NBAIR Newsletter

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ICAR–National Bureau of Agricultural Insect Resources

Tackling a taxonomic impediment: a small step for NBAIR, a big step for insect systematics!

Researchers the world over assert that the major stumbling block hindering the sound management of biodiversity is the existence of "taxonomic impediments", viz. the knowledge gaps in our taxonomic system, the shortage of trained taxonomists and curators and the restrictions imposed on the free exchange of dead specimens between taxonomists in different countries bound by the rules and regulations codified in the Biological Diversity Act, 2002. These taxonomic impediments adversely impact our ability to identify, conserve and utilise biodiversity.

There are millions of species of insects, mites and spiders that remain undescribed and there are far too few taxonomists to do the job, especially in biodiversity-rich, economically poor, tropical developing countries. Besides, as a consequence of history, it is museums in developed countries that hold most of the specimens as well as associated taxonomic information from developing countries. Indian museums too hold a large number of specimens of new species of insects and other arthropod species awaiting formal description. Internationally, the accepted taxonomic practice involves the exchange of dead specimens between taxonomists for comparison with types housed in select museums in various parts of the world to arrive at the correct identity of insect species for both new and known species.

The validity of descriptions of new species is in doubt unless compared with designated types. Misidentifications of either pests or their natural enemies have resulted in setbacks to agricultural production and in wasteful expenditure of considerable sums of money in various parts of the world.

NBAIR, the national repository for insect, mite and spider germplasm of agricultural importance, has taken a small yet firm step in tackling one of the taxonomic impediments. We have now succeeded in obtaining clearance from the National Biodiversity Authority through approval of 'Form B' for exchange of dead specimens of insects/ mites/ spiders (belonging to Bombinae, Braconidae, Bethylidae, Ichneumonidae, Tephritidae, Sphecidae, Anthocoridae, Pentatomidae, Scarabaeidae, Pseudococcidae, Coccidae, Platygastroidea, Thysanoptera, Miridae, Acari, Araneae) with leading taxonomists in UK, The Netherlands, Brazil, USA, Thailand, Israel, Japan, Sri Lanka, Germany, Australia and Romania.

Through this networking, we will not only be able to strengthen the NBAIR museum with identified specimens but will also be in a position to update and expand the databases of all groups of agriculturally important insects, mites and spiders on our website. This will empower the farm sector by enabling the formulation and adoption of effective pest management programmes through timely identification of both crop pests and their natural enemies in the event of pest outbreaks and in the face of newly invading pests.

Chandish R. Ballal
Director

ICBC2018 to be held in Bengaluru

The "First International Conference on Biological Control" will be held at Le Meridien hotel in Bengaluru from 27–29 September 2018. Interested researchers and students may please visit www.icbc2018bengaluru.com for particulars and continuous updates.

Research Highlights

A new species of *Megaprosternum*

A new bethylid species, *Megaprosternum cleonarovorum* Gupta & Azevedo (Bethylidae: Scleroderminae), has been described and illustrated from southern India as a gregarious larval ectoparasitoid of the cerambycid *Cleonaria bicolor* on *Ixora coccinea* (Figs 1 to 3). This is a new record of *Megaprosternum* from the Oriental region with first-ever documentation of the biology of *Megaprosternum* across the globe.

Fig. 1: *Cleonaria* damage on *Ixora*

Fig. 2: Larvae of *Megaprosternum* developing on *Cleonaria* grub inside *Ixora* stem galleries

Fig. 3: *Megaprosternum cleonarovorum*

New hymenopteran species

Two new hymenopteran species, *Apteroscelio aureus* Veenakumari, Talamas & Rajmohana (Fig. 4) and *A. shyamala* Veenakumari, Talamas & Rajmohana (Fig. 5) have been described and illustrated with first description of male of genus *Apteroscelio* (Hymenoptera: Scelionidae).

Fig. 4: *Apteroscelio aureus*

Fig. 5: *Apteroscelio shyamala*

Functional response of *Geocoris ochropterus*

Functional response of *Geocoris ochropterus* was studied against different densities of *Helicoverpa armigera* eggs. All the immature stages except first and second instars and adult exhibited a decelerating curve type II response. The attack rate and handling time were estimated as 1.858 h^{-1} and 0.031 h for third instar; 1.203 h^{-1} and 0.012 h for fourth instar; 1.515 h^{-1} and 0.009 h for fifth instar; 2.879 h^{-1} and 0.008 h for adult, respectively. It was observed that predation ability increased with age, thus the adult exhibited greater predation ability than immature stages.

New species of *Bactrocera*

Two new species of *Bactrocera* from India, *B.* (*B.*) *furcata* David & Hancock (Fig. 6) and *B.* (*Sinodacus*) *brevipunctata* David & Hancock (Fig. 7), have been described. Four species of *Bactrocera* were recorded for the first time from India: *B.* (*B.*) *aethriobasis*, *B.* (*B.*) *rubigina*, *B.* (*B.*) *syzygii* and *B.* (*B.*) *tuberculata*. Keys to 12 subgenera of *Bactrocera* and Indian species of *Bactrocera* (*Bactrocera*) have also been updated.

Fig. 6: Wing of *Bactrocera furcata*

Fig. 7: Wing of *Bactrocera brevipunctata*

Report on Biocontrol Workshop

The "XXVI Workshop of All-India Coordinated Research Project (AICRP) on Biological Control of Crop Pests" was held at Dr Yashwant Singh Parmar University of Horticulture & Forestry (YSPUHF) in Solan from 16–17 May 2017. Apart from reviewing the progress of work at all the centres under the network during 2016-17, the technical programme for the next year was also finalised at the meet. In his presidential address, Dr H.C. Sharma (Vice-Chancellor, YSPUHF) laid stress on the importance of ecology in biological control. Dr Chandish R. Ballal (Director, NBAIR & Project Coordinator, AICRP) presented the salient achievements of the project for 2016-17. Assistant Director-General (Plant Protection & Biosafety), ICAR, Dr P.K. Chakrabarty, and university officials, Dr K.S. Verma (Director of Research) and Dr J.N. Sharma (Dean, College of Horticulture), were among the large number of dignitaries present. Distinguished entomologists such as Dr S.N. Puri, Dr R.J. Rabindra and Dr B.V. Patil took part in the meeting. Newspaper reports on AICRP-BC activity were published on the occasion. Representatives of several private commercial biocontrol production units participated in the workshop.

Research Advisory Committee Meeting

The "XXI Research Advisory Committee Meeting" was held at NBAIR on 12 April 2017. The committee consisting of Dr S.N. Puri (Chairman), Dr P.K. Chakrabarty, Dr V.V. Ramamurthy, Dr P.K. Mukherjee, Dr Suresh Nair, Dr S. Lingappa and Dr Suraj Singh Rajput (Members) reviewed the research achievements and progress, and gave suggestions for future research. At the outset, Dr Chandish R. Ballal (Director, NBAIR) welcomed the committee and highlighted the previous year's achievements, including the substantial revenue generated and the increased focus laid on training and validation of biocontrol technologies. The divisional heads, Dr Prashanth Mohanraj, Dr S.K. Jalali and Dr N. Bakthavatsalam, presented the research achievements. The committee, while commending the basic research on insect resources, opined that NBAIR should spread itself to address new pest outbreaks as well as persistent pest problems.

Empowering women farmers

NBAIR organised a training programme on "Production of *Trichoderma* by Women Farmers and Seed Savers of Self-Help Groups (SHG)" in collaboration with Green Foundation at Harohally in Kulumedoddi village on 8 June 2017. The training was attended by officials from state department of sericulture, members of Green Foundation and about 30 women farmers of six SHGs from Kulumedoddi, Nasarahalli, Bairegowdanadoddi, Bevinamaradoddi, Chikkaballi, Bowinahalli and Chikkamaralwadi villages. Dr A.N. Shylesha (Principal Scientist, NBAIR) addressed the gathering, explained about the importance of the antagonistic fungus *Trichoderma* in plant disease management and highlighted its production methods, utility, benefits and application procedures. Dr K. Srinivasa Murthy, Dr B. Ramanujam, Dr R. Rangeshwaran (Principal Scientists, NBAIR), Dr Y. Lalitha and Mr Manohar Raju demonstrated the practical procedures. Women farmers were involved in packing the material for autoclaving, preparation of mother culture and inoculation from slants into autoclaved grains and liquid broth. Different application methods like seed treatment, root-dip treatment, mixing of farmyard manure with *Trichoderma* talc formulation followed by soil application were also demonstrated to participants. *Trichoderma* production on other media like vermicompost, silkworm waste and castor seed waste was also explained during the post-training interaction session. The participants were also given information on application and usage of *Pseudomonas fluorescens* and other biocontrol agents like trichogrammatids, bethylids, chrysopids and coccinellids. Cultures of *T. harzianum* and *P. fluorescens* were distributed to the participants.

International Day of Yoga at NBAIR

NBAIR celebrated the "International Day of Yoga" on 21 June 2016. Ms Rajalakshmi and team, yoga experts from The Art of Living Foundation, conducted the session. The programme started with practising various *asanas*, *pranayama*, *suryanamaskar* followed by *dhyana* and concluded with *sankalpa*.



Promotion

Dr M. Pratheepa has been promoted to Principal Scientist. Computer applications in agriculture is her specialisation, and currently she is working on data mining techniques, data analytics and bioinformatics.

Welcome!

Dr K. Sreedevi, Senior Scientist (Agricultural Entomology), joined NBAIR on 21 June 2017 on transfer from ICAR–Indian Agricultural Research Institute, New Delhi. Her field of expertise is taxonomy of Scarabaeidae.

Dr A. Kandan, Senior Scientist (Plant Pathology), joined NBAIR on 23 June 2017 on transfer from ICAR–National Bureau of Plant Genetic Resources, New Delhi. His field of expertise is molecular plant pathology.

Recognitions

Dr K. Sreedevi

Recognised as Member, Commission on Ecosystem Management, IUCN, for 2017-20.

Recognised as Executive Committee Member, Ethological Society of India, Bengaluru, for 2017-19.

Dr A. Raghavendra

Received *Young Scientist of the Year Award* from International Foundation for Environment and Ecology.

Selected Publications

David, K.J., Hancock, D.L., Singh, S.K., Ramani, S., Behere, G.T. & Salini, S. 2017. New species, new records and updated subgeneric key of *Bactrocera* Macquart (Diptera: Tephritidae: Dacinae: Dacini) from India. *Zootaxa*, 4272(3): 386–400.

Gupta, A., Rajeshwari, S.K. & Azevedo, C.O. 2017. Biology and description of *Megaprosternum cleonarovorum* sp. nov. (Hymenoptera: Bethylidae) a gregarious larval ectoparasitoid of *Cleonaria bicolor* Thomson (Coleoptera: Cerambycidae) from India. *Zootaxa*, 4237(1): 78–90.

Salini, S. 2017. First record of *Neojurtina typica* from India (Hemiptera: Heteroptera: Pentatomidae). *Journal of Threatened Taxa*, 9(4): 10133–10137.

Varshney, R. & Ballal, C.R. 2017. Biological, morphological and life table parameters of the predator, *Geocoris ochropterus* Fieber (Hemiptera: Geocoridae) fed on *Sitotroga cerealella* (Olivier) eggs. *Egyptian Journal of Biological Pest Control*, 27(2): 189–194.

Veenakumari, K., Talamas, E.J., Rajmohana, K. & Mohanraj, P. 2017. Two new species of *Apteroscelio* Kieffer (Hymenoptera: Scelionidae) from India. *Zootaxa,* 4277(1): 137–143.

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