

## Bio-diversity of insects\*

Biodiversity is one of the important cornerstones of sustainable development and represents the biological wealth of a given nation. The world is currently facing its greatest ever biodiversity crisis. Insects and plants are becoming extinct because of habitat loss, over-exploitation, pollution, overpopulation and the threat of global climatic changes. Insects comprise the largest group of organisms and are involved in various vital 'ecosystem services' such as pollination, decomposition, herbivory and biological control as well as contributing directly to human-based economies through silk, lac and honey production (silkworm, lac insects and honey bee). As we all know, India is one among the twelve mega bio-diversity countries of the world and we also realize that 80% of the insects are endemic in India. As such, the focus and aim of the conference was to foster the advancement in the field of bio-diversity of insects and sounder management of pest insects.

There were about 288 research papers apart from one keynote address and 6 plenary lectures. There were 20 technical sessions in the conference covering one key-note address, 5 plenary lectures and 248 research papers.

T. J. Pandian (Indian Council of Agricultural Research, New Delhi) in his inaugural talk introduced the need for conservation of animals, and plants, particularly insects. He also elaborated on the role of insects in the field of agriculture, forestry, medicine and veterinary science.

T. N. Ananthakrishnan in his keynote address, emphasized that the growing awareness of the significance of biodiversity and its rapid decline, has led to increasing interest in inventorying and monitoring of biodiversity at various levels alongside priorities for their conservation. He also stressed that the general assessment of biodiversity at the genetic, population, specific and ecosystem levels in vogue, increasing involvement in in-

sect biodiversity studies has to necessarily involve multidimensional aspects such as forest canopy, understorey and forest floor encompassing 'species guilds' in tropical forest, besides agro biodiversity involving genetic diversity found within individual crop and associated weeds. He pointed out that biodiversity forms the essential material for scientific studies of the history and evolution of life as knowledge of biodiversity is basic to all other fields of comparative and applied biology, providing a framework for ecological, behavioural and evolutionary studies. He said that the micro fauna like bacteria, virus and their association with insects have to be studied for sustainable forming of agricultural ecosystem.

Donald R. Barnard (US Department of Agriculture) spoke on the use of Global Information Technology for development of mosquito vector surveillance systems. He dealt with the importance of various components of Global Information System for identifying breeding sites for better management of mosquito vectors.

Wen-Qing Zhang (Sun Yat-sen University, China) highlighted external and internal causes in insect pest management practice and traced the cultural, chemical and biotechnological aspects of management system of insects.

Young-Joon Ahn (Seoul National University) in his talk stated that control of mosquitoes has been principally provided by the use of synthetic insecticides. He dealt with the adverse effects and regulatory status of these chemicals and the need for the development of selective mosquito control alternatives. Because plants and plant essential oils as well as their constituents are relatively nontoxic to mammals and are even exempt from toxicity data requirements in many countries, they have been exploited as mosquito control agents.

K. Murugan (Bharathiar University, Coimbatore) talked about the biodiversity and conservation of butterflies at the Western Ghats. He explained that the Western Ghats is one of the 'hot spots' of biodiversity and needs urgent attention for conservation because of the high degree of plant and butterfly endemism and the grave threats it faces.

Suryanarayanamurthy (Indian Institute of Chemical Technology, Hyderabad) spoke about the novel Decision Support System (DSS) and its applications in knowledge extractions in public health and particularly for mosquito transmitted diseases.

G. Thirumalai (Zoological Survey of India, Chennai) presented a paper outlining the need for conservation of aquatic and semi-aquatic group of insects and its biodiversity pattern in India.

R. M. Sharma (High Altitude Zoology Field Station, Solan) reported on the biodiversity status and faunal diversity of 65 species of insects belonging to 4 orders, namely Lepidoptera, Orthoptera, Hymenoptera and Coleoptera. He emphasized that Lepidoptera (moths and butterflies) fauna should be conserved because these are flagship species.

P. Narayanasamy (Annamalai University, Chidambaram) stated that fungal pathogens can be employed for sustainable management of agricultural pests.

V. Ramakantha (State Forest Service College, Coimbatore) expressed his views on the collection, conservation and documentations of forest insects.

Inoue A. Takashi (Japanese National Institute of Agrobiological Sciences) spoke on the life history pattern of butterfly species and the host-plant relationships; he also related the host plant preference and utilizations of Japanese and Indian butterflies.

S. Mohankumar (Centre for Plant Molecular Biology, Coimbatore) stated that insect molecular systematics has undergone remarkable growth in recent years and molecular methods are becoming increasingly important in systematic entomology. He pointed out that the genetic background of individual insect species and populations within those species influences the level of pest damage in crop plants and transmission of diseases by insect vectors. He further pointed out that the advances in methods of data generation and analysis have led to the accumulation of large amounts of DNA sequence data from most major insect groups.

N. Kulkarni (Tropical Forest Research Institute, Jabalpur) stated that adult beetle populations in the forest should be given

\*A report on the five-day International Conference on Bio-Diversity of Insects: Challenging Issues in Management and Conservation conducted at Department of Zoology, Bharathiar University, Coimbatore during 30 January - 3 February 2006.

priority, since it is an indicator species of forest ecosystems. Further, he described the role of beetles in the litter degradation and nitrogen recycling mechanism at the forest floor and importance of the various cultural operations in forest nursery and integrated nursery management for the forest propagation. K. R. Sasidharan (Institute of Forest Genetics and Tree Breeding, Coimbatore) explained the pollination ecology of butterflies and honey bees in the Western Ghats, Southern India, and the altitudinal variations of insect fauna in the Western Ghats Mountains and their role in ecological successions of forest ecosystem. P. Pramod (Salim Ali Centre for Ornithology and Natural History, Coimbatore) covered the importance of endemic species of insects in the Western Ghats and role in preserving the habit and habitats. Survey and species identification is essential for the future documentation of species.

N. Dhandapani (Tamil Nadu Agricultural University, Coimbatore) explained the importance of native predator/parasites/microbes and their conservation in the agricultural ecosystem. He stressed the demerits of chemical insecticides and their toxicity on environment and other non-target organisms.

S. Manimegalai (Tamil Nadu Agricultural University, Coimbatore) reported on the prevalence of silkworm diseases in the world and India in particular. She dealt with common disease prevalence in almost all silkworm-growing countries. The severity is more in tropical countries like India, where the climatic condition is favourable for multiplication of pathogens, viz. bacteria, virus, fungi and protozoa which contributes to 30–40 per cent loss in cocoon yield

S. Sithanatham (Sun Agro Biotech Research Centre, Chennai) stated that

egg parasitoids of insects constitute an important group of natural enemies of major crop pests. Trichogrammatids known to occur commonly in major tropical ecosystems, are extensively used in augmentative biocontrol, while Scelionids are potential targets for conservation biocontrol. He pointed out that scope exists for undertaking focused exploration and ecologically based analysis of native biodiversity and possible exchange of promising candidates, in compliance with international codes and agreements.

Subbiahpoopathi (Vector Control Research Centre Medical Complex, Pondicherry) stated that mosquito-borne diseases form a major component of communicable diseases (malaria, filariasis, dengue and Japanese encephalitis) in India and in Asian countries. He pointed out that synthetic insecticides have been effectively used during the past several decades to control these dipteran pests and to reduce vector-borne diseases. But the use of chemical insecticides has become problematic because of a multiplicity of factors including physiological resistance in the vectors, environmental pollution resulting in bioamplification of food chain contamination and harmful effects on beneficial insects. Further, he stressed the appropriate use of biological control for mosquito vectors.

Tenji Konishi (Doshishu Women's College of Liberal Arts, Kyoto) dealt with the medicinal plants which have mosquitocidal properties. He reported the larvicidal activities of plant extracts against *Aedes albopictus* (Culicidae) and *Paratanytarsus grimmii* (Chironomidae). Nahoko Uchiyama (National Institute of Health Sciences, Tokyo) described extractions and screening methodology of medicinal plants for mosquito control. She pinpointed the bioactivities of che-

micals from Rutaceae and Compositae for pharmacological activities on mosquito species and malarial parasite, *Plasmodium*.

H. Yoshitake (University of Tokyo, Japan) reported on biosystematics of the family Curculionidae with special reference to molecular identifications and bar-coding of the species.

N. Senthil Kumar (Sun Yat-sen University, China) covered the co-evolution of insects and plants. He noted that research has integrated many branches of science such as ecological, molecular and chemical aspects together to explore these issues which will unravel the sub-cellular processes down to gene induction that mediates these events, enabling us to study these genes and gene functions.

Y. Aldryhim (College of Agriculture, Saudi Arabia) focused on the current pest status and biological management with special reference to Red palm weevil (RPW) *Rhynchophorus ferrugineus* (Oliv.). He has correlated the influence of biotic and abiotic factors on the ecology, population dynamics and bionomics in South East Asia.

N. Krishnakumar (Forest Department, Chennai) explained the need for developing *in situ* and *ex situ* conservation strategies of insect fauna. He also explained the role of butterfly on plant pollinations as well as for the establishment of butterfly garden to conserve the endemic species of butterflies and also to promote 'Nature education and interpretation programmes'.

---

**K. Murugan**, Department of Zoology, Bharathiar University, Coimbatore 641 046, India. e-mail: kmvbk@yahoo.com