

NBAIR Newsletter



ICAR–National Bureau of Agricultural Insect Resources



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Grapes may be sour, but not roaches!

I was one of the three panelists on E-Television (ETV) to interview a man who eats live cockroaches. While he and three of us faced the arc lights and the camera, the anchor announced to the viewers that the gentleman will give a live demonstration of eating a living cockroach! Out from a bottle, the man pulled out a struggling fellow, and holding the cockroach between thumb and index finger, placed it on one side of the mouth (reminiscent of tobacco chewers!) swallowed first the gooey contents (which we entomologists call haemolymph) and then crunch-swallowed the exoskeleton, appendage, *et al!* One of the panellists, a lady nutritionist, turned her face away from him and even the camera, clearly showing her disapproval, that, in spite of these poor roaches known to have favourable omega three fatty acids! For the lady medical doctor, the other panellist, there was no expressed disapproval, but a rare reality, perhaps needing to be examined from a psychological angle.

To me, an entomologist, there were two important questions to the man on the show: One - “How did you develop this habit of eating live cockroach”? And this was his story: The man was on a trek in a forest with friends, when he lost his way. He was found only after three days. Fortunately he had a little water on him but no food. Well, to cut the story short, he had plenty of class Insecta around him! Hunger promoted him eventually to seize and crunch a few. He swallowed them with the remnant dregs of water in his bottle. He survived. Three days later he was found and was back to his small hotel business in Mysore.

(The nutritionists made sure that insects were not on his menu!)

My second question was how the roach tasted. “Sour”, was his reply. But the grapes were not sour for him. Since then insect diet was a regular once-a-week feast for him. His entomophagy was a closely guarded secret, even from his wife. But, after this TV telecast, his wife would know and that was his only remorse! [On YouTube, you can watch yet another man John Peter from Coimbatore eating roaches.]



The world over, insects are becoming important part of man's food! Even in some parts of India, it is in vogue. In many parts of the world, it is a delicacy. In Thailand, near Pattaya, I once saw a woman chasing cicadas with a crude net. On enquiry, I learnt these bugs are caught, dewinged, delegged, fried and eaten (see my note on this in *Insect Environment*, 5(1):3, 1999). Globally, insects as food is catching attention and fancy. In *Girl Meets Bug* (Google please), a list of edible bugs from ‘A’ to ‘Z’ is given. For many of us, who find insect-eating (tasting) repulsive let's stick only to honey, which however is also "buggy" — after all it is regurgitated nectar from the guts of the bee. Well, honey is honey, and it is sweet (not sour).

National Bureau of Agricultural Insect Resources was privileged to have the Hon'ble Union Minister of Agriculture, Shri Radha Mohan Singh, visiting on the afternoon of 2 April 2015. He saw our insect collections and expressed his desire to see the museum coming up to serve the farmers of the country. He declared open the “Insect Photo-Gallery” for the knowledge enhancement of entomology for farmers and students. Shri Radha Mohan Singh later addressed the staff, vice-chancellors and directors of institutes from across Karnataka.

Abraham Verghese
Director

Hon'ble Minister observing insects



Inaugurating photo-gallery



Research Highlights

New species of *Diolcogaster*

Four new species of the genus *Diolcogaster* (Hymenoptera: Braconidae: Microgastrinae) (Fig. 1) have been described: *Diolcogaster andamanensis* Gupta (from the Andaman Islands), *D. duocolor* Gupta, *D. longistria* Gupta and *D. solitarium* Gupta (from mainland India). The solitary larval parasitoid *D. solitarium* was reared from *Gatesclarkeana* sp. (Lepidoptera: Tortricidae). A new combination, *Diolcogaster tomentosae*, has been proposed for the Indian species *Protomicroplitis tomentosae* along with its redescription and documentation of the gregarious cocoons associated with the pyralid (Epipaschiinae) host feeding on *Terminalia catappa*.



Fig. 1: *Diolcogaster* spp.: (a) *D. andamanensis*; (b) *D. duocolor*; (c) *D. longistria*; (d) *D. solitarium*

Oscheius sp. against *Bactrocera cucurbitae*

Infective juveniles of *Oscheius* sp. were tested for their virulence against the melon fly, *Bactrocera cucurbitae*. A dose of 250 infective juveniles per pupa recorded 80% mortality at 48 h after inoculation (Fig. 2).

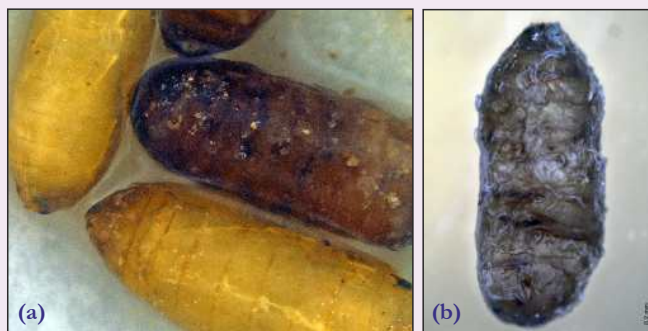


Fig. 2: *Oscheius* sp. infecting *Bactrocera cucurbitae*: (a) Healthy and infected pupae; (b) Nematode emergence

Gnat predator of *Phenacoccus madeirensis*

Diadiplosis birticornis (Fig. 3a), a gnat, is a potential predator of *Phenacoccus madeirensis*, a mealybug pest of cotton. A special association was observed between the gnat and the mealybug, wherein the predator lays eggs (5–22) on mealybug females (Fig. 3b) during oviposition resulting in the maggots crawling into the ovisacs to feed on the pest eggs. Predation of eggs was recorded in more than 60% of the ovisacs, and 12–16 gnats emerged from each ovisac. Gnats lived for 5–6 days, with a developmental period of 12–16 days. This predator can be easily mass produced on the pink mealybug.

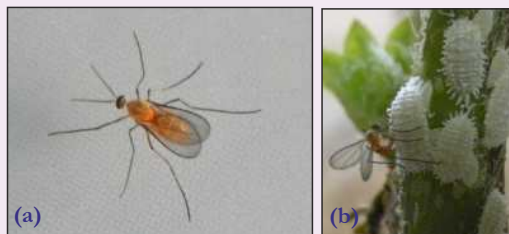


Fig. 3: *Diadiplosis birticornis*: (a) Adult; (b) Laying eggs on mealybug

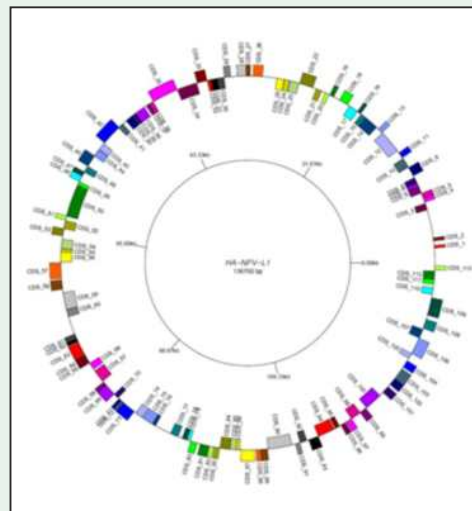
World Environment Day celebrations at Yelahanka Campus

“World Environment Day” was celebrated on 5 June 2015 at NBAIR Yelahanka Campus. In his inaugural address, Director Dr Abraham Verghese highlighted the need to conserve the environment and preserve the biodiversity so as to make Earth a better place to live in for future generations. He lauded the efforts taken by the scientists to maintain the pollinator diversity on the campus. Chief guest Dr T.M. Manjunath, former Director, Monsanto Research Centre, lauded the efforts taken by NBAIR in maintaining over 200 species of plants on the campus. He recalled his association in tree planting programmes elsewhere, but was pained to see the saplings wilt without aftercare. He informed that planting would be a success if it comes with aftercare. On this occasion, the staff members planted over 100 saplings, including several endangered plant species. The planting ceremony and other activities on the campus, like research on veterinary and fisheries insects and pollinator garden, were broadcast by Doordarshan – Chandana TV channel in the same evening.



Whole genome sequence of *Helicoverpa armigera* NPV from India

Nucleopolyhedroviruses (NPV) in a family of occluded viruses (Baculoviridae) have a very high specificity to insects representing Lepidoptera. These rod-shaped, double-stranded DNA viruses are one of the most potent biocontrol agents of *Helicoverpa armigera*, particularly on pulses and vegetables in India. The whole genome of *H. armigera* NPV from Ludhiana has been sequenced by a team of researchers led by Dr S.K. Jalali of NBAIR's Division of Molecular Entomology. The whole genome (GenBank accession number KT013224) was determined to be 136760bp long and circular, having a total of 113 protein-coding genes with four repeat regions. Altogether, 73 named proteins were identified. The gene arrangement and orientations of the assembled NPV whole genome were identical to the reported single-capsid NPV genome from G4 strain of China, NNg1 of Kenya and LB1 of Spain.



Circos plot for gene arrangement in *Helicoverpa armigera* NPV whole genome [Different colours represent protein-coding genes. Gene arrangements are depicted counterclockwise]

Report on Biocontrol Workshop



The “XXIV Workshop of All-India Coordinated Research Project on Biological Control of Crop Pests” took place at the Tamil Nadu Agricultural University (TNAU) in Coimbatore from 2–3 June 2015. The objective of the meet was to review the progress of work at all the centres under the network during 2014-15 and to chalk out the future experiments. In his presidential address, TNAU Vice-Chancellor Dr K. Ramasamy suggested strengthening of basic research in all fields of agricultural sciences, especially in biological control so that breakthroughs in pest management could be achieved for ensuring sustainability in agriculture.

Addressing the delegates, Dr P.K. Chakrabarty, Assistant Director-General (Plant Protection & Biosafety), ICAR, stressed that more successful biocontrol technologies should be developed so as to raise the crop area under biointensive IPM, which would lead to mitigation of harmful effects of chemical pesticides. He underlined the importance of publishing the data generated under the AICRP, and suggested producing crop-wise manuals on biocontrol technologies. He also favoured strengthening of biocontrol research in protected cultivation as well as on plant diseases. Dr Abraham Verghese (Director, NBAIR & Project Coordinator, AICRP) presented a summarised report for 2014-15, and along with Dr C.A. Viraktamath (RAC Chairman, NBAIR) and former Director Dr R.J. Rabindra, reviewed the progress of research on biocontrol of insect pests and plant diseases of various crops. Dr B. Ramanujam, In-Charge, AICRP PC Cell, reviewed the Tribal Sub-Plan programme with reference to biocontrol technologies in 10 centres throughout India. The recommendations and the technical programme for 2015-16 were finalised. Nearly 80 biocontrol researchers from all over the country and several biocontrol producers participated in the workshop.





Dr Abraham Verghese receives DBT award

Dr Abraham Verghese (Director, NBAIR) received the prestigious *Biotech Product and Process Development and Commercialisation Award* for 2014 from the Department of Biotechnology. He shares this award with Dr T.N. Shivananda and Dr P.D. Kamala Jayanthi of ICAR–Indian Institute of Horticultural Research. Dr Harsh Vardhan, Hon'ble Union Minister for Science & Technology, conferred the award at Vigyan Bhawan, New Delhi, on 11 May 2015.



New AICRP centre

The Regional Agricultural Research Station (RARS) in Anakapalle, Andhra Pradesh, became a partner of the All-India Coordinated Research Project (AICRP) on Biological Control of Crop Pests on 1 April 2015. The RARS under the Acharya N.G. Ranga Agricultural University is engaged in research on biocontrol of pests of sugarcane, rice and maize. Dr Abraham Verghese, Director, NBAIR & Project Coordinator, AICRP, visited the new centre and guided them on biocontrol experiments. The accompanying picture shows Dr Verghese examining a termite mound, which is a problem in sugarcane, at the RARS.

A new organic-friendly protocol for trapping melon fly[@]

A new protocol to trap the melon fly, *Bactrocera cucurbitae*, has been developed at NBAIR. This formulation does not require alcohol for impregnation and no insecticide (like DDVP) is used to kill the trapped insects. Field studies with this formulation have indicated that almost 2.5 times more flies are caught than with conventional trapping. Being a non-alcoholic preparation, entrepreneurs will be immensely benefited by avoiding the restrictions imposed in the use of alcohol.

@ Patent-filed product of NBAIR



A fruit fly trap being field-tested

ISO 9001:2008

NBAIR became a Quality Management System, which complies with ISO 9001:2008 certification to act as a nodal agency and national repository for collection, characterisation, documentation, conservation, exchange and utilisation of agriculturally important insects (including mites, spiders and related arthropods) and insect-related resources for sustainable agricultural growth.

Transfer

Dr J. Poorani, Principal Scientist (Agricultural Entomology), was transferred to ICAR–National Research Centre for Banana, Tiruchirapalli.

Selected Publications

- Gupta, A. & Fernández-Triana, J.L. 2015. Four new species of the genus *Diolcogaster* Ashmead, 1900 (Hymenoptera: Braconidae: Microgastrinae) from South East Asia with a key to the Indian species. *Systematic Parasitology*, 90: 285–300.
- Guruprasad, N.M., Harish, B.M., Jalali, S.K. & Puttaraju, H.P. 2015. Characterization of *Wolbachia* cell division protein (ftsZ) gene for potential management of uzifly, *Exorista sorbillans* (Diptera: Tachinidae). *Journal of Entomology and Zoology Studies*, 3(2): 57–61.
- Hayat, M., Zeya, S.B. & Veenakumari, K. 2014. Encyrtidae (Hymenoptera: Chalcidoidea) from Arunachal Pradesh, India. *Entomon*, 39: 197–228.

Compiled and edited by: **P. Sreerama Kumar & Abraham Verghese**

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Phone: +91 80 2341 4220 ♦ Fax: +91 80 2341 1961 ♦ Website: www.nbair.res.in

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