

राष्ट्रीय वनस्पति स्वास्थ्य प्रबंधन संस्थान  
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*Theme Article*



Root Knot Nematode (*Meloidogyne enterolobii*)  
in Guava Orchards

*Special Event*



Diploma on Agri-Inputs

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## From the Director General's Desk

Agriculture sustainability and Biosecurity of the native agro-ecosystems is under severe stress due to increase in global trade of agriculture commodities. The movement of agri-commodities specially planting material from one country to other has increased incursion of exotic pests and invasive alien pests. Horticulture is one of the major economic sector in Andhra Pradesh and Telangana states and is very lucrative. Many are engaged in nursery entrepreneurship, importing and marketing of various fruits, flowers and hybrid seedlings. *Meloidogyne enterolobii*, an emerging species of root-knot nematode, is currently considered to be one of the most damaging root-knot nematode species in many countries because the nematode has wide geographical distribution and wide host ranges. Recently NIPHM has identified the problem caused by Root knot nematode *Meloidogyne enterolobaii* based on Perennial pattern in guava fields causing severe wilt and death of affected trees. The disease was noticed in Rangareddy, Sangareddy, Medak and Nalgonda districts of Telangana and East and West Godavari districts of Andhra Pradesh. This nematode of quarantine significance has caused complete loss of affected guava orchards. The plant parasitic nematode diseases and their symptoms among the growers often go unnoticed due to lack of awareness. In order to educate farmers and disseminate the technologies for effective management various extension activities were taken by NIPHM. On campus and off campus trainings were organized specially for farmers in order to create awareness about nematode diseases, their symptoms, economical importance and management. NIPHM surveyed number of farmers field for detection and diagnosis of nematode diseases and recommended management practices to the farmers. Exclusive training programmes on nematode management are organized to the ICAR/SAU/KVK scientists, Quarantine officials, Agriculture, Horticulture and Extension officials from state Departments on detection and diagnosis of nematode disease in fields.



  
**(V. Usha Rani, IAS)**  
Director General

**Theme Article:****Root Knot Nematode (*Meloidogyne enterolobii*) incidence in Guava Orchards**

B. S. Sunanda, K. Vijayalakshmi, Ch. Sreenivasa Rao and Vinod Pawar

Guava decline, a deadly disease due to root knot nematodes (*Meloidogyne spp.*) and Fusarium wilt disease complex is spreading at an alarming rate in southern parts of India. It causes cholorosis, stunted growth, wilting, extensive root galling, partial to complete rotting of roots which ultimately cause death of plants both in nurseries and orchards. Hence, there is an urgent need to combat this menace and prevent its further spread to other states.

National Institute of Plant Health Management (NIPHM) Hyderabad has identified a serious problem of root knot nematode *Meloidogyne enterolobii*, destroying guava trees in both the states. Guava is an important tropical fruit after mango and banana grown across the country. Telangana and Andhra Pradesh together produces 184.48 thousand metric tones of guava from an area of 12.30 thousand hectare. The area under the crop in both the states increasing due to favourable climate and demand in market. However, the guava farmers have been facing a unique problem of dieback symptoms followed by complete death of trees during the past couple of years in Rangareddy, Sanga reddy, Medak and Nalgonda districts in Telangana and East and West Godavari districts of Andhra Pradesh. Though, the problem existed since couple of years, by the time farmers have come to realize it to be a nematode related problem, the crop has been devasted completely in many guava orchards. The infected fields, incidence of this disease varies from 60 to 90% and in some nurseries 100% was noticed.

**Symptoms observed in Guava fields -**

- The symptoms start with yellowing of plants followed by withering, giving the tree barren look and roots revealing a dirty root appearance with beaded knots.
- Plants become flaccid, that broken reveal a hollow twig.
- Roots are completely galled each of varying size with a dirty appearance.
- Galled roots often show rooting.
- Severe galling is seen all over the root system and many of them were compound galls.
- The roots are being studied for occurrence of any associated microorganisms, which may be involved in a disease complex leading to complete devestation of plants

**Over view of guava orchard showing infection of *M. entrolobii***

Farmers have their own observations such as trees under drip irrigation are undoubtedly infested rather than the conventionally irrigated ones, certain varities such as Taiwan VNR Bihi varieties of guava are more prone to infection than others. Saplings purchased from nurseries of West Bengal, Kadiyapulanka (East Godhavari) area are consistently showing vulnerability to nematode infestation.

**Yield loss:** In infected fields, incidence of this disease varied from 60 to 90% and in some nurseries, 90 -100% was noticed. On an average 60 – 80% yield loss is caused due to this disease and in severe cases, upto 100% is observed in guava orchards.



**Host range:** The root-knot nematode *Meloidogyne enterolobii* is polyphagous and has many host plants including cultivated crops and weeds. It attacks herbaceous as well as woody plants. The principal hosts are *Phaseolus vulgaris* (bean), *Coffea arabica* (coffee), *Gossypium hirsutum L.* (cotton), *Solanum melongena* (eggplant), ***Psidium guajava* (guava)**, *Solanum quitoense* (naranjilla), *Carica papaya L.* (papaya), *Capsicum annuum* (pepper), *Solanum tuberosum* (potato), *Glycine max* (soybean), *Ipomoea batatas* (sweet potato), *Nicotiana tabacum* (tobacco), *Lycopersicon esculentum* (tomato) and *Citrullis lanatus* (watermelon).

### Detection and inspection methods

The presence of *M. enterolobii* in infested soil and planting material can be determined by sampling of suspected material and subsequent extraction of second-stage juveniles using standard methods. Microscopic examination at 800–1000 times magnification is necessary for correct identification of the nematode species. Presence of females and males can assist in identification. However, as morphological characters of *M. enterolobii* are often similar to other *Meloidogyne* species, identification to species level is usually based on a combination of morphological/morphometrical characters and biochemical or molecular methods (For details see the EPPO Diagnostic Protocol, EPPO, 2011).



Second stage Juveniles of *M. enterolobii*

### Means of movement and dispersal

As is the case for other plant-parasitic nematodes *M. enterolobii* own movement is limited at most to a few tens of centimetres in the soil. The main routes for nematode dissemination are by infested planting material and soil, such as traded host plants or cuttings with roots, traded soil bearing products such as potatoes, soil attached to equipment and machinery and irrigation water.

### Nematode Management Strategies:

General management strategies for root-knot nematodes have been reviewed by Coyne et al. (2009) and Nyczepir & Thomas (2009). Taking into account the banning of most chemical nematicides, growing non host crops is the most efficient methods for reducing *M. enterolobii* populations. Unfortunately, the list of non host plants is very small, including cabbage, garlic, grapefruit, maize, peanut, sour orange and onion. As many

nematicides and fumigants are withdrawn from the market owing to their toxicity to their environment and residual effect, several bio pesticides are recommended which hold a good promise against nematode disease complex problems occurring in important horticultural crops.

### 1. Raising Nematode-Free Planting Material

- **Nematode-resistant rootstocks:** Locally available wild seedlings can be used as rootstocks for grafting as they would often have resistance against nematodes
- **Using soil-less medium:** Coir pith or vermiculite can be used for hardening of rooted planting material
- **Air layering:** Wherever air layering is possible, it would be a safe method of vegetative propagation, since the rooting media used is soil-less and can even be bio-fortified so as to ensure protection and can be shifted to sterilized media for hardening and for further growth of plants
- **Using nematode-free soil for hardening:** Under the present circumstances, there seems to be no better option than getting soil free from plant parasitic nematodes. The bulk soil to be used as hardening medium can be alleviated of plant parasitic nematodes by several methods, each having its own advantages and disadvantages
- **Solarization of soil in open.** For soil solarization, use of thin transparent polythene sheets for about 2-3 months during peak summer has been found to be very effective and may be used as routine good horticultural practice. Solarization of soil/polythene bags filled with soil by covering with polythene sheets is best
- **Use of soil from virgin lands or dried up ponds to fill their nursery polybags.** Rooted cuttings are made in sand medium under mist chambers and then changed into bigger polybags filled with sterilized soil medium using formaldehyde. Soil sterilization using either formaldehyde or hydrogen peroxide (100 ml in one-liter water) soak it overnight followed by solarization for few weeks to ensure nematode-free medium for filling nursery bags.

### 2. Cultural Practices:

- Movement of nematode infected root stocks across the states should be strictly restricted.
- Use of nematode free saplings for planting
- Removal and destruction of nematode infected saplings or trees
- Maintaining the orchard free from weeds and alternate hosts



### 3. Nematode management in nurseries

Treatment of soil mixture used for raising guava rootstocks

- A ton of soil mixture has to be mixed with 50 -100 kg of neem cake or pongamia cake enriched with the bio-pesticides such as 1kg *Paecilomyces lilacinus*, 1kg *Pseudomonas fluorescens* and 1kg *Trichoderma harzianum*.
- 5 kg of Carbofuran / phorate can also be added to one ton of soil mixture.

#### 4. Nematode management in orchards

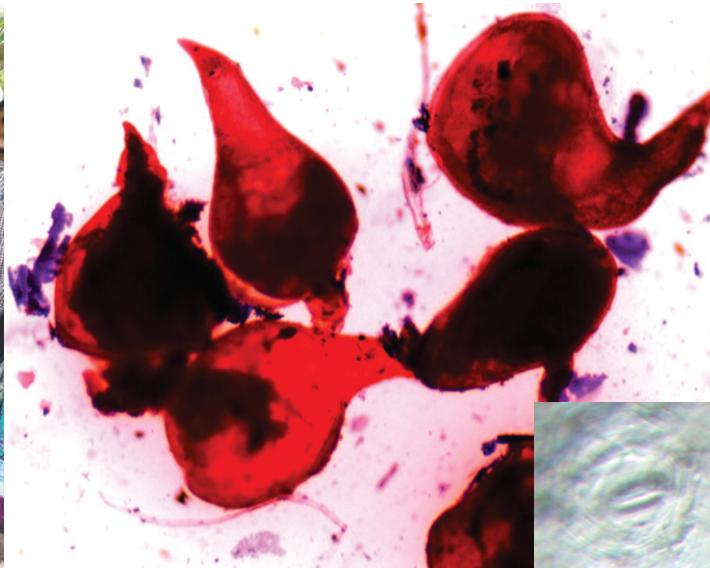
- Apply 3 – 4 kg of bio-pesticide enriched vermicompost/ Farm Yard Manure/ compost per plant at an interval of 3-4 months.
- Mix 20 kg of bio-pesticide enriched neem cake / pongamia cake in 200 lit water, leave it for two days. This can be used for drenching @ 2 – 3 lit/ plant or filter it thoroughly and use it for sending along the drip, once at an interval of 15 – 20 days.
- Farmers have been advised to apply nematicide carbofuron 3G @ 50gm/plant mixed with 1kg sand to facilitate uniform application around trunk of each plant. After 15days, apply neem cake @ 500g/plant fortified with *Trichoderma viridi*, *Pseudomonas fluroscens* and *Paecilomyces lilacinus* bio-control agents (100:2:2:1).
- Neem cake will acts as bio nematicide and bio-control agent will restrict the growth of the parasitic nematodes by way of parasitism, competition and suppression. For edible and fleshy fruit crops application of neem cake fortified with bio-control agents and use of neem oil for drenching are safe.
- Use Farm Yard Manure (FYM) 15 kg/plant as source of nutrition fortified with *Trichoderma* and *Pseudomonas* (100:1:1) to enahce the impact of bio-control agents and encourage early recovery.
- It is advised to apply neem cake 200 gm/pit fortified with bio-agents at the time of planting as precautionary measure. Alternatively carbofuron 3G granules @ 50gm/pit may be also be applied.
- As a precautionary measure farmers should avoid infested seedlings for planting.
- For nursery operators proper soil solarization is recommended to cure their potting soil for nematodes and other microorganisms. The chemical soil fumigants available in market shall be used under the supervision of plant protection officials.

#### Production of Bio-pesticide Enriched Neem cake

**A. Stock Mixture:** This should be ready at least one Month before Planting.

Take 1000 kg Neem cake ( Deoiled), on a Polythene sheet or on a cemented platform covered with a shade net, 4 Kg *Paecilomyces lilacinus* (2× 106), 4 Kg *Trichoderma viridae* (2×108), 4 Kg *Pseudomonas flueroscens* (2×106) Original culture

- Mix these 4 thoroughly and add optimum moisture (No water to emerge when squeezed between hands)
- Cover with a polythene sheet and incubate it under shade for about 20 days.



- Remove the sheet at every 4-5 days intervals, mix it thoroughly and moisten the stock mixture, if required.
- Around 20 days, the stock mixture will have multiple fold increase of the bioagents spores and thus the enriched neem cake will be ready for use.
- This stock mixture may be dried under shade and powdered to be stocked in gunny bags for further use up to 6 months.

**B.** Take 250- 300 kg of the stock mixture and mix 50-60 kg in one tractor load of FYM (250-300 kg in 5 Tractor loads or 15 – 20 tons/Acre) and incorporate it uniformly into the soil. This mixture of Enriched Neem cake and FYM, needs to be incorporated into the soil before the beds are made in the Tomato Field.

**C.** Take 400 Kg of the Stock mixture and put it into tomato beds as a basal dose. This enriched neem cake pure stock mixture needs to be incorporated into the beds after the beds are made in the Tomato Field.

**D.** Take 10 kg of stock mixture and mix it in 100 lit of water (1 kg/ 10 lit of water), and incubate it for 2 days.

- This liquid mixture is useful for spraying or application through drip irrigation after filtering. Liquid mixture shall be filtered using a thick muslin cloth or old Lungi cloth. The solid particles left over after filtration can be applied to the beds.
- The above unfiltered liquid mixture can also be used for drenching the beds.
- This liquid mixture needs to be prepared every time freshly at 15 days after transplanting and thereafter every 10 days up to 75 days after transplanting (7 times) for spraying and application through drip irrigation.

**E. Emergency Application:** If there is no time available, the stock mixture of enriched mixture of Neem cake of at least 2 days of incubation, can also be incorporated along with FYM into the soil (250-300 kg/Acre) or the pure Stock mixture into the beds (400 kg/acre).

- The Balance of the stock mixture can be further incubated for 20 days as suggested above and can be mixed and filtered after 2 days and used subsequently for sprays, drenching or application it through drip (as suggested in D).
- Another option in case of emergency, is: Take 10 kg De-oiled Neem Cake and dissolve it in 100 lit water, and add 100 ml/gr each of *Pacilomyces*, *Pseudomonas* and *Trichoderma*, and leave it for 2 days of incubation by stirring now and then.
- The above solution can be filtered for use as spray or application through Drip irrigation
- Without filtration, this liquid mixture can also be used for drenching of beds.

**5. Farmers Practices:** Some farmers procure soil from paddy fields for filling polybags, solarize it for two to three months, fill it in polybags and again solarize the bags by covering them with polythene sheets for a month, to ensure that no nematode population survives

- Use of bio-agents: Commercial formulations of nematode egg parasitic fungi, *Paecilomyces lilacinus*, *Pochonia chlamydosporia* are now available. Additionally, broad spectrum bio-agents like *Trichoderma viride*, *T. Harzianum*, *Pseudomonas fluorescens* can be multiplied in organic material, like FYM and incorporated in the potting media used for filling nursery bags

**6. Nursery certification:** The certification of nursery planting material must be enforced strictly by Govt. agencies to ensure movement of nematode-free planting. The infected material must be discarded and destroyed

## 7. Establishing a new orchard- pre-requisites for nematode management

- Care should be taken that the site selected for establishing a new orchard should not have a history of vegetables, turmeric or banana as previous crop as they may leave an inoculum of root-knot nematode, reniform nematode and lesion nematode.
- Collection of soil samples for nematode assay from proposed site
- Based on the soil sample assay report for nematodes, further field preparation can be taken up.
- No detection of any serious plant parasitic nematode: Go ahead as per other recommended Good Horticultural Practices.
- Detection of serious plant parasitic nematodes: De-nematisation of the soil must be taken up before transplanting plants by following methods
  - Deep summer ploughing
  - Keeping the land free from any plants, including weeds
  - Repeat sampling after 2-3 months for nematode assay till the site is free from major plant parasitic nematodes

### Conclusions:

- The guava growers are advised to avoid nematode affected saplings, removal and destroying of nematode affected trees, applying farm yard manure @ 100 kg, neem cake @ 250g and nematode egg parasitic fungus *Paecilomyces lilacinus* @ 25g and carbofuran @ 60g/tree at early stage of nematode infestation to overcome the nematode problem and to enhance fruit yield. (Dr. K. Poornima, Dr. S. Ramakrishnan and Dr. S. Subramanian, Department of Nematology Tamil Nadu Agricultural University Coimbatore, Tamil Nadu).
- Needs intensive wide survey on the presence of *M. enterolobii* in India.
- The most important pathway is import of host plants from areas where the pest is present. To prevent further introduction, import consignments of rooted plants should come from areas where the pest does not occur or from fields found to be free of *M. enterolobii*.

### References

- Coyne DL, Fourie HH & Moens M (2009) Current and future management strategies in resource-poor farming. In: Root-Knot Nematodes (Ed. Perry RN, Moens M & Starr JK), pp. 444–475. CAB International, Wallingford (UK).
- EPPO (2011) EPPO Standard PM 7/103 *Meloidogyne enterolobii*. Bulletin OEPP/EPPO Bulletin 41, 329–339.
- EPPO (2013a) EPPO Standard PM 7/119 Nematode extraction. Bulletin OEPP/EPPO Bulletin 43, 471–495.
- EPPO Data sheets on quarantine pests. Bulletin OEPP/EPPO Bulletin (2014) 44 (2), 159–163.
- Nyczepir AP & Thomas SH (2009) Current and future management strategies in intensive crop production systems. In: Root-Knot Nematodes (Ed. Perry RN, Moens M & Starr JK), pp. 412–443. CAB International, Wallingford (UK).

**Survey report: China beetle infestation in Arunachal Pradesh**

Dr. T. Yella Goud, Dr. P. Sakthivel, Dr. Alice R. P. Sujetha &amp; Dr. Kumawat

The litchi (*Litchi chinensis Sonn*) an important sub-tropical evergreen fruit crop belonging to family Sapindaceae. It is highly specific to climatic requirements and probably due to this reason its cultivation is restricted to few countries in the world. In India, approximately 428,900 metric tonnes of litchi is produced annually from 56,200 hectares. Litchi longhorn beetle (*Aristobia reticulator*) identified and reported as emerging threat to litchi by Kumawat and colleagues (The Coleopterists Bulletin and in newspapers in March and April 2017 respectively) in litchi growing areas of Pasighat and experimental farm of College of Horticulture and Forestry, Pasighat, East siang District, Arunachal Pradesh.

NIPHM always plays a proactive role in creating the awareness about pest incursions. A survey on the litchi longhorn beetle (*Aristobia reticulator*) of Litchi (*Litchi chinensis Sonn.*) was conducted by team constituted by DG, NIPHM and Director, Plant Biosecurity. Dr. T. Yella Goud, Assistant Director (Pest Surveillance) and Dr. P. Sakthivel, ASO (RPM) along with Dr. M.M. Kumawat, Assistant Professor (Entomology), College of Horticulture and Forestry, Pasighat surveyed nearby villages of Pasighat, East Siang district of Arunachal Pradesh on 18-12-2017.

Since the northeastern region of India is in close proximity to China, Myanmar and the bordering area is occupied with dense forest, this pest might have invaded from China or Myanmar where it causes heavy damage in litchi plantations. *Aristobia reticulator* may spread to major litchi-growing states like Bihar, West Bengal, and Jharkhand, if quarantine measures are not taken.

**General description:**

<b>Common Name</b>	: litchi longhorn beetle, litchi stem borer, litchi trunk borer, China beetle.
<b>Scientific Name</b>	: <i>Aristobia reticulator</i> (Voet)
<b>Origin</b>	: China
<b>Distribution</b>	: India (Assam, Manipur, Meghalaya, Sikkim, Tripura, Arunachal Pradesh), Bangladesh, China, Laos, Myanmar, Nepal, Thailand, Vietnam.

**Life cycle:**

The beetle has one generation per year, with adults emerging from June to August. Adult longevity ranges from 50 to 70 days. A female lays 16 – 43 eggs during an oviposition period of 25 – 42 days. The females girdle branches by chewing off 10 mm strips of bark, with the eggs laid on the wound and covered with exudate. The larvae hatch from late August and live under the bark until January when they bore into the xylem. The larval and pupal periods vary from 260 – 288 days and 32 – 42 days, respectively. Tunneling by the larvae may kill branches, but in severe cases whole trees. Established larvae can be located from the appearance of their frass, which is packed into the ends of tunnels.



**Observations:**

During the survey incidence of litchi longhorn beetle was recorded in experimental farm, College of Horticulture and Forestry, Pasighat. We found that almost all the trees in the farm were infected with the beetle.

- Larvae and adult stages of the *A. reticulator* can cause damage to the litchi plants.
- The newly emerged adults fed on bark of the tender branches thereby girdling them.
- The girdled region of the branches ranged 5–30 cm. Girdling were not uniform and continuous in most of the damaged branches. The adults feed on the bark and partially on xylem tissue, resulting in girdling of the stem, branches and twigs.
- Compared with young trees, older trees were heavily infested with more than 10 borers per tree, whereas in young trees, 3-4 borers were detected.
- In one experimental farm some of the severely infected/damaged trees were removed.
- Larvae were observed in the branches and twigs. Larvae are dorsoventrally flattened, creamy white with a dark brown head and with well-developed mandibles.
- Larval tunnels were oval in shape with approximately 5 mm to 7 mm height whereas width was around 15 mm.
- Larvae moved downward and the length of larval tunnels ranged more than 100 cm. The larval tunnels were longer in older plantations compared to young trees.
- The small sized frass exuding holes were observed on the branches.

**Host range:**

The greatest amount of damage caused by the adults feeding on bark was observed in litchi, followed by guava. Larval infestation was seen in litchi and guava trees only. According to literature, the beetle also attacks on China rose and red gram but during our survey we didn't find the Infestation on these hosts. No beetle damage was observed on citrus and mango trees in Pasighat.

**Conclusion:**

Large number of insect pests has been reported to occur on litchi at various growth stages, but a few are a real menace to the cultivation of this crop. During the survey, it is observed that almost all the trees present in the experimental farms of College of Horticulture and Forestry, Pasighat were infected with the long horn beetle. If quarantine measures are not taken properly it may spread to major litchi-growing states like Bihar, West Bengal, and Jharkhand states and surroundings areas. Therefore, there is a need to create awareness and pest alert among the various stakeholders and implementation of Integrated Pest Management strategy to manage pests on the basis of a systems approach that looks at the whole orchard ecosystem.

**International workshop on “Integrated Management of Root-Lesion Nematode”**

One day workshop on “Integrated Management of Root-Lesion Nematode' was organised at NIPHM in collaboration with University of Southern Queensland, Australia on 11.12.2017. The workshop was attended by 50 delegates from different States of India. The Scientists from Southern Queensland University, Prof. John Thompson, Mrs. Rebecca Zwart and Mrs. Roslyn



Reen were a part of the scientific team from Australia. A detailed lecture was given on root lesion nematode (*Pratylenchus*), its economic importance in various crops and the threat caused to horticultural and commercial field crops. The identification, distribution, extent of damage and need for adoption of integrated management strategies were also discussed.

**Diploma on Agri-Inputs (DAI)**

One year Diploma on Agri-Inputs was initiated from 4<sup>th</sup> December, 2017 with 17 participants from Andhra Pradesh and Telangana States. The program aims to train all the input dealers on various aspects related to science based recommendations and regulations on use of agri-inputs etc. and also to impart knowledge on critical issues such as weather, soil health, different agronomic practices,



pests and management methods, legislations, acts and rules, bio-intensive methods etc. The mode of the course is through two weeks contact classes in the beginning of the course and one week contact classes at the last week of the course with residential mode at NIPHM and one day contact class every month at NIPHM.

**Capacity Building Training Programmes on Plant Biosecurity**

Plant Biosecurity is of paramount importance to any country to safeguard food-security, sustainability of agricultural/horticultural production and also in protecting livelihood of people. Though incursion of alien pests into newer areas is not a new phenomenon, increased global trade has paved way for quicker entry of many exotic pests to hitherto unknown areas. The division organizes a number of training programmes in Biosecurity & Incursion Management, Rodent Pest Management and special capacity building programmes to promote safe trade in compliance of SPS. The following training programmes was organized by Plant Biosecurity Division during the month October - December, 2017:

SI No.	Name of the programme	Duration (days)	Date	
			From	To
1.	Plant Quarantine National Regulations and Procedures	5	09.10.2017	13.10.2017
2.	Pest Risk Analysis	5	06.11.2017	10.11.2017
3.	Pest Surveillance	5	20.11.2017	24.11.2017
4.	Phytosanitary treatment	15	20.11.2017	04.12.2017
5.	Regional Plant Health System Analysis	15	04.12.2017	18.12.2017
6.	Stored Grain Pest Management for FCI QC officials	5	18.12.2017	22.12.2017
7.	Rodent Pest Management in store houses of food grains	5	20.11.2017	24.11.2017
8.	Certificate Course on Urban Integrated Pest Management	15	27.11.2017	11.12.2017



## Capacity Building Training Programmes on Plant Health Management

Plant Health Management is vital for the sustainable agriculture, food security, food safety, agro based industries and economy of a country. The various strategies of Plant Health Management which includes the suppression of insect pests and diseases by the biocontrol agents and also the improvement of soil health by bio-fertilizers are gaining importance. The training programmes of the division were organised to reflect the importance of various bio-agents for pest management and the implementation of the low cost techniques in farmers' fields. Trainings were also given on AESA based PHM in conjunction with EE in crop fields good agriculture practices and ISNWM to promote sustainable plant health management practices.

The following training programmes were organised by Plant Health Management Division during October to December, 2017.

Sl No.	Name of the programme	Duration (days)	Date	
			From	To
1.	On-farm production of Biocontrol Agents and Microbial Bio-pesticides	10	04.10.2017	13.10.2017
2.	Field diagnosis and management of plant parasitic nematodes in horticultural crops	5	16.10.2017	20.10.2017
3.	Good Agricultural Practices (GAP)	5	23.10.2017	27.10.2017
4.	AESA based Plant Health Management in conjunction with ecological engineering for pest management in Rice	21	01.11.2017	21.11.2017
5.	Promotion of bee keeping for sustainable agriculture	3	27.11.2017	29.11.2017
6.	Integrated Soil Nutrient and Rhizosphere Management (ISNRM)	7	14.12.2017	21.12.2017



**Special Programmes**

1.	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	3	11.10.2017 31.10.2017 14.11.2017 28.11.2017	13.10.2017 02.11.2017 16.11.2017 30.11.2017
2.	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 Andhra Pradesh & Telangana	3	25.10.2017 20.11.2017	27.10.2017 22.11.2017
3.	Mass production and use of entomopathogenic nematodes for the management of white grubs in sugarcane for the farmers of Maharashtra	3	01.11.2017	03.11.2017
4.	One day training/ educational programme to Coromandel field staff	1		07.12.2017
5.	Induction Training Programme to newly recruited Agriculture Extension Officers of State Government of Telangana on "Sustainable Plant Health Management Strategies"	5	04.12.2017 18.12.2017	08.12.2017 22.12.2017
6.	Training on "On-farm production of bio-control agents and microbial bio-pesticides"	3	06.12.2017 27.12.2017	08.12.2017 29.12.2017



**Capacity Building Training Programmes on Pesticide Management**

NIPHM is one of the designated institutions for offering the mandatory training programme in pesticide formulation analysis as per the Insecticide Act. The Analysts of Central and State Pesticide Testing Laboratories have to undergo the training programme offered by NPHM to be qualified as analysts. NIPHM is also entrusted with the mandate of capacity building of all the stake holders for effective Pesticide Management. In view of this, Pesticide Management Division organized following training programmes during October to December, 2017.

Sl No.	Name of the programme	Duration (days)	Date	
			From	To
1.	Refresher program on Formulation Analysis of New Pesticides molecules	10	04.10.2017	13.10.2017
2.	Method validation in Pesticide Formulation Analysis and Measurement of Uncertainty	5	23.10.2017	27.10.2017
3.	Testing Physicochemical properties of Pesticide Formulations	5	06.11.2017	10.11.2017
4.	Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025:2005	5	04.12.2017	08.12.2017
5.	Inspection, Sampling and Prosecution Procedures under Insecticide Act, 1968	5	18.12.2017	22.12.2017



## Capacity Building Training Programmes on Plant Health Engineering

Application of pesticides continues to play a significant role in reducing crop losses due to pests even under IPM as a last resort. The success of pest management operations depends on proper technique of application of pesticide and the equipment used. Selecting the right equipment for pesticide application is vital for successful pest control to ensure safe and judicious use of pesticides. In view of this, Plant Health Engineering Division organized following training programmes during October to December, 2017.

Sl No.	Name of the programme	Duration (days)	Date	
			From	To
1.	Training on Pesticide Application Techniques and Safety Measures	5	09.10.2017 13.11.2017	13.10.2017 17.11.2017
2.	Training on Farm machinery and post harvest management for B.Tech Agricultural Engineering students	60	20.11.2017	19.01.2018
3.	Training on Safe use of pesticides and maintenance of sprayers	2	07.11.2017	08.11.2017
4.	Training on Pesticide Application Techniques and Safety Measures	1		08.12.2017
5.	Training on GIS approach in Soil, Water and Plant health Management	5	11.12.2017	15.12.2017



## **SKOCH "Order-of-Merit" Award**

A two-way interactive Farm level Implementation - eRepository of Farmers and Trainees Success was developed by NIPHM. This provides a platform to share the success achieved through Knowledge Transfer from Trainees to the Farmers, for other farmers / trainees to see – interact – learn and benefit. The application is adjudged for SKOCH Order-of-Merit Award – 2017, which was presented on 20<sup>th</sup> – 21<sup>st</sup> December 2017 at New Delhi.



## **Project report: “Impact of indiscriminate use of chemical fertilizers and chemicals”**

A three day review meeting on the DAC project “Impact of indiscriminate use of chemical fertilizers and pesticides” was organized from 26<sup>th</sup> - 28<sup>th</sup>, October 2017 at Punjab Agricultural University (PAU), Ludhiana under the Chairmanship of Smt. G. Jayalakshmi, IAS, Director General, NIPHM, Dr. K. Vijaya Lakshmi, Director, PHM Division, Dr. K. Loka Reddy, Sr. Consultant (Ent.) and Dr. T.G. Nageshwar Rao, Sr. Consultant (Path.) from PHM division and concerned Principal Investigators of the project representing 7 SAU (PJTSAU, ANGRAU, CSAU & AT, PAU, TNAU, BCKV, VNMKV) and 1 SHU (Dr. YSRHU) participated in the meeting. A field visit was also organized on 27.10.17 to organic field of paddy in Kapurthala district of Punjab.



एनआईपीएचएम ने पीएयू समेत 7 एग्रीकल्चर यूनिवर्सिटीज, 1 हार्टीकल्चर यूनिवर्सिटी को सौंपे आईपीएम प्रोजेक्ट

## कीटनाशक दवाओं पर रिसर्च पंजाब में हो रही कारगर, कम हुआ इसका इस्तेमाल

आईपीएम प्रोजेक्ट का उद्देश्य किसान विशेषज्ञों की सलाह लेकर कीटनाशक और खाद्यों का प्रयोग करने



इन यूनिवर्सिटीज़ को मिले कीटनाशकों पर रिसर्च के प्रोजेक्ट

यह अपने बुद्धि-विकास का अवधारणा उत्तम  
रा सैक्षण्य (वैज्ञानिक) के डाक्टर डॉ. के विज्ञा  
निकल्प युवराजींटी ने प्रोटोट्रॉक्स्ट्रा तेलांगना की घट  
ना को घट, डॉ. वासुदेव एवं गुरुत दो मिशनी, सैक्षण्य,  
र घट, यौवा स्थिरान्त को टमार और घट, ट्रॉक्स्ट्रा

जीवित रहने का एक अवसर है। यह जीवन की सुख-दूँगा और और सेवानाम पर दिलचस्पी के प्रतीक है। इस ग्रन्थ के अन्तर्गत दो अधिकारी शास्त्रीय विद्यार्थी द्वारा लिखा गया है। एक शास्त्रीय विद्यार्थी द्वारा लिखा गया है। दूसरा शास्त्रीय विद्यार्थी द्वारा लिखा गया है।

प्रोजेक्टों का उद्देश्य

## Adoption of technology has cut pesticide use in Punjab, says PAU

TIMES NEWS NETWORK



**PAUL NG** Baldev Singh Dhillon (middle) at a meeting of farm scientists.

**Ludhiana:** Use of pesticides in the state in 2016-17 has reduced, thanks to proper technology, nozzles and role of science and spray. Adoption of integrated pest management strategies has played an important role in reducing the use of pesticides. As compared to the graphs from 2001 to 2002, 3,800 metric ton insecticides was used in Punjab. This declined to 2,344

metric ton in 2016-17.

U VC Baldev Singh Dhillon (middle) a  
tal role in whitefly mana-  
ment, leading to a record  
yield of 756 kg/hectare.

le) at a meeting of farm scientists

contributed to food safety and minimised residue issues, she observed. IPM practices were adopted in several crops, she said, while divulging that tomato crop has shown positive results in this direction. Results in other crops are still being studied, she said.

studied, she said.

Dr K Vijayalakshmi, director, Plant Health Management, pointed out that there are many states in the country where pesticide consump-

ry where pesticide consumption is very high.

Studying how these pesticides and fertilisers are affecting different parameters is the main aim of the project, she said. Eight state agricultural universities are involved in the project.

**Project report on “District Pest Management Plan”**

A review meeting on the pilot project “District Pest Management Plan (DPMP)” was organized on 10<sup>th</sup> November, 2017 at MANAGE. The meeting was held under the Chairmanship of Smt. G. Jayalakshmi, IAS, Director General, NIPHM and Smt. V. Usha Rani, IAS, Director General, MANAGE. Fourteen participants including Directors, Assistant directors and other faculty from NIPHM and MANAGE, three farmers from two adopted villages Mucherla and Nallabelli also participated in the meeting.

A meeting on the pilot project “District Pest Management Plan (DPMP)” was organized on 29<sup>th</sup> November, 2017 at Bala vikas, Warangal Urban district to give orientation of NICE application to all the Agriculture and Horticulture Department officers. The meeting was held under the Chairmanship of Smt. G. Jayalakshmi, IAS, Director General, NIPHM and Smt. V. Usha Rani, IAS, Director General, MANAGE. One hundred and forty participants including Directors, Assistant directors and other faculty from NIPHM and MANAGE, District Agriculture Officer, DHSO, PD (ATMA), Project Director, KVK , AO's, AEO's, HO's and HEO's participated in the meeting. A total number of 63 Electronic tablets and Sim cards were issued to the officers of the district for the use of NICE application.



A one day orientation programme to Input dealers of Warangal Urban and Rural District was organized under

District Pest Management Plan (DPMP) jointly by MANAGE, NIPHM, Department of Agriculture, Government of Telangana & Dow-DuPont Agro Science Pvt. Ltd. in association with Interface Agriculture Technologies Pvt. Ltd on 14<sup>th</sup> December 2018 at Dealer Association Convention Hall, Warangal. The programme was attended by 200 input dealers and Department officers of Warangal Urban & Rural districts. Experts from MANAGE; NIPHM, Dow-DuPont, Department of Agriculture & Interface Agri. Tech. Pvt. Ltd. educated the input dealers about Do's and Don'ts in Pesticide usage.

A total of 465 Liters of *Trichoderma* and *Pseudomonas* were distributed to the farmers of Shambhunipally village of Warangal Urban district and Nallabelli village of Warangal Rural district. A total of 40 liters Azospirillum and 40 liters of PSB were distributed to the same villages and awareness was created among the farmers on the use of these bio agents.

A Total number of thirty messages were sent in the span of three months to 2000 farmers of the adopted five villages. The messages are sent through NICE application as well as through mkisan portal.

## Farmers Trainings on Rodent Pest Management

### 1. Pachamalai, Tamil Nadu on Rodent Pest Management – 74 Farmers

There are four training programme on Rodent Pest Management were organised in different states. The first programme was organized to the tribal farmers of Pachamalai hill at Top Sengattupatti, Tamil Nadu on 07-10-2017. The programme was jointly organized by NIPHM (financial support), Tamil Nadu Agricultural Department of Uppiliyapuram block, Tiruchy District (logistics support) and Research Department of Zoology of Nehru Memorial College (Autonomous), Puthanampatti. Seventy farmers from different parts of Pachamalai participated in the programme. Dr. P. Sakthivel (ASO-VPM), NIPHM outlined the objectives of programme and explained the role of NIPHM in management rodents. Dr. P. Neelanarayanan, Associate Professor of Zoology, Nehru Memorial College (Autonomous) handled the technical sessions viz., Rodent pests of Tiruchy District, Impacts of rodents on agriculture, Eco-friendly management of rodent pests under crop field situations and finally chemicals available for managing rodent pests and the details thereof were explained to the participants. The farmers were imparted training to use Tanjore bow traps, pit fall traps, rat hunting methods, burrow fumigation technique and “T” shape perching poles for avian predators particularly owls in the crop fields. Bromodiolone, a chronic single dose rodenticide was also prepared in the venue of the programme at 2% concentration with the help of participants and made into packets for placing in the active burrows of rodents in the farmers' crop fields.



### 2. Punnayur, Kerala on Rodent Pest Management – 113 farmers

One day farmer training programme was organized on Rodent Pest Management at Punnayur Block, Trichur Dist., Kerala on 09.11.2017. The programme was held at Punnayur Panchayat office and it was inaugurated by Panchayat President, Punnayur and 113 farmers from Punnayur block participated in the training programme.



In Punnayur block major crops are paddy, coconut, vegetables and pine apple. All the crops are being damaged by rodents (*Bandicota bengalensis*, *Rattus rattus* & *Squirrels*), the Punnayur was selected by Agri. Dept, Trichur to organise one day farmer training on rodent pest management to avoid revenue loss to the farmers and for effective management of rodents. Shri. Mariadoss, AD (RPM) explained the farmers on the ethology of rodents in paddy field, coconut gardens, storage places and homes; different species of rodents; damages and diseases caused by them; procedure of poison bait preparation, application; importance of bait stations; effective management of rodents by following integrated approaches; management of rodents in coconut gardens etc. The facts and figures were explained in Malayalam language using power point presentation.

A practical demonstration was given to farmers about rodent kill traps application, bait stations importance in application of poison baits, and farmers prepared the rodent poison bait using bromadiolone (packeting, pocketing) and the same was distributed to farmers for field application. Farmers of Punnayur block were happy, satisfied with this training programme and received good, excellent feed back from them. They requested NIPHM to organize such programmes continuously in all blocks.

### **3. Kottabommali, Andhra Pradesh on Rodent, monkey and wild boar Management – 76 Farmers**

The Asst. Director of Agriculture (Regular), Takkali had requested Director General NIPHM for organizing one day hands on training programme on the management of rodents, wild boar and monkeys for the farmers of Tekkali Sub Division of Srikakulam Dist. Accordingly, A training programme was organized at Kottabommali, Tekkali Sub Division in collaboration with Dept. of Agriculture, Andhra Pradesh on 14.12.2017.

The training programme was held at Kottambommali and 76 farmers from mandals of Pathapatnam, Nandigam, Kotabommali, Santha Bommali and Tekkali were actively participated and got benefitted. Along with farmers 24 officials at the cadre of Agricultural Officer, Asst. Agricultural Officer and Village Extension Workers were also participated in the training programme.



Detailed information were given on the problems of rodents in the agricultural and horticultural sectors, rodent ethology, biology, damages, non-chemicals control methods and chemicals control methods were informed to farmers. The wonder cages, different traps and bait stations were displayed and explained to the farmers. Information on ethology, biology of monkeys and wild boar were discussed with farmers and different management methodologies were informed to farmers.

### **4. Pasighat, Arunachal Pradesh on Rodent Pest Management – 90 farmers**

The fourth programme was organised at College of Horticulture and Forestry, Central Agricultural University, Pasighat from 19<sup>th</sup> – 20<sup>th</sup> December 2017. All together 90 farmers from Taki lalung, Rune, Bodak, Sille, Renging, Mirbuk, Napit, Paglet villages and Pasighat were participated in the training programme. The programme was inaugurated by Dr. A.K. Pandey, Dean, College of Horticulture and Forestry, Pasighat & Dr. M. Pathak, Head, KVK East Siang, Pasighat.



On the next day, the famers were taken into field at Jampani village where they were given hands on experience on rodent burrow identification, damage pattern in rice and vegetable crops, preparation of poison baits and its application procedures in field. Demonstration was given on preparation of Tanjore trap and application procedures. The programme coordinated by the Dr. AK. Kumawat, Scientist, CAU and Mr Toge Riba, KVK, SMS Plant Protection, Pasighat.

## Observance of Vigilance Awareness Week

NIPHM has organized 'Vigilance Awareness Week' by administering the Pledge by Ms. G. Jayalakshmi, IAS, Director General, NIPHM on to all officers and staff of NIPHM.

The following competitions were conducted during the observance of Vigilance Awareness Week

- 1<sup>st</sup> November, 2017 - debate competition was conducted on "My Vision – Corruption Free India"



- 2<sup>nd</sup> November, 2017 - lecture was organized on the theme "My Vision – Corruption Free India" in connection with Vigilance awareness delivered by Guest Speaker Shri. B. Pandu Reddy, Retd. Finance Officer, University of Hyderabad and Consultant (Finance Officer) at Tata Institute of Social Sciences, Hyderabad. The officers, faculty, staff and trainees of NIPHM have attended the lecture.
- 3<sup>rd</sup> November, 2017 - Essay writing competition conducted on "My Vision – Corruption Free India"



## NIPHM Foundation Day celebrations

National Institute of Plant Health Management (NIPHM) Foundation Day (10<sup>th</sup> year) was celebrated on 23-10-2017 in a befitting manner. The Director General G. Jayalakshmi, I.A.S. graced the occasion and addressed the gathering. In the function NIPHM staff and family members participated with great enthusiasm. The Director General appreciated the efforts of all the officers, faculty and employees of NIPHM for their commitment, hard work and support in building up the organisation.



## Visit of Hon'ble Minister of State for Agriculture and Farmers Welfare

Shri Gajendra Singh Shekhawat, Hon'ble Minister of State for Agriculture and Farmers Welfare, Government of India visited NIPHM on 25<sup>th</sup> November, 2017 as Chief Guest for the programme (dialogue) titled SKSK – “Saarthak Krishi – Samrudh Kisaan” organized by Forum for Awareness of National Security (FANS) an NGO with a select gathering of stakeholders.



### Students visit to NIPHM

- 53 BSc (Agr) students visited from TNAU on 02.11.2017
- 68 B.Sc. (Hon) students visited from KAU, Kerala on 09.11.2017
- 60 BSc (Agr) students visited from RMVU, Tamilnadu on 22.11.2017



## Motivational session was delivered on 'Attitude Alters Altitude'

Motivational session was delivered on 'Attitude Alters Altitude' by Dr. P. R. Subas Chandran, Freelance Journalist & Biographer on 05-12-2017. All officers & staff of NIPHM have participated in the event with enthusiasm. The session was very much relevant and useful for the overall personality development of NIPHM staff.



## Observance of Rashtriya Ekta Diwas (National Unity Day)

On the occasion of birth anniversary of Sardar Vallabhbhai Patel on 31-10-2017, Rashtriya Ekta Diwas (National Unity Day) was celebrated at NIPHM.



## Closing ceremony of 'Swachhta Hi Sewa' campaign

The closing ceremony of 'Swachhta Hi Sewa' campaign has been celebrated on 2nd October, 2017 by the officers and staff of NIPHM by offering floral tribute to Shri. Mahatma Gandhiji on 02-10-2017.

As a part of the programme various activities, viz. Demonstration /Awareness programme on “Waste Management” by representatives of GHMC & ITC Limited under ITC WOW Programme, alongside Shramdaan activity at office campus and honouring the Housekeeping /Sanitation workers who are engaged in Cleaning activity at NIPHM Campus were undertaken.



**Bit Farewell**

On attaining superannuation, Shri. J. Sree Rama Chandra Murthy, working as Upper Division Clerk has gracefully retired on 30-11-2017 after serving for 30 years of productive work. He has made immense contribution at NIPHM in Stores and Accounts sections in maintaining the institutional memory of the organization. NIPHM wishes him a peaceful and happy retired life.

**वर्ष 2017-18 हेतु राजभाषा कार्यान्वयन समिति की तृतीय बैठक संपन्न**

राजभाषा कार्यान्वयन समिति (राकास) की तृतीय बैठक वर्ष 2017-18 हेतु दिनांक 02-01-2018 को श्रीमती जी.जय लक्ष्मी, भा.प्र.से., महानिदेशक, एनआईपीएचएम की अध्यक्षता में हुई। बैठक में महानिदेशक के समक्ष जुलाई-सितंबर, 2017 की तिमाही हिंदी प्रगति रिपोर्ट प्रस्तुत किया गया। उन्होंने उक्त रिपोर्ट की समीक्षा करते हुए संस्थान में आगे भी राजभाषा अधिनियम की धारा 3(3) का अनुपालन शत-प्रतिशत किये जाने के निर्देश दिये। उन्होंने सभी प्रौद्योगिकी विड़ीयों को हिंदी में बनाकर एनआईपीएचएम वेबसाइट पर अपलोड करने के निर्देश दिये। साथ ही किसानों से संबंधित अन्य प्रौद्योगिकी वीड़ीयों एवं उपयोगी तकनीकों का भी हिंदी में अनुवाद किया जाए। संस्थान के प्रत्येक कर्मचारी एवं अधिकारी पत्रों एवं फाइलों पर कम से कम एक पंक्ति हिंदी में नोटिंग अवश्य लिखें, जिससे कि कार्यालयीन कामकाज में हिंदी को बढ़ावा दिया जा सके।

एनआईपीएचएम के वार्षिक प्रतिवेदन 2016-17, वार्षिक लेखा 2016-17 का हिंदी में अनुवाद किया गया। इसके साथ ही पीड़िकनाशी प्रबंधन प्रभाग के प्रशिक्षण मैन्यूअल “कीटनाशक अधिनियम 1968 एवं नियमावली 1971 संबंधी प्रवर्तन” का हिंदी में अनुवाद किया गया। महानिदेशक ने 24 अक्टूबर 2017 को संस्थान के “स्थापना दिवस समारोह” अवसर पर ‘हिंदी पखवाड़ा’ के दौरान आयोजित प्रतियोगिताओं में सफल प्रतिभागियों को नगद पुरस्कार एवं प्रमाण-पत्र प्रदान की।

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