National Institute of Plant Health Management
Department of Agriculture & Cooperation
Ministry of Agriculture, Government of India

Plant Health News Letter

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From the Director General's Desk

Biological invasions are taking place at an unprecedented rate due to many factors favouring its movement which includes man-made activities such as Trade, Travel, Transport and Tourism. The 4 T's are playing a major role in unwanted introduction of pests from one corner of the globe to the hitherto unrecorded areas posing biosecurity threat to all countries, especially the developing countries, where preparedness to tackle such situations is inadequate.

As per the guidelines of ISPM 9 it is the responsibility of the importing countries to have contingency or emergency action plans in place as preparedness mechanism to combat plant pest incursions. India being one of the 12 mega diversity countries in the world with 8% of species richness is vulnerable due to human aided activities as well as natural pathways of pest incursion. Coconut Hispid beetle which has already reached the neighbouring countries Maldives and Myanmar is a potential threat to India and Ug99 (stem rust of wheat) is another major food security threat. There is an urgent need to establish legal mechanism to manage exotic pest incursions and to strengthen efforts both at National and State level to prevent, contain and eradicate invasive and plant pests. Government of India has initiated action to introduce "Agricultural Biosecurity Act" to manage exotic pest incursions besides strengthening domestic biosecurity.

NIPHM has been designated as a nodal centre to develop capacity in plant biosecurity. The Institute has taken a proactive role by organizing training programmes to strengthen capacity in Plant Biosecurity and Incursion Management

Dr. K. Satyagopal IAS, Director General - NIPHM

among the National and State level stakeholders. This is a special programme offered at this Institute, focusing on the importance on preventive mechanisms, preparedness at ports of entry, pest risk analysis, exotic pest surveillance, pest incursion management and international & national obligations to prevent / tackle pest incursions. Presently the expertise available in this area is very limited and hence there is a need to build capacity of different stakeholders to take lead role in pest incursion management programmes in the future.

I hope officials of Directorate of Plant Protection, Quarantine & Storage, State Agriculture/ Horticulture Departments, scientists of ICAR Institutions, teaching faculty of State Agriculture/Horticulture Universities, Agricultural Extension functionaries will take advantage of these capacity building programmes.

(K. Satyagopal)
Director General

Theme Article
Emergency Preparedness for Plant Pest Incursions
Dr. N. Sathyanarayana and Dr. K. Satyagopal

Scientific evidence indicates that biological invasions are growing at an unprecedented rate, posing increasing threats to the diversity of life, and also disrupting native ecosystems. Global economies, as well as water availability, food security and human health are impacted adversely due to pest incursions. India, one among the 12 mega diversity countries in the world, is rich with 8% of world species. The richness of the varied agro climatic zones and the ecological disturbances are congenial conditions for the invading alien species to thrive.

Measures to prevent pest incursions: Current scenario

Through implementation of legal mechanism i.e. Plant Quarantine (Regulation of Import into India) Order, 2003, the imported plants and plant materials are regulated and the commodities are inspected, sampled and tested at the port of entry. The perishable live plants, bulbs, rhizomes, cuttings etc., imported for propagation, after completion of inspection at the port of entry are provisionally released to grow under Post-Entry Quarantine (PEQ) facilities established by the importers. There does not exists much stronger linkage from port of entry to PEQ facility and the procedures to be followed by notified Inspection Authority (who needs to carry out regular monitoring of imported plants for presence of exotic pests in the PEQ area) during PEQ period. If quarantine pests are intercepted, the consignments are subjected to approved quarantine treatments and if treatment is not an option then the consignments are either deported or destroyed. The weak link between Plant Quarantine & Customs, unregulated import of seeds/ plants /bulbs as accompanied baggage in small quantity go unnoticed at airports, has resulted in incursion of many economically important plant pests. When a new or exotic pest is reported for the first time, no serious thought is given to contain and eradicate the pest through concerted efforts by the stakeholders. Whereas when the same pest assumes an epidemic form, measures are initiated to control the pest to minimize the damage/loss.

The agricultural trade is increasing many folds and consequently the looming pest threats are also increasing. Coconut hispid beetle (*Brontispa longissima*) is one of the economically important pests of coconut and is polyphagous, which has already invaded into neighbouring countries such as Maldives and Myanmar, is a looming threat to India. The imported fruits may serve as major pathway of entry for exotic fruit flies, which might severely affect fruit production as fruit flies are polyphagous and can also harm vegetables. This calls for strengthening of plant quarantine system in India through policy, human resource, infra-structure enhancement, public awareness and contingency plan to thwart the entry or establishment of the pest.

Accidental introductions – devastating consequences: The Asian longhorned beetle hitchhiked to New York and Chicago in wood packing crates from China, where it escaped and has prompted the cutting, chipping and burning of over 8,000 street and yard trees at considerable cost. The beetle attacks maples and other hardwood species, threatening the timber, maple syrup, nursery, and fall foliage tourism industries across the Northeast.

A Caspian Sea tanker dumped its ballast water — and the Asian zebra mussel — into the Great Lakes a little more than a decade ago. Now the tiny mussels threaten to smother 140 native mussel species, and waterfront industries, like dams and power plants, must pay billions in on-going repairs to clogged pipes while passing the cost to consumers.

Contingency/emergency plan to combat pest incursion

There is a need to establish legislation to deal with exotic plant pests as regulatory system can only deal the management of pest incursion effectively. A nationally coordinated system of surveillance, inspection, testing, diagnosis and control using entry and post entry measures are required to prevent the establishment and spread of exotic plant pests that may have harmful effect on plants, human, animals and environment. These activities are responsibilities of Central Government, State/ Union Territory, Research Institutes, Agricultural Universities, Private/ Public sectors, Farmers and Public. At present the biosecurity of the nation is not addressed in a holistic manner with little coordination among various stakeholders. The harmonization and integration among the relevant sectors to deal with pest incursion management shall pave way for preventing the pest. entry, establishment and spread and save the nation from unwanted crop loss as well as expenditure towards control measures.

Need for invasive alien pest incursion management

Past experiences indicate lack of preparedness to combat the invasions of invasive alien pests on emergency basis, leading to entry and establishment of a number of invasive weeds and plant pests in recent years. There is a need to establish Emergency Plant Pest Incursion Management Protocols to combat further invasion of alien species into India that are likely to find their pathway through increased trade. There is a well-organized preparedness mechanism in place to carryout monitoring, early warning and control on war-footing to combat the invasion of locust into India in close cooperation with neighbouring countries. There is a need for such structured mechanism to be in place for managing the incursion of alien invasive plant pests. Further, it is pertinent to identify roles and responsibilities in the eventuality of plant pest incursion, besides enhancing the existing plant quarantine human resource to meet the increase in international trade of agriculture and strengthening the infra-structure facilities required for quick detection and diagnosis. There is a need to enhance the capacity of all the stakeholders to ensure effective and timely interventions to prevent / manage pest incursions. The looming threat of invasive species needs to be addressed by having effective contingency / emergency plant pest incursion management plans. This calls for strengthening of plant quarantine system in India through policy, human resources, infra-structure enhancement, public awareness and contingency plan to thwart the entry and / or establishment of pests.

Intentional introductions - unintended consequences: Large and costly invasions of Water hyacinth, Lantana, Mimosa resulted from gardeners planting these species for their bright showy flowers.

The cane toad (*Bufo marinus*) was first introduced to Australia in the 1930s as classical Biocontrol agent for managing sugarcane beetles. It spread rapidly, out-competing native species and devouring native insect life and is now threatening native species of insects and is responsible for extinction of some predator reptiles & smaller mammals from Australia due to its poison glands.

Way forward

Building on the guiding principles agreed to by the Conference of Parties under the Convention on Biological Diversity, the Global Strategy on Invasive Species has identified ten strategic responses to guide policy maker to address the growing problem of Invasive Alien Species. The strategies are (i) building management capacity, (ii) build research capacity, (iii) promoting sharing information, (iv) developing economic policies and tools, (v) strengthening national, regional and international legal institutional frameworks, (vi) instituting a system of environmental risk analysis, (vii) building public awareness and engagement, (viii) preparing

national strategies and plans, (ix) building invasive alien species issues into global change initiatives and (x) promoting international cooperation. There is a need to develop similar multipronged strategy to prevent the incursion of invasive alien species and if introduced then immediate measures to manage the invasive species. Some of the country specific strategies that can be employed to address the issue are:

Regulatory Framework:

There is a need to formulate regulations both at National and State levels which support prevention, containment and eradication of invasive alien species and exotic plant pests. In India, the agriculture, horticulture and forestry are the State subjects. The production, protection and conservation of agriculture, horticulture and forestry resources in each State are managed by respective State Departments. There is a need to review the existing policies and regulations, empower the State Departments of Agriculture, Horticulture and Forestry in regulating the inter-state movement of plants and plant materials to prevent, contain and eradicate exotic and invasive species which may threaten the native plant eco-system. An effective mechanism for information exchange, surveillance, monitoring and early warning systems for prevention, containment and eradication of plant pests needs to be developed. The NPPO, which is responsible for implementing the regulations at national level has to secure necessary budgetary support to meet the cost for containment and eradication in the event of pest incursion, including compensation in the event of extreme step of destroying the host plants to contain / eradicate the pest.

Regional Cooperation: India has land contiguity with many neighbouring countries and close proximity to the Island nations of Sri Lanka and Maldives, as a result any new pest incursions in these neighbouring countries may eventually enter into India as pests do not recognize national boundaries. The cooperation with neighbouring countries and harmonization of phytosanitary measures in the South Asia will go a long way in protecting the biosecurity of the Region as well as the Nation. India being a lead country in the region, should take the initiative for identifying the potential pest threats to the region and engage in human resource development in the area of Pest Risk Analysis, Pest Surveillance, Pest Diagnostics and Pest Incursion Management for South Asian Region. Further, in the event of any new pest incursions in the neighbouring countries which may be of potential concern to India's biosecurity, the NPPO of India may have to take proactive role by providing necessary assistance to the neighbouring countries in containment and eradication.

Institutional Framework: The production, protection and conservation of Agriculture, Horticulture and Forestry resources in each State are managed by respective State Departments. Each department do carry out regular surveys and surveillance for various parameters of production, conservation but the component of surveillance for exotic or invasive plant pests need to be included in the regular activities of each department. The States which have land contiguity with neighbouring countries and close proximity to neighbouring island countries to establish .State Biosecurity Authority / Council with State regulatory support to safeguard the plant resources from exotic plant pests. There is a need to create District Biosecurity Committee under the chairmanship of District Collector and include the Joint Directors of Agriculture, Horticulture and District Forest Officer and representatives of Biosecurity Cells within the districts as members to review the incidence of any pest epidemics as well as new pest occurrence within their jurisdiction. The District Biosecurity Committee must meet and review the pest situation at least once in every month and submit periodical reports to the State Biosecurity Council. In the event of any new pest sightings the committee must immediately alert the neighbouring District Biosecurity Committee's as well as State Biosecurity Council and NPPO. The State Biosecurity Council must confirm the pest identity in coordination with NPPO, to initiate necessary emergency actions to contain and eradicate the new pest. A Block Biosecurity Committee may be formed involving block level officials of agriculture, horticulture, forestry including farmers, traders, NGOs and industries dependent on agriculture, horticulture and forestry as stakeholders for reporting any exotic pest / invasive species. The representatives of Block Biosecurity Committee should regularly interact and report to the District Biosecurity Committee.

Building Management Capacity: There is a need to establish .emergency preparedness teams and rapid response mechanisms to tackle the incursion of invasive alien species and exotic plant pests. For successful containment, suppression and eradication of invasive alien species, regulatory support and interdepartmental coordination among various stakeholders are the key elements. There is a need for capacity building and networking of biodiversity specialists, environmentalists, plant quarantine specialists to address the issues posed by incursion of invasive alien species and exotic pests. To begin with capacity building efforts should be focused to build basic awareness on threats posed by potential invasive alien species and exotic plant pests among border control officials, quarantine officials, customs, food inspection authorities and stakeholders. The State

Agricultural/Horticultural Units along the border areas should be made part of the emergency preparedness/rapid response network. The above officials should be trained to organize regular surveys and surveillance for detection of new pest.

Preparedness Research: Asian Soybean Rust (*Phakopsora pachyrhizi*) (ASA) is a major threat to soybean cultivation in USA and USDA realized that they cannot avoid incursion of soybean rust entry into USA. The ASA was first reported in Louisiana, USA in November 2004. Two years before its arrival, USDA researchers were already busy coordinating field trials of fungicides such as tebuconazole, tetraconazole, myclobutanil and trifloxystrobin plus propiconazole in rust-infested regions of Zimbabwe and South America. There, they examined fungicide timing, application methods and rates, efficacy and residual activity. That and other data expedited approval of state requests for emergency-use exemptions for the fungicides on soybeans when the rust made its entry in 2004.

Research Capacity: There is a need to strengthen research capacity to analyse the risks posed by the invasive alien species, risk assessment and risk management. There is a need to develop improved techniques to eradicate and contain invasive alien species through biological control and other environmentally sustainable strategies. Further, identifying the limiting factors which affect the spread of the invasive alien species can prevent its spread. There is a need to develop research in exclusion methods without affecting the trade of agricultural commodities. The prediction model and its wide publicity among the stakeholders as awareness tool need to be developed for better awareness and management.

Environmental Risk Analysis: The NPPO must identify the emerging quarantine and invasive pest threats to India through appropriate risk analysis and environmental assessment. It must provide the detailed biology, ecology, host range, morphology supported by photographs of the pest with key identification characteristics and host symptoms of looming pests to the State Biosecurity Council, District Biosecurity Committee and Block Biosecurity Committees to organize awareness campaigns among the stakeholders to safeguard the Biosecurity through surveillance and early detection. The NPPO must develop guidelines on Do's and Don'ts in the event of exotic / invasive pest sightings.

Awareness: The public awareness on invasive species is vital in preventing the entry, establishment and eradication. Creating awareness on harmful effects of invasive species, their economic impact and successful eradication programs carried out elsewhere in the curriculum of schools and colleges in go a long way in enhancing the awareness among the citizens. Regular workshops on looming threats of invasive species involving NPPO, State Biosecurity Council, District Biosecurity Committee and Block Biosecurity Committees will not only create awareness but also enable them in containment and eradication in the event of any new incursions.

Awareness: In July 2008, *Anoplophora chinensis* (Coleoptera: Cerambycidae) was detected in Guernsey, UK on grafted *Acer palmatum* plants imported from China via the Netherlands. The plants arrived in Guernsey in late February were placed into cold-store. In early July when the plants were planted in an isolated nursery, 10 adult beetles of *Anoplophora chinensis* were found crawling on these plants. All the plants were immediately incinerated. Properties adjacent to the nursery were visited and leaflets supplied to make the owners aware of the situation. The local press, radio and TV stations were contacted and an island wide coverage was achieved. To date no further beetles have been found.

CONCLUSION

India is still free from many economically important exotic plant pests and other invasive species. Emergency preparedness to prevent the entry, establishment and to initiate containment and eradication activity in case of pest incursion is needed. There is a well-organized preparedness mechanism in place to prevent, control and eradicate locust invasion in the Country. However, this mechanism is confined only to the western borders of India and being implemented by NPPO for locust only. While drawing the lessons from locust control programme, urgent action is required for establishing a similar preparedness action plan for various looming threats of exotic pests and invasive alien species into India.

Special Events

Ambrosia eradication programme

NIPHM in association with Karnataka State Department & UAS Bangalore has initiated the Ambrosia weed eradication from 7 July 2013 onwards. To review the progress Director General, NIPHM along with Director Plant Biosecurity visited the infested areas in Karnataka and distributed the herbicide for Ambrotia management.

DG insecpecting the herbicide effects on Ambrosia and distributed herbicides to the farmers for Ambrosia eradication

Biological Control Promotion Programme

In view of popularizing tthe benefit of biological control for pest management and sustainable agriculture Dr. K. Satyagopal IAS, Director General NIPHM has taken an initiative by releasing the Bracon a biocontrol agent for managing red headed caterpillar a serious pest of coconut in Karnataka. He explained the importance of parasitoids in coconut pest management and their on-farm mass rearing technology.

DG releasing Bracon a Parasitoid for managing coconut red headed caterpillar

International Programmes

Visit of Director General NIPHM to APHIS/USDA

NIPHM strives to emerge as an internationally acclaimed Centre of Excellence for Human Resource and Policy Development in Plant Biosecurity and sustainable Plant Health Management. To strengthen the capacity in training, research and policy issues in these areas, NIPHM has eastablished collaboration with USDA. The work plan envisage organizing joint training programmes by incorporating advanced practices at NIPHM through participation of USDA technical experts, faculty exchange programmes, US based training programmes for NIPHM faculty, developing distance learning modules, methods developments & applied research and developing Regional Plant Health System Analysis Course. Dr. K. Satyagopal, IAS Director General NIPHM along with Dr. N. Sathyanarayana, Director Plant Biosecurity Division visited APHIS/USDA from9th to23rd November 2013 to discuss and strengthen the collaborative activities.

Director General's interaction with Texas University faculty on online education tools; and delivering lecture to USDA and North Carolina University officials on Systems Approaches and Sustainable Agriculture

Barbara Shah giving overview on plant disease & insect clinic activities at APHIS North Carolina State University; Visit to pest diagnostic facilities at Frederick

Dr. Satyagopal IAS, DG, along with faculty members of PDC Frederick, Maryland

Visit to high risk post entry quarantine facilities for Germplasm import at Beltsville, Maryland

Visit to molecular diagnostic lab Beltsville, Maryland; Interacting with experts of CANARY technology for rapid pest detection.

Special Events: PGDPHM for Agricultural Officers of Kerala

Department of Agriculture, Govt. of Kerala is collaborating with NIPHM to offer Post Graduate Diploma in Plant Health Management for the Agricultural Officers of Kerala. The main objectives of the course are:

- To develop a highly committed and competent cadre of agricultural professional to promote environmentally sustainable plant health and Bio-security Management in Kerala.
- To develop competence in Agro-ecosystem based analysis.
- To develop skills to organize Farmer Field Schools effectively.
- To improve knowledge to promote safe and judicious use of pesticides through adoption of appropriate application techniques.
- To develop skills in pest surveillance and disease diagnosis.
- To impart training and knowledge to officers and farmers on environmentally sustainable plant health management.

Implementation of the above objectives will be done through organizing PGDPHM programme by NIPHM for the Agricultural Officers of Department of Agriculture, Kerala. SAMETI will provide necessary amenities required for organizing these programs. NIPHM will organise PGDPHM programme of two years duration comprising of four semesters as both off campus and on-campus programme and also through field assignment at place of duty of the participants.

This programme was inaugurated by Dr. K. Satyagopal, IAS, Director General, NIPHM on 19th December at SAMETI, Kerala. Special address was delivered by Shri KR Jyothilal IAS, Secretary, Agriculture. Dr. P.Rajasekharan, Chief-Agriculture State Planning Board, Shri R Ajithakumar Director of Agriculture, Smt P.Sheela, Director SAMETI, Dr. P. Jeyakumar Director PHM, Dr. CK Preethambaran, Retired Director of Research, Kerala Agricultural University, and Sri. VV Pushpangadan Additional. Director of Agriculture were also present on this occasion. A total of 35 participants from Department of Agriculture, Kerala have joined the programme. After inaugural session Dr. K. Satyagopal, IAS, Director General, NIPHM delivered lectures to the participants on "Role of Agro-EcoSystem Analysis based Plant Health Management and Ecological Engineering for Pest Management", and "Systems Approach and Sustainable Agriculture". The contact classes were organised from 19th to 21st January, 2014, in which Dr. C.K.Peethambaran, Dr. P.Jeyakumar and Dr. Satish Kumar Sain delivered lectures.

Dr. K. Satyagopal, IAS, Director General NIPHM delivering Keynote Address

Sh. Subrata Biswas IAS, Agriculture Production Commissioner delivering the Presidential Address

Dr. K. Satyagopal, IAS, Director General NIPHM and Dr. Rajasekharan P lightning the lamp during the opening ceremony .

Capacity building programmes

Pest Surveillance

A training programme on Pest Surveillance which serves as basis for Pest risk analysis, identify Pest Free Area (PFA) and Areas of Low Pest Prevalence (ALPP) to promote export of agricultural commodity was conducted from 3rd to 10th October 2013. The aim of the training was to train the participants on the concept, methodology and types of survey and surveillance and international standards relevant to pest surveillance. 48 officials from ICAR institutes, Agricultural/Horticultural departments/Universities representing the states of Kerala, Bihar, Andhra Pradesh, Uttar Pradesh, Karnataka, Chhattisgarh, Odisha, Manipur, Tamil Nadu, Haryana, Maharashtra, Punjab, Himachal Pradesh, Arunachal Pradesh, West Bengal, Madhya Pradesh and Maldives participated in the training programme

Stored grain pest management for FCI and CWCs

A training programme on stored grain pest management was conducted from 25th to 30th October, 2013 exclusively for the officials of Food Corporation of India and Central Warehousing Corporation of the southern states. The aim of this programme was to cater to the needs of stored grain pest management problems in godowns and warehouses. Programme imparted knowledge and skills on stored grain pests and their importance, detection, identification, pheromones and traps used for monitoring and management aspects formed the core areas of the programme. 41 participants from the FCI and CWCs of Andhra Pradesh, Tamil Nadu, Kerala, Karnataka and Maharashtra participated in this training programmme.

Plant Quarantine National Regulations and Procedures

A training on Plant Quarantine National Regulations and Procedures was organized from 4th to 9th December, 2013. This course was mainly designed to impart knowledge on the procedures involved in import and export of agricultural commodities during trade. 17 participants from ICAR and state department/SAUs from Andhra Pradesh, Karnataka, Punjab, Maharashtra, Manipur, Gujarat and Bihar attended the training programme. They were trained on international conventions, agreements and standards, national regulations, standard operating procedures for import and export of plants and plant products.

Biosecurity and Incursion Management

A 21 days training programme on Biosecurity and Incursion Management was organized from 10th to 30th December 2013 with the aim to create awareness about exotic plant pest incursions & their management. Nine participants from Agricultural Departments /Universities and DPPQ&S of Madhya Pradesh, Haryana, Tamil Nadu, Bihar, Assam, Karnataka and Rajasthan participated in the programme. The participants were exposed to Plant Biosecurity concepts & threats associated with various pathways, Pest Risk Analysis, Pest Surveillance and Pest Incursion Management.

Stored Grain Pests – Detection and Identification & Phytosanitory Treatment

A training programme on stored grain pests - detection, identification and Phytosanitary Treatment (MBr & ALP) was conducted from 11th November to 2nd December, 2013 with two sub modules. Module I: stored grain pests - Detection and Identification from 11th - 15th November, 2013 and Module II: Phytosanitary Treatment (MBr & ALP) s from 18th November to 2nd December, 2013. Seven participants from DPPQ&S, CWC and agricultural university of Kerala, Bihar, Andhra Pradesh and Haryana attended 21 day training. Seven participants of CWC and agricultural department from Andhra Pradesh and Tamil Nadu attended Module I and 13 participants from private industry and DPPQ&S attended the Module II programme.

Method Validation in Pesticide Residue Analysis and Measurement of Uncertainty

A 6 days programme was organized from 6th to 11th November 2013. Eight participants from All India Network Project on Pesticide Residues, ANGRAU Hyderabad, MPKV Rahuri, and working for monitoring of pesticides residues at National level Pesticide Residue Analysis Laboratory, Govt of Maharashtra and a student of Diploma in Pesticide Management participated in the program. The participants were trained on the method validation and Measurement of Uncertainty.

Sampling of vegetables and fruits for pesticide Residue Analysis

A two day training program on "Sampling of vegetables and fruits for pesticide Residue Analysis" was conducted from 19th to 20th December 2013. Five participants were trained on Identification, Selection, Sampling, preparation of samples, etc for undertaking the Pesticide Residue Analysis.

Capacity Building

Pesticide Formulation Analysis

A training programme on Pesticide Formulation Analysis (66 days) which is a mandatory training under the Insecticide Act 1968 and Rules 1971 for the Analysts of Government Pesticide Testing Laboratories was organized from 18th to 26nd August 31 October 2013. 23 participants from Andhra Pradesh, Chandigarh, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Maharashtra, Rajasthan & Tamil Nadu were trained in the techniques involved in both volumetric and instrumental analysis method of pesticide formulation.

Inspection, Sampling and Prosecution

A training programme for the Insecticide Inspectors of State Departments of Agriculture was conducted from 21st to 26th October, 2013 for imparting the procedures for inspection, sampling & prosecution procedures under Insecticides Act- 1968. 11 participants participated in the programme.

Laboratory Quality System Management and Internal Audit

Three training programmes on Laboratory Quality System Management and Internal Audit as per ISO/IEC 17025-2005 were conducted from 1st to 5th October, 26th to 31st October and from 18th to 23rd December 2013 to enable participants to take up accreditation of their laboratories. 49 participants were trained on the required skills and procedures for obtaining ISO accreditation under NABL.

Pesticide Residue Analysis

A training programme on Pesticide Residue Analysis was organized from 18st November to 17th December 2013. Four participants were trained on various aspects of sample preparation, extraction, identification and quantification of pesticide Residues besides confirmatory analysis through latest analytical instruments like GC-MS/MS and LC-MS/MS.

Consultation on Accreditation of Pesticide Testing Lab. by NABL:

A training program was organized on "Laboratory Quality Management and Internal Audit as per ISO/IEC 17025-2005" from 08 to 15 December 2013 at Coimbatore. 14 Analysts of State Pesticide Testing Laboratories(PTLs) of Tamil Nadu participated in the training.

Biointensive Plant Health Management and FFS for Tobacco Board Officers

A six-day training programme on Biointensive Plant Health Management and Farmers' Field School Methodology for Tobacco Board Officers was organized between 2nd to 7th December 2013. 25 participants were exposed to the AESA based PHM & Ecological Engineering for Pest Management and other Biointensive methods of pest management especially in Tobacco. Dr. K. Satyagopal IAS, DG NIPHM and Dr. K. Gopal IAS, Chairman Tobacco Board interacted with the participants.

Integrated Soil Nutrient and Weed Management and Rhizosphere Engineering

A modular training course of 7 plus 6 day's duration on Integrated Soil Nutrient & Weed Management (ISNWM) and Rhizosphere Engineering were organized from 4th to 10th December and 11th to 16th December 2016. A total of 15 officers were trained in AESA, Ecological Engineering for pest management, Rhizosphere Engineering for soil health, Integrated Nutrient Management, VAM and microbial inoculants for stainable agriculture. Integrated Weed Management in different crops, weed surveillance, weed identification and weed vegetation analysis.

Crop specific AESA and Ecological Engineering for pest management in vegetables

A training programme was organized from 4th September to 4 October 2014. 18 officials from Tamil Nadu State Department of Horticulture attended the programme. They were trained on AESA, Ecological Engineering for pest management, Rhizosphere engineering, Integrated Soil, Nutrient, Weed Management, GAP, FFS, biological control of pest management and production of biocontrol agents etc.

Rodent Pest Management in Store Houses of Food Grains

Training programme was organized from Nov 27th to Dec 02nd, 2013 to build capacity on scientific rodent management techniques among CWC/SWC/FCI professionals. Four officers from CWC (AP, West Bengal and Odisha States) underwent the training and acquainted knowledge on ethology and scientific management of rodents. Trainees were trained on safe and judicious use of rodenticide poison baits in storage structures & premises.

Appropriate Pesticides Application Techniques and Farm Level Storage Structures

A training programme on "Appropriate Pesticide Application Techniques and Farm Level Storage Structures" was conducted from 3rd to 10th October 2013. 16 participants from Odhisa, Tamil Nadu, Maharashtra, Madhya Pradesh attended the training. The importance of safe and judicious use of pesticides, principles of pesticide application techniques & calibration of sprayer & nozzles, Storage problems of food grains at commercial/ farm level, Traditional & improved storage structures, detection of insect infestation in stored food grains, modern storage structures, control of stored grain insect pest, problems of moisture and damage of food grains were covered. Practical's on, selection of suitable equipment and operation of the equipment, selection of suitable nozzles and calibration of the sprayers were covered.

General Council, Executive Council and Academic Council meetings of NIPHM

Shri. Ashish Bahuguna IAS, Secretary DAC, Chairing the General Council Meeting of NIPHM held on 25th October 2013.

Shri Avinash K.Srivastava IAS, Additional Secretary DAC, Chairing the 13th Executive Council Meeting of NIPHM held on 20th Oct. 2013 at New Delhi

Dr. K. Satyagopal IAS, Director General NIPHM Chairing the Academic Council Meeting of NIPHM held on 25th October 2013.

Forthcoming Events

Pesticide Management Division

- Pesticide Residue Analysis. 28 April to 27 May 2014
- Instrumental Methods of Pesticides Analysis. 27 March to 16 April 2014
- International Code of Conduct on Pesticide Management & Pesticide Life Cycle Management with reference to Safety. 2 to 9 May 2014
- Laboratory Quality System Management and Internal Audit as per ISO/ IEC 17025-2005. 17 to 22 April, 2014
- Sampling of fruits, vegetables, and other items for Pesticide Residue Analysis & Calibration of Laboratory Equipments-Residue Analysis/PRA. 8 to 15 April, 2014
- Training on New Molecule of Pesticides (for SPTL Analyst Pre-requisite PFA trained only). 22 to 31 May 2014
- Calibration of Glassware and Laboratory Equipments- Pesticide Residue Analysis/Quality control.13 to 20 May 2014

Plant Health Management Division

- Fundamentals of Plant Health Management for Plant Health Doctors. 04 to 24 April 2014
- Production protocol for Biocontrol Agents and Quality Analysis & Quality Management of Microbial Biopesticides. 4 to 24 March, 8 to 28 April & 23 May to 12 June 2014
- Production protocol for Biocontrol Agents 4 to 14 March, 8 to 18 April & 23 May 2 June 2014
- Quality Analysis & Quality Management of Microbial Biopesticides. 15 to 24 March, 19 to 28 April & 3 to 12 June 2014
- Good Agricultural Practices (GAP). 20 to 29 March 2014
- Management of Polyphagous Pests with special reference to *Helicoverpa* & *Spodoptera*. 5 to 10 March 2014
- Farmers Field School. 2 to 9 March 2014
- Certificate Course on Urban Integrated Pest Management. 2 to 16 April 2014
- Rodent Pest Management in Endemic Areas. 15 to 24 May 2014
- Refresher Training on Rodent Pest Management. 15 to 21 May 2104
- Integrated Rodent Pest Management in Urban Environ. 4 to 8 April. 2014
- Appropriate Pesticide Application Techniques and Farm Level Storage Practices. 22 to 29 April 2014

Plant Biosecurity Division

- Biosecurity and Incursion Management. 8 to 28 April 2014
- Quarantine Pests- Detection and Identification. 8 to 28 May 2014
- Pest Risk Analysis. 14 to 19 April 2014
- Fundamentals of Plant Biosecurity. 7 to 12 April 2014
- Plant Quarantine National Regulations & Procedures. 1 to 5 April & 8 to 13 May 2014
- Emergency Preparedness and Incursion Management. 21 to 26 April 2014
- Stored Gain Pests - Detection and Identification. 11 to 15 March 2014
- Timber Log & SWPM Pests - Detection and Identification. 11 to 15 March 2014
- Plant Quarantine Procedures for Imports & Exports. 1 to 5 April 2014
- Forced Hot Air Treatment. 28 April to 2 May 2014
- Quarantine Insects- Detection and Identification. 22 to 28 May 2014
- Quarantine pathogens- seed health testing methods & molecular diagnostic techniques. 15 to 22 May 2014

Nominations may be sent by Email to:- niphm@nic.in

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