

# ICAR-NBAIR

## Newsletter

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ICAR-National Bureau of Agricultural Insect Resources



### Insect biodiversity: perspectives and implications

Insects hold a large share of the earth's biodiversity and account for more than half of all described species in the animal kingdom. Insects as crop pests or disease vectors influence agriculture, human life and natural resources. This demands for better understanding of the genetic and the morpho-functional aspects of insect biodiversity. Widespread contamination of ecosystems with plant protection chemicals is posing a threat to global biodiversity in general and insect biodiversity in particular. This rings the bell to compound our research efforts to conserve biological resources and associated knowledge.

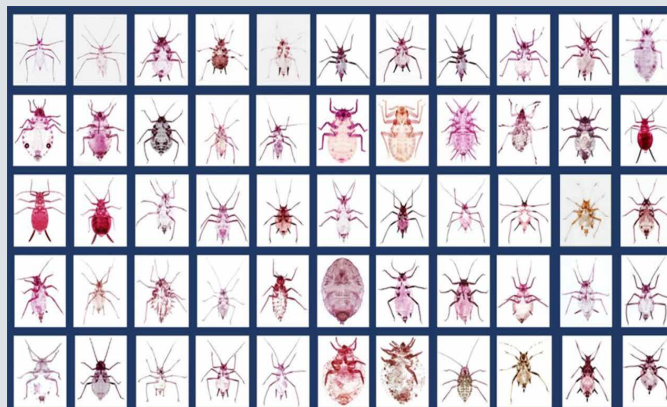
Conservation essentially requires the knowledge of existing biological resources, which can be achieved primarily if taxonomic research in our country is fostered. The taxonomic expertise, especially that of insects, mites, spiders, nematodes and associated organisms which potentially represent over 90% of different animal life forms on earth needs attention. ICAR-NBAIR has addressed this by assembling strong taxonomic experts who attempt to explore the unexplored and identify and characterise insects and insect-related genetic resources of agricultural importance that benefit the farmers.

To add a gem to the crown, ICAR-NBAIR National Insect Museum is authorised by the Ministry of Environment & Forests as the designated repository under the Biological Diversity Act, 2002 for agriculturally important insects, mites and spiders. It also serves as a

Center of Excellence for advanced taxonomic research and training for national and international students with upgraded infrastructural facilities and with the scientists having an extensive collaboration and cooperation among specialists and institutions across continents. This puts our country on the global map of the services rendered by the taxonomists on the biodiversity studies and in churning out the knowledge on the threat status of any species. This would help in developing conservation strategies and taking preventative measures before it becomes extinct. The study of economic impact of insects as pests of agriculture, veterinary animals, pollinators and decomposers also demands accurate identification.

This Bureau has established a complementary association between the morphological and molecular taxonomy. The expertise and the facilities in identification service have been extended to research scholars, scientists, and farmers across the country. A considerable foreign exchange in terms of the identification charges would have been paid but for the services rendered by the taxonomists in the Bureau. The Bureau aims to work towards a tangible work platform among prestigious institutions like ZSI, BNHM, IARI, State Universities etc., of international relevance and prosperity.

**Dr M. Nagesh**  
Director (Acting)

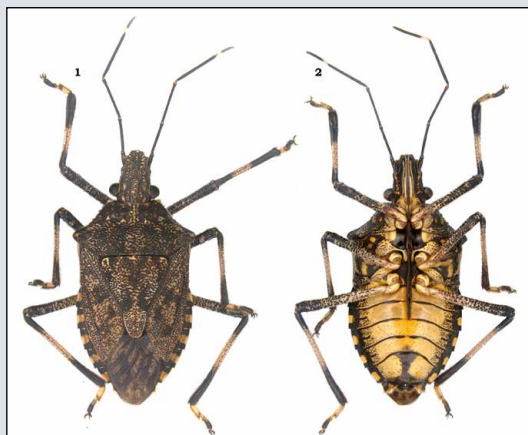


Diversity of aphids

## Research Highlights

### First record of the pentatomid genus *Lodosocoris* from India with description of a new species

The genus *Lodosocoris* (Hemiptera: Pentatomidae) was recorded for the first time from India. Prior to this report, the genus was monotypic with only *Lodosocoris azhari* from Pakistan. The genus was redescribed along with the description of *Lodosocoris santhae* Salini (Figs 1&2) based on specimens from Arunachal Pradesh. *Lodosocoris santhae* was described and illustrated based on male and female genitalia.



**Figures 1&2:** *Lodosocoris santhae*. 1, dorsal habitus; 2, ventral habitus

### *Halyomorpha picus*: first confirmed record from Pakistan and two new junior synonyms

The first confirmed record of *Halyomorpha picus* (Hemiptera: Pentatomidae) from Islamabad Capital Territory, Pakistan was published along with habitus images and electron scanning micrographs of the male genitalia of the voucher specimens. Two junior subjective synonyms of *H. picus* were published. *Halyomorpha punjabensis* and *H. azhari* were synonymized with *H. picus*. The record of *H. scutellata* from Pakistan by Sharif *et al.* (2020) was based on misidentification of a species of *Neohalys* and hence excluded from Pakistan fauna. Based on the analysis of female genitalia figures provided by Gadalla (2004), the record of *H. picus* from Egypt represented a misidentification of *H. halys*, which extended the distribution of that invasive species to North Africa.

### *Halyomorpha halys* fixed as the type species of the genus *Halyomorpha*

The genus *Halyomorpha* (Hemiptera: Pentatomidae) was established based on a single species, *Halys timorensis* which is currently a junior subjective synonym of *Halyomorpha picus*. The examination of the voucher specimens identified as *Halyomorpha timorensis* by Mayr, a syntype of *Halys timorensis*, and syntypes of *Pentatoma halys* revealed that: i) *Halyomorpha timorensis*, stat. restit., must be reinstated as a valid species, and not considered as a junior subjective synonym of *H. picus*; ii) Mayr's specimens belonged to two different species, *Halyomorpha halys* and *H. picus*. The

problem of double misidentification of the type species of *Halyomorpha* was resolved by action of the first revising author(s) according to the Article 70.3 of the ICZN (1999). Hence *P. halys* (= *Halys timorensis* sensu Mayr, nec Westwood) was fixed as the type species of *Halyomorpha*. A list of 36 valid species currently placed in *Halyomorpha* and their synonyms were compiled and published.

### *Scirtothrips dorsalis* as a pest of celery

*Scirtothrips dorsalis* (Fig. 3), the chilli thrips, was reported for the first time as a pest of celery, *Apium graveolens*. Infested celery plants in a polyhouse at Kalahalli village in Hoskote taluk of Bengaluru Rural district, Karnataka, India, had light to dark brownish scars on various parts besides discoloured and distorted leaves (Fig. 4). Association of fungal or bacterial disease was dismissed based on microscopic analysis of tissue sections. Eggs, juveniles, and adults of thrips were abundant, especially on the leaves.



**Fig. 3:** *Scirtothrips dorsalis*



**Fig. 4:** Damage symptoms on *Apium graveolens* plants due to *Scirtothrips dorsalis* infestation

### *Blaptostethus pallescens* for the management of thrips

*Blaptostethus pallescens* was evaluated to manage *Scirtothrips dorsalis* and *Thrips palmi* on capsicum grown in poly-house at Doddabalapura. Weekly release of *B. pallescens* @ 20-30 per square meter (total 4-5 releases) in alternation with the biopesticide *Bacillus subtilis* led to the reduction of thrips population from 2.9/plant to 0.4/plant.

### Survey in chilli fields of Andhra Pradesh and Telangana infested with thrips

A survey was conducted to inspect the thrips infested chilli fields of Andhra Pradesh and Telangana from 30 November 2021 to 2 December 2021 as per the request of the Horticultural commissioner, Government of Telangana. The survey team consisted of four scientists from ICAR–National Bureau of Agricultural Insect Resources, Bengaluru and ICAR–Indian Institute of Horticultural Research, Bengaluru. The team inspected farmers' fields infested with thrips in both states. The chilli fields were severely infested with thrips (Figs 5–8) and representative samples were collected from each field. The species associated was identified as *Thrips parvispinus*, an invasive species reported from India in 2015. Along with thrips incidence, virus infection transmitted by whitefly was also noticed in the visited fields. But the identified thrips species is not reported as a vector of Tospoviruses. All the visited fields were heavily infested with thrips and each flower harboured around 10–30 thrips. Three farmer-scientists interaction sessions were organized and cost-effective thrips management practices were recommended. Farmers were advised to undertake neem oil spray mixed with chemical sprays and to install blue sticky traps @ 25/acre. Drenching of insecticides was also recommended since the species pupates in the soil. The survey team, Mr V.P. Gautham, IAS, District Collector, Khammam and Mr S.S. Sridhar, IFS, Horticulture Commissioner, Andhra Pradesh updated the status of thrips infestation and recommendations to be followed for its management to for their needful action (Fig 9). Being an invasive polyphagous pest, there is a strong need to understand the ecology of the species. There is an urgent need to take up and evaluate various management options to curtail its further spread and damage.



Fig. 5: Chilli field infested with thrips

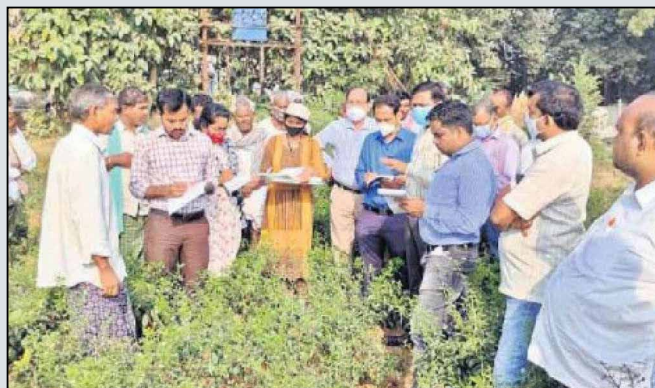


Fig. 6: Scientists inspecting chilli fields



Fig. 7: Thrips sample collection



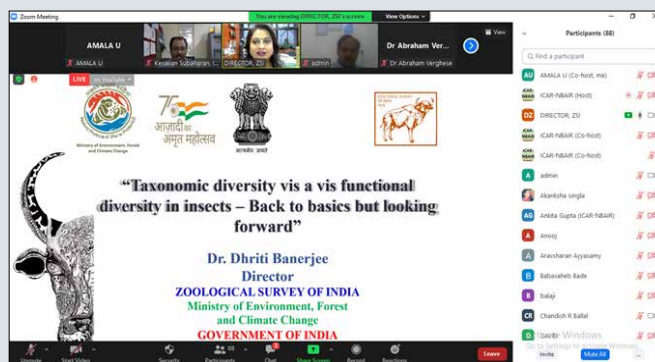
Fig. 8: Scientist's interaction with media



Fig. 9: Farmer-Scientists interactive meeting

## ICAR-NBAIR organised webinar on 'Taxonomic diversity vis-a-vis functional diversity in insects - Back to basics but looking forward'

ICAR-NBAIR organised an online webinar series 008 as a part of Azadi Ka Amrit Mahotsav on 6 October 2021. One hundred participants from ICAR institutes, AICRP (BC), State Agricultural Universities and Zoological Survey of India (ZSI) attended the webinar. Dr M. Nagesh (Director Acting, NBAIR) in his introductory remarks emphasised the importance of taxonomic studies to address the problems posed by alien invasives entering India. This was followed by a talk on 'Taxonomic diversity vis-a-vis functional diversity in insects - Back to basics but looking forward' by Dr Dhriti Banerjee, Director, ZSI, Kolkata. She expressed that NBAIR and ZSI should work in tandem, and this would yield better results to serve the community. In her lecture, she elaborated the research and activities carried out at ZSI and its regional centres across the country in survey, exploration, and monitoring of faunal diversity in various states, ecosystems and protected areas of India. The role of ZSI in the preparation of the red data book was discussed. In her talk, she briefed upon the research activities being taken up by the 'Centre on Disease Vectors' in the lines of faunal inventorisation of mosquito vectors, advanced real time surveillance system and utilization of essential oils in the management of vectors. The molecular studies carried out by ZSI to decipher the gut microbiome in Thysanoptera using next generation sequencing was discussed. The problems associated with the digitization of insect museum specimens and the need to quantify the biodiversity of insects in agro-ecosystems was deliberated. The talk was followed by a discussion on key issues like the establishment of synergy between the ICAR-NBAIR and ZSI to address the gaps in taxonomic studies. Dr Abraham Verghese, Former Director, ICAR-NBAIR mooted the idea of establishing a regional centre of ZSI in Karnataka. Among the other participants who participated in the discussion were Dr Chandish R. Ballal and Dr N. Bakthavatsalam Former Directors of ICAR-NBAIR and the researchers from other institutes. Dr M. Nagesh in his concluding remarks agreed upon the need to have closer interaction between the researchers at NBAIR and ZSI to bring about a synergy in insect taxonomy related works. The program was organised and coordinated by Drs Kesavan Subaharan, Amala Udayakumar and M. Pratheepa.



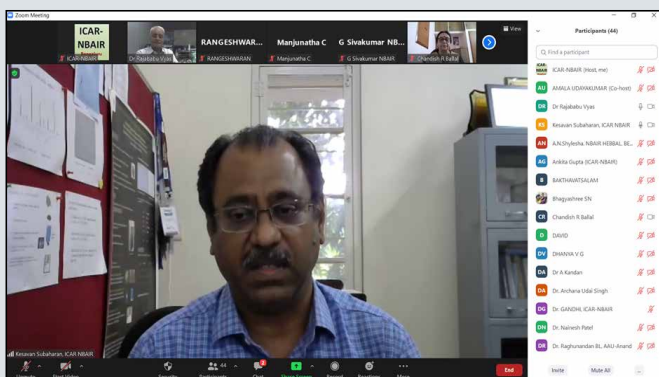
## ICAR-NBAIR organised awareness programme on 'Waste to Wealth conversion using black soldier fly' under 'Swachh Bharat Abhiyan'

ICAR-NBAIR organised a farmers' meeting to celebrate 'Swachh Bharat Abhiyan' at Thalhalli village, Nandhi Hobli, Chikkaballapura district on 26 October 2021. NBAIR scientists, village panchayat leaders and 41 farmers participated in this programme. Scientists from NBAIR explained about the Swachh Bharat theme, importance of hygiene, COVID-19 preventive measures including vaccination. Drs Mahesh Yandigeri, S. Salini and U. Amala explained and demonstrated the technology of 'Waste to Wealth' conversion using black soldier fly (BSF) for the efficient conversion of kitchen waste into manure/compost and also on the use of immature BSF as poultry feed and fish feed. Alcohol based hand sanitizers produced in the Bureau and also folders about 'Black Soldier Fly: an alternative for waste management and fish feed', were distributed to the farmers.



## ICAR–NBAIR organised webinar on ‘Microbes for IPM and its importance in Aatma Nirbhar Bharat for sustainable crop production.’

ICAR–NBAIR organised a webinar series 008 as a part of Azadi Ka Amrit Mahotsav on 2 November 2021. Sixty-seven participants from ICAR institutes, AICRP (BC) and State Agricultural Universities attended the webinar. Among the participants were, Dr Chandish R. Ballal and Dr N. Bakthavatsalam, Former Directors of ICAR–NBAIR. Dr R. Rangeshwaran, Principal Scientist (Microbiology) in his introductory remarks explained the importance of microbial biopesticides in the current scenario of pesticide residues and resistance development in insects due to over dependence on insecticides in agriculture. The speaker Dr Raja Babu Vyas delivered a talk on ‘Microbes for IPM and its importance in Aatma Nirbhar Bharat for sustainable crop production.’ In his talk, he covered various aspects of microbial pesticides, viz. entomopathogenic fungi, bacteria, viruses and nematodes for the management of insects. He deliberated upon the success stories and economic impact of effective strains of microbial pesticides globally. He explained about the case study on biological control of root-knot nematode using antagonistic and parasitic fungus, *Paecilomyces lilacinus*. The exemption of entomopathogenic nematodes from registration of CIBRC was also discussed. The availability of effective *Bacillus* based plant growth promoting rhizobacterial strains with a dual role as entomopathogens as well as growth promotion in plants was discussed. The need for policy guidelines from the Government to bring in private industries into mass production and commercialisation of microbial biopesticides on an industrial scale was discussed. Dr R.R. Rachana, Scientist (Entomology) proposed vote of thanks. Drs Kesavan Subaharan, Amala Udayakumar and M. Pratheepa organised the webinar.



## ICAR–NBAIR organised ‘Training on mass production and release techniques of *Anagyrus lopezi* for the classical biological control of cassava mealybug in India’

ICAR–NBAIR organised training programmes on ‘Mass production and release techniques of *Anagyrus lopezi* for the classical biological control of cassava mealybug in India’ in four batches on 12 November 2021 (Batch I), 23 November 2021 (Batch II), 2 December 2021 (Batch III), and 14 December 2022 (Batch IV), respectively. A total of 48 participants from SAUs, Tamil Nadu State Department of Horticulture and Krishi Vigyan Kendras attended the one-day training programme. The trainees were provided with hands-on training on mass production and field release techniques of *A. lopezi*. The objective of the training was to help the officials to establish the production centre of the parasitoids to meet the local needs. Drs M Sampath Kumar, M Mohan, A N Shylesha, Sunil Joshi and Ankita Gupta coordinated the training programme.



### ICAR-NBAIR conducted Mera Gav Mera Gaon activity

A team of scientists visited the mulberry growing areas at Kulumedoddi village on 24 November 2021. Around 16 farmers were sensitised on the use of biocontrol agents for the management of insects infesting mulberry. The release method of trichocards to manage leaf roller in mulberry was demonstrated to the farmers. The use of uzi fly traps developed jointly by ICAR-NBAIR and Central Sericultural Research & Training Institute (CSRTI) for the management of uzi fly infesting silkworm was explained to the farmers. Drs Richa Varshney and Y. Lalitha coordinated the event.



### ICAR-NBAIR celebrated Constitution day

ICAR-NBAIR celebrated the Constitution Day on 26 November 2021. The officials of the Bureau took oath to promote constitutional values among citizens.



### ICAR-NBAIR conducted Mera Gaon Mera Gaurav activity

A team of scientists visited Kadasegenahalli and Thoudanahalli villages on 30 November, 2021. Around 26 farmers were sensitised on the use of biocontrol agents. The use of uzi fly trap developed jointly by ICAR-NBAR and CSRTI and *Tuta absoluta* traps developed by Dr Kesavan Subaharan and importance and release of trichocards. Drs Richa Varshney, R.S. Ramya and Y. Lalitha co-ordinated the event.



### ICAR-NBAIR celebrated International Day of Disabled Persons

ICAR-NBAIR celebrated International Day of Disabled Persons as a part of the Azadi Ki Amrut Mahotsav at BEL Ashankura Trust for differently-abled persons on 3 December 2021. Drs Richa Varshney, Y. Lalitha, supporting staff and contractual staff with the trainee Mr Punith visited the trust. The team reviewed the activities of the wards engaged in carpet making, weaving foot mats, making reusable shopping bags, paper covers, painting greeting cards, garlands etc. and interacted with teachers, steering committee members and parents. Dr Richa Varshney explained about the improvement, confidence and progress noticed in the mental and physical ability of Mr Punith (Trainee) with his continuous association and working opportunity in the laboratory along with officials. She expressed that Mr Punith proved as a role model to improve the life of persons with different abilities and applauded that the services of staff of BEL Ashankura for this cause of their Sincere Service to Humanity. Mr Ramakrishnappa, Supporting Staff at ICAR-NBAIR as a parent of the trainee shared his experiences about his son's behavioural changes at home after being associated as a trainee in the laboratory.



## ICAR-NBAIR & ICAR-Central Inland Fisheries Research Institute, Barrackpore jointly organised Demonstration meeting on 'Mass Production of Black soldier fly for utilisation as fish feed' at Peechi, Kerala, 16 December 2021

ICAR-National Bureau of Agricultural Insect Resources, Bengaluru and ICAR-Central Inland Fisheries Research Institute, Regional centre Bengaluru jointly organised a one day Discussion cum Demonstration meeting on 'Mass Production of black soldier fly for utilisation as fish feed' at Government Fish Seed Hatchery at Peechi, Thrissur district, Kerala on 16 December 2021. Around 35 participants from the State Department of Fisheries, Private fish hatcheries and farmers participated in the programme. Mrs Joemol, Assistant Fisheries Extension Officer, Government Fish Seed Hatchery, Peechi coordinated the conduct of the meeting. The need for alternative protein source in fish feed was discussed. The global scenario of using insect protein in aquacultural diets and progress made in use of BSF as a protein supplement in fish feed was highlighted. The mass production of black soldier fly for utilization as fish feed was explained with details about the life cycle of the insect, potential of different waste substrates that favours quicker multiplication of the insect. The factors affecting the culture establishment of the insect was elaborated. Few participants who were involved in mass culturing of black soldier fly interacted during the programme and expressed their problems associated with the breeding. The problems related to the rearing of black soldier fly like breeding of other flies in the waste bins and methods to overcome the same were discussed. Dr Amala Udayakumar, Scientist (Entomology), ICAR-NBAIR and Dr Preetha Panikkar, Principal Scientist & Head, ICAR-CIFRI Regional Centre Bengaluru organised the meeting.



## ICAR-NBAIR celebrated Kisan Diwas

ICAR-NBAIR celebrated Kisan Diwas at Thalahalli village, Chikkaballapura district on 23 December 2022. Waste to Wealth conversion using black soldier fly was demonstrated to the farmers. The different life stages of the black soldier fly was explained to the farmers. A pit was opened adjacent to the farmer's field and agricultural wastes were added in the pit. The first instar larvae were inoculated in the wastes and the technique was demonstrated to the farmers. The utilisation of kitchen wastes at homesteads for conversion into nutrient rich compost was discussed and the farmers were encouraged to adopt such measures in their households. The importance of vermicomposting was explained to the farmers. The use of biocontrol agents for the management of insects infesting brinjal was elaborated to the participants. Drs M. Pratheepa, U. Amala and T. Shivakumara co-ordinated the programme.



## ICAR-NBAIR celebrated Swachh Bharath Abhiyan

ICAR-NBAIR celebrated Swachh Bharath Abhiyan under Azadi-Ka-Amrut Mahotsav with the theme "Waste to Wealth Management". Elocution competition was conducted etc. under this program. The workshop on 'Solid waste management' was held on 29 December 2021. The chief guest Mr M. Santhosh Kumar, Consultant in Solar Energy and Solid Waste Management from Mahatma Gandhi Institute of Rural Energy and Development, Bengaluru delivered a talk on 'Solid waste Management'. He emphasised the importance of the segregation of waste materials, the procedure to produce the manure using vegetable wastes and the need of civic sense in cleanliness. The staff pledged to keep the office premises for free of plastic bottles and bags. Dr M. Nagesh, Director-Acting, ICAR-NBAIR and the staff actively participated in this event.



### Participation of ICAR-NBAIR in Krishi Mela 2021

ICAR-NBAIR participated in the Krishi Mela 2021 organised by the University of Agricultural Sciences, Bengaluru, 11-14 November 2021 to showcase various technologies developed at the institute.



### Superannuations

Mr P.K. Sonkusare, Senior Technical Officer superannuated on 31 October 2021. Dr Y. Lalitha, Chief Technical Officer superannuated on 31 December 2021. To commemorate their retirement, colleagues at ICAR-NBAIR organised a farewell function and felicitated them.



### Transfer

Mr Malay Bisht, Administrative Officer was transferred to ICAR-National Institute of Biotic Stress Management,

Raipur, Chhattisgarh on 10 November 2021. Staff welfare of ICAR-NBAIR organised a farewell function for him.

### Welcome!

Mr J. Mathew, Administrative Officer joined ICAR-NBAIR, Bengaluru on 23 December 2021.

Mr K.T. Shivakumara, Scientist (Entomology), joined ICAR-NBAIR on 30 September 2021 on transfer from ICAR-Directorate of Medicinal and Aromatic Plants Research, Anand.

### Transfer of Technologies

“A technique for rearing of parasitoid *Nesolyinx thymus* (Girault) and their use in housefly, *Musca domestica* management” to M/s Synergy Biotech, Karnataka.

### Awards and Recognitions

Awards bagged by NBAIR scientists at “Fifth National Symposium on Plant Protection in Horticulture (NSPPH-2021)” organised by ICAR-Indian Institute of Horticultural Research, Bengaluru, 27-29 December 2021.

### Best oral presentations

Dr M. Nagesh

Dr U. Amala

Dr Rachana, R.R.

### Publications

Kment, P., Salini, S. & Ahmed, Z. 2021. *Halyomorpha picus* (Hemiptera: Heteroptera: Pentatomidae) first confirmed record from Pakistan and two new junior synonyms. *Zootaxa*, 5060 (3): 429-438.

Ghosh, E., Varshney, R. & Radhika, V 2021. Performance of larval parasitoid, *Bracon brevicornis* on two *Spodoptera* hosts: implication in bio-control of FAW. *Journal of Pest Science*. <https://doi.org/10.1007/s10340-021-01385-0>.

Kment, P., Salini, S., Rédei D. & Rider, D. 2021. *Halyomorpha halys* fixed as the type species of the genus *Halyomorpha* (Hemiptera: Heteroptera: Pentatomidae). *Acta Entomologica Musei Nationalis Pragae*, 61(2): 615-630.

Pandey, A.K., Deka, B., Varshney, R., Cheramgoi, E.C. & Azariah Babu A. 2021. Do the beneficial fungi manage phytosanitary problems in the tea agroecosystem? *Biocontrol*, 66: 445-462.

Salini, S., Rabbani, M. K., Amala, U. & Mahendiran, G. 2021. First record of the genus *Lodosocoris* Ahmad & Afzal (Hemiptera: Heteroptera: Pentatomidae: Halyini) from India with description of a new species. *Zootaxa*, 5072 (1): 053-062.

Sreerama Kumar, P. & Rachana, R.R. 2021. *Scirtothrips dorsalis* (Thysanoptera: Thripidae) is a pest of celery, *Apium graveolens* (Apiaceae): first report and diagnostic characters. *Journal of Integrated Pest Management*, 12(1): 46; 1-5.

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