



Report of Insect-Pests Collection, Handling, Preservation and Biological Control training for ICFRE Technical Personnel at ICFRE-HFRI Shimla

(November 18-22, 2024)

ICFRE-Himalayan Forest Research Institute, Shimla organized one week (November 18-22, 2024) training programme on “**Insect-Pest Collection, Handling, Preservation and Biological Control**” for technical personnel of ICFRE, which is funded by Indian Council of Forestry research and Education (ICFRE), Dehradun (U.K.) under HRD Scheme. The main objective of the training program was to provide hands on training amongst ICFRE Technical Personnel about the insect pests collection, their handling, preservation and biological control.



Five participants, including N. Yuvaraj Praveen, ICFRE-Institute of Forest Biodiversity, Hyderabad (IFB), Sh. Bande Nawaj, ICFRE-Institute of Wood Science and Technology (IWST), Bangalore, Sh. Mahesh Kumar, ICFRE- Institute of Forest Productivity (IFP) Ranchi, Sh. C. Rajesh, IFGTB, Coimbatore and Sh. Yashwant Kumar Soni, ICFRE-SDC, Chhindwada (M.P.) attended the training programme. **Dr. Pawan Kumar (Scientist-F and Head, Forest Protection Division) Training Coordinator** welcomed the Chief Guest **Dr. Sandeep**

Sharma, Director, ICFRE-HFRI, Shimla who formally welcomed all the participants attending the training programme. Dr. Sandeep talked about the major insect pests of forestry ecosystem and their ill effects. He emphasizes that this training programme will be of immense help to the participants as they will be provided hands on training in the field of different methods of insect pests collection, their handling, dry and wet preservation methods. He further said that our environment, beneficial insects are also declining due to excessive use of certain pesticides. So this training

programme will be helpful to the participants where in different management strategies will also be shared with them by different experts of entomology field. He also highlighted the major research



initiatives being conducted by the institute. He further explained about Bio-fertilizers and Bio-pesticides products viz., **HIM BOKIL-I, HIM ALBIWASH, HIM GROWTH BOOSTER, HIM TRICHOKAWACH, HIM MRIDA SANJEEVANI** developed by the Institute.

Dr. Pawan Kumar, Training coordinator briefed about the schedule of training program, he emphasizes the proper identification of insect pests of forestry ecosystem and further said that this training programme will cover the major aspects of different methods of collection, handling, preservation and biological control practices. He briefed about the importance of bio-fertilizers and bio-pesticides products developed by the Institute in the managing major insect pest population. **Dr. Ashwani Tapwal** (Scientist-F, Forest Protection Division) proposed the Vote of Thanks in the inaugural session.

Technical sessions

Day-1 (November 18, 2024)



Dr. Pawan Kumar, Scientist-F and Training Coordinator delivered a talk on **Historical Importance of the Taxonomy and Newer Trends for the Taxonomic Study of Lepidoptera**. In his opening remarks he said about Stages in Taxonomy- Alpha taxonomy (analytical phase): Level at which species are characteristics and named. Beta taxonomy (synthetic phase): Arrangement of species into a natural system of lower and higher categories. Gamma taxonomy (biological phase): Analysis of intraspecific variations and evolutionary studies. He further talked about Importance of Taxonomy as there is a subtle relationship between the characterization of an organism by a systematist and finding solution of a particular problem by a scientist. Careful and accurate identification and classification are of vital importance. He talked about newer trends in taxonomy, like Morphological Approach, Shapes of Antenna of Lepidoptera, Cytological Approach, Biochemical Approach etc.

Dr. Mahender Singh Thakur, Chairman, Deptt. of Environmental Science, Himachal Pradesh University, Shimla presented a talk on **“Taxonomic Studies of Insect Pollinators: An Overview”**. He said that Taxonomic studies are essential for the identification and classification of insect pollinators, which is crucial for understanding their role in biodiversity and ecosystem functioning. By identifying species and assessing their abundance, these studies provide insights into pollinator health, behavior, and their contributions to plant reproduction. He further talked about Diversity, Distribution, and



Relative Abundance Studies. He also touched upon the topic of Methodology for Insect Pollinator Collection and Observation, Pollen Analysis, Wing Venation and Genitalia Studies. He also lays emphasis on Killing, Stretching, and Preservation of Specimens, Identification of Insect Pollinators.



In the second half of the first day the participants were provided hands on training on insect taxonomy. In which participants were acquainted to various taxonomic keys of different insect orders. They were provided hands on training to wing venation of insect orders (lepidoptera, hymenoptera etc.), dissection of genitalia, slide preparation of wings and genitalia and their identification characteristics. They were also told about the different procedures involved in slide preparation.



Day-2 (November 19, 2024)

Second Day proceedings started with the presentation by Akhil Kumar, Chief Technical Officer ICFRE-HFRI, Shimla where he delivered his talk on **“Insect Pests of Oaks of North Western Himalayas and their ecofriendly control measures”**. In his talk he briefed about the distribution and socio-economic significance of different oak species like *Quercus glauca*, *Quercus oblongata*, *Quercus floribunda*, *Quercus semecarpifolia*, *Quercus baloot*. Later in his talk he threw some light on threats to these oak species particularly the insect pest problems in the oak forests. He further talked about *Lymantria obfuscate*, Indian Gypsy Moth (IGM) and its biology and management in the forest. Talking of Insect -pests of Moru oak he explained in detail about the Biology and management of *Heterocrasa expansalis*. He also talked about the biology and management of stem borer *Xylotrechus basifuliginosus* of Kharsu Oak. Talking about the ecofriendly control measures he touched upon the topic of nuclear polyhedron virus of *Lymantria obfuscate* (LONPV) and for management of *Heterocrasa expansalis*, he said that plant extracts (Pissumar) had been found quite effective.

Dr. Ashwani Tapwal, Scientist-F, Forest Protection Division HFRI Shimla delivered a talk on **“Application of entomopathogens and Biofertilizers in Forestry”**.



He apprised the participants about different types of Bio-fertilizers and explained about their benefits in forestry. He said that in the forest nurseries and agriculture system, two types of major substances viz. fertilizers and pesticides are being used to enhance the productivity and manage pest and diseases. Although, they increase the productivity of crops, but have high cost and polluting nature. He said that biofertilizer and biopesticide are sustainable and eco-friendly. He further talked about Nanopesticides/ nanofertilizers which are the novel products targeting pests/crop in smaller concentrations. In his talk he lays emphasis on Nitrogen fixing biofertilizers, Phosphorus solubilizing biofertilizers, Phosphorus mobilizing biofertilizers and Plant growth promoting rhizobacteria. He also talked about the biofertilizer product developed by HFRI, Shimla viz., **HIM MRIDA SANJEEVANI**, **HIM TRICHOKAWACH** and **HIM GROWTH BOOSTER**. He further talked about their uses and mode of action. Therefore, it is need of the hour to adopt eco-friendly means like bio-fertilizers and bio-pesticides during crop cultivation.



Dr. Harinder Singh Banyal, Chairman, Deptt. of Biosciences, Himachal Pradesh University, Shimla presented a talk on “**Standard Technique of Collection and Preservation of Entomofauna**”. In his opening remarks he talked about Characteristics of insects, he said that Insects can be collected by a range of methods, including Handpicking, Sweeping, Beating, Aerial Netting and Light Traps. He further talked about Equipments required for Insect collection. He also explained Killing and Preservation techniques like Dry Preservation and Liquid Preservation. He talked about Mounting Specimens, Pinning techniques of various Insect orders and their Labelling.

During hands on training to the participants on the second day they practice extraction, preparation and application of native plant extracts viz., *Boenninghausenia albiflora* (Pissumar). They were told different steps involved in plant crude extraction with the help of soxhlet apparatus by use of methanol as extraction agent. Lab Demonstration on Bio control agents and their



showcased to the participants.



applications on major insect pests of forestry ecosystems were also

Day-3 (November 20, 2024)

Field Visit Field Visit of participants was conducted to Western Himalayan Temperate Arboretum (WHTA), Potter's Hill where they were told about the different host plants of butterflies. They were also showcased the various symptoms on plants and their leaves about the attack of different insect orders. The participants also collected butterflies and other insects of order coleopteran, hymenoptera, hemipetra and diptera etc.

Dr. Pawan Kumar, Scientist-F and Training coordinator Practical demonstrated different ways of insect pests collection like Handpicking, Sweeping, Aerial Netting etc. and different equipments required for Insect collection. He further practically demonstrated the process of killing and preservation methods.

Practical demonstration of wing venation extraction and genetelia extraction and its slide preparation of Hymenoptera, Diptera, Hemipetra etc. insect orders were provided to the participants at Department of Bio-sciences, Himachal Pradesh University, Shimla. Later on participants also practice wing venation and genetelia extraction and slide preparation from the insect pests specimens at HPU Shimla.



Dr. Mahender Singh Thakur, Chairman, Deptt. of Environmental Science, HPU, Shimla showcased the participants about Taxonomic characters of Insect Pollinators particularly the honey bees. He practically demonstrated Killing, Stretching, and Preservation of Specimens, Identification of Insect

Pollinators.

Dr. Harinder Singh Banyal, Chairman, Deptt. of Biosciences, Himachal Pradesh University, Shimla, provided hands on training on Standard Technique of Collection and Preservation of Entomofauna to the participants. He also showcased characteristics of insects and range of methods by which insects can be collected, including Handpicking, Sweeping, Beating, Aerial Netting and Light Traps. He further practically demonstrated about Equipments required for Insect collection. He also explained Killing and Preservation techniques like Dry Preservation and Liquid Preservation. He talked about Mounting Specimens, Pinning techniques of various Insect orders and their Labelling.

Dr. Joginder Singh, Associate Prof. Deptt. of Biosciences, HPU, Shimla apprised the participants about the role of ants in our ecosystem. He explained about different ant species found in the forest ecosystem and their colonization. He also practically demonstrated the difference between major ant species and their identification features.

At the end of the field visit Dr. Pawan Kumar thanked all the faculty members of HPU, Shimla for their valuable inputs.

Day-4 (November 21, 2024)

Field Visit Field Visit of participants was conducted to ZSI, Solan where they were apprised about Zoological survey of India, and its functioning. Participants were then provided hands on training particularly to insect order Coleoptera, their identification features, characteristics and their mouth parts etc. They were also apprised about their detrimental role in degrading forest ecosystem. The participants were also provided hands on training to the pinning, labeling of insect pest specimens. They were also showcased different methods of preservations like dry and wet preservation. At the end of the field visit Dr. Pawan Kumar thanked all the faculty members including Dr. Avtar Kaur, Dr. Prakash Pathania and Dr. Kamal Saini for providing valuable inputs in this training programme.



Day-5 (November 22, 2024)

Proceedings of the last day of this training programme begins with the presentation by Dr. Meenakshi Sharma, Associate prof. Center of Excellence Sanjouli College, Shimla. Where in her

she delivered her talk on “**Identification and Characterization of Hymenopteran Insects with Special Emphasis on Pollinators**”. In her talk she said that Hymenopteran insects are a diverse and ecologically significant order, which includes bees, wasps, ants, and sawflies. They play essential roles in ecosystems as pollinators, predators, and contributors to soil aeration and nutrient cycling. She also talked about General Characteristics of Hymenoptera and Main Groups of Hymenopterans like Bees, Wasps, Ants (Family Formicidae), Sawflies (Suborder Symphyta). Further she talked about Social and Solitary Behavior of Hymenoptera their life cycle and reproduction, Ecological Roles of Hymenopterans. She also explained types of honey bees species like *Apis mellifera*, *Apis cerana*, *Apis dorsata*, *Apis florea* and *Apis andreniformis*.

On the second talk of the day Dr. Pawan Kumar, Scientist-F and Training coordinator delivered his talk on “**Ecofriendly management practices against insect pests of forestry in India**”. In his talk he said that Nursery Pests like White-grubs, Cutworms, Termites and Crickets, Defoliators, Sapsuckers and Grasshoppers are major determining force in raising of seedlings. He further explained about wood-boring insects of Chirpine tree, Control Measures for termites, Control Measures for Nursery Caterpillars. Talking of Ecofriendly alternates to fight these pests and diseases he said that Trichocard as effective Biocontrol agents against serious pests of Teak. He said that Institute has also developed 2 products viz., HIM BIODIL-I and HIM ALBIWASH. HIMALBIWASH (65 Flowable Formulation) is a liquid formulation effective against *Yponomeuta padella* (Birdcherry defoliator); *Anarsia lineatella* (Poplar defoliator of cold desert), Aphids; Scale insects; defoliator of Salix spp. (Willow); *Heterocrassa expansalis* (Oak defoliator); *Plecoptera reflexa* (defoliator of Shisham). HIMBIODIL-1 is effective against stored seed pests such as *Plodia interpunctella* (Seed borer of chilgoza pine); *Homaloxestis chlopsis* (Seed/ berry pest of Juniper); *Curculio glandium* (Acorn weevil of Oak) and seed pests of Shisham. He further talked about the natural enemy i.e. insect parasitoids (*Trichogramma chilonis*) and its application in managing major insect pests of forestry.

Valedictory & Discussion Session

The valedictory and discussion session was conducted during the afternoon session on November 22, 2024.

Dr. Sandeep Sharma, Director, HFRI, Shimla appreciated the participants for their keen interest in the Training Programme and assured to take care of their suggestions. Certificates of participation were distributed to participants during the valedictory session. **Dr. Pawan Kumar, Scientist-F and Head, Forest Protection Division** proposed vote of thanks, wherein he thanked ICFRE, Dehradun for funding of this training programme under HRD Scheme, he also thanked Director, HFRI Shimla and resource persons from different fields. Lastly he thanked all the participants of this training programme.

Photographs



Inaugural session Chaird by Director HFRI, Shimla



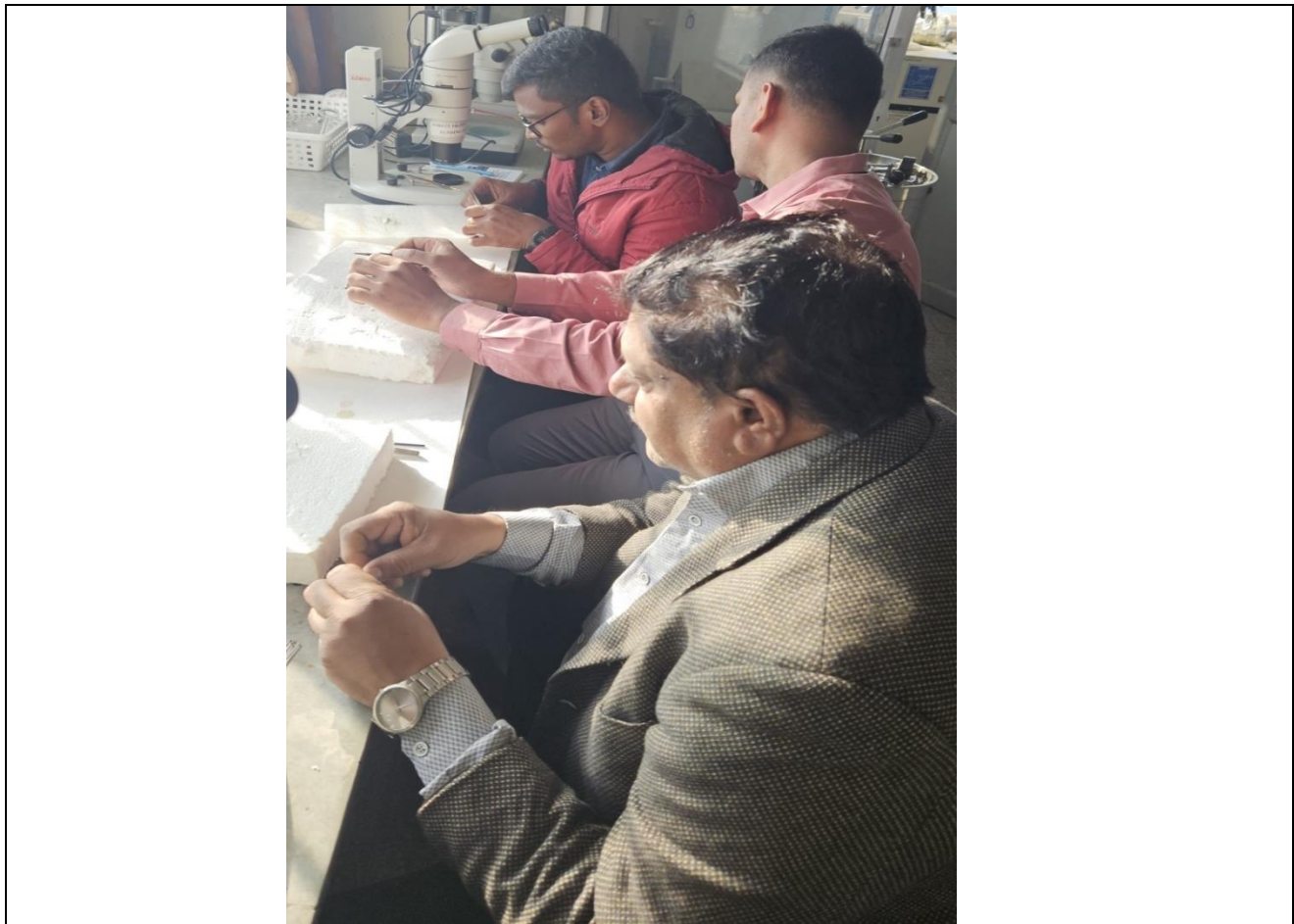
Technical Session by Dr. Pawan Kumar, Training Coordinator



Dr. Sandeep Sharma, Director, HFRI Shimla during his talk



Participant during interaction



Group Photo



Field Visit to ZSI Solan (21.11.2024)



Practical hands on training to the participants



Visit of participants to Technology Demonstration Centre (TDC)



Field visit to HPU Shimla (20.11.2024)



Distribution of certificates to participants



Distribution of certificates to participants

