NBAIR Newsletter

ICAR–National Bureau of Agricultural Insect Resources

Vol. VII (1) March 2015

Sound of insect music and Tuta

The sixties of the 20th century saw a major turning point in the way entomologists thought of pest control, with the publication of Rachel Carson's *Silent Spring* (1962). She contended, and rightly so, if DDT or organochlorines were to continue as pest interventions, bird life may soon shrink, resulting in diminished songs of birds. In fact, *Silent Spring* was a metaphorical title implying a lifeless spring, which not only included songs of birds but also sounds of animals and insects.

This brings us to the focus on insect sounds and songs. Though unwritten, it is not farfetched to say that the sixties of last century was unwittingly dedicated to "sounds" and what better way than with the release of Robert Wise's *The Sound of Music* in 1965. It is 50 years since this release, and I have seen this film scores of time. Sound and music touch us, and so should insect acoustics. We need to lend an ear to their music. In fact, acoustics for characterising cryptic species, soil dwelling insects, latent feeders (storage, wood borers, etc.) is gaining momentum since the turn of this millennium (e.g., Mankin et al., 2000, Eavesdropping on insects…. *Journal of Economic Entomology* 93: 1173–1182). In our Bureau, this will be a futuristic focus, especially for characterising and detecting insects. May "acoustic biosystematics" take a significant place in the integrated taxonomy of insects.

We have brought an updated bilingual brochure on NBAIR. Our Honourable Agriculture Minister Sri Radha Mohan Singh was kind enough to release this on 9 January 2015, in the presence of our DG, Dr S. Ayyappan.

We want all cooperation in tackling the new invasive pest, *Tuta absoluta*, on tomato. It is distributed in Andhra Pradesh, Karnataka, Maharashtra and Gujarat. Any sight records anywhere may be reported to us for our dynamic mapping and interventional support. A brochure on this (in English/Hindi/Kannada) is available on request.

Abraham Verghese
Director

New research facilities at NBAIR's Yelahanka Campus

Dr S. Ayyappan, Secretary (DARE) & Director-General (ICAR), inaugurated the Veterinary & Fisheries Arthropod Laboratory and ICAR/NAIP-Funded Pilot-Scale Production of Biopesticides Unit at the Yelahanka Campus of NBAIR on 10 January 2015. The inauguration was followed by the release of a book (*Proceedings of the Brainstorming Session on Insects Related to Veterinary and Fisheries Sciences*) and a table calendar. Addressing the staff and students of NBAIR, Dr Ayyappan called on the staff members and students to seek clarifications or ask questions. He took a range of questions on several issues and cleared doubts on ICAR's policies, programmes, etc.

Research Highlights

A new pupal parasitoid

A new species of pupal parasitoid *Anisopteromalus indicus* Gupta & Sureshan (Hymenoptera: Pteromalidae) (Fig. 1) from a lymantrid host has been described from India.

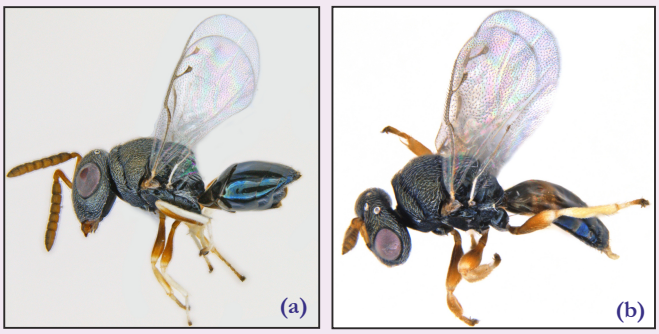


Fig. 1: *Anisopteromalus indicus*: (a) Female; (b) Male

Hypomeces squamosus in Nagaland

Hypomeces squamosus (Fig. 2), a polyphagous curculionid, was found infesting many plant hosts, primarily *Citrus* species, in Nagaland during February/March 2015. The locals have raised concerns over this pest.

Fig. 2: *Hypomeces squamosus*

Genetic variations among Indian populations of cabbage diamondback moth

Plutella xylostella, commonly known as diamondback moth, is one of the most widely distributed and serious pests of cruciferous crops across the world. To examine the pattern and magnitude of genetic variation in this species in India, a fragment of the mitochondrial (mt) *COX1* gene of the insect collected from 13 localities in India, spanning a geographic area of approximately 12.25 million km^2, was sequenced. Sequence analysis of the 658bp fragment resulted in 9 haplotypes, of which 5 populations clustered to form a haplotype group. Among these populations, 11 polymorphic sites were observed, of which 5 were transitional and the rest were of transversional substitution. Phylogenetic analysis in comparison with nucleotide sequences from other countries showed that all the populations were highly interrelated. Nevertheless, these variations could have been induced by local selection pressure such as insecticide usage, host strain variation and cultural practices.

Cleonaria bicolor damaging *Ixora*

The cerambycid beetle *Cleonaria bicolor* (Fig. 3) is an emerging pest on *Ixora* species. It attacks *Ixora* plants throughout the year with overlapping life stages. The beetles feed on the undersurface of tender leaves making elongate holes (Fig. 4) on either side of the midrib. More than 10 stem-boring grubs at various developmental stages are seen in a single plant. Pupation takes place inside the stem and the adult emerges through an exit hole.

Fig. 3: *Cleonaria bicolor*

Fig. 4: *Ixora* leaf damage

Tuta update

Tuta absoluta, a lepidopteran pest commonly called the South American tomato moth, has been recorded in many tomato-growing regions of western and southern India. The exceptional speed and extent of *T. absoluta* invasion have called for domestic pest alert / pest warning across the affected areas. A group meeting on its status in India was organised at NBAIR in collaboration with the Directorate of Plant Protection, Quarantine & Storage on 21 February 2015. Dr C.A. Viraktamath (Professor Emeritus, University of Agricultural Sciences, Bengaluru) chaired the session. Dr S.N. Sushil (Plant Protection Adviser to Government of India), Dr Abraham Verghese (Director, NBAIR), scientists from NBAIR, Quarantine, IIHR and state department officials participated in the meeting and discussed the issues related to the pest. Monitoring and management strategies were devised during the meeting. Researchable areas were also identified. A rapid action plan on monitoring and management of this pest has been communicated to all the stakeholders.

National Meeting on New/Safer Molecules and Biocontrol Technologies for Integrated Pest Management in Crops, 23 February 2015, Bengaluru

The Society for Biocontrol Advancement (SBA) in association with NBAIR conducted the National Meeting on New/Safer Molecules and Biocontrol Technologies for Integrated Pest Management, at the Karnataka Veterinary Council's auditorium in Bengaluru on 23 February 2015. This meeting was intended for scientists, students, practitioners and purveyors of both biocontrol and safer chemical pesticides.

Dr P. Sreerama Kumar welcomed the delegates and set the ball rolling. In his opening remarks, Dr Abraham Verghese, President, SBA and Director, NBAIR, welcomed the delegates and informed that the meeting was unique as it attempted to blend toxicology and bioagents in IPM.

There were two technical sessions for platform presentations. The first session was on new and safer molecules in IPM and the session was chaired by Dr T.M. Manjunath, Former Director (R&D) Monsanto, Bengaluru. He lauded the efforts taken by the organisers to sensitise the need for bringing together chemical-pesticide manufacturers and biocontrol entrepreneurs to achieve desirable results that benefit the farming community. Key presentations were by representatives from DuPont India and Bayer Crop Science.

The second session on biocontrol technologies for IPM was chaired by Dr S. Sithanantham, Director, Sun Agro Biotech, Chennai. Presentations in the session included mass production technologies and safe use of bioagents in conjunction with chemical pesticides so as to have a robust IPM programme.

More than 30 researchers presented their work in the poster session. Prizes were given away to 12 presenters during the wrap-up session, which was chaired by Dr Abraham Verghese and moderated by Dr Sreerama Kumar.

The national meeting was followed by the General Body Meeting of SBA. The activities of the society for the year 2014-15 were presented by the Secretary, SBA. Thirty-four life members of the society were conferred *Fellow of Society for Biocontrol Advancement*. *Dr B.S. Bhumannavar Team Award* was given to Dr S.K. Jalali and his team for the achievements in the area of biological control. The new executive council took charge from the outgoing board.

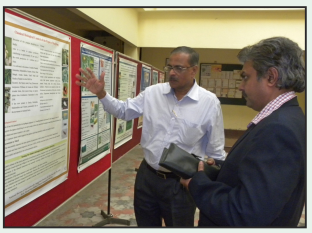
NBAIR at National Farmers' Meet for Horticultural Crops

NBAIR participated in the National Farmers' Meet jointly organised by the Regional Research Station (Tamil Nadu Agricultural University) and ICAR's Horticulture Division at Paiyur in Tamil Nadu on 14 March 2015. Farmers from Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Kerala and Puducherry participated in the meet. They showed keen interest in biocontrol technologies exhibited at our stall.

International Darwin Day celebrated

On the International Darwin Day (12 February 2015), Dr K. Praveen Karanth from Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, delivered a lecture titled "Evolution in action: from Darwin's finches to Indian taxa" at NBAIR. New exhibits featuring aspects of Charles Darwin's association with entomology were on display at the 'Insectarium'.

Secretary (ICAR) visits NBAIR



Mr R. Rajagopal, Secretary (ICAR) & Additional Secretary (DARE), visited NBAIR on 17 January 2015. Impressed with the entomological research at NBAIR, he spent time in various laboratories to interact with scientists and understand their work. Mr Rajagopal also addressed the staff members and encouraged them to be in touch with him for any issue.

Mizoram farmers trained on citrus rejuvenation

Farmers of Mizoram were trained on citrus rejuvenation on 28 March 2015 at the Mizoram Centre of ICAR Research Complex for NEH region in Kolasib. During the training, Dr Abraham Verghese (Director, NBAIR) and Dr T.N. Shivananda (ICAR–Indian Institute of Horticultural Research) demonstrated the organic sealer-cum-healer developed by NBAIR for citrus borer management and cleared farmers' doubts on pest management in citrus.

Reduce/Reuse/Recycle

As part of the national campaign on cleanliness ('Swachh Bharat') in work place, an attempt was made to reuse scrap material to erect a temporary parking shelter at the Yelahanka Campus of NBAIR. The success of this endeavour is manifold as it enabled us to recycle the waste and maintain a clean work place and at the same time address the austerity measures that could be a role model in the organisation.

Awards for NBAIR researchers

Ms Enakshi Ghosh, **Dr Chandish R. Ballal** and **Ms G. Roopa** won the *Best Oral Presentation Award* for their paper at the International Conference on Innovative Insect Management Approaches for Sustainable Agro Ecosystem, held at Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai, 27–30 January 2015.

Ms V.M. Malathi, Dr S.K. Jalali, Dr D.K. Sidde Gowda, Dr M. Mohan and **Dr T. Venkatesan** also won the *Best Oral Presentation Award* in another session at the same conference.

Dr R. Rajeshwari, Senior Technical Assistant, was awarded the *University Gold Medal* and *Dr K. Ramakrishnan Memorial Gold Medal* for her Ph.D. thesis, by the University of Agricultural Sciences, Bengaluru.

News from our administrative office

Mr Ajit Desai was promoted to Assistant Administrative Officer w.e.f. 10 October 2014.

Mr A. Vijaya Kumar was relieved from NBAIR on 31 January 2015 to join as Junior Accounts Officer at ICAR–Indian Institute of Rice Research (IIRR, Hyderabad).

Mr N. Narayanaswamy, Assistant, joined NBAIR on 2 February 2015.

Patents Filed

Bhattacharya, S., Bhagat, D. & Samanta, S.K. 2014. Nanogels, methods and device thereof in pest management. Indian Patent File, 372/CHE/2014.

Bhattacharya, S., Moitra, P. & Bhagat, D. 2014. Surface functionalisation for sensing of volatile organic compounds. Indian Patent File, 516/CHE/2014.

Bhattacharya, S., Pratap, R., Moitra, P. & Bhagat, D. 2014. A pheromone detector. Indian Patent File, 521/CHE/2014.

Selected Publications

Archana, M., D'Souza, P.E., Jalali, S.K., Renukaprasad, C. & Ojha, R. 2015. DNA barcoding of commonly prevalent *Culicoides* midges in South India. *Indian Journal of Animal Sciences*, 85: 37–39.

Gupta, A. & Sureshan, P.M. 2014. A new pteromalid species of the genus *Anisopteromalus* Ruschka (Hymenoptera) from India. *Oriental Insects*, 48(1–2): 67–72.

Kharbanda, N., Jalali, S.K., Ojha, R. & Bhatnagar, R.K. 2015. Temporal expression profiling of novel *Spodoptera litura* nucleopolyhedrovirus encoded microRNAs upon infection of Sf21 cell line. *Journal of General Virology*, 96: 688–700.

Shashank, P.R., Ojha, R., Venkatesan, T., Jalali, S.K. & Bhanu, K.R.M. 2015. Molecular characterization of brinjal shoot and fruit borer, *Leucinodes orbonalis* (Guenée) (Lepidoptera: Crambidae) based on mitochondrial marker cytochrome oxidase I and their phylogenetic relationship. *Indian Journal of Experimental Biology*, 53: 51–55.

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Published by: Director, ICAR–National Bureau of Agricultural Insect Resources, Hebbal, Bengaluru 560 024, India

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Printed at: Navbharath Enterprises, Bengaluru 560 020