International Organisation for Biological Control (IOBC)
Asia & Pacific Regional Section, IOBC-APRS

IOBC-APRS Newsletter No. 15 June 2024

Message from your President

Contents

Dear Members

I would like to echo the words of our IOBC Global President Dr Martin Hill in his last newsletter: "…we probably all recognize this… we have to get better at reporting on the positive impacts of biological control." Recently an on-line article about four weed biocontrol agents having approval to be released in New Zealand against purple loosestrife, *Lythrum salicaria*, met with negative feedback from readers of the article on Facebook. Individuals comments were horror that scientists were to introduce insects from overseas to combat the impacts of an introduced weed. The thoughts expressed included that it was inevitable it would go wrong, that insects would switch to feeding on something else, and it implied there was zero trust that scientists like us knew what they were doing. These resounding negative views in my mind are a result of distrust as well as a complete lack of understanding by the general public on biology.

I am deeply concerned that our young people are getting less and less informed about biology, during their education and their education in the sciences focuses more in computer literacy and technology, than it does on basic biology such as plant sciences, microbiology and zoology. At a conference I attended in Australia last year science educators reported they had surveyed young Australians and one in three teenage students did not know that books are made from plant-based materials! Two in three students did not know that denim used to make jeans is a plant material (2020 PIEFA Student Survey data – "self rated knowledge of Food & Fibre Industries").

The trend is obvious, without all people having some basic knowledge about such fundamental sciences as plants, insects, microbes and their interactions, and their importance for primary industries and food production, biological control could quickly lose it's "social license" to continue.

We all have a part to play. We need to circulate easy to read articles, like this one, to explain biological control (**https://www.epa.govt.nz/community-involvement/science-at-work/bcas/**), we need to speak about our work whenever invited to do so. Let's all play our part and share our amazing science with young minds as much as we possibly can!

Toni Withers

Microbes at work in the Pacific against coconut rhinoceros beetle, a re-emerging invasive pest in the Pacific

The coconut rhinoceros beetle (CRB), *Oryctes rhinoceros*, is a major invasive pest of coconut palm, oil palm and other palm species, particularly in the Pacific region. CRB is native to South-East Asia and was first reported invading the Pacific region in 1909 (Upolu, Samoa) and spread (primarily through human mediated means) to several South Pacific Island countries and territories (PICTs), damaging palms and the livelihoods in the region. From the 1970s, CRB has been successfully managed in its invasive range using an integrated pest management (IPM) system that incorporates microbial biological control agents with sanitation to remove CRB breeding sites. However, following a period of over 35 years with no reported range expansion, from the early 2000s CRB is again expanding its range in a new wave of invasions severely damaging palms in the affected countries. As part of a project funded through a New Zealand Aid Programme provided by the New Zealand Ministry of Foreign Affairs and Trade (via the New Zealand Aid Programme), and in collaboration with project partners from the Pacific Community (SPC), Papua New Guinea, Solomon Islands, and Vanuatu, a team of AgResearch scientists has been working to identify and develop pest management options to bring the new CRB invasions under control.

The new CRB invaded Pacific locations being reported have included Guam (2007), Central Province, Papua New Guinea (2010), Oahu, Hawaii (2013), Guadalcanal, Solomon Islands (2015), South Province, New Caledonia (2019), Efate, Vanuatu (2019), and Majuro, Marshall Islands (2023). Common to the vast majority of these locations is the presence of severe palm damage by beetles not seen since the introduction of *Oryctes rhinoceros nudivirus* (OrNV), new CRB variants not previously found in the historically invaded regions of the Pacific (e.g. Samoa, Fiji, outer provinces of Papua New Guinea), and a lack of OrNV infection in CRB populations associated with these new invasion locations.

Coconut palms severely damaged by adult *Oryctes rhinoceros* adults (top right inset photo) adult.

In initial tests, CRB populations in Guam, Solomon Islands and Port Moresby (PNG) were non-responsive to the commonly released isolates of the OrNV biocontrol agent which did not establish robust infections as was achieved in the earlier Pacific releases. Subsequently, OrNV isolates from a wider range of sources were tested and a new OrNV isolate (V23B) was identified that is able to infect CRB and spread within the Vanuatu population. Lab assays in Solomon Islands using this same isolate are also promising. While the POM population remains non-responsive to V23B, another new OrNV isolate is showing promising infection and mortality results from lab-based assays. Although not apparent from the earlier successful OrNV releases, the observations from this recent wave of invasions provides a reminder of the importance of testing the local invading CRB population to identify a suitable OrNV isolate for release.

Following discovery of suspected CRB presence in new locations, or unexpected severely damaging outbreaks, it is important to report the finding to the appropriate local (or region) biosecurity or agriculture extension teams. This will enable confirmation that CRB is indeed present, and allow collection of specimens to identify what CRB variant is present (using lab-based diagnostic methods). Based on the CRB identification results, a tailored response can be designed and appropriate biocontrol agents tested. A rapid response is necessary to mitigate impact.

Islands free of CRB need to remain vigilant for the potential of CRB invasion.

Sean Marshall

Senior Scientist, Microbial Solutions, AgResearch, Lincoln, New Zealand

Email: Sean.Marshall@agresearch.co.nz

Freshly felled dead decaying palm filled with *Oryctes rhinoceros* larvae.

Insect natural enemies, augmentation and conservation: Indian perspective

Insect natural enemies; predators and parasitoids play an important role in pest suppression as they cause no harmful effect on environment, health and minimal non-target effects. Augmentative biological control of insect pests and mites is used when existing population of natural enemies is low and ineffective. Worldwide, c.a. 350 natural enemies has been commercially produced and used in pest management. Internationally the market for beneficial insects (also known as macrobials) is growing rapidly and estimated to reach USD 1630 million by 2028, at a compound Annual Growth Rate (CAGR) of 13.2% during 2022-2028 (Research and Markets, 2024). The demand for beneficial insects are mostly in protected cultivation and for high value crops. The major biocontrol agents used worldwide are predatory mites *viz.*, *Amblyseius swirskii* , *Phytoseiulus persimilis*, *Neoseiulus californicus* and *Neoseiulus cucumeris* followed by heteropteran bugs and aphelinids.

In India, *Trichogramma* spp. are the widely used biocontrol agents and are used not in covered crops but in cereals, vegetables and fruit crops. One of the notable successes was recorded in Kerala where Bio-intensive pest management (BIPM) module utilises *Trichogramma japonica, Trichogramma chilonis* and *Pseudomonas flourescens* (a bacterium used as a biopesticide) resulted in high yield with collaborative efforts by the farmers, State Biocontrol Lab-Mannuthy and input management by Farmer's cooperative bank. Many Indian state agricultural universities, state departments are engaged in production and supply of *Trichogramma* eggs (trichocards) to farmers. *Goniozus nephantidis* and *Bracon brevicornis* are the larval parasitoids and have been used against black headed caterpillar in coconut in area wide programmes. *Encarsiaguadeloupae*, a parasitoid of rugose spiraling whitefly in coconut is recommended for conservation and inoculative release. *Cryptolaemus montrouzieri* (a ladybird) which was introduced in India decades agoiswell established and used by augmentation against mealybugsin particular *Ferrisia virgata, Maconellicoccus hirsutus* and *Planococcus lilacinus* in fruit orchards, ornamental plants and mulberry. The lacewing *Chrysoperla zastrowisillemi* is an effective predator for many sucking insect pests. Recently, a strain of *Chrysoperla zastrowisillemi* (PTS-8) having tolerance to different groups of pesticides *viz.,* organophosphate (OP), organochlorine (OC) and synthetic pyrethroid has been developed by ICAR-National Bureau of Agricultural Insect Resources, Bangalore of India. This strain could be usefulin crops with high insecticides usage.

In last two decades progressive research has been made exploring the usefulness of Hemipteran predators anthocorid bugs (*Blaptostethus pallescens, Cardiastethus exiguous, Xylocoris flavipes* etc.), predatory mirid bugs (*Dortus primarius*, *Nesidiocoris tenuis, Termatophylum orientale* etc.), reduviid bugs and geocorid bugs (*Geocoris ochropterus*, *Geocoris superbus*). Research has standardized their rearing protocols and evaluated their efficacy against sucking insect pests like thrips, mites and other insect pests.

Recently, anthocorid bugs and predatory mirid bugs have been evaluated against thrips and the leaf mining moth *Tuta absoluta*. The results are encouraging to proceed with these bugs along with other interventions to curtail sucking and other pests in protected cultivation where growers are looking forward to adopting biocontrol as an alternative to insecticides.

In India very few commercial insectaries are producing macrobials. However, some state agricultural universities, state agricultural department, progressive farmers and growers have taken up the production of biocontrol agents.

Conservation biological control (CBC) is one of the approaches to biological control gaining importance for pest management. Avoiding harmful pesticides or using need-based “softer” pesticides judiciously is one important aspect of conservation biological control. To protect and support natural enemies anthropogenic interventions are required. It involves habitat management, providing non crop plants and banker plants which provide shelter, nectar, alternative food (prey/pollen/nectar); floral intercropping, bund vegetation etc. These interventions increase the diversity of natural enemies, reduce their mortality and provide conducive microclimatic conditions for optimising natural enemy’s population growth. Landscape heterogeneity and complexity generally benefit natural enemies by reducing antagonistic interactions like intraguild predation which might impede biological control of insect pest. The ecosystem services provided by CBC is not restricted to pest control, it contributes to restoration and enhancement of biodiversity, reduces soil erosion etc.

Many anthocorid and geocorid bugs supplement their predatory diet with pollen and their establishment can be assisted by selecting non-crop inter-plant species which produce pollen. In India, *Orius* sp. and *Geocoris ochropterus* have been found associated with maize pollen. Therefore, plants can be selected that coincides with pollen and nectar availability for natural enemies. Prior establishment of natural enemiesin the crop areas also plays an important role in pest suppression *viz.,* aphid, *Tuta absoluta* etc. Hence, Predator-In- First approaches can be combined with adopting suitable inter-plants providing pollen, alternative preys and shelter to generalist predators.

In Conclusion although a lot of publicity has been carried out to publicise the benefits of augmentative biological control in India, still more effort can be made to increase the success of conservation biological control. We are promoting especially the selection of non-crop plants, and tailor made shelter beds for natural enemies to harness maximum benefit of biological control.

Richa Varshney,
Scientist (Senior Scale) (Insect Germplasm Conservation and Utilization), National Bureau of Agricultural Insect Resources, Bengaluru, India,
E-mail: richavarshney84@gmail.com

Predatory mites – a cornerstone of biological control

Predatory mites are important biological control agents. They play a vital role in maintaining predator and prey populations at equilibrium level in natural systems and are the most important commercially available augmentative biological control agents. Species of the family Phytoseiidae are by far the most important group of commercially available predatory mites with about 20 species offered worldwide. Out of these, *Amblyseius swirskii*, *Phytoseiulus persimilis*, *Neoseiuluscu cumeris* and *Neoseiulu scalifornicus* are the most important ones. Soil predatory mites, like *Stratiolaela psscimitus* (Laelapidae) or *Macrocheles robustulus* (Macrochelidae) are much less frequently used. More recently, species like for instance *Pronematus ubiquitus* (Iolinidae) for the control of the tomato russet mite (*Aculopsly copersici*) have been investigated for commercial use.

The specialized spider mite predator *Phytoseiulus persimilis* was the first biocontrol agent commercially available. Most of the other phytoseiid species on the market are generalists. They feed on various small insects and mites but also on pollen. This makes it possible to establish a predatory mite population in pollen-bearing plants before the pests arrive. The generalist feeding habit of these species also makes it possible to rear them on factitious prey (stored product mites) making the mass-rearing process much more efficient compared to rearing in a tri-trophic system with plant, pest and predator. It also offers the possibility to produce slow-release sachets for a continuous release of predatory mites in the crop over several weeks. Another strategy more frequently used in recent years is supplementary feeding of phytoseiid predatory mites with astigmatid prey mites, *Artemia* spp. cysts or pollen to increase predatory mite densities and biological control in crops where the damage threshold is very low.

Amblyseius swirskii **feeding** ***Tetranychus urticae*** **and** ***Phytoseiulus persimilis*** **attacking a thrips larva (source Koppert)**

Dr. Markus Knapp,
Koppert Biological Systems,
P.O. Box 155, 2650 AD Berkel en Rodenrijs,
The Netherlands.
Email : mknapp@koppert.nl

A ground-breaking approach to pest management with RNAi

The quality and reliability of food and feed are all greatly impacted by the application of modern agribusiness science solutions. In particular pest control research and business is actively seeking more sustainable alternatives to chemical pesticides due to mounting public concern about their impact on human and environmental health. The usage of double-stranded RNA (dsRNA) to inhibit messenger RNA's typical function is known as ribonucleic acid interference (RNAi), and it was initially documented in 1990. Because it is so selective, RNAi can stop nucleotide sequences that are found in just the target pest. Hence, scientists are pushing to elevate RNAi to the status of a crucial tool in the field of agricultural science. In recent years, the RNAi process has been identified as a very promising alternative for chemical and biological pest control agents.

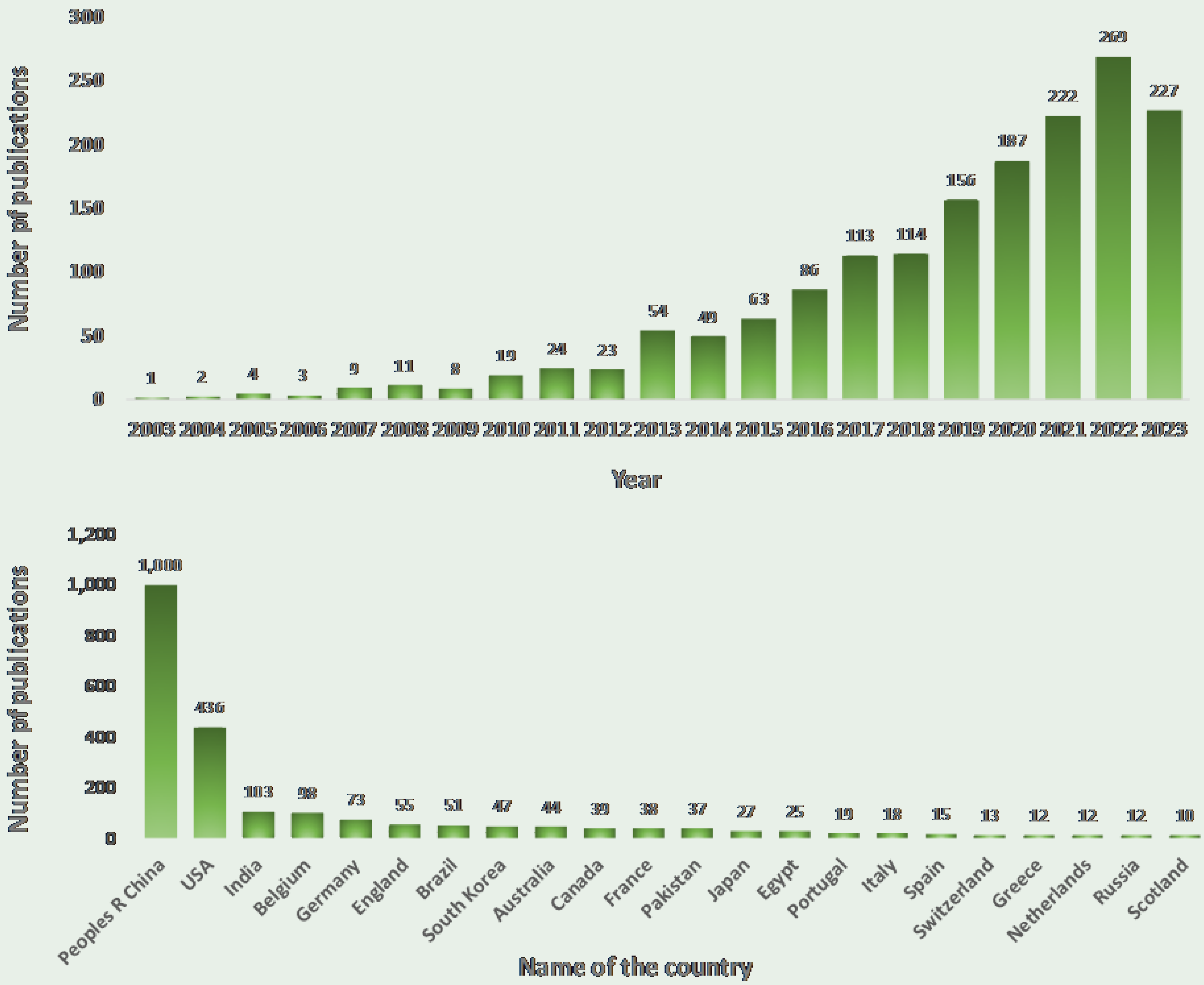
In 2017, the first RNAi pesticide (SmartStax Pro) was approved by the US Environmental Protection Agency. To fight both northern (*Diabrotica barberi*) and western (*Diabrotica virgiferavirgifera*) maize rootworms, the genetically modified maize seed was introduced, that employs RNA interference in conjunction with transgenic insecticidal proteins. How this works is that *D. virgifera*'s DNA contains a crucial protein, Snf7, for survival. RNAi technology inserts a targeted piece of DNA into the maize genome encoding the *DvSnf7* gene. Upon transcription, RNA undergoes self-folding, resulting in the formation of double-stranded RNA. Upon ingestion of DvSnf7 dsRNA maize by *D. virgifera*, the cellular machinery of the insect separates the two strands of the dsRNA and then pairs one of the strands with the Snf7 mRNA. An enzyme cleaves the mRNA, hence inhibiting the synthesis of the crucial Snf7 protein.

RNAi pesticide was also recently approved by Chinese regulators in 2021, while in Europe, it has been authorized for the market for all uses except cultivation. A few more RNAi pesticides are expected to be released by various international regulatory authorities. RNA interference is a naturally occurring cellular process that limits the protein synthesis mechanism in all eukaryotic organisms, including insects. Theoretically, RNAi first appeared as a virus defence system. Degradation of mRNA results from sequence-specific targeting. In terms of plant protection, this technology shows great promise due to its high specificity, rapid degradation, and effectiveness. The widespread adoption and application of RNAi-based products is still a long way off. The relatively low control rate in comparison to conventional chemical controls and the wide variation in response levels shown in different groups of insect pests are two of these obstacles.

Manufacturing on a huge scale at a reasonable cost is still a challenge, even with recent advancements. However, the artificial intelligence-mediated design of targeted small molecules based on RNAi will emerge as useful new tools for crop protection, enhancing the existing toolbox of solutions.

Evidence suggests that the performance of RNAi is enhanced by many alternative dsRNA nanoformulations, including nanocarriers, guanylated polymers, and gold nanoparticles (AuNPs). To increase RNAi efficacy, nanoformulations protect them against degrading enzymes, make it possible for dsRNA to penetrate the body wall, and enhance its cellular absorption and endosomal escape. While developing RNAi insecticides to prevent resistance is critical, the technique has the potential to provide a greener way to manage crop pests. Naturally occurring pest predators (example: *Hippodamia convergens, Coccinella septempunctata, Coleomegilla maculate,* and *Harmonia axyridis*) are among the non-target creatures that these pesticides could harm. For important pests that are resistant to RNA interference, getting double-stranded RNA to the cell's cytoplasm where it can do its work should increase the effectiveness of RNA interference. Improving RNAi efficiency and facilitating dsRNA delivery to the region of action are two potential outcomes of nanoformulations of dsRNA. Recent developments in the production and delivery of double-stranded RNA by microbes seem promising. Verifying the specificity of double-stranded RNAi is crucial for demonstrating their non-targeted effects. Bioinformatics techniques can help optimize dsRNA sequences and reduce similarity to pest-related sequences. The discussion on regulatory and bio-safety issues is crucial for assessing the risk of RNAi-based products and developing a comprehensive risk assessment and management framework. This will need to be conducted on a country by country basis.

RNAi is unique in its ability to target specific pests, but it should not be considered a one-size-fits-all solution against crop pests. Instead, combining multiple green and molecular possibilities simultaneously can increase the expected durability of the strategy and the successful management of resources against pests.



Number of publications about RNA interference (RNAi) and pests during the recent years (top) by various leading countries (bottom) in the fields.

RNAi pesticides are not regulated globally, and the European Unionis being cautious and not fully approving their use. Synthetic interfering RNAs may be exposed to farmers, farm-workers, and rural populations through spray drift, with unknown risks and impacts. Despite these issues, artificial intelligence-mediated RNAi designs are expected to be valuable new crop protection tools for the future.

Dr J. Francis Borgio,

Imam Abdulrahman Bin Faisal University, Dammam 31441, Kingdom of Saudi Arabia
Email: fbalexander@iau.edu.sa/borgiomicro@gmail.com.

Forest Biosecurity Regional Training Workshop Fiji

The Forest Biosecurity Regional Training Workshop, supported by the United Nations Food and Agriculture Organization and the Asia-Pacific Forest Invasive Species Network and run by the University of the Sunshine Coast, was held in Suva, Fiji from the 5-8 September 2023. It was attended by 35 participants representing 12 Pacific Island Countries and had presenters from Australia and New Zealand (Figure 1). The workshop aimed to deepen the understanding of forest biosecurity and foster collaboration across the region through covering such topics as the importance of forest biosecurity, recognition of symptoms and signs of tree pests and diseases, forest health surveillance techniques, high-risk site surveillance as a critical early detection methodology, and biological control of established forest weeds and opportunities for implementation.

Figure 1. Attendees of the Forest Biosecurity Regional Training Workshop, Suva.

Representatives from each country gave reports on their major pests, including weeds and any management activities been undertaken. Numerous pests such as scales, white flies and papaya mealybug, as well as the weeds, chromolaena, mikania and African tulip trees are also targets for biological control, with agents released and established in several countries. Participants also reported on the challenges that their countries face in managing their forests and associated pests. Many of the pests and weeds were common to numerous countries but not all countries had the relevant biological control agents for each species.

There were numerous group exercises to illustrate what measures are in place to manage forest pests. These include legal frameworks, policies, acts, regulations, monitoring and surveillance at ports of entry, capacity building and training, as well as border control and cargo checking, and public awareness and quarantine policies.

The participants also highlighted some of the constraints that various countries face in managing forests and in particular pests and weeds. These included funding constraints, limited facilities, resources and capacity. Overall, there was scope for enhanced public awareness initiatives, policy synchronization, and strengthening inter-island biosecurity measures.

In another exercise, participants were asked about their level of awareness of biological control of pests and weeds undertaken in their country. Many of the participants were involved in forest management but were not necessarily involved in biological control. In addition, for many countries, biological control agents for either pests or weeds had not been released at all or for 10 or more years. Therefore, it was not surprising that overall awareness of biological control was low in some countries. Similar results have been reported at similar workshops in Southeast Asia, where biological control had also not been practiced for long periods of time.

Figure 2. African tulip trees invading the forest at Colo-i-Suva Forest Park, Fiji. (Left)

Figure 3. *Liothrips urichi*, a biological control agent for *Miconia crenata* in Fiji. (Right)

There was a one day field trip to inspect the new quarantine facility atthe Secretariat of the Pacific Community. This facility was funded by the Australian Government. The field trip also took in a visit to Colo-i-Suva Forest Park to view invasive weeds and some management activities. *Spathodea campanulata* (African tulip tree) (Figure 2) and *Miconia crenata* (Koster's curse were both common along the forest edges. The thrips, *Liothrips urichi*, which was released in Fiji to help control Koster's curse was seen on many plants (Figure 3).

Overall, the workshop was viewed as a success by all participants, through discussions on the importance of forest biosecurity, how to detect pests and how to manage them, as well as identifying constraints and limitations to implement such activities. Some of these pests and weeds are beyond conventional control, making biological control a viable alternative. However, the lack of awareness and knowledge of biological control in the region where both pests and weeds are causing widespread negative impacts on agriculture, forestry and biodiversity presents a challenge for biological control practitioners. Hopefully, more workshops and attendance at conferences can help increase awareness and the benefits of biological control in the Pacific.

Michael Day,
Queensland Department of Agriculture and Fisheries , Australia, E-mail: tropicalweedbiocontrol@gmail.com

Simon Lawson, University of the Sunshine Coast, E-mail: slawson@usc.edu.au

Two new releases of weed biological control agents in the Pacific

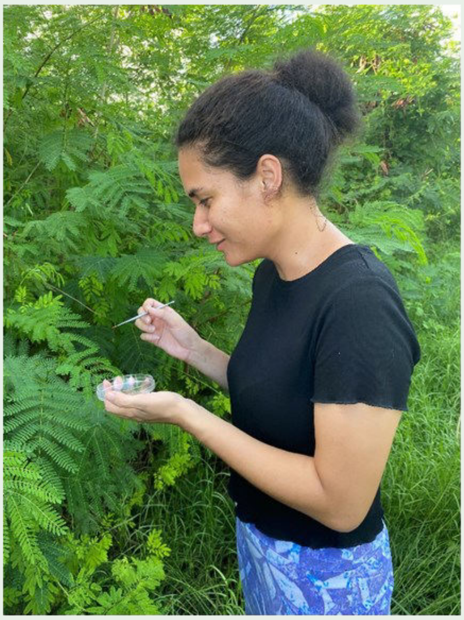
Tuvalu welcomed its first-ever natural enemy to control an invasive weed in April. Tuvalu had previously released biological control agents to management insect pests but never weeds. This release was made possible with support from New Zealand's Manaaki Whenua - Landcare Research (MWLR) who run a Natural Enemies - Natural Solutions programme as part of the Pacific Regional Invasive Species Management Support Service (PRISMSS). Funding for this release was provided by the Managing Invasive Species for Climate Change Adaptation in the Pacific (MISCCAP) programme, funded by the New Zealand Ministry of Foreign Affairs and Trade, and the GEF-6 Regional Invasives Project (GEF-6 RIP) funded by the Global Environment Facility.

In March 2022, a stakeholder workshop held in Funafuti, the capital of Tuvalu, determined that *Leucaena leucocephala* (leucaena), or tamalini as it is called there, should be prioritized as a target for biological control. In Tuvalu, leucaena was deliberately introduced to Vaitupu atoll for soil improvement and accidentally introduced to Funafuti atoll in soil contaminated with the seeds. It has subsequently become very weedy on both islands.

***Leucaena leucocephala* in Tuvalu**

The tiny sap-sucking psyllid *Heteropsylla cubana* which is native to tropical America, self-established throughout much of the Pacific, following the spread of leucaena, but it has not yet found its way to some of the more remote islands. The psyllid only attacks plants in the genus *Leucaena*. Both nymphs and adults feed on, and damage, the soft new growing tips of leucaena, which can cause severe tree stunting and the death of seedlings. In April 2024, the psyllids were released on Funafuti in April, with the assistance of Tuvalu's National Invasive Species Co-ordinator, Sam Panapa. "We are happy to be able to benefit from this natural enemy and to manage more weeds through this technique in the future," said Sam. "This method is safer than using chemicals and more cost effective." The psyllid's establishment success and post-release impact in Tuvalu will be closely monitored.

Heteropsylla cubana



TialePanapa, Department of Environment releasing *Heteropsylla cubana* in Tuvalu

Apart from being the first weed biological control agent to be released in Tuvalu, this is the first time that *H. cubana* has been deliberately released against *L. leucocephala* in any country. The psyllid is widespread in Asia, Africa and Australia, where it was accidentally introduced along with the introduction of *L. leucocephala*. In some countries, *H. cubana* is viewed as a pest but in others, where leucaena has taken over large areas, it is viewed as a beneficial insect that can help reduce the spread and impacts of leucaena.

A seed-feeding weevil *Acanthoscelides macrophthalmus* has previously been released against *L. Leucocephala* in South Africa and following establishment, has since spread to other countries in Africa. There are also reports of the weevil in Asia. It is possible that earlier reports of its presence in the Pacific could be incorrect, confusing the damage with another species.

Also in April, MWLR facilitated the release of the gall fly *Cecidochares connexa* in the Republic of Marshall Islands (RMI) for the biological control of *Chromolaena odorata* on Bikini Island in collaboration with their Ministry for Natural Resources and Commerce. This was only the second release of a weed biological control agent, the first being in 1948. *Cecidochares connexa* was reared by researchers at Queensland Department of Agriculture and Fisheries and five pairs of flies and 240 galls containing pupae or mature larvae were hand-carried into the country under permit. Funding for this release was also provided by MISCCAP and GEF-6 RIP.

Travel to Bikini Island from Majuro proved challenging with itineraries (and cost) changing daily, as the airstrip servicing Bikini Atoll being out of commission due to disrepair and that all islands that make up the atoll are currently uninhabited. Travel to Bikini Island was made possible chartering an Australian Government-donated patrol boat belonging to the Police Department and took 2 nights to reach the island. Ten pairs of flies and about 100 pupae, which had been dissected from the galls en-route, were released on the island. Most plants were dry and seeding but a few healthy plants, on which releases were made, were growing near abandoned buildings. Care was taken to double bag all quarantine waste for later destruction.

Cecidochares connexa

Photo: C. Wilson

***Chromolaena odorata* flowering and seeding on Bikini Atoll**

Chromolaena is a major weed throughout Asia and the western Pacific, as well as numerous countries in Africa. *Cecidochares connexa* was first used as a biological control agent against chromolaena back in the 1990s, when it was introduced into Indonesia and the Philippines and then later Papua New Guinea, as part of an ACIAR-funded project, led by the Queensland Government. The gall fly readily establishes and was a great success and was later released in the Federated States of Micronesia, Guam, Palau and Timor Leste, where it is also helping to control the weed. It was also released in India and West Africa. The gall fly is extremely mobile and from Indonesia, it spread to Malaysia and Singapore. While it was released in only Côte d'Ivoire in West Africa, it is now reported in Liberia, Guinea, Ghana, Togo, Benin, Nigeria and Cameroon.

Byrelson Jacklick of Ministry of Natural Resources and Commerce releasing *Cecidochares connexa* flies on a healthy stand of chromolaena beside an abandoned building in town.

By releasing the gall fly on Bikini Island, it is hoped that the weed can be brought under control and thus reducing the chance of the weed spreading to other islands and or countries. A return trip to confirm establishment is being planned for 2025. The biological control of chromolaena story is just one of many examples where research conducted by one country, can have significant flow effects to other countries where the target weed is also a problem. Moving biological control agents around the world is extremely cost-effective, as the bulk of the research and testing has already been done and additional testing for particular countries is usually minimal. Under several programmes funded by the New Zealand government and managed by MWLR, with collaboration from SPREP and Queensland Department of Agriculture and Fisheries, numerous biological control agents have recently been released in Vanuatu, Tonga, Cook Is, RMI and now Tuvalu to manage weeds such as cat's claw creeper, parthenium, giant sensitive plant, lantana, African tulip tree, chromolaena and leucaena.

Michael Day,
Queensland Department of Agriculture and Fisheries , Australia,
E-mail: tropicalweedbiocontrol@gmail.com

Lynley Hayes, Manaaki Whenua Landcare Research, E-mail: HayesL@landcareresearch.co.nz

Jointly Organised by

FIRST ANNOUNCEMENT

APFISN

10th International Workshop on Biological Control and Management of Eupatorieae and other Invasive Alien Plants

Kerala Forest Research Institute (KFRI), Kerala, India | 11 - 14 February 2025

The International Workshop on Biological Control and Management of Eupatorieae and other Invasive Alien Plants will be organized under the patronage of the Kerala Forest Research Institute (KFRI), India, the International Organisation for Biological Control (IOBC), the Food and Agriculture Organization of the United Nations and the Asia-Pacific Forest Invasive Species Network. Earlier workshops in this series discussed the biological control of invasive alien plants such as *Chromolaena odorata* and *Mikania micrantha*. This workshop will evaluate the success, status and future prospects of the biological control of these species and the scope and options for biological control of the other major invasive plants widespread in the Asia-Pacific region and beyond. KFRI, the workshop venue, is located in the lap of the Western Ghats, which is one of the hotspots of biodiversity and a World Heritage Site. Invasive alien plants, especially the members of Eupatorieae and other species are widespread in most of the habitats in the region, posing significant impacts on the environment, wildlife, agriculture, and the livelihoods, especially of economically weaker communities. Climate, land-use change and forest degradation promote invasion by alien species and threats from these are predicted to increase in the future. Management of invasive alien plants in the region is mostly attempted through physical and chemical measures, which are not long-term and sustainable solutions. Biological control is considered the most suitable management approach to contain the problem, especially when the species are widespread.

MARK YOUR DATE & REGISTER NOW!

Organizing Committee

Mr. Michael Day (Queensland Dept. of Agriculture & Fisheries)
Dr. KV Sankaran (IPBES Expert on Invasive alien species)
Dr. Shiroma Sathyapala (Forestry Officer, FAO)
Dr Kannan CS Warrier (Director, KFRI)

For further details, please contact:

Coordinating Committee

Dr P Sujanapal (sujanapal@kfri.res.in, sujanapalp@gmail.com)
Dr TV Sajeev (sajeev@kfri.res.in, tvsajeev@gmail.com)

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Registration Form

10th International Workshop on Biological control and management of Eupatorieae and other invasive alien plants

Kerala Forest Research Institute, India 11-14 February 2025

Name :____

Title :____________________

Institution/University: ____

Address:____

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E-mail: _____________________________ Tel: ____________________________

I wish to participate in the workshop (please mark boxes with an X):

☐ India ☐ International

I plan to give a presentation: ☐ Oral ☐ Poster

Tentative title____

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Return this form, either electronically or by post, to:

Dr. P Sujanapal

Principal Scientist & Head, Silviculture Department

Kerala Forest Research Institute, Peechi, Thrissur- 680653, Kerala, India

iobcworkshop2025@gmail.com, sujanapalp@gmail.com

as early as you can but preferably before 30 July 2024.

A second announcement will provide details on the submission of abstracts, registration fees, and options for accommodation.

17th International Symposium on Biological Control of Weeds — seeking scientific session proposals

XVII INTERNATIONAL SYMPOSIUM ON
BIOLOGICAL CONTROL OF WEEDS
8–13 MARCH 2026 ROTORUA NEW ZEALAND

We are excited to announce that the 17th symposium will be held in Rotorua, New Zealand. Located in the centre of the North Island, Rotorua is a hidden gem known for its geothermal landscapes, rich Māori culture, and incredible backyard of ancient forests. To keep up with the latest news and find out key dates for abstract submission and registration subscribe at https://isbcw-rotorua.com/#register
For more information about the symposium visit https://isbcw-rotorua.com/

Our logo explained
The white spots in the lower right of the leaf depict a stunningly successful biocontrol programme for Aotearoa New Zealand (AoNZ) with the white smut fungus (*Entyloma ageratinae*) released against mist flower (*Ageratina riparia*). The beetle and leaf area eaten in the shape of AoNZ depict an emerging success against tradescantia (*Tradescantia fluminensis*), due to the combined impacts of three species of beetles and a fungal pathogen. The beetle also marks the place where the Symposium will be held in Rotorua.

The kōwhaiwhai pattern to the left was gifted to Manaaki Whenua – Landcare Research (MWLR) to represent protection from biological threats, which is one of MWLR's responsibilities as kaitiaki, or guardians, of the land. Kaitiaki can be depicted in the form of a manaia (a creature with a bird beak, human body and fish's tail) which can be a spiritual guardian against evil. It also incorporates Takarangi, a traditional design that depicts Ranginui (the sky) and Papatūānuku (the land) as their children push them apart. The koru (spiral) represents life which flows, intertwines and connects. The kōwhaiwhai pattern also depicts the unique geothermal area in which Rotorua resides, where steam emerges from the ground and the largest geysers in the Southern Hemisphere can be found.

Further IOBC Event Websites

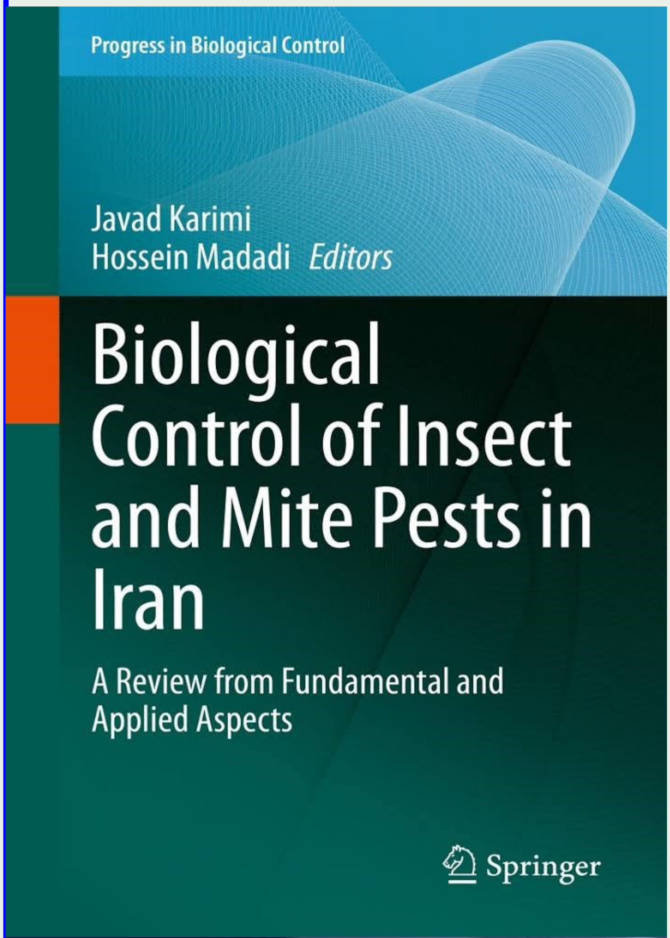
IOBC-Global: https://www.iobc-global.org/events.html

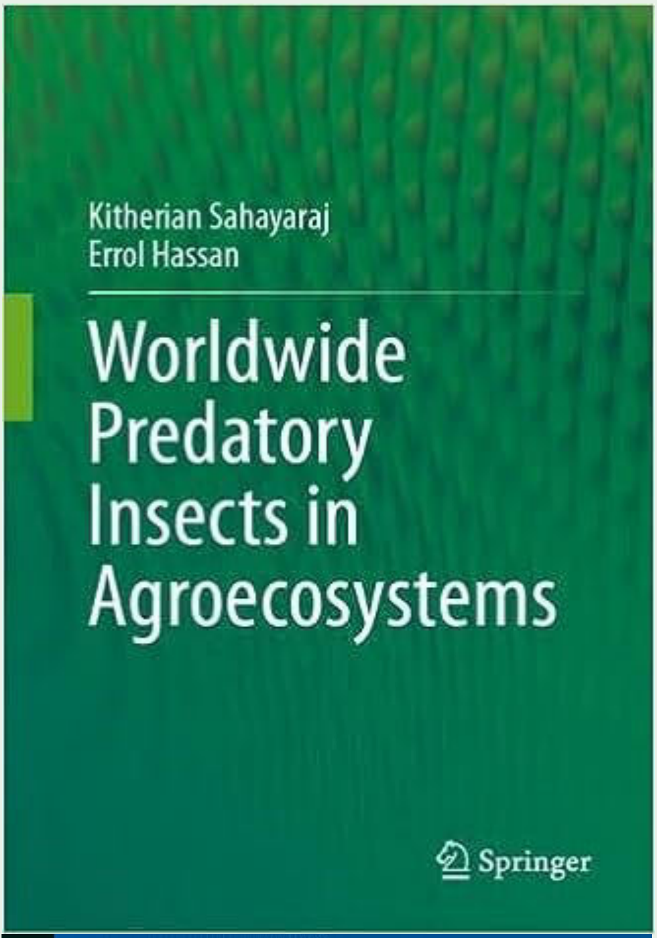
West Palaearctic Regional Section, IOBC-WPRS: https://www.iobc-wprs.org/events/index.html

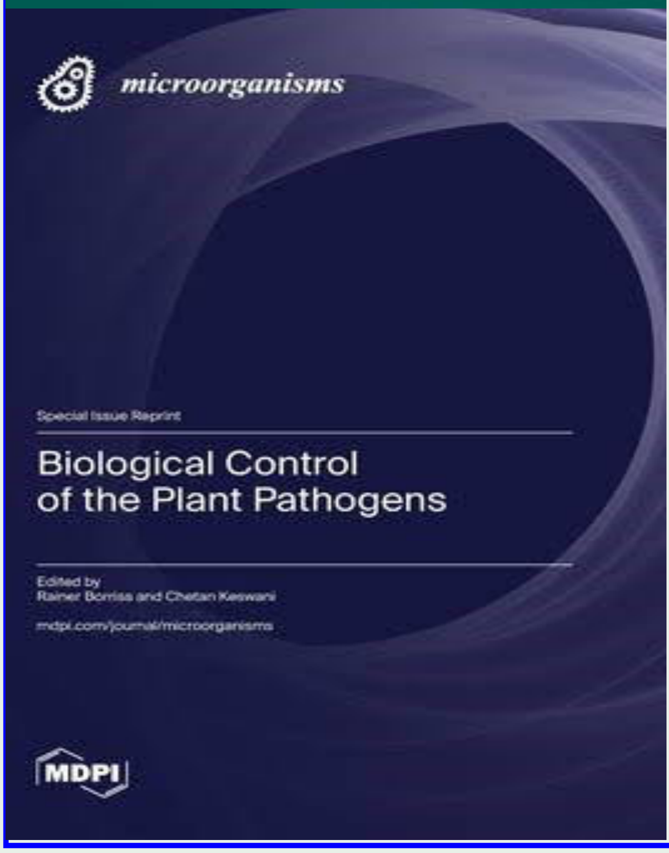
Neotropical Regional Section (NTRS): http://www.iobcntrs.org/Events.aspx

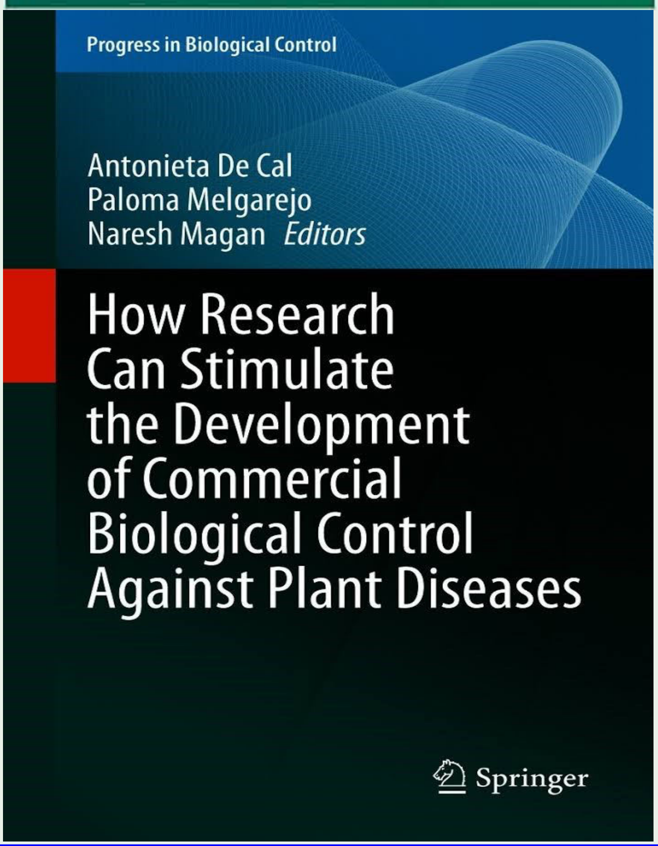
Nearctic Regional Section, IOBC-NRS: https://www.iobcnrs.org

Biological Control Books for your reference









Join IOBC

Membership in IOBC is open to all individuals and all organizations, public or private, who desire to promote the objectives of biological control. There are four categories of membership:

• Individual Membership is open to all individuals engaged or interested in biological control. Student members will receive discounted rates

• Institutional Membership is open to any institution, including government departments, academies of science, universities, institutes and societies participating in biocontrol activities.

• Supporting Membership is open to any person or institution interested in promoting the objectives of the Organization.

• Honorary Membership may be conferred by the Council to anyone who has made outstanding contributions to biological control.

There are many benefits to becoming a member of the IOBC-APRS:

- Free access to specific IOBC website information (agenda of biocontrol related meetings, IOBC internet book of Biological Control, IOBC Global and Regional Newsletters, etc.)
- Free access to IOBC Publications on website (e.g. WG Quality Control bulletins, proceedings of WGs)
- Free participation in IOBC Global Writing Partnership
- Free bulletins of IOBC workshops that you have attended in your Regional Section or of IOBC Global
- Lowest registration fee at IOBC meetings (non-members pay an extra fee)
- Reduced subscription fee for IOBC Journal of BioControl (25 % of normal price)
- Reduced subscription fee for Biocontrol, Science and Technology

Fill out the form:

Become a member now!

Biocontrol Training Courses in our region?

Worldwide education in biological control IOBC Global often receives questions about education and training possibilities for biological control. With the help of our Regional Sections and Working Groups, we are frequently able to help finding answers, but it is not always an easy and quick procedure.

Therefore, IOBC global ask you to provide information about education and training opportunities in your country. We will summarize this information and publish it on the Global website. Please present the information to secretary-general@iobc-global.org as follows:

- Name of course / training:
- Institute / organization providing this course:
- Course period and length of course in days:
- Costs of course:
- Entrance requirements:

For more information and application forms: http://www.iobc-global.org/membership.html

APRS news — did you pay your membership invoice?

Due to the time it took to transfer our funds from New Zealand to Korea, we did not issue 2023 invoices. However all members should now have received 2024 invoices from our Treasurer Ikju Park, and one reminder.

Members of APRS who do NOT pay within 3 months of first issued invoice, will from now on be classified as a "Corresponding Member". This will permit those members continued access to these e-Newletters from APRS and from IOBC global, but NO voting rights, no access to global funds for sponsorship of events, or training courses, and no membership certificates.

http://aprs.iobc.info/

http://www.iobc-global.org/rs_aprs.html

Job Opportunities

The IOBC-APRS Newsletter/Website offers the opportunity of drawing attention to biological control related job opportunities, internships, post-docs, studentships etc.

If you would like to advertise a job opportunity, please send the following details to the General Secretary, IOBC-APRS; Sahayaraj KItherian email: ksahayaraj58@gmail.com

:Title: Position, institution, city, country

- Short description
- Logo of the institution
- Application deadline

Your IOBC-APRS Executive Committee 2022-2026

President -Toni Withers: toni.withers@scionresearch.com

Immediate -Past President -Geoff Gurr: ggurr@csu.edu.au

Secretary General -Kitherian Sahayaraj: ksahayaraj58@gmail.com

Treasurer -Ikju Park: ikju.park@ucr.edu

Vice-President -Xue-xin Chen:xxchen@zju.edu.cn

Committee- Bill Palmer :palmerwa@bigpond.com

Mark McNeill :mark.mcneill@agresearch.co.nz

Ronny Groenteman :GroentemanR@landcaresearch.co.nz