme			
1	Plant Health Management for Sustainable Agriculture	21	10.08.2022	30.08.2022

I. Training programme report (officers)

1. Production Protocol for Bio control agents (Predators, parasitoids, microbial bio pesticides & bio fertilizers)

As scheduled in the NIPHM training calendar 2022-23, an on campus training programme on “Production Protocol for Bio control agents (Predators, parasitoids, microbial bio pesticides & Bio fertilizers)” was organized at NIPHM from 29.06.2022 to 19.07.2022 (21 days). In this programme total of 25 officers from SAUs, KVKs, ICAR institutes and agricultural and allied departments of different states & organizations have participated. In this training the officers learned about the production protocol techniques for predators, parasitoids, biopesticides like *Trichoderma*, *Pseudomonas*, EPF, Biofertilizers and EPN. Quality control aspects of Biopesticides and biofertilizers were covered. Participants were taken to exposure visit for ICRISAT, Varsha Bioscience Laboratories and IIOR during this 21 days training program. In addition a field exercise was conducted at farmers field to identify pests and natural enemies.



2. Plant Health Management in Tobacco crop

Off-campus training on “Plant Health Management in Tobacco crop” was organized at Mysore on 12.07.2022. In this programme total of 23 Field officers from different auction platforms of Tobacco Board, Karnataka state have been participated. In this training session’s topic such as Integrated Nutrient Management in FCV tobacco, role of biofertilizers in INM and applications methods, insect pest of FCV tobacco and management practices, role of

biopesticides in disease control, on-farm production of biofertilizers, *Trichoderma* & *Pseudomonas fluorescens* were discussed. This training is helpful to the field level officials to knowledge on balanced nutrient application, INM, diagnosis of insect pests, IPM in tobacco crop and on-farm production techniques of biofertilizers and Biopesticides, application methods.



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A field visit of NIPHM staff along with field officers visited six tobacco growers’ fields (primary picking started) in the jurisdictions of Mysore and Periyapatna RMO’s, Tobacco Board and diagnosed different disease symptoms, insect damages, and nutrient disorders. The field officers were explained about management practices for diseases/insect damages/disorders.





3. e- ITEC – MEA training program on Production Protocol for Bio-fertilizers and Bio-control agents

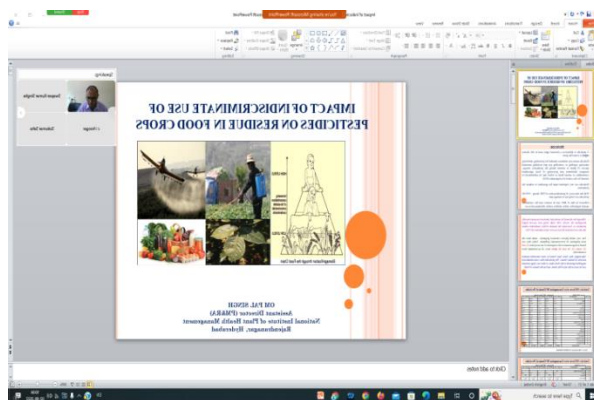
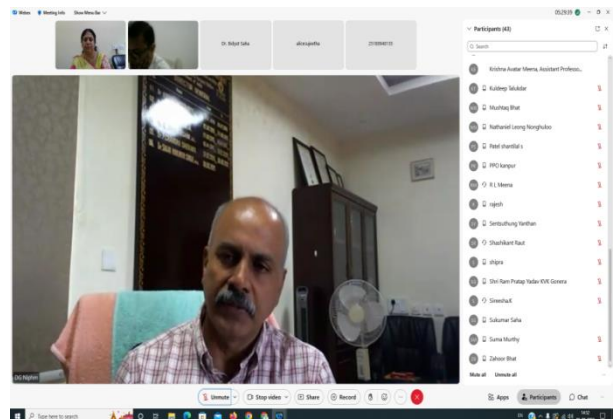
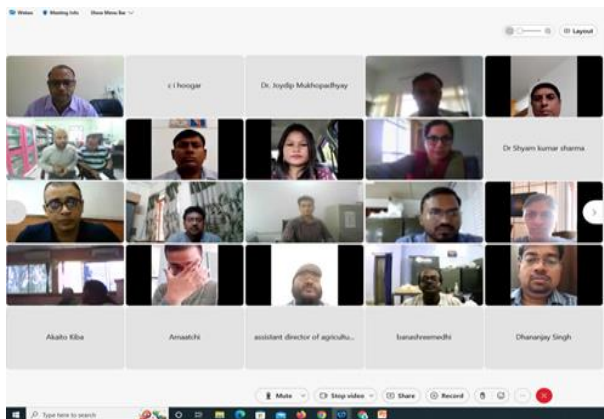
As approved by competent authority, an international training program on “*Production Protocol for Biofertilizers’ and Biocontrol agents*” was organized by NIPHM through virtual mode from 25.07.2022 to 29.07.2022 (5 days) with collaboration under Ministry of External Affairs, GOI, India. In this meeting, a total of 22 participants from different countries.

Principle and concepts of Biological control, Role of Biofertilizers in plant health management, Isolation and characterization of biofertilizer isolates, Ecological Engineering for pest management, Mass production of carrier and liquid based formulations, Mass production of Predators, Novel biofertilizer inoculants for Sustainable Agriculture, Role of Biopesticides in disease management and on-farm production of Biopesticides, Strategies for promotion of Bio-inoculants in Organic Agriculture, Mass production of Parasitoids, Role of EPF and NPV in pest management and mass production techniques, Mass production of Entomopathogenic Nematodes



4. Study on Impact of Indiscriminate use of Pesticides and Fertilizers in Agriculture

As scheduled in the NIPHM training calendar 2022-23, an online training programme on “**Study on Impact of Indiscriminate use of Pesticides and Fertilizers in Agriculture**” from 01.08.2022 to 05.08.2022 (5 days). In this programme total 51 officers/scientists from different states & organizations have participated. In this training the impact of indiscriminate use of chemical fertilizers and pesticides on pest resurgence and resistance, impact of indiscriminate use of pesticides on beneficial insects, impact of indiscriminate use of pesticides and fertilizers on soil nutrient and fertility, Judicious use of pesticides registered with CIB&RC and Alternative control measures: Biopesticides for insect pest management, Impact of indiscriminate use of chemical fertilizers and pesticides on soil biological properties, environment & climate change, how to educate farmers on usage of biofertilizers in agriculture was covered.



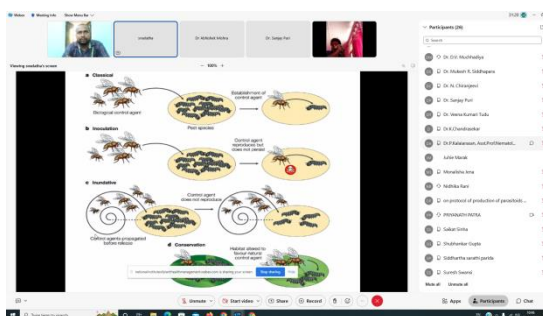
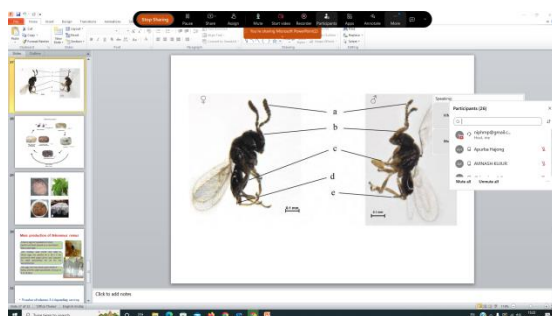
5. On-Farm Production of Bio-control Agents and Microbial Bio-pesticides

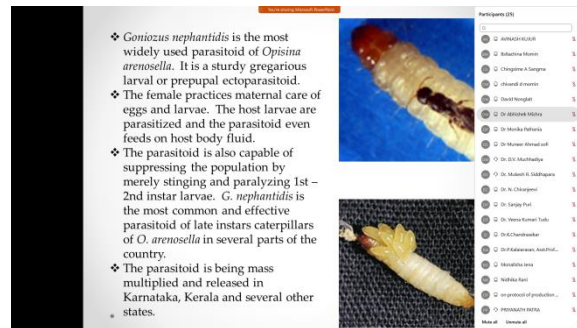
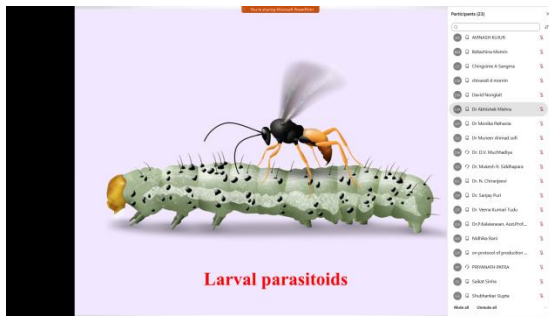
The plant health is influenced by several biotic and abiotic factors such as soil, nutrient management, insect pests, diseases, weeds etc. Biological control plays an important role in the management of the crop pest and diseases. Under such conditions, good agricultural practices (GAP) coupled with integrated pest, disease, weed and nutrient management practices are advocated as comprehensive solution. As per the NIPHM training calendar 2022-23, a 12 days training program on **“On- Farm Production of Bio-control Agents and Microbial Bio-pesticides”** was organized at NIPHM from **12th to 23rd September, 2022**. In this program total of 16 officers/scientists from different SAUs, KVKs and ICAR institutes and state department are participated.



6. Production protocol for predators and parasitoids

As per the NIPHM training calendar 2022-23, an online training programme on **‘Production protocol for predators and parasitoids’** was organized at NIPHM from **5th to 9th September, 2022** (5 days). In this programme total of 31 officers/scientists from different states & organizations are participated.



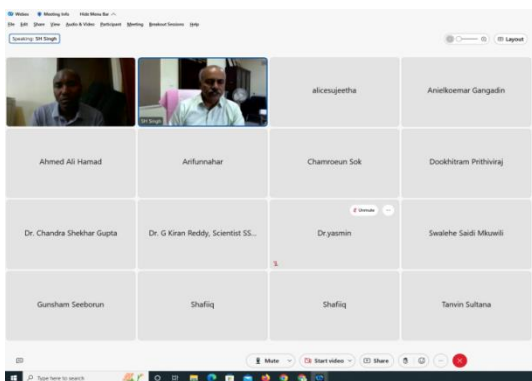


Field release techniques of predators and parasitoids



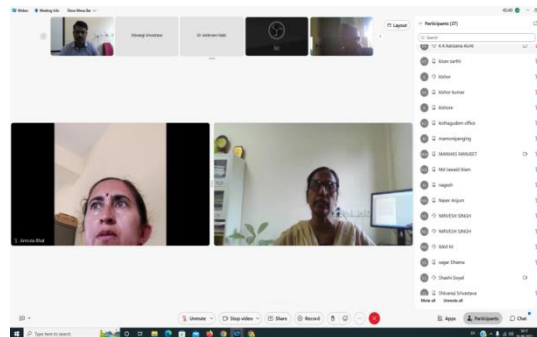
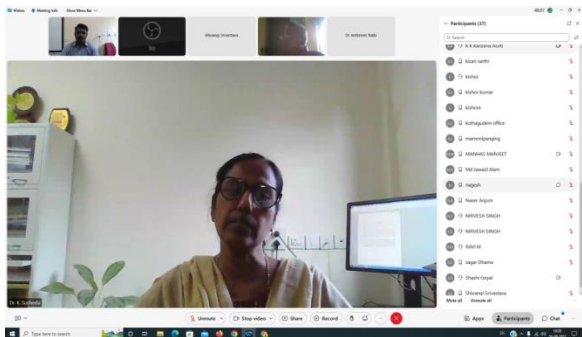
7. e- ITEC – MEA training program on Sustainable Soil Management Practices to increase Crop Productivity

NIPHM is the training partner with the Indian Technical and Economic Cooperation (ITEC) under the Ministry of External Affairs (MEA), Govt. of India. An international e-ITEC training program on “Sustainable soil Management Practices to increase crop Productivity from 19.09.2022 to 23.09.2022 (5 days) for the officials of various countries. The main objective of the training program is to impart knowledge on soil testing importance, integrated soil nutrient and rhizosphere management, different farming systems for soil fertility improvement, role of bio inputs in soil health management and better soil practices for crop productivity etc. A total of 15 participants from different countries viz., Cambodia, Suriname, Iraq, Iran, Tanzania, St. Kitts& Nevis, Bangladesh, Egypt, Kenya, Maldives and Mauritius are attended. This virtual training program underwent various aspects of soil management practices such as integrated soil nutrient management for sustainable farming and challenges, advances in soil fertility management, rhizosphere engineering for soil health management, soil fertility in organic farming and natural farming systems : challenges and perspectives, biofertilizers: importance in soil fertility, Soil test based nutrient Management and use of on-farm soil test kit, Vermitechnology in soil fertility management, Strategies for survival & increasing microbial population of biofertilizers in soil, Role of biopesticides in control of soil borne diseases in plants, Integrated soil nematode management, Sustainable soil Management Practices to increase crop Productivity, On-farm production of biofertilizers and application methods and shown technology videos of NIPHM.



8.Plant Health Management in Protected Cultivation

As scheduled in the NIPHM training calendar 2022-23, an online training programme on ‘**Plant Health Management in Protected Cultivation**’ was organized at NIPHM from **26th to 30th September, 2022** (5 days). In this programme total of 40 officers/scientists from different states & organizations have participated.



II. Farmers training programmes

1. Farmers training on Biofertilizer and Biopesticides –application methods

A training programme to farmers conducted on 01.07.2022 (one day) at Sadashivanagar (V), Ramareddy (M), Kamareddy (Dist.), Telangana. About 100 progressive farmers are attended. The farmers underwent importance of Biofertilizers and Biopesticides, biocontrol agents and their applications methods in different crops. In this programme, KVK, Rudrur, PJTSAU staff, PACS members, AO’s/AEOs of the respective Mandal are attended. The bio inoculants produced by NIPHM, distributed by PACS chairman.



2. Good Agricultural Practices

An on campus training program was conducted for Tamil Nadu farmers from 26th to 29th July. During this program Good agriculture practices and use different biocontrol agents like Predators, parasitoids, biopesticides, biofertilizers and EPN and their production technologies were explained. In th is training program 40 farmers and two officers from Coimbatore, Tamil Nadu were participated.



3. Plant Parasitic Nematodes and their Management in Horticultural Crops

One day training on “Plant Parasitic Nematodes and Their Management in Horticultural Crops” was organized on 14th September 2022. at Moinabad, Ranga Reddy dist. 25 farmers and students were attended the training In the training programme, the importance of nematodes in the horticulture crops and their identification, nematode techniques and management was explained in detail. field application methods of biopesticides viz., Trichoderma and Pseudomonas were explained in detail to the farmers and also the information on mode of action and the diseases that can be managed using the above biopesticides was also passed on to the farmers. Further, the farmers also interacted to know more about nematode disease symptoms and cultural and chemical management of nematodes also why the problem of nematodes are getting as serious threat nowadays specially in horticultural crops. And coordinator also explained about the facilities available to the farmers at NIPHM for the nematode management.



4. Farmers training on On-farm production of bio-control agents”

The training cum interaction session on ‘On-farm production of Biocontrol agents’ conducted on 03rd September, 2022 through online mode by NIPHM. A total of 23 participants from FPO farmers from Villupuram, Tamil Nadu have attended in this program. The training was conducted in Tamil language. The inaugural address and brief introduction about the program and lecture was handled by Dr. S. Jesu Rajan, Scientific Officer (Entomology). In the training, importance and field application techniques of different biological control agent’s viz., biopesticides (*Trichoderma* & *Pseudomonas*), biofertilizers and predators and parasitoids, EPN, EPF and NPV were explained to the farmers and also interacted with farmers related to on-farm techniques of biocontrol agents and field application methods.



5. Training cum Demonstration on usage of Bio-fertilizers and Bio-pesticides in FCV tobacco

As per the Competent Authority of NIPHM, Hyderabad deputed the two faculty members namely Dr.S.Basavaraj, AD-H&F and Dr.K.Damodara Chari, ASO-(Microbiology) to NLS area of Jangareddygudem, AP for the organization of Training cum demonstration on the use of biopesticides (*Trichoderma harzianum* and *Pseudomonas fluorescens*) in FCV tobacco as desired by tobacco growers during nursery stage and main fields translation and other initial stages for controlling the soil borne diseases like damping off and black shank, which are major problems in tobacco crop. Tobacco growers are spending more amounts towards chemicals to control these diseases and unknowingly deteriorate the soil health & quality. NIPHM staff visited different villages of Mysore & Periyapatna regions of Tobacco Board and conducted one day training cum demonstration at FCV grower’s fields on 12.09.2022. Visited three villages in the NLS, Jangareddygudem, (Kannavaram, Vellachintalagudem, Bandapuram) and conducted demonstration and use of Biopesticides (*Trichoderma and Pseudomonas*) and Biofertilizers (K-releasing bacteria) in FCV tobacco in different stages of the crop (nursery and main field application). Further visited different FCV tobacco nurseries of progressive farmers and diagnosed disease symptoms and suggested the recommendations. In this program, about 250 FCV tobacco growers from different villages have participated.

6. Training cum Demonstration on usage of Bio-fertilizers and Bio-pesticides in FCV tobacco

Visited two villages in the NLS, Jangareddygudem, (Markandeyapuram & Challavarigudem) and conducted demonstration and use of Biopesticides (*Trichoderma and Pseudomonas*) and Biofertilizers (K-releasing bacteria) in FCV tobacco in different stages of the crop (nursery and main field application). Further visited different FCV tobacco nurseries of progressive farmers and diagnosed disease symptoms and suggested the recommendations. In this program, about 150 FCV tobacco growers from different villages have participated.



7. Farmers training on on-farm production of bio-fertilizers and bio-control agents

As approved by the competent authority, a training programme to farmers conducted from 26.09.2022 & 28.09.2022(3 days). About 30 progressive farmers from Andhra Pradesh and Telangana are attended. The farmers underwent different Plant Health Management practices such as Agro Ecosystem Analysis and Ecological Engineering in IPM in paddy, chilli and vegetable crops. Underwent hands-on training on on-farm production of Bio-fertilizers, Bio-pesticides, Bio-control agents, preparation of vermicompost, pheromone traps and lures, and their usage.





III. Webinars/Workshop/Conference:

A national workshop on *'Evolving Support Systems for Bio-input Resource Centre enterprises'*, was organized from 5th -7th September 2022 at NIPHM, Hyderabad under collaboration with Watershed Support Services and Activities Network (WASSAN) & NCNF (National coalition for Natural farming). The workshop is intended as a platform for different stake holders to share their experiences and on the nature and form of blackened support required by BRCs.



IV. Student training programme:

1. Plant Health Management for Sustainable Agriculture

A 21 days special student training program on ‘Plant Health Management for Sustainable Agriculture’ was organized at NIPHM from 10th to 30th August, 2022 (21 days). In this program total of 30 students from different campuses of ANGRAU viz., Agricultural College, Bapatla (10 students), S.V. Agricultural College, Tirupati (8 students), Agricultural College, Mahanandi (5 students) and Agricultural College, Naira (7 students) participated. During this program students were exposed to different plant health management strategies like use of biocontrol agents, biopesticides, biofertilisers and preparation of lures, vermicomposting, Pesticides spray techniques, Soil testing & soil test based nutrient management, Pesticide Residue Analysis and Food safety measures.





Forthcoming training programmes

S No	Name of the programme	No. of Days	From	To
I. Officers training programmes				
1.	Sustainable pest management programme for districts levels	03	26.10.2022	28.10.2022
2.	Production Protocol for natural enemies of insect Pests	05	31.10.2022	04.11.2022
3.	Quality control of microbial bio-pesticides	10	09.11.2022	18.11.2022
4.	Plant Health management strategies in different crops	21	23.11.2022	13.12.2022
5.	AESA and Ecological engineering for pest management	05	19.12.2022	23.12.2022
II. Farmers training programmes				
1.	On farm production of bio control agents	03	25.10.2022	27.10.2022
2.	Nutrient management in organic farming	03	09.11.2022	11.11.2022
3.	Vermi technology	03	28.11.2022	30.11.2022

Pesticide Management Division

PM Division Training Programs

During **July to September, 2022**, the division has conducted six offline training programme.

Sl. No.	Name of the programme	No. of Days	From	To
1.	Calibration of Laboratory Glassware for Pesticide Quality Testing Laboratories	2 days	12.07.2022	13.07.2022
2.	Calibration of Laboratory Glassware and equipment for pesticide Quality Testing Laboratories	8 days	12.07.2022	19.07.2022
3.	Inspection, Sampling and Prosecution Procedures under Insecticide Act 1968	5 days	25.07.2022	29.07.2022
4.	Refresher Programme on Formulation Analysis of New Pesticides molecules	10 days	16.08.2022	25.08.2022
5.	Pesticide Formulation Analysis	60 days	22.08.2022	20.10.2022
6.	Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968	5 days	05.09.2022	09.09.2022

1. Calibration of Laboratory Glassware for Pesticide Quality Testing Laboratories:

Two days training programme on “**Calibration of Laboratory Glassware for Pesticide Quality Testing Laboratories**” was conducted from 12th to 13th July 2022. A total of 16 participants were participated the training and the participants are from State Agriculture Department of Tamil Nadu.

The trainees were trained on various laboratory glassware calibrations such as volumetric flask, pipette, burette etc. The training will be benefited to the analyst working in quality testing laboratories for generation of valid results if the glassware are calibrated as per BIS method for calibration of Glassware. It will help in laboratory accreditation process as glassware calibration is an important requirement as per ISO/IEC 17025: 2017.



Training programme on “Calibration of Laboratory Glassware for Pesticide Quality Testing Laboratories

2. Calibration of Laboratory Glassware & equipment for pesticide Quality Testing Laboratories:

PMD has conducted eight days training programme on “**Calibration of Laboratory Glassware and equipment for pesticide Quality Testing Laboratories**” from 12th to 19th July 2022. A total of 15 participants were participated the training. The participants are from State Agriculture Department of Tamil Nadu and Telangana.

The trainees were trained on various laboratory glassware calibrations such as volumetric flask, pipette, burette etc. and equipment such as HPLC, GC-FID and UV- Spectrophotometer.

The training will be benefited to the Quality testing laboratory analyst of for generation of valid results and laboratory accreditation process as glassware and equipment calibration are an important requirement as per ISO/IEC 17025: 2017.



Training programme on “Calibration of Laboratory Glassware and Equipment for Pesticide Quality Testing Laboratories

3. Inspection, Sampling and Prosecution Procedures under Insecticide Act 1968

The Division has conducted two programme on “**Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968**” during 25th to 29th July and 5th to 9th September.

A total of 53 Insecticide Inspectors/Agricultural officers were participated the programme. The participants are from State Agriculture Department of Haryana, Gujarat, Andhra Pradesh, Maharashtra, Tamil Nadu, Madhya Pradesh and Karnataka. The aim of the training programme is to build the capacity of Insecticide Inspectors. The trainees were trained on various salient features of the Act 1968 and Rules 1971, Insecticide Registration and licensing Procedure, Inspection and sampling of pesticide formulation and Prosecution Procedure under Insecticide Act 1968 as per BIS specification for sampling of pesticides.



Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968

4. Refresher Programme on Formulation Analysis of New Pesticides molecules:

Training on “**Refresher Programme on Formulation Analysis of New Pesticides molecules**” was conducted from 16.08.2022 to 25.08.2022. A total of 7 participants were participated. The participants are from State Agriculture Department of Haryana and Karnataka. The trainees were trained on analysis of pesticides and Pesticide Formulation. The training focuses more on analysis of new pesticides which were not covered during 60 days training on Pesticide Formulation Analysis and on troubleshooting issues related to quality control analysis with respect to new pesticide.



Refresher Programme on formulation Analysis of New Pesticide Molecule

5. Pesticide Formulation Analysis:

PMD is conducting 60 days training programme on **“Pesticide Formulation Analysis”** from 22.08.2022 to 20.10.2022. A total of 20 participants are participating from State Agriculture Department of Tamil Nadu, Haryana, Karnataka, Chhattisgarh and Telangana.

During the training the analyst were trained on various methods of pesticide analysis such as volumetric, spectrophotometric (UV-Vis Spectrophotometer and Fourier-transform infrared spectroscopy, FT-IR) and chromatographic techniques (High Performance Liquid Chromatography -HPLC, Gas Liquid Chromatography-GLC) for analysis of pesticides as per legally valid methods i.e BIS standards. The trainees were also trained on general laboratory safety rules and first aids measures for chemical laboratory to minimise health risks, accidents to the laboratory personnel and to be in a position to act first aid measures in case of emergencies.



Training on Pesticide formulation Analysis

Forthcoming training programmes:

Sl. No.	Title of the Programme	Duration	From	To	Eligibility Criteria
1.	Pesticide Residue Analysis (PRA)	21 days	02.11.2022	22.11.2022	Analysts / Scientists / Technical Staff Working in State Govt. or Central Govt. Departments/Laboratories / Govt. Universities with knowledge in laboratory activities and Chromatography
2.	Testing of Physicochemical properties of Pesticide formulations	5 days	21.11.2022	25.11.2022	Analysts working at SPTLs / RPTLs / CIL and other Government Labs engaged in Pesticide Formulation Analysis with training on Pesticide Formulation Analysis (PFA) of NIPHM
3.	Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968(ISPP)	5 days	05.12.2021	09.12.2021	Agricultural / Horticultural Officer (or equivalent position) working in State Department (or) designated Insecticide Inspector (Central / State)

4.	Method Validation and Measurement of Uncertainty in Pesticide Formulation and Residue Analysis	5 days	12.12.2022	16.12.2022	Analysts working at SPTLs / RPTLs/ CIL and other Government Labs engaged in Pesticide Formulation Analysis or Pesticide Residue Analysis (PRA) undergone training on (PFA) at NIPHM
5.	Sampling of Fruits, Vegetables and other items and Calibration of laboratory equipment for Pesticide Residue	5 days	19.12.2022	23.12.2022	Science Graduate Analysts / Scientists / Technical Staff working in testing labs of State Govt. /Central Govt. / ICAR / Govt. Universities
6.	Sampling of Fruits, Vegetables and other items for Pesticide Residue Analysis	2 days	19.12.2022	20.12.2022	Science Graduate Analysts / Scientists / Technical Staff working in testing labs of State Govt. /Central Govt. / ICAR / Govt. Universities

Plant Health Engineering Division

PHE Division Training Programs

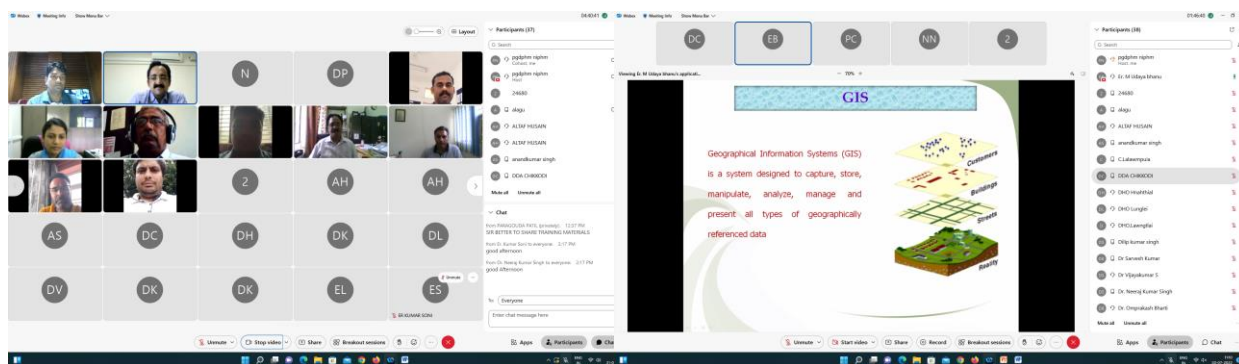
Training programs conducted during the period : Jul-2022 and Sep-2022

S No	Category	Name of the programme	No. of Days	From	To
1.	Officers	Irrigation Systems and Advancements	03	19.07.2022	21.07.2022
2.	Officers	Digital Agriculture	03	25.07.2022	27.07.2022
3.	Officers	Pesticide Application Techniques and Safety Measures	05	22.08.2022	26.08.2022
4.	Officers	Post Harvest Management and Storage Techniques	05	19.09.2022	23.09.2022
5.	Farmers	Pesticide application Techniques and Safety Measures	01	13.09.2022	13.09.2022
6.	Students	Pesticide application Techniques and Safety Measures “(Agrill Engg Students)”	01	22.07.2022	22.07.2022
7.	Students	Pesticide application Techniques and Safety Measures “(Agrill Engg Students)”	05	05.09.2022	09.09.2022
8.	Students	Pesticide application Techniques and Safety Measures “(Agrill Engg Students)”	05	19.09.2022	23.09.2022

1. Irrigation Systems and Advancements

A 3 day virtual training program on “Irrigation Systems and Advancements” was organized from 19th – 21st July 2022. Total 37 participants from 12 different states participated in the training program. Among them, 33 are Male and 9 are Female participants.

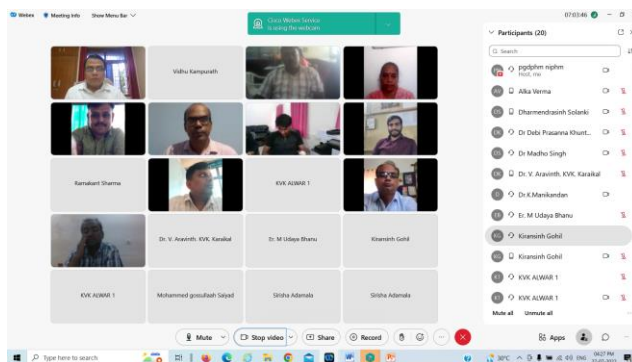
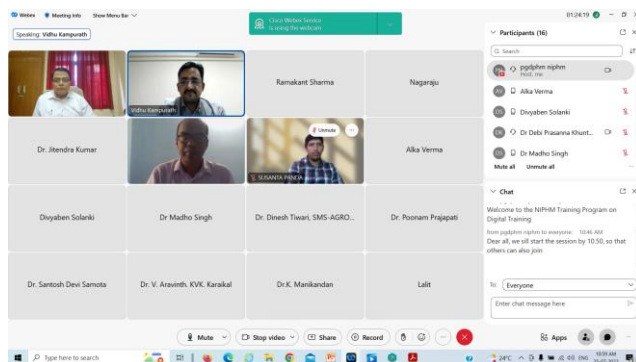
The participants were enriched with basic principle of of irrigation techniques, micro irrigation system and fertigation, roles of RS and GIS in agriculture, advances in irrigation technology, subsidy on drip and sprinkler irrigation system, and care and maintenance of micro irrigation system.



2. Digital Agriculture

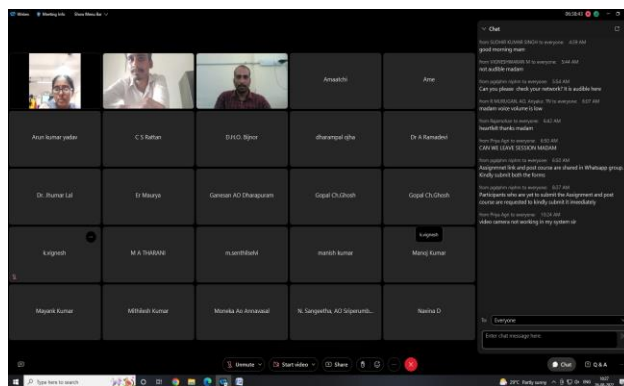
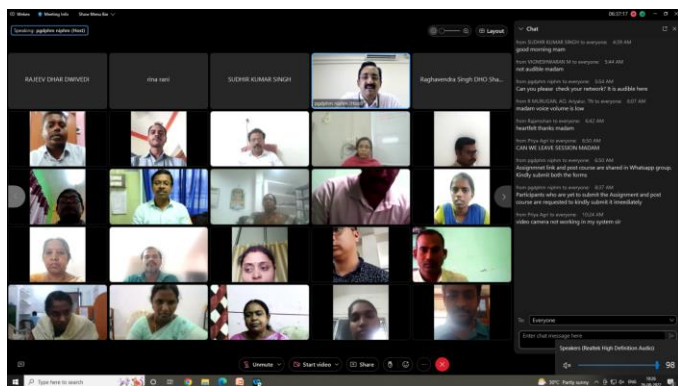
An online program on Digital Agriculture was conducted from 25-07-2022 to 27-07-2022 which was attended by a total of 21 officers (male: 16 and female:5) from various organizations across the country.

The lectures covered topics related to basics of ICT, GIS, GPS, Big Data, IoT, Precision Agriculture, Decision Support Systems and their uses with use case examples on each technology in agriculture, aspects of enabling use of ICT by smallholder farmers, field state wise agriculture tools and uses, various sources of agriculture related information and digital tools available, types of ICT-enabled services useful for enhancing livelihoods of smallholder farmers, key drivers of ICT in agriculture.



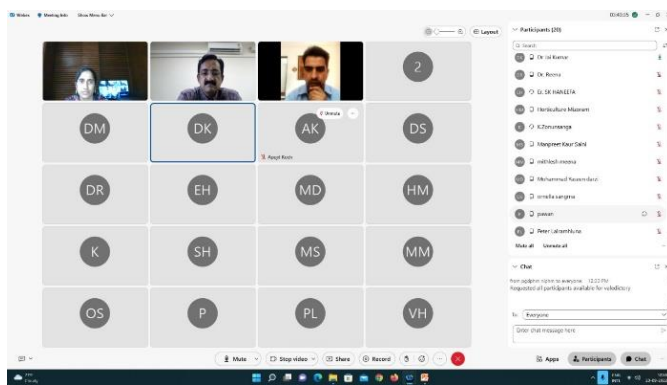
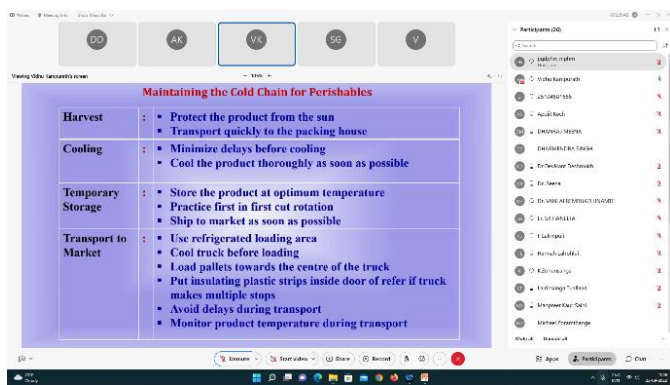
3. Pesticide application Techniques and Safety Measures

Total 70 officers 40 male and 30 female participants attended the 5-day programme, conducted during 22nd to 26th August 2022. Lectures were arranged on topic viz., different aspects such as basic principles of spraying, different spraying techniques, selection of sprayer, nozzles and its classification, selection of nozzle, calibration of sprayers and nozzles, pesticide formulations and compatibility, safety precautions and minor maintenance of pesticide application techniques. Good appreciation received from the participants.



4. Post Harvest Management and Storage Techniques

Total 36 officers, 30 male and 6 female participants attended the 5-day programme, conducted during 19th to 23rd September 2022. Lectures were arranged on topic viz., Post-harvest losses of Agricultural commodity, Post-harvest losses of fruits and vegetables, Cleaning and grading of agricultural commodities, fruits and vegetables, Drying and storage for Agricultural commodity, Drying and dehydration for fruits and vegetables, Storage and transportation facilities for fruits and vegetables, Import and export facilities for agricultural commodities, Packing methods and material, Machineries used for processing and Alternative processing methods and Rodent pest management in storage.



5. Pesticide Application Techniques and Safety Measures “(Farmers)”

PHE division conducted an off campus farmers training programme on “Pesticide Application Techniques and Safety Measures” at Kummera village, Chevella district, Telangana on 13th September 2022. Er. M Udaya Bhanu (Scientific Officer) has organized this training programme for thirty farmers at Kummera village.

The training programme was moduled to cover the aspects of adverse impacts of spraying, basic spraying principles, selection of a sprayer, and selection of nozzle, safety precautions and demonstration of different spray patters with nozzles and its selection was explained.



6. Pesticide Application Techniques and Safety Measures “(Agrill Engg Students)”

PHE division organized offline students training programme on “Pesticide Application Techniques and Safety Measures” in association with Vignan Engineering college, Tenali, Andhra Pradesh. Total 37 students (21 male & 16 female) attended the programme. They have enriched with pesticide application skill, automated irrigation and agronomical management.

7. Pesticide Application Techniques and Safety Measures

A request-based training programme for five days on “Pesticide Application Techniques and Safety Measures” for B. Tech (Agri.) students from Sri Shakthi Institute of Engineering & Technology, Coimbatore was conducted from 5th to 9th September 2022.

Total 30 students (12 male and 18 female) attended the programme. This program was module in such way that more practical and less theory to be cover. The practical on different high-volume sprayers, low volume sprayers, ultra- low volume sprayers, tractor operated sprayers and nozzles were carried out. An institutional exposure visit to ICRISAT was taken up, students were aqainted with different technologies and equipment available.



8. Pesticide Application Techniques and Safety Measures

A request-based another training programme for five days on “Pesticide Application Techniques and Safety Measures” for B. Tech (Agri.) students from Sri Shakthi Institute of Engineering & Technology, Coimbatore was conducted from 19th to 23th September 2022.

Total 27 students (20 male and 07 female) attended the programme. This program was also module in such way that more practical and less theory to be cover. The practical on different high-volume sprayers, low volume sprayers, ultra- low volume sprayers, tractor operated sprayers and nozzles were carried out. An institutional exposure visit to ICRISAT was taken up, students were acquainted with different technologies and equipment available.



Forthcoming Training Programs

S.No	Title of the Programme	Division	From	To	Eligibility criteria	Course Coordinator & e-mail
1.	Pesticide application techniques and safety measures	PHE	17.10.2022	21.10.2022	Extension officers from State Agriculture and Horticulture departments, Scientists of ICAR, SAUs and officials from KVKs, DPPQs	Er. Sk Haneefa Begum, Assistant Scientific Officer (PHE) asopheniphm2-ap@nic.in
2.	RS & GIS applications in Plant Health Management	PHE	14.11.2022	18.11.2022	Extension officers from State Dept. of Agri./ Horti., soil survey, soil conservation, Watershed Project, Scientists of ICAR/ SAUs , etc. working on GIS	Er. M. Udaya Bhanu Scientific Officer (PHE) sopeniphm2-ap@nic.in
3.	Efficient use of water resources	PHE	22.11.2022	24.11.2022	Extension officers from State Dept. of Agri./ Horti., soil survey, soil conservation, Watershed Project, Scientists of ICAR/ SAUs , etc.	Er. Govind Maurya Assistant Scientific Officer (PHE) asopheniphm1-ap@nic.in
4.	Plant Protection Techniques for Plant Health Management	PHE	02.12.2022	22.12.2022	Extension officers from State Dept. of Agri./ Horti., soil survey, soil conservation, Watershed Project, Scientists of ICAR/ SAUs , etc. working on GIS	1. Dr. Vidhu Kampurath P Joint Director (PHE) jdenggniphm-ap@nic.in Er. 2.Haneefa Begum Assistant Scientific Officer (PHE) asopheniphm2-ap@nic.in
5.	Pesticide application techniques and safety measures	PHE	05.12.2022	09.12.2022	Extension officers from State Agriculture and Horticulture departments, Scientists of ICAR, SAUs and officials from KVKs, DPPQs. NGOs	Dr. Vidhu Kampurath P Joint Director (PHE) jdenggniphm-ap@nic.in

6.	Pesticide application techniques and safety measures (Farmers)	PHE	21.10.2022	21.10.2022	Farmers	Er. M. Udaya Bhanu Scientific Officer (PHE) sopheniphm2- ap@nic.in
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Special Events

- The 76th Independence Day has been celebrated at NIPHM on 15.08.2022. Dr. Sagar Hanuman Singh, IPoS, Director General, NIPHM has hoisted the National Flag in the office campus. Following the flag hoisting ceremony, prizes were distributed to the winners and runners in the competitions conducted among the officer/staff working at NIPHM.





- Shri Manoj Ahuja, IAS, Secretary DA&FW, GoI visited NIPHM on 26.08.2022 and interacted with faculty members of institute. The Director General showcased the activities of the institute and proposed future possibilities of enhancement of activities of the institute. The Secretary appreciated the efforts taken by the institute in promoting various Plant Health Management strategies.





- The Hindi Fortnight - 2022 was organized from 30.08.2022 to 14.09.2022 by conducting various competitions in Hindi. Hindi Diwas was celebrated on 14.09.2022 at NIPHM wherein, all the officers and staff of NIPHM have participated.



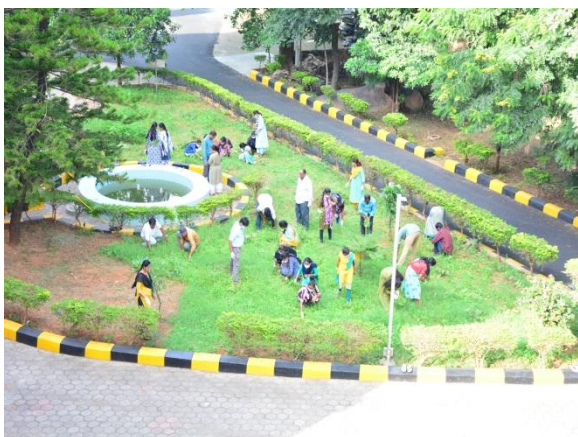


- “Swachhta hi Sewa” (SHS) Campaign observed at NIPHM from 15.09.2022 to 02.10.2022.

- **Observation of Parthenium Awareness Week**

Parthenium, also known as carrot grass, is a problematic and aggressive weed posing a serious threat to agriculture, the environment and human health. It causes health hazards like skin allergy (dermatitis), hay fever and asthma in human beings, and is also toxic to livestock. It threatens native biodiversity besides the loss to crop productivity. It is a nuisance in public amenity areas like parks, residential colonies and orchards. It harbors other pests like mosquitoes, cockroaches, rodents, etc. in an urban area. The weed squeezes grasslands and pastures, hence reducing the fodder supply. In view of the above, an awareness week was observed at NIPHM from 16-22 August 2022. Under the Parthenium awareness week, creation of awareness to farm labour and housekeeping labour, mass removal activity done by staff members, contractual staff and outsourcing staff, trainees at NIPHM campus, laboratory premises and NIPHM field under the leadership of the Director-General, NIPHM and emphasized Parthenium-free campus.





● **Visitors:**

Officials: (Govt./Private/NGO)

- i. Official from Better Cotton Initiative visited Division. Exclusive training programmes were earlier conducted for them by the Division. Proposal for collaborating for awareness and better application techniques in farmers for selected villages were discussed.
- ii. Experts from M/s Navariti Innovations visited Division. Activities of the division was explained to them. Possible collaboration in the front of pest detection using AI was discussed.
- iii. Officials trainees from EEI, Rajendrangan visited the PHE division's Plant Protection Machinery lab and automated irrigation systems. Further, a practical session was also organised for them on 'drone challenges and opportunity in agriculture'.

Students:

- i. One hundred fifteen student from College of Agriculture, Naigon, Nanded, Maharashtra visited PHE workshop and got acquainted with developed equipment.
- ii. One hundred thirty-two students along with faculty members from TNAU College visited PHE workshop and got acquainted with developed equipment.
- iii. Thirty-seven students along with faculty members from TNAU college visited PHE workshop and got acquainted with developed equipment
- iv. Eighty-nine students along with teachers from Birla open minds international school, Kollur visited workshop and got acquainted technologies available.



- v. Ninety students from college of agriculture, Udgir Maharashtra visited workshop and got acquainted technologies available.



Research & Development

1. AICRP on Biological Control of Crop Pests (ICAR-AICRP-BC)-NIPHM, Hyderabad (Volunteer Centre)

Evaluation of NIPHM white media for the production of *Nomuraearileyi* (*Metarhiziumrileyi*) NIPHM MRF-1 strain for management of Maize Fall Army worm (*Spodopterafrugiperda*)

This project aimed for the production of *Metarhiziumrileyi* two media viz. NIPHM White media and broken rice were used. To standardize the production technology, the media under test were made into six treatments (Broken rice (without yeast extract), Broken rice (with yeast extract), 1% NIPHM white media, 2% NIPHM white media, 3% NIPHM white media, 4% NIPHM white media) and for each treatment two replications were maintained.

Project progress during this quarter: Preparation of SMAY media and Performed sub culturing of *Metarhizium rileyi* (EPF) on SMAY media. The work on bioassay is under progress.

2. Pesticide Formulation and Residue Analytical Centre (PFRAC):

The Pesticide Formulation and Residue Analytical Centre (PFRAC), Pesticide Management Division, is an accredited laboratory in accordance to ISO/IEC 17025:2017.

The laboratory has collected 294 samples (Fruits, vegetables, cereals, pulses, milk and water) from Banjarahill Hyderabad, Medchal/Malkajigiri, and Saidabad under Central Sector Scheme “Monitoring of Pesticide Residues at National Level (MPRNL)” and analyzed about 200 samples for pesticide residues during the period.

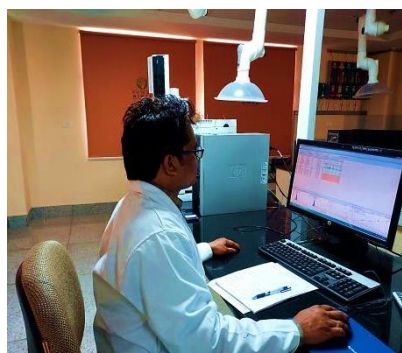
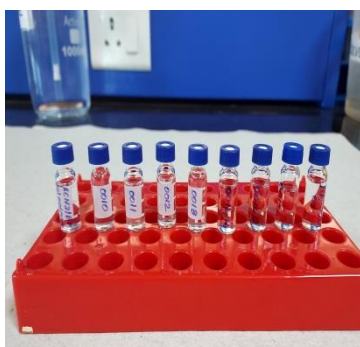
A total of 157 samples (fruit and vegetables) were received from ANGRAU and analyzed during the period under MPRNL scheme. The Laboratory also received 105 water samples from CSIR-NEERI for pesticide residues analysis by LC-MS/MS under MPRNL scheme. All the samples were analyzed and the reports were submitted.

The laboratory (PFRAC) has participated proficiency testing on Red chilli powder samples conducted by Aaswi-PT provider. The laboratory was evaluated and found satisfactory result as per the report submitted by Aaswi-PT provider.

Pesticide Management Division has received 100 tobacco samples from Tobacco Board, Guntur. Eighty eight (88) samples were extracted / prepared for analysis.

Two pesticides formulation samples received from National Seed Corporation, Raichur, Karnataka for quality test. The samples were analyzed and submitted the reports.

A total of 43 botanical/bio-pesticides samples were received from different state of Tamil Nadu (18 samples), Kerala (7 samples), Haryana (1 sample), Gujarat (3 samples), Maharashtra (6 samples), Bihar (6 samples) and Karnataka (2 samples). The samples were tested for pesticide contaminants/adulteration by GC-MS/MS and LC-MS/MS.



Sample preparation and analysis of Bio product Sample

3. Proficiency Testing Center (PTC):

PTC, PMD conducted **PT-PRA program** on Chana Dal (PTC/PR/05/21-22), Water (PTC/PR/03/21-22) and orange (PTC/PR/04/21-22) for pesticide residue analysis. The final reports were sent to 41 participants during the period.

PTC, PMD conducted PT PRA program on Mango and Wheat in the month of **May 2022**, and the samples were dispatched on 04th June 2022. The results were received from participants in the month of July 2022. The final report for PT-PRA (PTC/PR/ 01/22-23) on Mango (Dimethoate, Fenpropathrin, Imidacloprid, Lambda Cyhalothrin, Quinalphos, Thiamethaxom) were sent to 29 participants. The final report for PT-PRA (PTC/PR/ 02/22-23) on Wheat (Alpha Cypermethrin, Buprofezin, Chlorpyrifos, Deltamethrin, Dimethoate, Quinalphos, Tricyclazole) were sent to 34 participants.

PTC, PMD has organised PT PFA programme on Cypermethrin Technical, Imidacloprid SL, Quinalphos EC (PTC/PF/01,02 & 03/2022-23) in the month of April 2022. Samples were dispatched on 29th April 2022 to 59 laboratories. The results were received from the participants during June 2022. The final reports of PT PFA programme on **Cypermethrin Technical** (programme no. PTC/PF/01/2022-23), Imidacloprid SL (programme no. PTC/PF/02/2022-23) and Quinalphos EC (PTC/PF/03/2022-23) were prepared and sent to 59 participants.

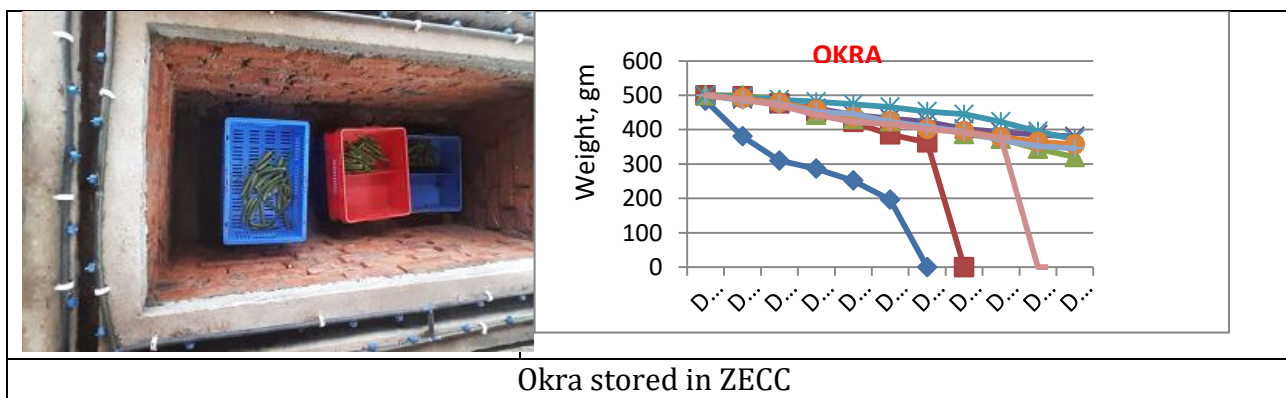
4. Construction and Evaluation of Zero energy cool chamber

Zero Energy Cool Chamber is an eco-friendly storage system that doesn't require any type of energy to be adopted. A cool chamber was designed and constructed for the purpose of demonstration to trainees.

The performance evaluation of ZECC is under process to optimize the parameters of the chamber. The following are the parameters are measured to evaluate the ZECC.

- i. Outside temperature and RH
- ii. Inside temperature and RH

For performance evaluation of ZECC, to know the shelf life of different commodities, material purchased from local market were taken to evaluate the shelf of commodities in three different storage conditions were selected like control, refrigeration and ZECC. The commodity selected was okra for trial 2. In ZECC, the trays were placed 1 in row, 2 in a row and 3 in a row to study the shelf life of commodities with different conditions.



5. FEASIBILITY STUDIES ON USES OF TREATED SEWAGE WATER ON SPINACH (*Spinacia oleracea*):

Based on the finding, it can be concluded that-

- Soil physical characteristics has been improved in treatment T3 i.e Single filter treated water might be due to heavy load of organic matters in single treated water.
- Vegetable produced were maximum observed T3 (Single filter treated water) i.e 103kg. The highest produced were observed due to the heavy load of nutrients.
- Total microbial and fungal counts showed maximum in T3 (single treated water).
- In treatment (T1) micro and macro elements were absorbed maximum in soil followed by T3
- The maximum uptake in crop for treatment (T1) Zn and Magnesium, In treatment (T2) Iron and Manganese and (T3) Copper and potassium. It might be due to the antagonistic effects and synergistic effects.

6. Creation of spraying awareness & safe application of pesticides and their exposure to pesticide residue

- Total 609 farmers data collected; analysis is going on.
- Awareness training for 100 selected farmers being scheduled, the confirmation is awaited of YFA-KVK officials.

7. Nozzle wear study: After continuation running of 50 hours test rig, sample of 0 h, 25 h and 50 h sent to PMD lab for analysis.

Extension Activities / Village Adoptions

Under farmers advisory cell, faculty are interacted farmers about their queries related to plant protection, bioinputs usage etc. Almost 150 farmers are approached NIPHM through telephonic communication.

Faculty Achievements

- Dr. Vidhu Kampurath, JD-PHE as a member of BoS, attended the meeting of PG/PhD programmes of faculty of Ag Engg of Kerala Ag University.
- Dr. Vidhu Kampurath, JD-PHE attended meeting with Deloitte for training programmes for staff of Ag Department of Maharashtra, along with DG and other Directors.
- Dr. Vidhu Kampurath, JD-PHE and Er. Madhavi, JRF, attended drone pilot training and successfully certified as Drone pilots cum instructor.
- Er. M Udaya Bhanu delivered expert lecture at EEI, Rajendranagar on "Safe handling and usage of pesticides" in the training Recent trends and applications in plant protection for sustainability in Agri and Horticulture Sectors.
- Dr. Vidhu Kampurath Participated in FAD 11 meeting of BIS as a member and contributed. Nominated as a member in the BIS code preparation for electrostatic spraying.
- Dr. Vidhu Kampurath and Er. Sk. Haneefa Begum attended the webinar on "Role of Agricultural Graduates in Agri - warehousing sector", organized by RPCAU, Pusa on the eve of Engineers Day
- Dr. Vidhu Kampurath attended the online drone meeting conducted by Ministry of Agriculture and Farmers welfare.

Other Activities

1. **MOOCs in Plant Biosecurity:** Total 29 participants have been enrolled in 8th batch of the programme.
2. **MOOCs in Rodents and Household Pest Management:** Total 10 aspirant are attending the module.
3. **Kerala PGDPHM:**
 - i. 4th semester end exams of Vth Batch were conducted on 05.07.2022 at SAMETI, Kerala.

4. Lab Activities:

- i. Maintaining/Rearing of stored grain insect cultures
 - ii. Rearing of fruit fly culture
 - iii. Fruit fly lure preparation
5. Maintenance of vermicompost unit at NIPHM and Staff Quarters

6. NIPHM Instructional farm:

During this quarter Kharif 2022-23, sowing of cucurbits (ridge gourd, bottle gourd, bitter gourd), maize, sorghum, green gram, red gram and okra has done. Transplanted paddy, tomato, brinjal and chilli. Timley irrigation and weeding in maize, ridge gourd, bottle gourd, bitter gourd, sorghum, greengram, groundnut, paddy, tomato, brinjal, chilli and redgram. Stacking in ridge gourd, bottle gourd and bitter gourd. Prepared seedbed/plots, bunds and sown maize, kodo millet and groundnut crops for natural farming project. Installed pheromone traps and sticky traps. Fields were monitored regularly and data on pests and natural enemies recording going on. Harvested ridge gourd, bottle gourd, bitter gourd, brinjal, okra, green gram and leavy vegetables.



7. Polyhouse (Protected Cultivation)

During this quarter kharif 2022, the following farm activities are performed under protected cultivation. Nursery maintained for cabbage, cauliflower and broccoli. Irrigation and weeding in broccoli, cabbage and cauliflower. Installed pheromone traps and sticky traps. Collected and destroyed leaf eating caterpillars. Irrigation, weeding and staking was done.



8. As the Coordinators for Input Dealer Course, faculty are monitoring the classes, visits and all activities.





9. The PHE division arranged a get-together on the eve of Engineers Day on 15th Sept 2022. The legendary engineer, Sir Mokshagundam Vishveshwaraya was remembered on the occasion.

हिंदी क्रियाकलाप

राजभाषा कार्यान्वयन समिति की द्वितीय बैठक एवं अन्य गतिविधियां संपन्न :

राजभाषा कार्यान्वयन समिति (राकास) की द्वितीय बैठक वर्ष 2022-23 हेतु दिनांक 17-10-2022 को डॉ. सागर हनुमान सिंह, भा.डा.से, महानिदेशक, एनआईपीएचएम की अध्यक्षता में आयोजित हुई। बैठक में महानिदेशक के समक्ष जुलाई-सितंबर, 2022 की तिमाही हिंदी प्रगति रिपोर्ट प्रस्तुत की गई। उन्होंने उक्त रिपोर्ट की समीक्षा करते हुए संस्थान में राजभाषा अधिनियम की धारा 3(3) के पूर्णतः अनुपालन किये जाने के निदेश दिये। एनआईपीएचएम के सभी प्रौद्योगिकी वीडियो एवं किसानों से संबंधित अन्य प्रौद्योगिकी वीडियो को हिंदी में बनाने हेतु निदेश दिये।

संस्थान की गतिविधियां :

हिंदी पखवाड़ा-2022 एवं हिंदी दिवस समारोह का आयोजन -

राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान (रावस्वाप्रसं), कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार के अंतर्गत एक अग्रणी स्वायत्त संस्थान है, जो राजभाषा हिंदी के कार्यान्वयन एवं कार्यालयीन कामकाज में राजभाषा हिंदी को बढ़ावा देने के लिए प्रयासरत है। हर वर्ष की भांति इस वर्ष भी राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान (एनआईपीएचएम) में हिंदी पखवाड़ा-2022 एवं 14 सितंबर, 2022 को हिंदी दिवस मनाया गया। उक्त कार्यक्रमों एवं समारोह का आयोजन एनआईपीएचएम के महानिदेशक डॉ. सागर हनुमान सिंह, भा.डा.से. की अध्यक्षता एवं उनके दिशा-निर्देशानुसार किया गया। हिंदी पखवाड़ा एवं हिंदी दिवस का सफलतापूर्वक आयोजन किया गया।



हिंदी पखवाड़ा समारोह - (दिनांक 30-08-2022 से 13-09-2022 तक) :

दिनांक 30-08-2022 से 13-09-2022 तक की अवधि के दौरान संस्थान में हिंदी पखवाड़ा मनाया गया। पखवाड़े की शुरूआत हिंदी कार्यशाला से किया गया।

हिंदी कार्यशाला का आयोजन : दिनांक 30-08-2022 को राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान में महानिदेशक डॉ. सागर हनुमान सिंह, भा.डा.से. की अध्यक्षता में हिंदी कार्यशाला आयोजित की गई। हिंदी अधिकारी विजय कुमार साव ने मंचस्थ अधिकारी सहित उपस्थित सभी अधिकारियों एवं कर्मचारियों का स्वागत किया तथा हिंदी पखवाड़ा के दौरान आयोजित होने वाली विभिन्न हिंदी प्रतियोगिताओं के बारे में बतलाया।

निदेशक (पीबीडी) एवं प्रभारी निदेशक (पीएचएम) डॉ. जे. एलिस आर पी सुजीता ने कर्मचारियों को संबोधित करते हुए कहा हिंदी कार्यशाला का अधिक से अधिक लाभ उठाना चाहिए एवं सरकारी कामकाज में राजभाषा हिंदी का इस्तेमाल करें और अपने दैनिक कार्य व्यवहार्य में भी हिंदी में बातचीत करें। कर्मचारियों को पखवाड़ा के दौरान आयोजित हिंदी प्रतियोगिताओं में बढ़-चढ़ कर भाग लेना चाहिए। यह प्रतियोगिता कर्मचारियों के लिए सीखने का अच्छा अवसर है। उन्होंने आगे कहा कि संस्थान में राजभाषा विभाग, गृह मंत्रालय, नई दिल्ली द्वारा जारी राजभाषा संबंधी नीति, दिशा-निर्देशों एवं नियमों का क्रियान्वयन समुचित तरीके से अनुपालन किया जा रहा है।



अतिथि वक्ता श्री मोहम्मद कमालुद्दीन, सहायक निदेशक, केन्द्रीय हिंदी उप-प्रशिक्षण संस्थान, सिकंदराबाद ने सरकारी कामकाज के दौरान राजभाषा हिंदी में बारांबार इस्तेमाल होने वाले पारिभाषिक शब्दावली की संरचना, बनावट एवं वाक्य के तौर पर इस्तेमाल करने के बारे में बखूबी ढंग से बतलाया। उन्होंने इस बात पर बल दिया कि कोई भी पारिभाषिक शब्द को इस्तेमाल निरंतर करने से सरल एवं सहज लगते हैं। शब्द का उपयोग नहीं किये जाने पर बोझिल, अपरिचित एवं कठिन लगते हैं। इसलिए हमें निरंतर प्रयास करते रहना चाहिए। हिंदी कार्यशाला के दौरान डॉ. निर्माली साइकिया, प्रभारी निदेशक (पीएमडी), श्री एन. मुरली मोहन, वित्त सलाहकार, डॉ एजी. गिरीश, उपनिदेशक (पीपी) एवं अन्य अधिकारीगण एवं कर्मचारीगण उपस्थित थे। श्री राथोड़ मोहन नारायण, हिंदी अनुवादक एवं श्री उबैद मोहम्मद (हिंदी टंकक) ने कार्यक्रम संचालन में सहयोग दिया।



विभिन्न हिंदी प्रतियोगिताओं का आयोजन :

1. हिंदी निबंध लेखन प्रतियोगिता : दिनांक 01-09-2022 को हिंदी निबंध लेखन प्रतियोगिता का आयोजन किया गया। यह प्रतियोगिता केवल हिंदीतर कर्मचारियों के लिए आयोजित की गई थी। इस प्रतियोगिता में श्रीमती थोटा प्रियंका, अवर श्रेणी लिपिक (प्रथम), श्रीमती श्रीलक्ष्मी, आशुलिपिक (द्वितीय) एवं श्रीमती पद्मा, आशुलिपिक ने तृतीय स्थान प्राप्त किया। हिंदी निबंध प्रतियोगिता हेतु दो शीर्षक विषय क्रमशः 1. दहेज प्रथा : हमारे समाज के लिए अभिशाप है कैसे और इसका उन्मूलन। 2. कार्यालयीन कमकाज के दौरान राजभाषा हिंदी में कार्य करने आ रही कठिनाईयां एवं इसका निवारण, जिसमें किसी एक विषय पर प्रतिभागियों को अपनी इच्छानुसार निबंध लिखना था।



हिंदी निबंध लेखन प्रतियोगिता में भाग लेते हुए प्रतिभागी

2. प्रशासनिक शब्दावली एवं हिंदी में टिप्पण एवं मसौदा लेखन प्रतियोगिता : दिनांक 02-09-2022 को 'हिंदी में टिप्पण एवं मसौदा लेखन प्रतियोगिता' का आयोजन किया गया। इस प्रतियोगिता में श्रीमती सैयद नाजिया, कार्यालय अधीक्षक ने प्रथम स्थान प्राप्त किया। डॉ. ज्योति भारद्वाज, सहायक वैज्ञानिक अधिकारी ने द्वितीय पुरस्कार प्राप्त किया। श्री ओमपाल सिंह, सहायक निदेशक ने तृतीय पुरस्कार प्राप्त किया।



प्रशासनिक शब्दावली एवं हिंदी में टिप्पण एवं मसौदा लेखन प्रतियोगिता में भाग लेते हुए प्रतिभागी

3. समूह प्रदर्शन प्रतियोगिता : हिंदी पखवाड़ा मनाये जाने क्रम में दिनांक 05-09-2022 को कर्मचारियों के लिए समूह प्रदर्शन प्रतियोगिता का आयोजन किया गया। तीन प्रतिभागियों का एक समूह था। प्रति समूह को अपनी इच्छानुसार हिंदी में नाट्य, समूह गान या अन्य गतिविधियों पर प्रस्तुती देनी थी। इस प्रतियोगिता में प्रथम पुरस्कार श्रीमती लक्ष्मी एवं ग्रुप, श्री वेंकट रेड्डी ग्रुप (द्वितीय) एवं डॉ. ए.जी गिरीश एवं ग्रुप को तृतीय पुरस्कार दिया गया।



समूह प्रदर्शन प्रतियोगिता में भाग लेते हुए अधिकारी एवं कर्मचारीगण

4. कंप्यूटर पर हिंदी टंकण प्रतियोगिता : दिनांक 06-09-2022 को कंप्यूटर पर हिंदी टंकण प्रतियोगिता का आयोजन किया गया। इस प्रतियोगिता में डॉ. सी. एस. गुप्ता, सहायक वैज्ञानिक अधिकारी ने प्रथम, रोहिल वाडी, एमटीएस (द्वितीय) एवं श्री सैयद विकार अहमद, एमटीएस ने तृतीय पुरस्कार प्राप्त किया।



कंप्यूटर पर हिंदी टंकण प्रतियोगिता में भाग लेते हुए अधिकारी एवं कर्मचारीगण

5. चित्र आधारित कहानी लेखन : दिनांक 12-09-2022 को चित्र आधारित हिंदी कहानी लेखन प्रतियोगिता का आयोजन किया गया। यह प्रतियोगिता केवल हिंदीलक्षर कर्मचारियों के लिए आयोजित की गई थी। इस प्रतियोगिता में प्रतिभागियों को चित्र देखकर कहानी लिखने के लिए दिया गया था, जिसमें श्री सी. रवि कुमार, सहायक वित्त एवं लेखा अधिकारी (प्रथम), श्रीमती जी. ऊषा, अवर श्रेणी लिपिक (द्वितीय) एवं श्रीमती एन. श्रीदेवी, प्रवर श्रेणी लिपिक को तृतीय पुरस्कार मिला।



चित्र आधारित हिंदी कहानी लेखन प्रतियोगिता में भाग लेते हुए अधिकारी एवं कर्मचारीगण

6. हिंदी प्रश्नोत्तरी प्रतियोगिता : दिनांक 12-09-2022 को ही दोपहर बाद हिंदी सामान्य ज्ञान प्रतियोगिता का आयोजन किया था। प्रति प्रत्येक समूह में तीन प्रतिभागी थे और कुल 06 समूह (ग्रुप) ने भाग लिया। प्रशासन अनुभाग (प्रथम), लेखा अनुभाग (द्वितीय), पादप जैवसुरक्षा प्रभाग ने तृतीय पुरस्कार प्राप्त किया।



हिंदी प्रश्नोत्तरी प्रतियोगिता में भाग लेते हुए अधिकारी एवं कर्मचारीगण

प्रतियोगिता में सभी सफल प्रतिभागियों को हिंदी दिवस समारोह के अवसर पर डॉ. सागर हनुमान सिंह, भा.डा.से. महानिदेशक, एनआईपीएचएम ने अपने कर कमलों से नकद पुरस्कार एवं प्रमाणपत्र प्रदान की गई।

हिंदी दिवस समारोह का आयोजन :

दिनांक 14-09-2022 को राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान-हैदराबाद में 'हिंदी दिवस एवं पुरस्कार वितरण समारोह' का आयोजन किया गया। हिंदी दिवस एवं पुरस्कार वितरण समारोह की अध्यक्षता डॉ. सागर हनुमान सिंह, भा.डा.से., महानिदेशक-एनआईपीएचएम ने की। हिंदी दिवस कार्यक्रम का शुभारंभ मंचस्थ अधिकारियों द्वारा दीप प्रज्वलन से की गई एवं राजभाषा हिंदी संगीत वीडियो की प्रस्तुति से की गई।



उन्होंने हिंदी पखवाड़ा-2022 के दौरान आयोजित हिंदी विभिन्न प्रतियोगिताओं में सफल प्रतिभागियों को अपने कर-कमलों से नकद पुरस्कार एवं प्रमाणपत्र वितरित कीं।



महानिदेशक द्वारा विभिन्न प्रतियोगिताओं में सफल प्रतिभागियों को नकद पुरस्कार एवं प्रमाणपत्र प्रदान करते हुए

महानिदेशक ने समारोह में उपस्थित अधिकारियों एवं अतिथि वक्ता श्रीजयशंकर प्रसाद तिवारी, भूतपूर्व सहायक निदेशक, केन्द्रीय हिंदी प्रशिक्षण, उप-संस्थान, सिकंदराबाद को हिंदी दिवस की हार्दिक शुभकामनाएं दीं। उन्होंने कर्मचारियों को संबोधित करते हुए कहा कि भाषा अपने विचारों, आचारों एवं अभिव्यक्ति को व्यक्त करने का माध्यम है। कोई भी भाषा कठिन नहीं होती है। यदि सीखने की ललक हो एवं ईमानदारी के साथ निरंतर प्रयास किया जाए, तो सहजतापूर्वक सीखा जा सकता है। संस्थान में प्रत्येक तिमाह के अन्तराल पर कार्यशाला का आयोजन किया जाता है, जिसमें कर्मचारी भाग लेकर अपने हिंदी कार्यसाधक ज्ञान में संवर्द्धन कर सकते हैं। अपनी समस्याओं को वक्ता के समक्ष बेझिझक बोल सकते हैं।

संस्थान के प्रभारी रजिस्ट्रार डॉ. विधु कांपुरत पी. ने संस्थान की राजभाषा हिंदी की गतिविधियों के बारे में अवगत कराया। उन्होंने कहा कि संस्थान में राजभाषा विभाग, गृह मंत्रालय, भारत सरकार, नई दिल्ली द्वारा जारी प्रति वर्ष वार्षिक कार्यक्रम के दिशानिर्देशों के अनुसार हिंदी के क्रियान्वयन हेतु प्रयासरत् है एवं निर्धारित लक्ष्यों को हासिल कर रहा है। समय-समय पर राजभाषा विभाग, गृह मंत्रालय, भारत सरकार, नई दिल्ली द्वारा निर्धारित प्रशिक्षण पाठ्यक्रमों के लिए कर्मचारियों को नामित किया जाता है। ताकि, वे प्रशिक्षण प्राप्त कर कार्यालयीन कामकाज को राजभाषा हिंदी में सुचारू रूप से कर सके एवं उनके कार्य-क्षमता एवं कुशलता वृद्धि में हो।



अतिथि वक्ता ने अपने संबोधन में कहा कि कोई भी व्यक्ति अपनी मातृभाषा में अपनी अभिव्यक्ति को सहजता से व्यक्त करता है। लेकिन, दूसरी भाषा सीखने की बात होती है, ये व्यक्ति या कर्मचारी के निरंतर सीखने पर निर्भर करता है। उन्होंने कहा कि आज के प्रौद्योगिकी युग में भाषा सीखना एवं टाईपिंग करना अब कठिन नहीं रह गया। हमारे लिए कंप्यूटर पर कई एप्लीकेशन उपलब्ध हैं, जिसकी सहायता एवं सामान्य प्रशिक्षण लेकर सीखा जा सकता है। उन्होंने इस बात पर बल दिया कि हिंदी के साथ अन्य भारतीय भाषाओं एवं बोलियों का भी विकास होना चाहिए, जिससे की हमारी संस्कृति और भी सशक्त एवं समृद्ध बने।

इस हिंदी दिवस समारोह में डॉ. निर्माली साईकीया, प्रभारी निदेशक(पीएमडी) एवं संयुक्त निदेशक (रसायन), वित्त सलाहकार श्री एन. मुरली मोहन एवं श्री शेख लियाकत अली अहमद, सहायक निदेशक (आईसीटी) तथा अन्य वरिष्ठ अधिकारी एवं कर्मचारीगण उपस्थित थे। हिंदी अनुवादक श्री राथोड़ मोहन नारायण ने उपस्थित अधिकारियों एवं कर्मचारियों का धन्यवाद ज्ञापित किया। हिंदी टंकक श्री उबैद मोहम्मद ने कार्यक्रम संचालन में सहयोग दिया।



राजभाषा शील्ड पुरस्कार :

संस्थान में वित्तीय वर्ष 2021-22 हेतु राजभाषा हिंदी में बेहतर कार्य निष्पादन करने वाले प्रभागों को राजभाषा शील्ड योजना के तहत वनस्पति स्वास्थ्य अभियांत्रिकी (पीएचई) को प्रथम एवं पादप जैवसुरक्षा प्रभाग (पीबीडी) को द्वितीय राजभाषा शील्ड पुरस्कार प्रदान किया गया।



महानिदेशक द्वारा राजभाषा हिंदी में बेहतर कार्य निष्पादन करने वाले प्रभागों को राजभाषा शील्ड प्रदान करते हुए

प्रोत्साहन योजना पुरस्कार :

हिंदी दिवस के अवसर पर वर्ष 2021-22 हेतु प्रोत्साहन योजना के तहत कार्यालयीन कामकाज के दौरान दस हजार हिंदी शब्द या इससे अधिक लिखने वाले कर्मचारियों को अधिकतम हिंदी शब्दों की गणना के अनुसार नकद पुरस्कार प्रदान किया गया। जिसमें डॉ. विधु कांपुरत पी. प्रभारी रजिस्ट्रार एवं संयुक्त निदेशक (पीएचई) को प्रथम पुरस्कार, श्रीमती टी श्रीदेवी, वैज्ञानिक अधिकारी (द्वितीय), श्री सी रवि कुमार, सहायक वित्त एवं लेखा अधिकारी (द्वितीय) एवं डॉ. जी. बेबी रानी, सहायक वैज्ञानिक अधिकारी को तृतीय पुरस्कार प्रदान किया गया।



महानिदेशक द्वारा प्रोत्साहन योजना पुरस्कार प्रदान करते हुए

संस्थान के गतिविधियों को हिंदी समाचार पत्रों में प्रकाशन :

संस्थान की गतिविधियों के प्रचार-प्रसार हेतु 'हिंदी दिवस, पुरस्कार वितरण समारोह-2022' कार्यक्रमों को हैदराबाद से प्रकाशित दैनिक समाचार पत्र 'हिंदी मिलाप' में प्रकाशित किया गया। इसके अलावा, हिंदी कार्यशाला एवं हिंदी पखवाड़ा-2022 के दौरान आयोजित समस्त प्रतियोगिताओं एवं अन्य कार्यक्रमों को हिंदी में प्रकाशित किया गया।

हिन्दी मिलाप

एनआईपीएचएम में विभिन्न प्रतियोगिताएँ आयोजित

हैदराबाद, 3 सितंबर-(मिलाप ब्यूरो) राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान में हिंदी पखवाड़ा-2022 मान्य जाने के क्रम में आज अधिकारियों एवं कर्मचारियों के लिए हिंदी में टिप्पण एवं मसौदा लेखन प्रतियोगिता और हिंदी निबंध लेखन प्रतियोगिता का आयोजन किया गया। संस्थान राजभाषा नीति के उपयोजिता, हिंदी के कार्यान्वयन एवं कार्यालयीन कामकाज में राजभाषा हिंदी

को बढ़ावा देने के लिए प्रयासरत है। प्रतिभागियों को दैनिक सरकारी कामकाज में प्रयुक्त हिंदी मसौदा लेखन जैसे कार्यालय आदेश, परिपत्र एवं आदेश आदि के मसौदा लेखन लिखने के लिए प्रश्न-पत्र दिए गये।

हिंदी निबंध लेखन प्रतियोगिता देखेज प्रथा हमारे समाज के लिए अभिशाप है कैसे और इसका उन्मूलन,



एनआईपीएचएम में आयोजित प्रतियोगिता का दृश्य।

राजभाषा हिंदी में कार्य करने में आ रही कठिनाइयाँ एवं इसका निवारण विषयों पर आयोजित की गईं। विकल्प के तौर पर प्रतिभागियों को अपनी इच्छानुसार दो विषयों में से किसी एक पर निबंध लिखना था। इन प्रतियोगिताओं में अधिकारियों एवं कर्मचारियों ने उत्साह के साथ बड़-बड़कर भाग लिया।

पखवाड़े के दौरान आयोजित प्रतियोगिताओं में सफल प्रतिभागियों को 14 सितंबर को हिंदी दिवस एवं हिंदी पखवाड़ा समारोह के अवसर पर नगद पुरस्कार एवं प्रमाण-पत्र प्रदान किये जायेंगे। इन प्रतियोगिताओं का संचालन एवं आयोजन संस्थान के हिंदी अनुभाग द्वारा किया गया।

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हिन्दी मिलाप

एनआईपीएचएम में हिन्दी कार्यशाला आयोजित

हैदराबाद, 30 अगस्त-(मिलाप ब्यूरो) राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान, हैदराबाद में प्रादेशिक डॉ. सागर हनुमान सिंह, भा. डा. से. की अध्यक्षता में हिन्दी कार्यशाला का आयोजन किया गया। अलग-अलग बतौर इस विद्यार्थी के अनुपम, संस्थान के हिन्दी अधिकारी विद्यार्थी सागर साह ने मंचाध्य



राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान, हैदराबाद में आयोजित हिन्दी कार्यशाला का दृश्य।

अधिकारियों सहित सभी अधिकारियों एवं कर्मचारियों का स्वागत किया। उन्होंने हिन्दी पखवाड़ा के दौरान आयोजित होने वाली विभिन्न हिन्दी प्रतियोगिताओं के बारे में बताया।

विदेशिक (पीसीडी) एवं प्रभारी निदेशक (पीएचएम) डॉ. जे. एन. एन. आर. पी. सुजीता ने कर्मचारियों को काफ़ी हिन्दी कार्यशाला का अधिक से अधिक लाभ उठाएँ। साथ ही सरकारी कामकाज में राजभाषा हिन्दी का इस्तेमाल करते हुए दैनिक कार्य व्यवहार में भी हिन्दी में बोलें। कर्मचारियों को पखवाड़ा के दौरान आयोजित हिन्दी प्रतियोगिताओं में भाग लेना चाहिए। यह प्रतियोगिता कर्मचारियों के लिए सीखने का अच्छा अवसर है। उन्होंने कहा कि संस्थान में राजभाषा विभाग, 700 मंगलम, नई दिल्ली द्वारा जारी राजभाषा संरक्षी नीति, दिना-निर्देशों एवं विद्यार्थी का क्रियाव्यवहार करते हुए एवं 'ग' श्रेण तक विद्यार्थी लक्ष्य को प्राप्त किया जा रहा है। साथ ही परभारतीयव्यवहार के कर्मचारियों को निर्धारित हिन्दी पाठ्यक्रम परिचय दिया जा रहा है।

विस्तार प्रयास करते राजा पहिले। अक्सर पर डॉ. निमिती सखिया (प्रभारी निदेशक, पीएचएम), एन. सुजो मोहन (विभागाध्यक्ष), डॉ. ए.जी. विरेश (अपरनिदेशक, पीसी), अन्य अधिकारियों एवं कर्मचारी उपस्थित थे। आर. मोहन नारायण (हिन्दी अनुवादक) एवं डॉ. विद्यादेव (हिन्दी ट्यूटोर) ने कार्यक्रम संचालन में सहयोग दिया। हिन्दी अधिकारियों ने भव्यवादा शक्ति किया।

अतिथि बतलाया मोहम्मद कागालुदीन (सहायक निदेशक, केन्द्रीय हिन्दी अनु-निदेशक संस्थान, विद्यादेव) ने सरकारी कामकाज के दौरान राजभाषा हिन्दी में बतलाया इस्तेमाल होने वाले पारिभाषिक शब्दावली को संचालन, बनवाते एवं वाक्य के तौर पर इस्तेमाल करने के बारे में बताया। उन्होंने इस बात पर बत दिया कि किसी भी पारिभाषिक शब्द का इस्तेमाल निवार करने से वह सरल एवं सहज लगते हैं। शब्द का उपयोग नहीं किये जाने पर अधिकतर अवर्तित एवं कठिन लगते हैं। इसे

Happy Birthday

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भादवा सुदी द

'हिंदी मिलाप' समाचार पत्र में छपी खबरों की कतरन

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