



**IOBC-APRS
Newsletter No. 14
August 2023**



Message from your President

Dear Members,

I am delighted to write my first message as your local chapter President, after transitioning from my role as Secretary-General of our small Asia Pacific chapter of IOBC. So first to introduce myself to those of you I have not met yet. I am a New Zealand entomologist. I was trained in NZ in insect-plant interactions with a PhD on the behaviour of a serious Cecidomyiid pest of wheat (the Hessian fly). I then undertook a very interesting post-doc in Queensland, Australia, specialising in improving host specificity testing methods for weed biological control agents. There I studied some biocontrol agents of Ragweed and Parthenium, before returning to New Zealand and specialising in weed and insect pest management in forestry.

I live in Rotorua which is the base for the NZ forestry research institute (called Scion), and I run an insect containment facility where we undertake biological control research as well as research on pests of biosecurity importance.



Rotorua is a small city that is reasonably famous for its boiling mud pools and geysers, and a long history of tourism due to the geothermal wonders, including a near-by volcano. I live close to some beautiful native forest and have two teenage sons.

This year feels to me as it has been full of conferences and colleagues taking overseas holidays to visit relations. In terms of personal highlights, in the last summer I was finally able to release a new parasitoid (a Braconid called *Eadya daenerys*) against a Eucalyptus tree pest, the tortoise beetle. This has been a culmination of over ten years of research working closely with Dr Geoff Allen in Tasmania, Australia and funded by some NZ forestry companies and the NZ government.

2024 is approaching rapidly and some highlights for IOBC will be the International Congress of Entomology being held in Kyoto Japan, and the IOBC International Congress in Costa-Rica. Please read about the upcoming events later in the newsletter

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Profile of Honorary Member Rachel McFayden

IOBC- APRS currently has four honorary members: Dr Barbara Barratt, Dr Rachel McFadyen, Dr Muni Rangaswamy and Dr Ren Wang. In each newsletter we will introduce you to one of them, so you can learn about their life work, and why IOBC honoured them with life membership.



Dr Rachel (Cruttwell) McFadyen obtained her PhD in Agriculture in 1972, at the University of the West Indies in Trinidad & Tobago, on the insects feeding on *Chromolaena* (*Eupatorium*) *odoratum*, while employed at the CIBC West Indian Station. She then went to Tucuman, north-west Argentina, employed by CIBC to find insects for biological control of *Harrisia-amartinii* cactus for Queensland, Australia. In 1976, she moved to Brisbane, Queensland, working at the Queensland Government Biological Control unit, which she led from 1998. During these years, she was responsible for the testing, rearing, and field release of numerous insect and rust disease agents against harrisia cactus, parthenium weed, annual ragweed, rubbervine, chromolaena and fireweed. She was project leader for the successful ACIAR (Australian Council of International Agricultural Research) project from 1993 to 2003, introducing biocontrol agents against chromolaena in Indonesia, The Philippines, East Timor and Papua New Guinea. From 2003 to 2008, she was Director of the Cooperative Research Centre for Australian Weed Management, based in Adelaide.

Rachel took an active role in improving the biosecurity regulations controlling plant imports, and the development of food testing for weed biocontrol agents. She served on several advisory committees, was key-note speaker at national and international weed and biological control conferences, and President of IOBC SEARS from 1997 to 2001. In 2022, she was appointed Member of the Order of Australia (AM) for services to biosecurity and entomology.

Rachel has two "pet" weeds – chromolaena and parthenium. She worked on both from the start of her career, watched them spread throughout the tropical world, and oversaw the successful introduction of several biocontrol agents against these weeds.

Your IOBC-APRS Executive Committee 2022-2026

President

Dr Toni Withers, is a biological control scientist from New Zealand's Forestry Research Institute, Scion, in Rotorua.

Email: to-



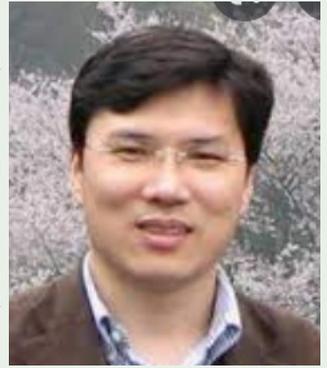
ni.withers@scionresearch.com

Vice-President

Dr Xue-xin Chen is Chang-Jiang Distinguished Professor of Entomology at Zhejiang University, Zijingang Campus, Hangzhou, China. He holds the role of APRS committee as Vice-President.

Email:

xxchen@zju.edu.cn



Treasurer

Assistant Professor Ikju Park is from South Korea, but moves to an Assistant Professor role at UC Riverside in September.

He is a sensory ecologist specialising on how insect herbivores exploit their host plants from non-host plants based on olfactory and visual cues in the complex environment.

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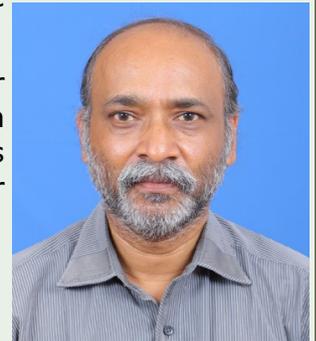
Secretary-General

Dr. Kitherian Sahayaraj, Associate Professor in Zoology, Manonmaniam Sundaranar University, in Tamil Nadu, India, has joined the executive in 2023.

We are most grateful for his enthusiasm to join us. His specializations are reduviid predator and Biopesticides.

Email:

ksahayaraj58@gmail.com



Immediate Past-President

Geoff Gurr is our immediate past president, leaving in Orange, NSW, Australia.

Email: ggurr@csu.edu.au



Committee

Ronny Groenteman represents IOBC APRS on the IOBC Global

Mark McNeill is a committee member

Both has many years working in IOBC and furthering the science of biological control both in this region and globally.



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:

Obituary of Cliff Moran

It is with great sadness that Prof. Cliff Moran passed away in September after an illness borne by his usual pragmatism. Cliff was a very decent human being. He entered Rhodes University in 1956 as an undergraduate student. He lectured at RU from 1963 to 1978, became Professor of Entomology in 1979, and then, from 1983 to 1985, Dean of the Science Faculty. In 1986, Prof Moran was appointed permanent full-time Dean of Science at the UCT, a post held until 1999. Cliff has been a strong applicant to the Chief of CSIRO Entomology for many years.

His contribution to the biological control of weeds is remembered. Prof. Martin Hill, Director of the CBC, said Prof. Cliff Moran, was one of the fathers of Weed Biological Control. Despite 50 years of commitment to research in his field, Moran humbly viewed himself primarily as an effective administrator, mentor, reviewer, editor, and a person who gets things done through collaboration, rather than as a top notch scientist. Prof. Cliff Moran's special interest in the biocontrol of invasive alien trees and weeds has helped to reduce the frequency and intensity of damaging wildfires and, most particularly, resulted in huge socio-economic benefits by improving the runoff of water from catchments into rivers to help preserve South Africa's meager water supplies." He was a Life Fellow at the University of Cape Town (UCT) (1991), British Council Scholarship at Silwood Park, Imperial College, London (1974), British Petroleum Scholarship, Visiting Professor in the Department of Zoology, University of Oxford, and Visiting Research Fellowship at Merton College, Oxford (1980 – 1981).

He is remembered fondly by IOBC-APRS members through his invaluable contributions to weed biological control in the Asia Pacific region particularly Australia.



Reduviid Predators: A fascinating insect for Biological control

Reduviid predators are the largest heteropterans worldwide. Reduviid predators are distributed across various ecosystems, including different types of agro-ecosystems, semi-arid zones, scrub jungles, and forests. They play a vital role in maintaining the prey predator population at equilibrium levels, regardless of whether they are present. Reduviid predators predate on young and adult forms of Isopetera, Hemiptera (Fig. 1), Orthoptera, Coleoptera, Plateria, and the larvae of Lepidoptera (Fig. 1). In general, larger reduviids prefer large pest insects, whereas small pests are easily predated by small predators. They show many unique behaviors, such as group feeding, camouflaging, feigning death, rolling, spitting, nodding behavior, stinging, and emitting pungent odors, which are some of the passive and active defensive attitudes and mechanisms among the Reduviids investigated. Reduviids are maintained in various agroecosystems under various climatic conditions because of their polyphagous nature and morphological features. It is easy to mass culture on a small and large scale, utilizing natural hosts, laboratory hosts, artificial diets with insects, and meat as the main ingredients. However, commercial reduviid predators are not produced in any industry. Moreover, artificial diets are available to rear reduviid predators. Field release trials demonstrate the importance of these predators. Many field studies have failed to distinguish between pests and reduviid predators because of their morphological similarities. Hence, reduviids can be easily eradicated from agro-ecosystems by using pesticides knowingly or unknowingly. Few world-wide very important reduviid biological control agents are *Pristhesancus plagipennis* (Australia), *Rhynocoris kumarii*, *Rhynocoris marginatus* (Fig. 1), *Rhynocoris fuscipes* (India), *Sphedanolestes impressicollis*, *Harpactor fuscipes* (China), *Rhynocoris marginatus* (Pakistan), *Onocephalus pilicornis*, *Reduvius pallipes* (Egypt), *Rhynocoris iracundus*, *Zelus renardii* (Italy). Hence, it is necessary to teach and provide training to extension and field workers about reduviid predators. Moreover, only a small number of people worked with these fantastic predators. Young entomologists also require training in reduviid predators to popularize the student community, research scholars, and faculty.

(Contact: Sahayaraj, Kitherian-ksahayaraj58@gmail.com)

Fig.1. *Rhynocoris marginatus* feeding on lepidopteron larvae and cotton mealybug



Timor Leste scientists visit Queensland to learn how to combat mistflower

Mr Latizio Beni Da Costa Cruz and Ms Anita Salsinha De Jesus, both from the Ministry of Agriculture and Fisheries visited the Queensland Department of Agriculture and Fisheries' Ecosciences Precinct to learn from local scientists on mistflower (*Ageratina riparia*) biological control.

Ageratina riparia (Regel) R.M.King & H.Rob. (Asteraceae) or mistflower is a highly invasive weed native to Mexico. It is now found in Africa, Asia Australia, Europe and the USA, affecting pastures and riparian areas. In Timor Leste, it is found in the high altitude areas, affecting pastures (Fig. 1). Apart from outcompeting preferred grass species, mistflower is highly toxic and cattle that eat it, suffer liver damage and die.



Figure 1. Mistflower infesting grazing areas in Timor Leste **Figure 2.** Galls formed by *Procecidochares alani* on mistflower

Conventional control, using herbicides is beyond the means of farmers and the plant is too widespread to remove by physical means. Mistflower has been the target of weed biological control since the 1960s when research first began in Hawai'i. Since then, four biological control agents have been deliberately released in four countries, USA (Hawai'i), Australia, New Zealand and South Africa. Two agents, a stem-galling fly *Procecidochares alani* Steyskal (Diptera: Tephritidae) and a smut pathogen *Entyloma ageratinae* Barreto & Evans (Entylomatales) have established in all countries in which they have been released. Both biological control agents cause medium to high levels of impact on mistflower.

As part of an Australian Department of Foreign Affairs and Trade-funded project managed and supported by the Crawford Fund, the feasibility of importing both the gall fly and the smut into Timor Leste to help manage mistflower was investigated. Two scientists from the Timor Leste Ministry of Agriculture and Fisheries visited Queensland to work with local scientists. During the visit, the scientists inspected facilities at the Ecosciences Precinct and discussed requirements for how to rear and field-release both biological control agents. They also inspected mistflower and its biological control agents in the field around Brisbane (Figs. 2 & 3), as well as other weeds of interest to Timor Leste (Fig. 4). As a result of the visit, work is now underway to import both biological control agents into Timor Leste. This will involve preparing import risk assessments and upgrading rearing facilities to facilitate field releases, and the teams are investigating funding options to support further work in the biocontrol of mistflower.

Figure 3. Latizio Beni Da Costa Cruz inspecting mistflower for the gall fly and the smut in the field near Brisbane.



Figure 4. Jason Callander, QDAF, Latizio Beni Da Costa Cruz and Michael Day, inspecting lantana for biological control agents, near Brisbane. 6

Recording and determining *Opuntia* cactus species in New Caledonia

Invasive *Opuntia* species have long been a problem in New Caledonia, where there are no native species of this genus or for the entire family Cactaceae. In 1932, the moth *Cactoblastis cactorum* was introduced to control *Opuntia stricta*. The moth had previously been introduced into Australia where it was proven to be very effective at controlling the plant. The cochineal *Dactylopius opuntiae* (supposedly "ficus-indica" or "Mexican" lineage) was also introduced from Australia in 1957 to control several *Opuntia* species. Both agents initially provided good control on the species on which they established. In 2003 and 2007, the mealybug *Hypogeococcus pungens* was introduced to control *Acanthocereus tetragonus* but failed to establish on each occasion.

As part of a specific project named "OSAPIK", New Caledonian Biodiversity Agency (NCBA) experts on Invasive Alien Species started to reference and map all known populations of *Opuntia* on mainland and peripheral islands. In March 2023, they approached researchers in the Queensland Department of Agriculture and Fisheries (QDAF) to help identify some of the *Opuntia* species present in New Caledonia. They had noticed that the biological control agents present in the country did not damage all *Opuntia* populations found and had the view to eventually import the appropriate biological control agents for each *Opuntia* species present.

Initially, photos of cactus plants in several populations found in New Caledonia were sent to QDAF and most populations were able to be confirmed, with the two most common species being *O. Monacantha* and *O. ficus-indica*. There also appeared to be populations of *O. stricta*. However, there were some doubts of the species of various populations. To add to the doubts, the cochineal *D. opuntiae* previously introduced into New Caledonia, did not appear to be exerting much impact on some populations of its preferred host *O. ficus-indica*, which raised the question as to the true identity of the *D. opuntiae* lineage and/or the true identity of some of the *Opuntia* populations thought to be *O. ficus-indica*.



Figure 1. Sites in New Caledonia where *Opuntia* species have been recorded (NCBA).

After a major prospecting effort and a call for contribution to partners of the NCBA and the general public in New Caledonia, 153 *Opuntia* populations have been recorded and five species pre-identified morphologically (*O. monacantha*, *O. ficus-indica*, *O. stricta*, *O. dillenii* and *O. cochenillifera*). To help clarify the identity of some *Opuntia* populations and the cochineal already present in New Caledonia, samples of plant tissue and cochineal have been collected and sent to QDAF for genetic analyses. Once the species present have been identified, the correct or most suitable biological control agents could be introduced into New Caledonia.

In addition, depending on the final species identification, there will be a need to import *D. opuntiae* "stricta" lineage to control *O. stricta* and *D. ceylonicus* to control *O. monacantha*, as both cochineals have not yet been introduced into New Caledonia. Cactus species are a major problem in numerous countries including Australia, South Africa, India, and Sri Lanka, with over 30 species targeted for biological control. Some of the biological control agents introduced, especially the cochineal, are quite specific, attacking only one or two cactus species. The *Opuntia* cactus situation in New Caledonia highlights the importance of knowing the weed species present so that the most appropriate biological control agent can be introduced.



Figure 2. Infestation of *Opuntia* sp. in New Caledonia. ©Northern province



Figure 3. Populations of *Opuntia* species, in which the species is not confirmed. © NCBA and Michael Le Corre - IRD

Weed Biocontrol in the Cook Islands Shows the Way for Others

New Zealand research organisation Manaaki Whenua – Landcare Research (MWLR) is assisting eight developing countries in the Pacific to develop biocontrol programmes for their most problematic invasive weeds. Their longest running programme, which has been underway now for nearly a decade, is based in the Cook Islands. MWLR staff recently visited the main island of Rarotonga to gauge progress, and to explore the use of remote sensing technology to monitor weed populations and the impacts of biocontrol control agents.

Baseline data about the extent of weed populations at the outset of biocontrol projects is often poor at best, making it both difficult to make the case for action and to demonstrate the impact of biocontrol overtime. MWLR is trialling the use of satellite imagery (50 cm resolution), imagery from an airplane (10 cm resolution) and drone close-up imagery (less than 4 cm resolution) to see what approach might be most cost-effective, practical for future usage. As well using RGB (visible) photography, the team also collected multi/hyperspectral imagery (to capture light reflected that can't be seen by the naked eye) and LiDAR. It is likely that a combination of these methods will be used to produce weed distribution maps.

One of the weeds under study is the African tulip tree (*Spathodeacampanulata*), considered one of the 100 worst alien invasive species in the world, and a widespread issue throughout much of the Pacific Region. Two natural enemies have been released on Rarotonga. A gall-forming mite (*Colomeruspathodeae*) which stunts the new growth was released in 2016, quickly becoming well established and widespread. Galled leaves are easy to see, even when high up in tall trees. However, establishment of a leaf-mining fleabeetle (*Paradiboliacoerulea*) released in 2021 has been harder to determine. Beetle damage is quite subtle at low population levels, and difficult to spot up in the canopy, where it is suspected the beetles may be most active. So, the team used a drone to take images of the canopy and a special claw attachment to sample foliage, to look for signs of the beetles. The latest surveys indicated that establishment is looking likely, and it is hoped the beetle population will build up to damaging levels over the next few years.

The most impressive biocontrol agent released in the Cook Islands to date is the balloon vine rust fungus (*Puccinia arechavaletae*) which now has its host, grand balloon vine (*Cardiospermum grandiflorum*), well under control. The balloon vine rust fungus was released on Rarotonga in 2017, and within six months a 90% decrease in balloon vine cover was achieved at some sites. Within two years, the total percentage cover of the vine at the 20 release sites declined from over 75% cover to under 30%.

As part of best practice, MWLR, regularly undertake field surveys to check for any unanticipated non-target damage from weed biocontrol agents. On the most recent trip they surveyed the two closest plant relatives to balloon vine in Rarotonga, *Dodonaeaviscosa* and *Allophyllostimoriensis*, and were able to confirm a clean bill of health with no sign of any non-target attack as predicted by host-range testing prior to release.

Progress is also being made against two other vines. A rust fungus (*Puccinia spegazzini*) is reducing the abundance of mile-a-minute (*Mikania micrantha*) at inland sites although it appears to be much less effective in the coastal lowlands. Also, the red postman (*Heliconiuserato*) butterfly which was released to control red passionfruit (*Passiflora rubra*) is now a common sight in Rarotonga.

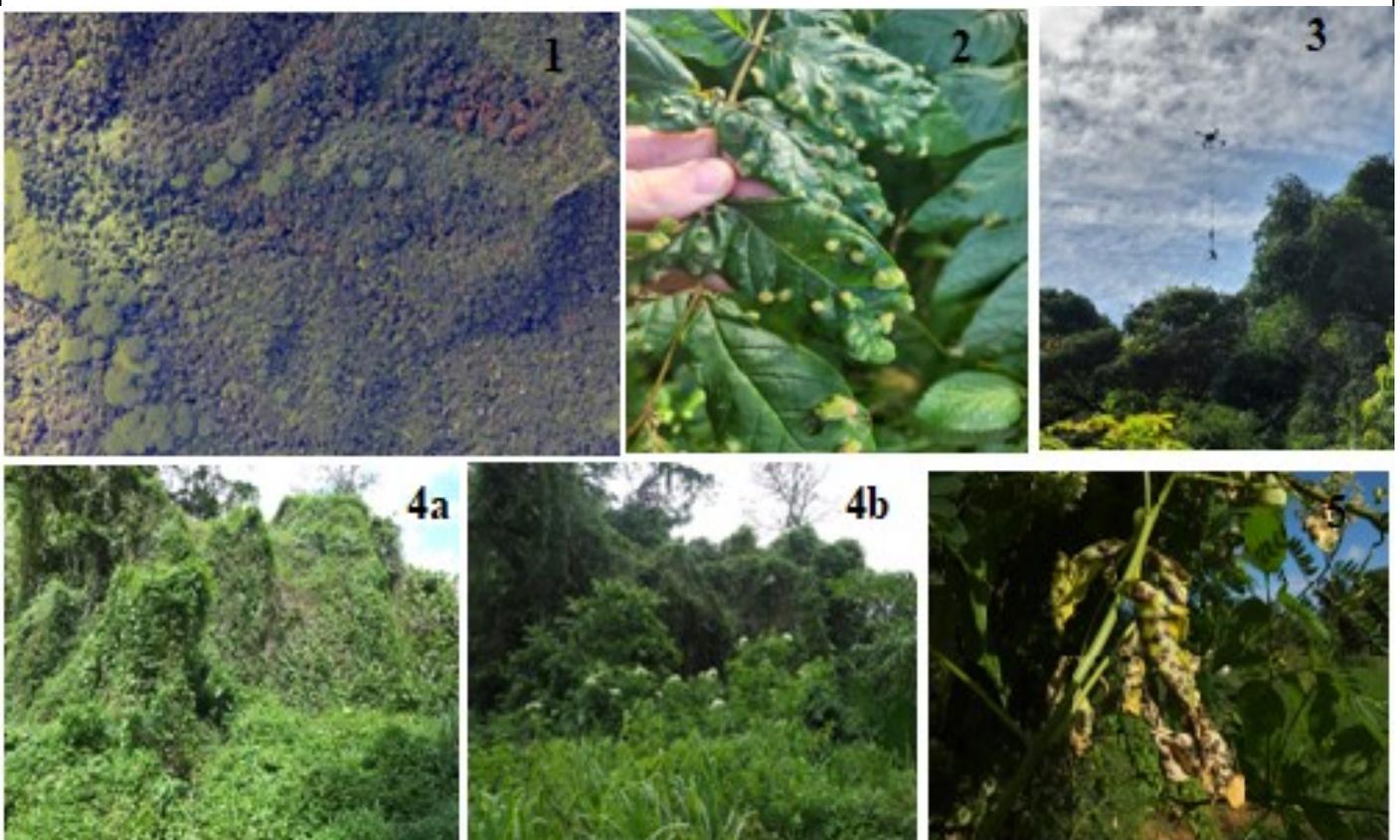
This attractive butterfly is the subject of an evolutionary study being led by Assistant Professor Gabriela Montejo-Kovacevich who was formerly based at the University of Cambridge but has recently begun work at the University of Uppsala in Sweden. This study is investigating potential changes due to different evolutionary pressures in Rarotonga, where, for example, the butterfly has fewer natural enemies than in its native range in South America.

Two further biocontrol agents have been released in Rarotonga. Populations of a scale insect (*Tectococcusovatus*) are slowly building up on strawberry guava, while another rust fungus (*Puccinia xanthii*) is impacting on cocklebur (*Xanthium pungens*). A strong foundation has been built now in the Cook Islands from which future benefits will be reaped, from which lessons learnt can be used to help other Pacific Island nations, and which will continue to be built upon as new biocontrol agents, currently in development, become available.

This project is part of the Managing Invasive Species for Climate Change Adaptation in the Pacific (MISCCAP) Programme, which is funded by New Zealand's Ministry of Foreign Affairs and Trade. This project would not have been possible without considerable international collaboration and assistance from: Cook Islands Ministry of Agriculture, Cook Islands National Environment Service, Droneworks Consultancy, Rhodes University, Te Ipukurea Society, University of the South Pacific, University of Viçosa, United States Department of Agriculture, and the United States Forest Service.

Contact: Lynley Hayes (haysel@landcaresearch.co.nz), Programme Leader: Pacific Natural Enemies – Natural Solutions.

Pictures



1. Aerial view of African tulip trees with distinctive orange flowers
2. African tulip gall mite
3. Drone with claw
4. Turangi Valley before (a) and after (b) biocontrol agents released
5. Balloon vine rust

Members recent papers in the IOBC journal

The new Impact Factor (IF) for BioControl for 2022 has been released recently. We got 2.5. This is definitely a good score. Our journal remains in the 1st quarter of the category of Entomology

Volume 68, issue 3, June 2023

Special Issue on Access and Benefit Sharing and Biological Control Genetic Resources

Issue editors

Peter G. Mason & Barbara I. P. Barratt

11 articles in this issue



Do silvopastoral management practices affect biological pest control in oil palm plantations?

Frisko Nobilly, Sharifah Nur Atikah, Muhammad Syafiq Yahya, Shokri Jusoh, Thomas M. R. Maxwell, Ahmad Razi Norhisham, Kamil Azmi Tohiran, Raja Zulkifli & Badrul Azhar [✉](#)

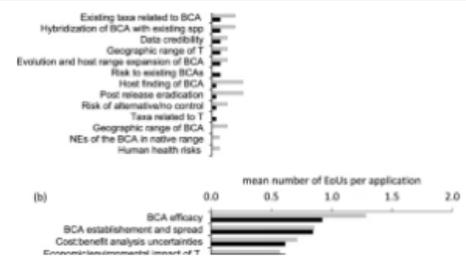
BioControl 68, 411–424 (2023) | [Cite this article](#)

[Characterising uncertainty in risk assessments for biological control: using case studies from New Zealand to inform future research](#)

B. I. P. Barratt, E. D. Meenken & T. M. Withers

OriginalPaper | [Open Access](#) | Published: 04 February 2023

Pages: 101 - 115

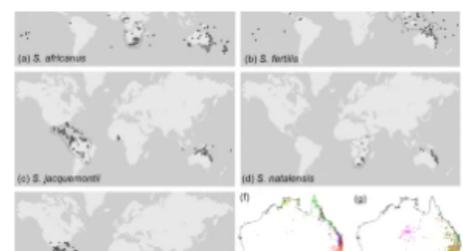


[Biocontrol of weedy *Sporobolus* grasses in Australia using fungal pathogens](#)

T. V. Steinrucken & J. S. Vitelli

Review | [Open Access](#) | Published: 29 March 2023

Pages: 341 - 361



[The establishment and spread of *Tamarixia triozae*, a parasitoid of the potato psyllid, in New Zealand](#)

Melanie Davidson, Thalia Sachtleben ... Melanie Walker

OriginalPaper | [Open Access](#) | Published: 13 March 2023

Pages: 363 - 373



For these articles and more, go to: <https://www.springer.com/journal/10526>

ICBC3—International Congress of Biological Control — seeking scientific session proposals



IOBC OILB



Third International Congress of Biological Control (ICBC3), 24-27 June 2024, in San José, Costa Rica.

During this congress, IOBC-Global will also organize a General Assembly with a lot of news and present the results of the election of the new Executive Committee

www.IOBC-ICBC.com
email: info@IOBC-ICBC.com

IOBC are preparing for the **Third International Congress of Biological Control (ICBC3)** in San José, Costa Rica, from Monday 24th June to Thursday 27th of June 2024. We are soliciting ideas for scientific session subjects and panel discussion topics and volunteers to organize sessions and panels and to recruit speakers/panellists. ICBC3 will provide the ideal platform for multi and inter-disciplinary biological control research and application. Therefore, this congress is unique in serving as a meeting point for scientists and practitioners from universities, research institutes, governmental, non-governmental and private-sector organizations who are working on a wide breadth of biological control targets including insect pests, plant and animal diseases, weeds and invasive vertebrates whether they use importation, augmentation or conservation as approaches and whether they are interested in basic science related to biological control or in improving its application. Session subjects and panel discussion topics should be conceptual, and the speakers/panellists should stimulate ideas by presenting new information.

We hope that some APRS members will contribute ideas for scientific session subject and/or panel discussion topic and actively participating as a volunteer to organize such a session/panel.

Please submit your scientific session subject / panel discussion topic online to https://www.iobc-icbc.com/index.php?cat=call_sessions following the information IOBC Global Newsletter Issue 113 – August 2023 5 requirements, by **End of October 2023** so that the proposals for scientific sessions/ panels and organizers can be shared with the members of the Scientific Steering Committee and the best ones selected.

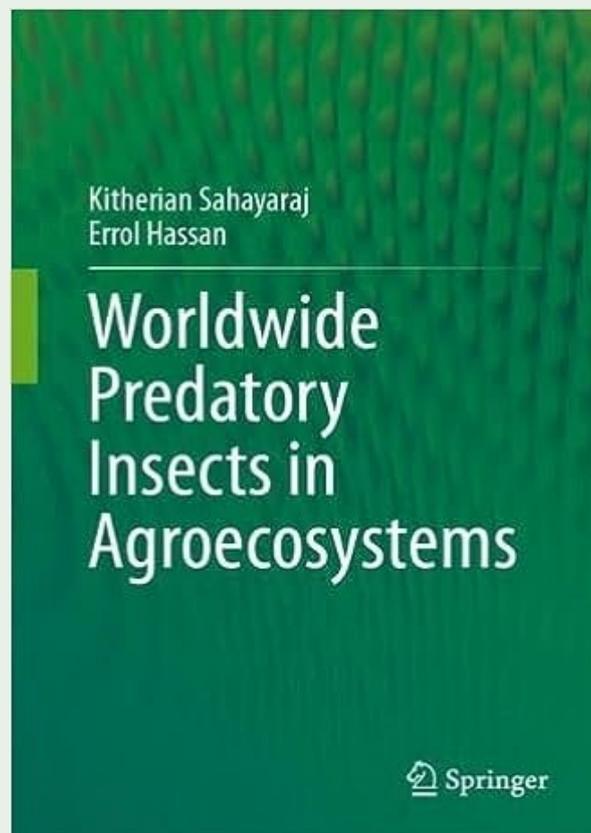
Worldwide Predatory Insects in Agroecosystems

by **Kitherian Sahayaraj** (Author), **Errol Hassan** (Author)

ISBN-10 9819909996 , ISBN-13 978-9819909995

Price Hardcover: \$199.99

This book brings out the world record of various predatory insects and their role in pestiferous insect management in a safer manner. The main focus of the book is to address the ecological and environmentally safe methods of managing pests of various crops. The utilization of various types of chemical pesticides for our crop protection and food production leads to environmental concerns and health hazards to plants and animals. This book mainly focuses on the distribution and diversity of various predatory insects in different crops. It also sellout the bi-nomics, biological control potential at a laboratory, controlled fields and natural conditions. Moreover, mass production technology and environmental safety aspects are also highlighted in various chapters. This book is of interest and useful to undergraduates, post-graduates, research scholars and doctoral candidates, extension workers, and agricultural professionals, and also a valuable source of reference to the relevant researchers and students in the region.



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 2022 invoices. However all members should now have received 2023 invoices 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



Newsletters of possible interest to members:

Chinese Academy of Agricultural Sciences—IPP - Newsletter

<https://ipp.caas.cn/en/newsletter/201701/no4201702/index.htm>

Australian Entomological Society - <https://entomology.edu.au/news>

What's News in Biocontrol of Weeds—from Landcare Research, New Zealand— <https://www.landcareresearch.co.nz/publications/weed-biocontrol/>

Forest health news—from Scion, New Zealand—<https://www.scionresearch.com/services/science-publications/forest-health-news>

Invasive invertebrates from Landcare Research, New Zealand

<https://www.landcareresearch.co.nz/discover-our-research/biosecurity/invasive-invertebrates/>

CSIROscope—Weeds, fungi, weevils and biosecurity— from CSIRO Australia—<https://blog.csiro.au/weeds-fungi-weevils-and-biosecurity/>

Plant Protection news and articles from Directorate of Plant Protection Quarantine & Storage, Haryana , India—<https://ppqs.gov.in/newsletters/>

Plant Protection News from Chinese Academy of Agricultural Sciences (CAAS), Beijing, China-<https://ipp.caas.cn/en/newsletter/>



The JIRCAS **Mango Genetic Resources Site** has been open to the public since 2017, providing information on mango genetic resources to researchers, producers, and consumers in **Japan**. In response to recent many visits and inquiries from overseas, we have reorganized the information and launched an English version of the site with content specifically for overseas users.

<https://www.jircas.go.jp/en/database/mango/mango-top>

International Congress of Entomology in Japan—2024



Dates : August
25_[sun] - 30_[fri], 2024

Venue : **Kyoto, Japan**
[Kyoto International Conference Center]

XXVII International Congress of Entomology

The ICE2024 Kyoto Congress will be held at the Kyoto International Conference Centre and the organizing committee is now fully engaged under the theme 'New Discoveries through Consilience'. The 16th Congress in Kyoto in 1980 was the first to be held in Asia, so the congress returns to Japan after 44 years.

<https://ice2024.org/>

Deadline for Early Bird Registration is **December 15, 2023**

Registration Fee

	Early Bird
General	JPY 74,100
Student	JPY 37,700
Developing country *	JPY 37,700
Accompanying guest	JPY 31,200

※All payment must be made in Japanese yen.

※The category "Student" is for students at the time of registration.

Article Invitation for IOBC-ARAS Newsletter

Dear IOBC-ARAS Member

You are cordially invited to contribute an article (maximum of 250 words with one or two high-quality photos) on biological control of general interest to the next newsletter. The best three or four articles will be considered for publication.