


## From the Director General's Desk



**G. Jayalakshmi, IAS**  
**Director General**

Agricultural input management is the key factor not only for maintenance of ecological balance and preserving natural ecosystem biotic equilibrium but also for sustainable agriculture and safe food production. In the recent years, many lessons are learnt due to excessive use of inputs such as chemical fertilizers and pesticides, experiencing depletion of soil qualities, pest resistance and secondary pests out breaks, and hence, farmers are slowly shifting towards natural farming, an ecological farming approach, where natural products prepared from biological or mineral sources are used for crop production and protection. NIPHM has initiated an investigation on a small scale to evaluate the products available in the market for the presence of microbes such as *Trichoderma viride*, *T. harzianum* (antagonistic fungi), *Pseudomonas flourescens* (antagonistic bacteria) and Entomopathogenic fungi such as *Metarhizium anisopliae*, *Beauveria bassiana* or *Verticillium lecanii*, which are proven to be established bio-pesticides. I hope and believe that these initiatives of the institute will be able to reach to all the stakeholders especially to the farming community through ICAR / SAU's / Department of Agriculture of the states through their NIPHM trained scientist/professionals.

  
(G. Jayalakshmi, IAS)  
Director General

## WHAT'S INSIDE

### Theme Article Page 2-4

- Natural Products – A Study to Understand the Presence of Useful Microbes with Pesticidal activity

### Special Event Page 5-7

- Convocation of 2<sup>nd</sup> batch of PGDPHM (off campus), Kerala
- International training programme on Phytosanitary Treatment for Nepal Officials

### Capacity Building Page 8-13

- Plant Bio-security
- Plant Health Management
- Pesticide Management
- Plant Health Engineering
- Vertebrate & Urban Pest Management

### NIPHM Activities Page 14-16

- Participation in Exhibitions
- Alumni Forum
- Republic Day & Women's Day Celebrations

**Theme Article: Natural Products – A Study to Understand the Presence of Useful Microbes with Pesticidal activity**

Smt. T. Sridevi, SO(R&NMA), Dr. Nirmali Saikia, AD(PM & RA), Dr. Ch. Sreenivasa Rao, Director (PMD)

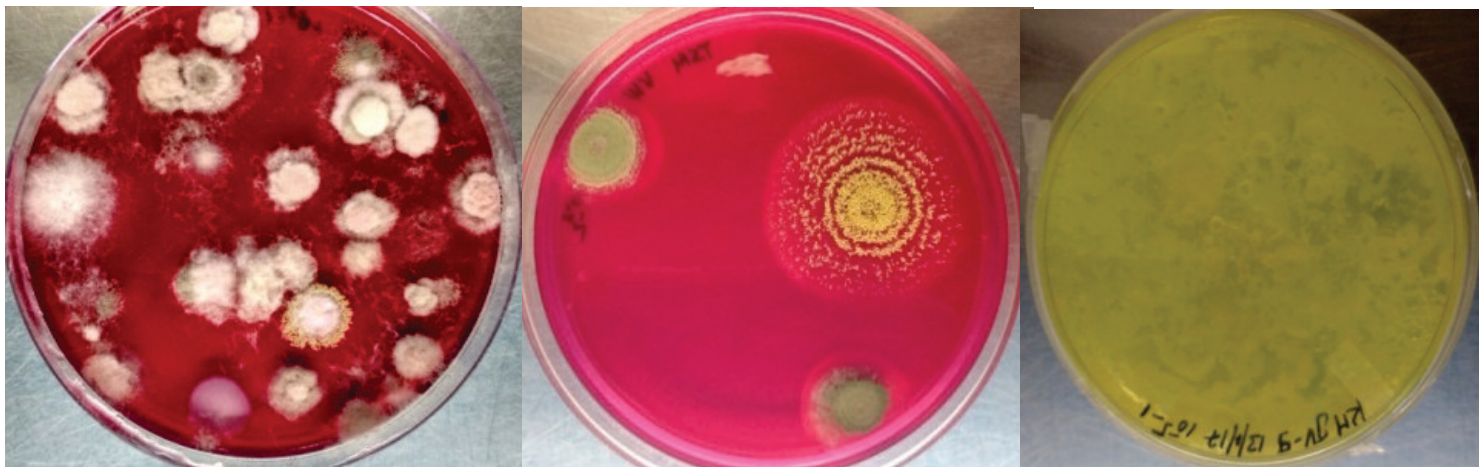
Organic or natural farming has been practiced since ancient times and considered to be native of India. In the divine scripts, the use of *panchagavya* the combination of five ingredients, dung, urine, cow milk, curd and ghee, from Indian native cow is prescribed in order to enhance soil fertility and plant vigour, enabling the crop to fight against the pest from within its own system. But, with the advent of green revolution the use of chemical or synthetic pesticides up surged to protect the yield losses and feed the large population and so the organic farming took a backseat. However, the continuous use of chemical pesticides has proved to be hazardous to environment and human health and thus the use of organic natural products resurfaced. Farmer with his own knowledge is preparing different concoctions and using them for crop claiming improved growth due to their application. These natural products are a combination of compost soil, certain leaves, cow dung, cow urine, Ghee, fermented curd and milk of native Indian breed cows.

These Concoctions are used in different forms, as foliar spray, soil application along with irrigation water, seed or seedling treatment. There are certain findings on the increased soil fertility and enhanced biological efficiency of crop due to application of natural concoctions such as Panchagavya, pest repellence and disease resistance due to Sanjibani and cow urine. Based on all these claims, a study was taken up to search for the existence of any beneficial micro-organisms that act as bio-pesticides in these farmer prepared concoctions. We investigated for the presence of microbials such as *Trichoderma viride*, *T. harzianum* (antagonistic fungi), *Pseudomonas fluorescens* (antagonistic bacteria) and Entomopathogenic fungi such as *Metarhizium anisopliae*, *Beauveria bassiana* or *Verticillium lecanii*, which are proven to be established bio-pesticides.

The samples were collected from practicing traditional organic farmers from various locations of Andhra Pradesh and Telangana regions which are called with different names such as *Brahmastram*, *Dasagamyastra*, *Jeevamrutam*, *Panchagavya*, *Cow pat pit*, *Ghana Jeevamrutham* etc. Isolation of beneficial micro-organisms was carried out by serial dilution method followed by pour plate technique. Three different types of media i.e., *Trichoderma* Specific Medium (TSM) for *Trichoderma* spp., Kings B for *Pseudomonas fluorescens* and Saborauds Dextrose Agar with yeast (SDAY) for entomopathogenic fungi were used. Identification of the micro-organisms was done by morphological characterization using visual and microscopic observation.

Out of the 25 samples of natural concoctions, 14 have shown the presence of one or more of the beneficial micro-organisms. Among them, *Trichoderma* spp. were the most common isolates followed by *Metarhizium anisopliae*, *Beauveria bassiana* and *Pseudomonas fluorescens*. The beneficial microbials were found majorly in, Jeevamrutha and Ghanajeevamrutha. Other natural concoctions such as gobanam, dashaparini kashayam, panchagavya, brahmastram, cocopit, vermiwash and sour buttermilk also have shown the presence of microbials.

*Trichoderma* spp., are majorly isolated from natural products in which fertile soil is a key ingredient. *Trichoderma* spp. are free-living filamentous fungi associated with soil and root ecosystems. Hence, it is presumed that, these antagonistic fungi in the fertile soil might be the source for their build up and this could impart antifungal properties to these natural products.



Natural products, cow pat pit and vermiwash showing presence of *Trichoderma* spp.

Isolates of *Pseudomonas* spp. in Jeevamrutham

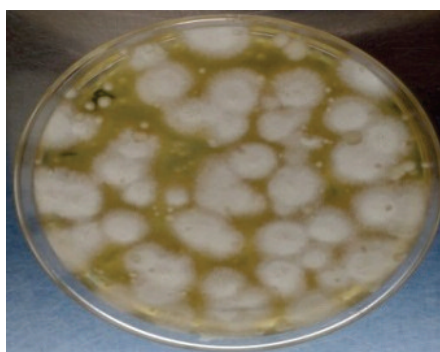


Summary of the results of screening of Organic Natural Products or Concoctions for Presence of Beneficial microorganisms shown in below table:

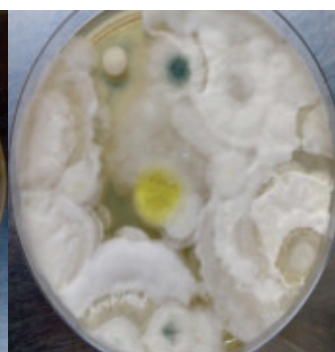
S.No.	Name of the Product	Trichoderma on TSM		Pseudomonas on Kings B Medium		Beauveria/ Metarhizium/ or other Entomopathogenic Fungi on SDAY Medium	
		Presence	CFU Observed (CFU/g)	Presence	CFU Observed (CFU/g)	Presence	CFU Observed (CFU/g)
1	Brahmastram-I	-ve	Nil	-ve	Nil	-ve	Nil
2.	Dasagamyashtra	-ve	Nil	-ve	Nil	-ve	Nil
3.	Jeevamruta-I	+ve	1 X 10 <sup>3</sup>	-ve	Nil	+ve	1 X 10 <sup>3</sup> ( <i>Metarhizium spp.</i> )
4	Gomutram	-ve	Nil	-ve	Nil	-ve	Nil
5	Cow pat it	+ve	11 X 10 <sup>3</sup>	-ve	Nil	+ve	1 X 10 <sup>6</sup> ( <i>Metarhizium spp.</i> )
6	Panchagavya-III	-ve	Nil	-ve	Nil	-ve	Nil
7	Brahmastram-II	-ve	Nil	-ve	Nil	-ve	Nil
8	Gobaanam	+ve	3X10 <sup>2</sup>	-ve	Nil	+ve	4 X 10 <sup>3</sup> ( <i>Metarhizium spp.</i> )
9	Fishamine	-ve	Nil	-ve	Nil	-ve	Nil
10.	Tutakula Kashayam	-ve	Nil	-ve	Nil	-ve	Nil
11.	Ghanaa Jeevamruta	+ve	1 X 10 <sup>4</sup>	-ve	Nil	+ve	2X10 <sup>4</sup> ( <i>Metarhizium spp.</i> )
12.	Dashaparini Kashayam	-ve	Nil	-ve	Nil	-ve	Nil
13.	Brahmastram-III	+ve	1 X 10 <sup>2</sup>	-ve	Nil	-ve	Nil
14.	Agniastram	-ve	Nil	-ve	Nil	-ve	Nil
15.	Fish Aminoacid II	-ve	Nil	-ve	Nil	-ve	Nil
16.	Jeevamruta-II	+ve	1 X 10 <sup>3</sup>	-ve	Nil	+ve	1 X 10 <sup>6</sup> ( <i>Metarhizium spp.</i> )
17.	Ghana Jeevamrutha-II	+ve	2X10 <sup>5</sup>	-ve	Nil	+ve	3 X 10 <sup>5</sup> ( <i>Metarhizium spp.</i> )
18.	Panchagavya -IV	-ve	Nil	+ve	2 X 10 <sup>4</sup>	-ve	Nil
19.	Jeevamruta-III	+ve	1X10 <sup>3</sup>	+ve	6 X 10 <sup>1</sup>	+ve	1X10 <sup>4</sup> ( <i>Metarhizium spp.</i> )
20.	Jeevamrutha-IV	+ve	1X10 <sup>1</sup>	-ve	Nil	+ve	2 X 10 <sup>2</sup> ( <i>Metarhizium spp.</i> )
							3X10 <sup>1</sup> ( <i>Beauveria spp.</i> )
21.	Jeevamrutha-V	-ve	Nil	-ve	Nil	+ve	5X10 <sup>5</sup> ( <i>Beauveria spp.</i> )
22.	Vermiwash	+ve	3X10 <sup>2</sup>	-ve	Nil	+ve	1X10 <sup>3</sup> ( <i>Metarhizium spp.</i> )
23.	Panchagavya – V	-ve	Nil	-ve	Nil	-ve	Nil
24.	Dashaparini Kashayam	-ve	Nil	-ve	Nil	+ve	6X10 <sup>3</sup> ( <i>Beauveria spp.</i> )
25.	Sour Buttermilk	-ve	Nil	-ve	Nil	+ve	9X10 <sup>2</sup> ( <i>Beauveria spp.</i> )

It is noticed that, the commercially available preparations of panchagavya or probiotics in the market could not yield positive results with respect to the presence of micro-organisms under study. However, the presence of micro-organisms in the natural concoctions prepared by organic farmers is only, up to 102 to 104 dilutions, unlike the commercial formulations of bio-pesticides for which the minimum requirement of CFU for effective control of pathogens is presence of one or two colonies in 106 or 108 dilutions. Hence, it may be suggested that the single application of these natural products may not yield in significant results in controlling the pest or disease and repeated application is required to help in building up of inoculum of beneficial microorganisms.

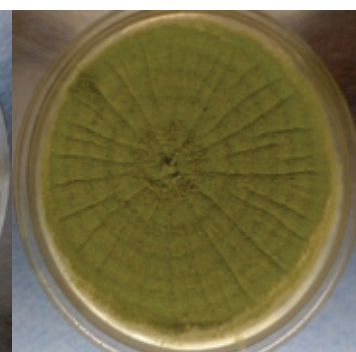
The presence of *Pseudomonas fluorescens*, in the natural products was investigated by inoculating the natural products on the King's B Medium and observing the colonies for development of any fluorescence. In our



Isolates of *Beauveria bassiana*



Colonies of *Metarhizium*



Pure culture of *Metarhizium*

findings, only two samples, panchagavya and jeevamrutha have shown the presence of *Pseudomonas* spp. Out of several samples of jeevamrutha, ghana jeevamrutha and panchagavya collected from different regions of A.P and Telangana, only two samples have shown the presence of *Pseudomonas* spp, which may be attributed to the soil type used for the preparation of these samples. There are studies that suggest that the natural occurrence of *Pseudomonas* fluorescens depend upon the soil type, the suppressive soils being the more natural habitats. Soils in which the pathogen does not establish or persist, establishes but causes little or no damage, although the pathogen persists in the soil are called suppressive soils. In the suppressive soil, fluorescent pseudomonads could be detected to a depth of 1 m; suppression was readily transferred by addition of 5% or more suppressive soil to a conducive soil. Hence, it is suggestive that the kind of soil used in the preparation influences the existence of this rhizobacterium in the natural concoctions.

The samples, jeevamrutham, ghana jeevamrutham, vermiwash, gobanam, dashaparini kashayam and Sour butter milk have shown the presence of the entomopathogens, *Basillus bassiana* and *Metarhizium anisopliae* on SDAY medium. However, the presence of *B. bassiana* in natural products is comparatively lower than the occurrence of *M. anisopliae*. Several studies suggest that *M. anisopliae* is more common in cultivated habitats, as it is relatively tolerant to pesticides. It is suggested that *B. bassiana* requires frequent serial passage through insects to survive, and scarcity of hosts in heavily cultivated areas makes the presence of this entomopathogen relatively low. In contrast, *M. anisopliae* conidia are capable of longer-term persistence in the absence of arthropod hosts and have a higher survival rate in the soil than *B. bassiana*.

## Conclusion

It is claimed that the natural products are improving pest and disease tolerance and enhanced crop production. However, when tested for the presence of beneficial micro-organisms these natural products, especially the products available in the market, these products fall short of the established commercial microbial bio-pesticides with respect to the CFU count. This suggests that repeated application of these products may enhance the crop production and single application may not impart significant resistance to pests and diseases. Application of poor and adulterated organic inputs loses the confidence of the farmers on organic farming due to their poor performance. Hence, regulation is needed especially for marketing of farmer prepared natural products, bio-fertilizers and bio-pesticides. Compost soil is one of the ingredients in the preparation of natural products, and this may be the source for the occurrence of the beneficial micro-organisms in the natural products. However, the type of soil used and the method of preparation play a major role for the existence of these micro-organisms. The natural products prepared by farmers can fit into the definition of plant bio-stimulants or bio-enhancers, substances that enhance nutrition efficiency, abiotic stress tolerance and/or crop quality traits. However, study on virulence or pathogenicity of the fungal isolates obtained from the natural products against the pests and diseases can only prove the efficacy of these natural products.

## References

- Cook, R. J., and K. F. Baker. 1983. The nature and practice of biological control of plant pathogens. The American Phytopathological Society, St. Paul, Minn.
- Natarajan, K., (2002). Panchagavya—A Manual. Other Indian Press, Mapusa, Goa, India, pp: 333.
- Quesada-Moraga E, Navas-Cortes JA, Maranhao EAA, Ortiz-Urquiza A, Santiago-Alvarez C., 2007. Factors affecting the occurrence and distribution of entomopathogenic fungi in natural and cultivated soils. Mycological Research 111: 947-966.
- Stutz, E.W., Defago, G., and Kern, H. 1986. Naturally occurring pseudomonads involved in suppression of black rot of tobacco. Phytopathology 76(2): 181-185.
- Swaminathan, C., Swaminathan, V. and Vijayalakshmi, K, 2007. Panchagavya Boon to Organic Farming, First edition, International Book Distributors Lucknow, 20-63.
- Vanninen I. 1996. Distribution and occurrence of four entomopathogenic fungi in Finland: Effect of geographical location, habitat type and soil type. Mycological Research 100: 93-101.
- Vanninen I., Tyni-Juslin J., and Hokkanen H, 2000. Persistence of augmented *Metarhizium anisopliae* and *Beauveria bassiana* in Finnish agricultural soils. Biocontrol 45: 201-222.



## Convocation of 2<sup>nd</sup> batch of Post Graduate Diploma in Plant Health Management Programme (off campus)

2nd Batch of PGDPHM off-campus programme organised jointly by NIPHM, Hyderabad and SAMETI, Kerala was concluded and 33 Agricultural officers from Department of Agriculture, Kerala received the Diploma Certificates. The convocation was held at SAMETI, Kerala on 4th April, 2017. The function was attended by Smt. G. Jayalakshmi IAS, Director General NIPHM, Smt. V. Usha Rani IAS, former Director General, NIPHM, Sri. Raju Narayana Swami IAS, Agricultural Production Commissioner, Kerala, Sri. Biju Prabhakar IAS, Director of Agriculture, Kerala, Dr. Vijayalakshmi, Director, PHM Division, NIPHM, Dr. P. Rajasekharan, Chief, Agriculture Division, Kerala State Planning Board, Smt. Radhamani, Director, SAMETI and many other dignitaries. During the function, certificates and silver medals are given to the officers who excelled in academics with maximum OGPA. In addition to this, three cash awards was awarded by NIPHM to three meritorious officers based on the research work carried out and also on their role in the popularization of NIPHM technologies among the farmers, self help group etc.



## International training Programme on Phytosanitary Treatments

A 15 day duration training programme was organized from 9<sup>th</sup> - 23<sup>rd</sup>, January, 2017 and total 30 participants from various pest control organizations and fumigation service providers were trained. The participants learnt use of approved fumigants, their physical and chemical properties, safety precautions to be followed while handling fumigants, modes of action of fumigant, principles of fumigation, monitoring the fumigant concentration, appropriate use and maintenance of fumigants and safety equipment's. The participants were able 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 Directorate of PPQ&S. The participants had hands-on practical experience in creating gas-tight enclosure, laying gas supply and monitoring lines, use of vaporizer, leak detector and gas concentration monitor.





## International training programme on Phytosanitary Treatment for Nepal Officials

Plant Quarantine is the first line of defense in Plant Protection. The global movement of plants and plant material has a primary requirement of pest freedom. Hence, the phytosanitary measures are required to be in place to prevent the entry of exotic pests into the country thereby saving the agricultural economy from the ravages in these pests. NIPHM organized a training programme on Phytosanitary treatments for the officials of Ministry of Agricultural Development, Nepal from 19<sup>th</sup> -28<sup>th</sup> March, 2017. Ten officials from Nepal were trained on various aspects of Plant Quarantine and different Phytosanitary treatments. The participants learnt use of approved fumigants, their physical and chemical properties, safety precautions to be followed while handling fumigants, principles of fumigation, monitoring the fumigant concentration, and Forced Hot Water Treatment. The participants had hands-on practical experience in creating gas-tight enclosure, laying gas supply and monitoring lines, use of vaporizer, leak detector and gas concentration monitor.



## Training Cum Workshop on Training Methods

NIPHM has organized a training-cum-workshop on training methods for the newly recruited faculty and research fellows from 6<sup>th</sup> to 10<sup>th</sup> February, 2017. In the training programme, the trainees were given practice on training process, learning principles, participative method and enumerated cluster traits of effective speaker. The participants were also involved in other activities like watching of video on the presentation secrets of Mr. Steve Jobs, Apple (Computer) founder, lesson plan writing, presentations, analysis of caselet on a trainer, differentiation between inductive and deductive approach, differentiation between a teacher and facilitator, exercise on eye contact, playing game, dancing & singing to overcome the stage fear and for developing gestures and voice modulation. The presentations of participants' were documented through a video for self-feedback and also for repository and retrieval.



## Annual Group Meeting of All India Coordinated Research Project (AICRP) on Nematodes at Kolkata, West Bengal

The annual technical meet of All India Coordinated Research Project (AICRP) on Nematodes of ICAR was held from 24<sup>th</sup> to 25<sup>th</sup> February, 2017 at Kolkata. During the meeting, Dr. Sunanda B.S. (ASO- Nematology) has presented the proposed annual research action plan for AICRP nematode Centre of NIPHM, Hyderabad. During the meetings, approval was given to the NIPHM centre for conducting the survey in Telangana State for mapping the diversity of nematodes in the state. In addition to this, development of suitable nematode disease management practices was also assigned.





## Management of Nematode problem in Rashtrapati Bhavan, New Delhi

NIPHM has got the rare opportunity to visit the Presidential Garden, New Delhi to diagnose the nematode infestation in fruits and ornamental crops of Rashtrapati Bhavan. ASO (Nematology) NIPHM has visited the flowers, fruits and vegetable gardens of the Secretariat Rashtrapati Bhavan, New Delhi from 6th to 14th March, 2017 for the diagnosis of plant parasitic nematode infestation in different crops. The soil samples and infested plants were collected for analysis of nematode infestation. Root Lesion nematodes

(*Pratylenchus penetrans*) and Root Knot Nematode (*Meloidogyne incognita*) were isolated from the roots of plants. The management practices to be followed were also conveyed for the suppression of nematode infestation.



## Visit to the farm of Hon'ble Chief Minister, Telangana State (KCR farm)

A visit was conducted by ASO (Nematology) NIPHM on 28<sup>th</sup> February, 2017 to the farm of Honourable Chief Minister at Erravelli, Gadwel, Telangana State for the diagnosis of nematode diseases in vegetable crop grown under polyhouse conditions. The soil samples and infested plants were brought to the laboratory for the analysis of nematode infestation. The nematodes were isolated and identified as the Root Knot Nematode (*M.incognita*). The management practices were suggested for the nematodes.



## Nematode Awareness Day

NIPHM has initiated special training programmes for the Horticultural officials of the State Governments on 'Management of Nematode Diseases in Poly house and Fruit Crops'. In this regard, as per the request of the Deputy Director of Horticulture, Karnataka, Nematode Awareness Day was organised by ASO (Nematology) NIPHM from 4<sup>th</sup> to 5<sup>th</sup> February, 2017 at Dharwad, Karnataka. More than 65 farmers and 45 Horticulture officials have participated in the workshop. During the workshop, participants were sensitized about the restriction of quarantine nematodes as a precautionary measure.

## Visit of NIPHM Officials to Bangladesh

NIPHM officials' viz., Dr. Cherukuri Sreenivasa Rao, Director - Pesticide Management & Plant Biosecurity (i/c) and Dr. K. Susheela, Scientific Officer (PRA) visited Bangladesh from 6<sup>th</sup> to 9<sup>th</sup> February, 2017 to understand National plant health systems in Bangladesh and to foster the stronger relationships between NIPHM and Bangladeshi NPPO with respect to Capacity building. The USDA officials, namely, Ms. Sharon Williams, APHIS Attache and Dr. Tanvir Mahmud Bin Hossain, Agricultural Specialist, FAS-USDA, also participated in the visit.

During the visit, the officials have visited Plant Quarantine Wing & Plant Protection Wing of Department of Agriculture & Extension (DAE), Plant Quarantine Centre at Chittagong Seaport, Bangladesh Agricultural Research Institute (BARI), Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) and Shere-e-Bangla Agricultural University (SAU)





## Capacity Building

### Stored Grain Pests Detection and Identification

Increasing trade in stored grains and stored products is causing alarming biosecurity concerns. The international grain movement is increasingly becoming a contentious issue both for biosecurity protection and market access negotiations. The detection of such pests and precise identification is essential to determine the appropriate Phytosanitary treatment. Fumigation by and large is the most accepted Phytosanitary treatment. In India, fumigation with Phosphine and methyl bromide are accepted treatments.

A twenty one day duration training programme having two built in sub-modules viz. (i) Stored Grain Pests-Detection and Identification & (ii) Phytosanitary Treatment (MBr& ALP) was organized from 02<sup>nd</sup> -23<sup>rd</sup>, January, 2017. A 5 day duration training was organized from 2<sup>nd</sup> – 6<sup>th</sup>, January, 2017 and three participants from Uttar Pradesh, Madhya Pradesh and Jammu & Kashmir were trained. The participants learnt the importance of stored grain pest management in the context of national food security and global grain trade. The trainees also learnt methods of detection and identification of various stored grain insect pests by employing appropriate identification tools, use of pheromones and traps. The significance of Systems Approach in managing the food grains was explained.



### Pest Risk Analysis

A training programmes on 'Pest Risk Analysis' was conducted during 13<sup>th</sup> to 17<sup>th</sup> February, 2017. A total of thirty six participants from various State Department of Agriculture, SAUs, ICAR and DPPQ&S were trained. The participants learnt the importance of International conventions & National regulations, SPS obligations for regulating the trade, based on pest risk analysis. The concept of risk and risk analysis, PRA process for assessing the likelihood of pests being associated with the pathway, transport and its direct and indirect impact in the event of pest establishment, spread and the risk management options to minimize such

events were elaborated. The participants also learnt the importance of PRA for market access for new commodities in the international trade through mock exercises.



### Fruit fly: Surveillance and management

Tephritid fruit flies are responsible for losses in fresh produce as well as considered as major impediment in export of economically important fruits and vegetables. NIPHM organized a five days training programme from 20<sup>th</sup> -24<sup>th</sup>, February, 2017 on 'Fruit fly: Surveillance and management' for 21 officers of DPPQ&S, State Department of Agriculture, SAUs and ICAR. The participants were trained through various lectures & hands-on practices such as fruit fly biology, classification, fruit fly identification, exotic fruit flies and their paths of entry, fruit fly surveillance. More emphasis was given on surveillance, pre-harvest management of fruit flies by employing cultural control, trapping by using baits and lures, biological control agents and sterile insect technique for area-wide management of fruit flies. The participants were also exposed to the strategies to promote export of fresh produce by employing postharvest management measures including phytosanitary treatment and pest free area concept. Practical sessions included preparation of low-cost bottle trap and ME & Cue lure, establishment of traps in the field and collection and identification of fruit flies.





## Capacity Building

### Plant Quarantine National Regulations and Procedures & PQP procedures for imports and exports

As per Article IV of IPPC, each contracting party of IPPC shall make provision for an official National Plant Protection Organization to safeguard the country's agricultural economy and the biodiversity from the ravages of exotic pests. The main responsibilities of public authorities involved are; issuance of Phytosanitary certificates, pest surveillance, pest risk analysis, inspection, disinfestations, post entry quarantine etc. The stakeholders viz., plant quarantine officials, PSC issuing authorities and PEQ inspection authorities, need to acquire appropriate knowledge on plant quarantine regulations, procedures and documentation in order to safeguard Biosecurity and to facilitate safe trade.

A five day duration training programmes on 'Plant Quarantine National Regulations and Procedures & PQP procedures for imports and exports' was conducted from 06<sup>th</sup> to 10<sup>th</sup>, March, 2017. Twenty three participants (13 officials from government and 10 private industry participants) were attended the programme.

The participants learnt the importance of SPS Agreement, International conventions, National Regulations, SOPs on imports and exports. Further, through mock exercises & practical scenarios, the participants learnt the procedures for use of on-line PQIS software and procedures to be followed in import/export of seeds, plants, bulbs, grains, fruits, GMOs, Germplasm and bio-control agents.



### Training to farmers from KVK, Nandad, Maharashtra

Three days training programme was organized for the farmers of KVK, Nandad, Maharashtra on 'On-farm production of biocontrol agents and microbial biopesticides' from 04<sup>th</sup> to 06<sup>th</sup> January, 2017. A total of 18 farmers were trained on the mass production techniques of predators and parasitoids (*Trichogramma* sp., *Bracon* sp., *Chelonus* blackburnii, reduviid bugs, coccinellids, *Chrysoperla* sp. etc.), biopesticides (*Trichoderma*, *Pseudomonas*, NPV, EPF, EPN etc.) and biofertilizers and were made aware of the new concepts of pest management i.e. AESA based PHM in conjunction with Ecological engineering for pest management in the training programme. They were also trained in vermicompost preparation, rodent pest

management, fruit fly trap and lure preparation and pesticide application techniques.



### Training on 'On-farm production of bio-control agents and microbial bio-pesticides to promote AESA based PHM in conjunction with ecological engineering for pest management' for farmers of Tamil Nadu

Five training Programmes were conducted in 'On-farm production of bio-control agents and microbial bio-pesticides to promote AESA based PHM in conjunction with ecological engineering for pest management' for the farmers of Tamil Nadu. The farmers were given training on the mass production of various parasitoids (*Trichogramma* sp., *Bracon* sp., *Chelonus* sp.), predators (*Reduviids*, *Coccinellids*, *Chrysoperla*, etc.), microbial bio-pesticides and bio-fertilizers. They were also familiarized with the vermicompost preparation, pesticide application techniques, rodent pest management, fruit fly traps and lure preparation. In addition they were also taught about the new concepts of pest management i.e. AESA based PHM and Ecological engineering for pest management. A total of 130 farmers attended the programme.



### Farmers Field School Methodology

A five days training programme on 'Farmers Field School (FFS) Methodology' was organized from 9<sup>th</sup> to 13<sup>th</sup> January, 2017. Total 18 officers from different states had participated in the training programme. The participants learned about the agro-ecology and management skills in farmer field. They were also trained on integrated nutrient and pest management.





## Capacity Building

### Field diagnosis and management of plant parasitic nematodes in Horticultural crops

NIPHM has organised training programme on 'Field diagnosis and management of plant parasitic nematodes in Horticultural crops' from 9<sup>th</sup> to 13<sup>th</sup> January, 2017 to the Horticultural officials of Karnataka state. The training programme mainly emphasised on the current status of Plant parasitic nematode problems in India, diagnosis of plant parasitic nematode infestation in horticulture crops, plant parasitic nematodes of quarantine importance, bio-intensive approaches in nematode management, on-farm mass production of Trichoderma and Pseudomonas, and their use in nematode management, introduction to Entomo-pathogenic nematodes (EPN), handling of plant parasitic nematodes and EPN etc. A total of 18 participants from Karnataka have attended the programme.



### Training programme on 'Principals of Plant Health Management' in collaboration with MANAGE

Training programme on 'Principals of Plant Health Management' was organized at NIPHM in collaboration with MANAGE from 1<sup>st</sup> to 3<sup>rd</sup> February, 2017. A total of 25 Agri-entrepreneurs from Telangana state have attended the programme. The participants were trained on various concepts of bio-intensive insect pest management strategies like AESA based PHM, Ecological Engineering and the low cost mass production techniques for natural enemies, microbial biopesticides, entomopathogenic nematodes, biofertilizers etc.



### Fundamentals of Plant Health Management for Plant Health doctors

Twenty one days training programme on 'Fundamentals of Plant Health Management for Plant Health doctors' was organized to the Assistant Professors/ Scientists from different State agricultural Universities of India at NIPHM, Hyderabad from 8<sup>th</sup> to 28<sup>th</sup> February, 2017. The participants were trained on Ecological engineering, AESA and were given hands on practice on mass production techniques of parasitoids, predators and field release of the natural enemies. The mass production of EPN, EPV, EPF, antagonistic fungi and biofertilizers were also covered during the training programme. Classes were arranged on the diagnosis and management of important plant diseases, impact of climate change on crop yield and pest incidence, wild boar management, rodent pest management, vermiculture, preparation of low cost fruit fly traps, plant quarantine, pesticide residue management, pesticide spray techniques etc. In addition to this, institutional visits were also arranged to Various ICAR and SAU institutes to expose them to the latest developments in the field of plant health management. A total of 36 participants including the PGDPHM students (regular), NIPHM have attended the programme.



### Orientation-cum-capacity building program for the Facilitators / Coordinators of DAESI at MANAGE & NIPHM

NIPHM has organised two days 'Orientation-cum-capacity building training programme for the Facilitators / Coordinators of DAESI' in collaboration with MANAGE, Hyderabad from 08 to 09 Feb, 2017 and 07 to 09 March,





## Capacity Building

2017. During the programme, participants were trained on the mass production of various parasitoids (*Trichogramma*, *Bracon* sp., *Chelonus* sp. etc.), predators (*reduviids*, *coccinellids*, *Chrysoperla* sp. etc.) microbial bio-pesticides (*Trichoderma*, *Pseudomonas*, EPF, NPV etc.) and bio fertilizers. They were also trained in vermicompost preparation, seed treatment with microbial bio-pesticides (bio-priming) etc. A total of 67 participants from different states of India have attended the programme.

### Training on "On-farm production of bio-control agents and microbial bio-pesticides to promote AESA based PHM in conjunction with ecological engineering for pest management" for farmers of Andhra Pradesh and Telangana

Three days training programme was organised to farmers of AP and Telangana in 'On-farm production of bio-control agents and microbial bio-pesticides to promote AESA based PHM in conjunction with ecological engineering for pest management' from 22<sup>nd</sup> to 24<sup>th</sup> February, 2017. Farmers were trained on various bio intensive approaches in plant health management like AESA, Ecological Engineering, on-farm production of bio-control agents and microbial pesticides, preparation of vermi-compost, preparation of low cost fruit fly traps etc. A total of 56 farmers from AP and Telangana have attended the programme.



### Training on 'On-farm production of biocontrol agents and microbial biopesticides' for Haryana group farmers

Training programme on 'On-farm production of biocontrol agents and microbial biopesticides' were organised at NIPHM for the farmers from Haryana. The participants were imparted skills and were given hands-on-practice in on-farm production of biocontrol agents, namely, parasitoids viz., *Trichogramma* sp, *Chelonus blackburnii*, *Bracon* sp. and predators such as *Reduviids*, *Anthocorid* bugs, *Chrysoperla* sp., *Coccinellids* and biopesticides such as *Trichoderma*, *Pseudomonas*, Entomopathogenic fungi and Entomopathogenic Nematodes (EPN), biofertilizers (VAM) and vermicompost. A total of 9 participants have attended the programme.

### Training on 'On-farm production of biocontrol agents and microbial biopesticides' to Warangal farmers (Balavikasa NGO, Warangal district)

NIPHM has organised training programme on 'On-farm production of biocontrol agents and microbial biopesticides' to the Warangal farmers on 6<sup>th</sup> and 7<sup>th</sup> March, 2017. The technologies covered under this programme include mass production of parasitoids such as *Trichogramma* sp., *Chelonus blackburnii*, *Bracon* sp., *Goniozus* sp. etc., mass production of predators such as *Chrysoperla* sp., *Reduviids*, *Coccinellids* etc., mass production of microbial biopesticides such as NPV, *Trichoderma*, *Metarhizium*, *Lecanicillium*, *Pseudomonas* etc. and Entomopathogenic nematodes. A total of 26 participants have attended the programme.

### Training programme on 'Entomopathogenic nematodes for the biological control of root grubs in sugarcane' for the technical officers of Vasant Dada sugar industries from Pune District, Maharashtra

The training programme on 'Entomopathogenic Nematodes for the biological control of root grubs in Sugar cane' for the technical officers of Vasant Dada Sugar Industries and progressive farmers from Pune dist. of Maharashtra state was conducted at NIPHM from 15<sup>th</sup> to 17<sup>th</sup> March, 2017. 36 participants including the cane officers and progressive sugarcane growing farmers have participated in this training programme. The participants were given training on rearing of host insects namely, *Corcyra cephalonica* and *Galleria mellonella*, techniques for mass production of EPN,





## Capacity Building

formulation and application methods of EPN and bio-intensive management of root grubs etc.

### Training programme on 'Bio-intensive approaches in Plant Health Management' for officers of VFPC, Kerala

NIPHM has organised training programme on 'Bio-intensive approaches in Plant Health Management' to the officers of Vegetable and Fruit Promotion Council Keralam (VFPC), Kerala from 22<sup>nd</sup> to 24<sup>th</sup> March, 2017. The participants have gained knowledge on use of non pesticide management practices in vegetables and fruit crops like rearing of host insect *Corcyra cephalonica*, mass production of *Trichogramma* sp. and preparation of Trichocards, mass multiplication of egg-larval and larval parasitoids, predators (*Reduviids*, *Coccinellids*, *Chrysoperla* sp. etc.), biopesticides (EPF, NPV, EPN, botanicals), biofertilizers (VAM), preparation of fruit fly lures and vermicomposting. In addition to this, institutional visit to ICRISAT was also organized as a part of training programme. A total of 14 officers from different districts of Kerala have attended the programme.



### Pesticide Formulation Analysis

To develop the capacity in analysts at PTLs, RPTLs, and ITLs, a training programme on Pesticide Formulation Analysis is organized from 08.11.2016-12.01.2017 with 14 participants and from 07.02.2017 to 13.04.2017 with 16 participants, representing Bihar, Haryana, Madhya Pradesh, Jammu & Kashmir, Telangana, Gujarat, Himachal Pradesh and Tamil Nadu states. The participants were acquainted knowledge on principles of pesticide management, instrumental methods of analysis, volumetric methods of analysis and Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025-2005.

The participants learnt using legally valid analytical methods approved by Bureau of Indian Standards and the Registration Committee, Central Insecticide Board for analysis of pesticide formulations. The participants were trained in various techniques and methods of analysis both in volumetric as well as modern analytical instruments viz. Chromatographic (HPLC, GLC) and Spectroscopic (UV-Vis & IR) Techniques.



### Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025:200

To organize and maintenance of documentation records and laboratories as per ISO/IEC 17025:2005, this programme was organized during 02-07 January, 2017. The participants were provided essential knowledge in Introduction to ISO 17025:2005, importance of Accreditation & Quality concepts, maintenance of documentation, importance of various clauses, conducting management review meetings, process of Accreditation, Role and responsibility of Quality Manager followed by group presentation on Adequacy of ABPL Quality Manual.



### Documentation procedures for NABL accreditation for PTLs and PRLs

This programme was aimed and conducted from 24-27 January, 2017 to provide and understand the requirement of SOPs, forms and formats etc. for obtaining NABL accreditation. The participants were trained introduction to Documentation, Organization and Quality Management System, Infrastructure, Housekeeping, Document control, procedure for storage of documentation, nonconformance, corrective and preventive action, conducting internal audits, management reviews, preparation of document (i.e. sample receipt to disposal), report generation, methods of analysis and SOPs, Documentation on Equipment, AMCs and calibration, measurement traceability, Inter laboratory comparisons, conducting Proficiency testing programs etc.

### Appropriate pesticide Application Techniques and Farm Level Storage Structures

The main purpose of pesticide application technique is to achieve maximum efficacy with minimum side effects on



## Capacity Building

non-target organisms. The knowledge on farm level storage structures enhances the farmers to safely store the produce and also can sell it when there is a better market price. 16 participants from 7 different states attended the training programme. The participants gained knowledge on use of spraying techniques and farm level storage practices. Institutional visits of IGMRI and FCI, Cherlapally were also organized to show different storage structures, method of storage and construction specifications of godowns.



### Safe and Judicious Use of Chemical Pesticides

NIPHM organized a training programme on Safe and Judicious use of chemical pesticides from 6<sup>th</sup> to 13<sup>th</sup> March, 2017. Total 12 participants from 2 states attended the training programme. Participants were trained on various aspects like appropriate selection of spraying techniques, dosage requirements, pesticide formulation and their properties, quality control of pesticides, judicious use of rodenticides, safe use of pesticides and precautions to be taken while spraying and storage of pesticides. Practical sessions were organized on application techniques, selection of suitable nozzles, calibration of the sprayers, and their operation.

### 21-days Training on 'Integrated Vertebrate Pest Management':

NIPHM organized a 21-days training on 'Integrated Vertebrate Pest Management' to the ICAR, KVK Scientists, state agriculture officers, agriculture extension functionaries from 04.02.17 to 24.02.17. A total of 12 from states of Tamil Nadu (02), Madhya Pradesh (02), Gujarat (02), Telangana (02), Andhra Pradesh (02), Punjab (01) & Maharashtra (01). They were trained in various aspects such as biology, ecology and integrated management of wild boar, monkey, rodents, birds etc., Indian Wild life act. 1972. Participants were exposed to field situation in assessing the rodent and wild boar damage and studied their ecology.



Hand on experience was given on application of various management techniques at godown and poultry premises.

### 5-days Refresher training on 'Rodent Pest Management

NIPHM organised a 5-days refresher training on 'Rodent Pest Management' to state agriculture officers, agriculture extension functionaries from 04.02.17 to 08.02.17. A total 14 from states of Tamil Nadu (04), Madhya Pradesh (04), Gujrat (02), Jammu & Kashmir (01), Tripura (01), Karnataka (01), Telangana (01) were attended this training. Participants were trained in several basic concepts on rodent management with hands on practicals related to eco-safe, nonchemical management based on village mapping, seasonal calendar, rodent breeding profile in agriculture and horticulture crops.



### 5-days training on 'Vertebrate Pest Management

NIPHM organized 05-day training on Vertebrate Pest Management, to the agriculture extension officials from 06.03.17 to 10.03.17, 2016. A total 07 agriculture officers from states of Tamil Nadu (5), Madhya Pradesh (01), Punjab (01) were imparted the training. The participants were given exposures to different aspects like Indian Wild Life Act., 1972, biology and management of rodents, ungulates, wild boar, birds and their managements. Dr. Vasudeva Rao (Co-coordinator), All India Network Project on Vertebrate Pest Management were invited and rendered their expertise to the participants. The participants were given field exposure on wild boar and rodents damages and their management.





## Participation in National Agripreneurs Convention cum National Agri Startup Exhibition

MANAGE Hyderabad organised a first National Agripreneurs convention from 7 to 9 March 2017 at HMDA Ground, Necklace Road, Hyderabad. To promote the Agripreneurs and Agripreneurship with better networking and business expansion ideas, MANAGE organized Agri Start-ups Exhibition at Hyderabad. The purpose of the Exhibition is to attract Agriculture professionals towards Agripreneurship and Agribusiness activities and also, to create a forum for Agripreneurs to build linkage between the Agripreneurs to develop their businesses through networking. National Institute of Plant Health Management, Hyderabad participated in the National Agripreneurs convention. Activities of all divisions viz. Plant Biosecurity, Plant Health Management, Pesticide Management and Plant Health Engineering were exhibited with live demonstrations.



### Participation in Exhibition

Cyme of Social Development, a Non Government Organization organized three days Rajasthan Srijan from 20<sup>th</sup> to 22<sup>nd</sup> January, 2017 at Jhunjhunu, Rajasthan. National Institute of Plant Health Management have participated in the event and exhibited its low cost technologies including mass multiplication of Biopesticides & Bio control agents, Fruit fly bottle traps, Bio fertilizers, vermitechnology etc. Leaflets (Hindi) describing easy methods for onfarm mass production of biopesticides, fruit fly bottle trap were distributed to the visiting farmers, scholars, scientists, entrepreneurs and others. Some of the farmers have also given their address to get information on various activities and training programmes conducted by NIPHM.



### Alumni Forum

Training Program on Low Cost NIPHM technologies was organized by Mrs. Lisymol sunny Kerala PGDPHM IIInd batch participant at Krishibhavan, Udayamperoor, Ernakulam District, Kerala. Training programme was conducted in connection with crop health management scheme on low cost on farm production of Trichoderma and Fruit fly traps. She demonstrated Trichoderma enriched with cow dung in farmer's field. The preparation was formulated as 90 Kg cowdung + 10 Kg Neemcake + 1 Kg Trichoderma. The enriched cowdung was used for cowpea crop and the farmers were satisfied with good growth and productivity.





### Off-campus programs

- Conducted an off-campus program on "Pesticide Application Techniques" for 26 farmers on 1<sup>st</sup> February 2017 at Amdapur village, Moinabad mandal, Telangana state. The demonstration of the PHE developed equipment was done in farmers field. The media coverage in Namaste Telangana Newspaper on 02.02.2017 about the training programme.
- Conducted an off-campus program on Demonstration and use of NIPHM equipment for 26 farmers on 22nd March 2017 at Amdapur village, Moinabad Mandal, Telangana state.



### Installation of drip irrigation system in NIPHM field

Around 1 acre of NIPHM field, which remained as uncultivated land, was brought under drip irrigation system from January, 2017 successfully. This system is the most efficient method of irrigation that saves water to a great extent and prevents the wastage of water. The cucurbitaceous crops like water melon, ridge gourd, bottle gourd and the solanaceous crops like tomato were now under this drip irrigation system. Cucurbitaceous crops require high amount of water and with the installation of this irrigation system, the fruit quality and yield of the crops was observed to be excellent because of the proper availability of water in the beds.



### Republic Day Celebrations

The 68<sup>th</sup> Republic Day was celebrated by NIPHM trainees, officers and staff with great enthusiasm; Director General NIPHM hoisted the National Flag on this eve.



### International Women's Day Celebrations

The International Women's Day was celebrated at NIPHM. Smt. V. Usha Rani, IAS, Ex-Director General, Dr. K. Vijaya Lakshmi, Director (PHM), Ms. D. Chanchala Devi, Registrar have delivered their message to the women employees who attended the function with zeal and enthusiasm.





## Welcome to NIPHM

Smt. G. Jayalakshmi, IAS (Andhra Pradesh, 1995) has assumed the charge of Director General, NIPHM on 03-04-2017.



Ms. D. Chanchala Devi, Deputy Director, Tribal Welfare, Andhra Pradesh has assumed the charge of Registrar, NIPHM on 01-03-2017.



## राजभाषा कार्यान्वयन समिति की चतुर्थ बैठक एवं हिंदी कार्यशाला आयोजित

दिनांक 30-03-2017 को महानिदेशक, एनआईपीएचएम के निदेशानुसार श्रीमती डी. चंचला देवी, रजिस्ट्रार की अध्यक्षता में वर्ष 2016-17 हेतु राजभाषा कार्यान्वयन समिति (राकास) की चतुर्थ बैठक आयोजित हुई। बैठक में रजिस्ट्रार के समक्ष अक्टूबर-दिसंबर, २०१६ 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 पर सराहना की एवं आगे भी इस धारा के पूर्णतः अनुपालन किये जाने के निदेश दिये। पिछले बैठक के दौरान लिये गए निर्णयों पर की गई कार्यवाई करने हेतु राजभाषा कार्यान्वयन संबंधी कई निदेश दिये। बैठक में सूचित किया गया कि ट्राइकोग्रमा विडियो का हिंदी अनुवाद कर दिया गया है। इस संबंध में, उन्होंने इस विडियो को शीघ्र हिंदी में बनाकर एनआईपीएचएम वेबसाइट पर अपलोड करने के निदेश दिये। साथ ही किसानों से संबंधित अन्य



प्रौद्योगिकी वीडियो एवं उपयोगी तकनीकों का भी हिंदी अनुवाद किया जाए। उन्होंने निदेश दिया कि संस्थान के प्रत्येक कर्मचारियों एवं अधिकारियों को पत्रों एवं फाइलों पर अपना हस्ताक्षर हिंदी में करना चाहिए, जिससे की संस्थान के कार्यालयीन कामकाज में राजभाषा हिंदी को बढ़ावा दिया जा सके। हिंदी अधिकारी को लगभग 100 शब्दों या वाक्यों की सूची तैयार करने हेतु निदेश दिये गए, जिसका इस्तेमाल सरकारी कामकाज के दौरान बार-बार किये जाते हों। बैठक में सूचित किया गया कि पादप जैवसुरक्षा प्रभाग से प्राप्त प्रशिक्षण मैन्युअल 'पादपस्वच्छता' का हिंदी में अनुवाद कर दिया गया है।

इस संस्थान में दिनांक 28-02-2016 को कर्मचारियों एवं अधिकारियों के लिए एक दिवसीय हिंदी कार्यशाला का आयोजन किया गया। हिंदी कार्यशाला के अतिथि वक्ता डॉ. महेश कुमार, हिंदी अधिकारी, आईआईएमआर-हैदराबाद ने हिंदी टिप्पण एवं मसौदा लेखन का प्रशिक्षण देते हुए राजभाषा हिंदी के नीति, नियम एवं राजभाषा के प्रति सरकारी कर्मचारियों की जिम्मेदारियों को विस्तारपूर्वक जानकारी दी।

### Editor

Dr. Ch. Sreenivasa Rao, Director, Pesticide Management Division  
dirpmniphm-ap@nic.in

### Associate Editor

Dr. C. S. Gupta, Assistant Scientific officer(PP)  
asopniphm2-ap@nic.in

### Published by: Registrar

National Institute of Plant Health Management (NIPHM)  
Department of Agriculture, Cooperation & Farmers Welfare,  
Ministry of Agriculture & Farmers Welfare, Govt. of India  
Rajendranagar, Hyderabad - 500 030, INDIA. Ph: +91 40 24013346,  
Tele Fax: +91 40 24015346; niphm@nic.in; registrarniphm@nic.in