International Organisation for Biological Control (IOBC)
Organisation Internationale de Lutte Biologique (OILB)

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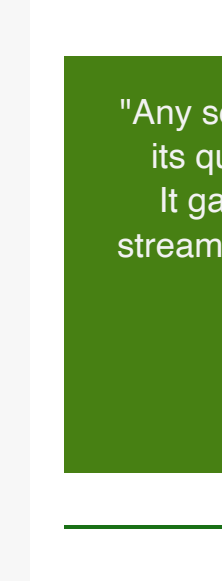
Have your say! The Executive Committee of IOBC-Global will hold its annual meeting in September 2019. If you would like us to include any items on the agenda, do let us know.

For newsletter contributions, ideas, comments, email secretary-general@iobc-global.org

> "Any science can be likened to a river. It has its obscure and unpretentious beginning; its quiet stretches as well as its rapids; its periods of drought as well as of fullness. It gathers momentum with the work of many investigators and as it is fed by other streams of thought; it is deepened and broadened by the concepts and generalizations that are gradually evolved.
> **So it is with the science of biological control**."
>
> Rachel Carson in Silent Spring (1962)



President's Column

Biological control as a conservation science

I would like to use this column to highlight the ways in which biological control can be seen as a conservation science. I think that we all understand that biological control furthers conservation goals but our discipline seems to have developed separately from the science of conservation biology. Thus I think that there is a good reason to think explicitly and carefully about how biological control can contribute to conservation.

I should be clear that when I say conservation I am talking about the conservation of native biodiversity. I think we are all aware that we are living through a biodiversity crisis that is worsening by the day. There are many reminders of this, and the recent UN report on the topic is perhaps the strongest. Among other things, this report suggests that we need to increase our efforts to limit the loss of biodiversity globally. As biological control scientists we are all in a great position to help, and my purpose here is to make clear how biological control is achieving conservation goals.

Biodiversity loss is driven by four main causes – habitat loss, climate change, invasive species and pesticide use. Biological control can help to alleviate all of these causes of biodiversity loss and I will try here to explain how and give some examples.

1. First, biological control can protect biodiversity by controlling invasive species

The importation of effective biological control agents can control invasive species in natural areas and thus protect native species from the negative effects of invasive species. While biological control introductions have traditionally been used mainly against agricultural pests, there is an increasing trend to target invasive species in natural areas. To date, at least 70 species of weeds, insects or vertebrates that are invasive in natural areas have been targeted using biological control introductions. And the good news is that a high rate of these projects have been successful: **90% of the introductions have benefited native biodiversity in terms of either species richness or abundance.** And since most of these projects have been done within the last few decades, they have been conducted using modern risk assessment protocols. This means that these benefits to biodiversity were achieved while incurring minimal ecological risks.

I would like to give a sampling of just two of these projects; these and similar cases are featured in the recent book 'Integrating Biological Control Into Conservation Practice', edited by van Driesche et al. for Wiley Blackwell.

- First, control of Melaleuca trees in the Everglades Ecosystem of Florida, USA. The melaleuca tree is native to Australia and has invaded the everglades, where it is transforming diverse wetlands into monospecific stands of these trees that crowd out all native vegetation and wildlife. The biological control project has involved introducing two specialized insects to control Melaleuca and it is protecting the entire Everglades ecosystem, including many native plant and animal species from the smothering effects of this tree.

- Second, control of cottony cushion scale in the Galapagos Islands. This is the same Australian cottony cushion scale that has threatened citrus worldwide and was controlled by the famous coccinellid beetle Rodolia cardinalis (the vedalia beetle). This same beetle was introduced into Galapagos to control the cottony cushion scale, which was threatening native and endemic plant species with extinction. The project was a great success and thus likely saved some native and endemic plant species from local and global extinction.

As I noted above this is just a sampling that shows the kind of impressive conservation outcomes that can be achieved by biological control.

2. The second way that biological control can support native biodiversity is by limiting the use of pesticides

Decreasing pesticide use has been perhaps the most important goal of biological control since the publication of Silent Spring by Rachel Cason in 1962. In the 50+ years since Silent Spring this message is still very relevant. **Pesticides are still a serious threat to native biodiversity and biological control is still an important way to reduce their use.** I am sure that everyone reading this has their own stories to tell about this but I would like to just briefly mention a project that I have been involved with where we are trying to link biological control with reduced pesticide use and conservation of native biodiversity. The project involves biological control of the soybean aphid in North America. Early studies established an economic threshold of 250 aphids per plant as a level above which farmers were advised to apply insecticides. We did experiments to see to what extent predatory insects kept aphids below this threshold and this led to an estimation that biological control was keeping aphids below threshold levels in 80% of fields! For our next step, we are estimating the effects of these reductions on particular aspects of native biodiversity. In particular we are focusing on some native prairie butterflies – the Dakota Skipper and the Powieshiek Skipperling. These two butterflies specialize on prairie grasses and persist in prairie habitat that is adjacent to where soybeans are grown. They used to be common in our area but their populations started to decline at the same time that spraying for soybean aphid started in the year 2001 and now they are near extinction. The best hypothesis to explain this decline is drift intro prairie fragments from insecticide applications against the soybean aphid. So – even though resident predatory insects limited spraying against soybean aphids over these years, there was enough spraying to have strong effects on populations of these native butterflies. However, we have a new biological control agent in the system now – the Asian parasitoid *Aphelinus certus* that became introduced accidentally and was first found in our area in 2011. Our experiments show that this parasitoid can cause substantial soybean aphid mortality to the point of significantly slowing population growth. We are currently using a matrix modeling approach to estimate whether this parasitoid will decrease insecticide application enough to save these butterflies from extinction.

3. Third, biological control can protect biodiversity by limiting climate change

It is by now well known that global warming is a threat to native biodiversity and also that human-induced greenhouse gas emissions are an important driver of global climate change. Thus – any practices that can substantially decrease greenhouse gas emissions have the potential to slow global climate change and thus to protect native biodiversity in the long run. Biological control can help us to achieve this goal in a few ways, and one is by reducing the need to manufacture and transport and apply pesticides.

I would like to go back to the soybean aphid example that I introduced previously to illustrate this idea. Using the same calculations that I outlined previously **we estimated that biological control has led to a reduction in greenhouse gas emissions of 200 million kg of CO_2 equivalents/year in the United States**. This is based on reductions in the greenhouse gas emissions associated with the manufacture, transport and application of insecticides that would have been applied against the soybean aphid had predatory insects not slowed aphid population growth. Just to put that into perspective, this amount is **equivalent to taking about 60,000 cars off the road for an entire year**. Of course this is just one small example – but it shows how important biological control can be in reducing greenhouse gas emissions. I'm sure many of you could do similar calculations associated with your own work to show similar benefits.

4. Lastly, biological control can protect biodiversity by reducing habitat loss

Habitat loss is acknowledged as the biggest threat to biodiversity. But how can biological control reduce habitat loss?

There are two answers to this question. The first is that **biological control can leverage sustainable land-use practices that conserve habitat.** We all know that habitat conservation produces benefits for biodiversity and for human societies. But practices that protect habitat do not necessarily provide short-term profits for farmers or other landowners. If farmers see a benefit to conserving native habitat they will be more likely to do it than if the benefits are diffuse and accrue to the environment or society in general. In other words, **if it can be shown that habitat conservation or improvement can lead to substantially improved pest or weed management, farmers will be more willing to do it.**

Another way that **biological control can reduce habitat loss is by making agriculture more efficient.** There's a great recent example of this principle involving invasion of the cassava mealybug in southeast Asia over the last few decades. A study that was published this year in Nature Communications Biology by Wyckhuys et al. showed that the yield loss caused by this pest led to an expansion of land used to grow to cassava and that this expansion came at the loss of native forests. Fortunately, cassava mealybug has recently been controlled by the introduction of a parasitoid wasp in the region. **This release restored cassava yields and slowed deforestation by 30 – 90%**.

These cases and many others show how biological control is an important conservation science and that it has already done wonderful and important work in preserving native biodiversity. There is also no reason why biological control should not expand greatly to provide even more such services in the future. The reason is that the field has seen huge improvements in risk assessment supporting biological control introductions and in commercial mass production of biological control agents over the last 20 years or so (among other developments). What this means is that **there is really no excuse for biological control not to become an increasingly larger component of the conservation sciences.**

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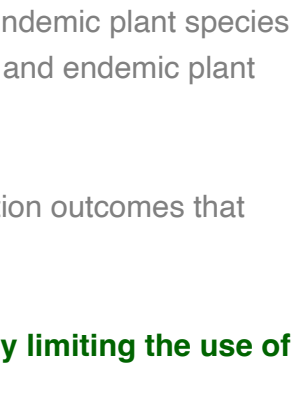

Obituary
Frank Wijnands

By Carlo Malavolta and Baerbel Gerowitt

Our highly regarded and very passionate IOBC colleague Frank Wijnands passed away suddenly in a hospital in Nairobi during the night between Thursday 21 March and Friday 22 March 2019.
We are devastated and deeply saddened by the news.

Frank was hard to miss in a crowd. Frank had a long track record in applied research as a systems researcher, both nationally and internationally. In the 1980s, he was engaged in the Epipré programme, whereby farmers were able to finetune the spraying of wheat by using field observations and weather circumstances.

After that, under the guidance of Pieter Vereijken, among others, he occupied himself with business systems research at the OBS in Nagele. It was here that he established his name and reputation as an inspirational, skilled, engaged, and enthusiastic systems researcher. He had the ability to develop a vision and to realise it by connecting the various skills, knowledge, and stakeholders. He was involved in launching and directing several large programmes on the development of the agriculture of the future in the area of conventional and organic. *Telen met Toekomst, Akkerbouw 2000, BIOM* and *VEGINECO* are important examples of these.

For his efforts, he was honoured with the KNPV award in 2005, as someone who provided inspiration and managed to bring cohesion to crop protection and cultivation systems, and who managed to connect fundamental research and practice. Over the last few years, he took his expertise and applied it to international projects.

Furthermore, he was selected in 2005 to participate in the "Commission on Guidelines for Integrated Production" of the International Organization for Biological and Integrated Control (IOBC-WPRS). He has acted as its Chairman since 2014 with great enthusiasm and dynamism. In both these roles he edited the last versions of the IOBC Integrated production Objectives and General principles and of several IP Crop specific Guidelines.

We at IOBC owe Frank a lot of gratitude, for all the work he has done for us and for his contribution to this general sector. He has made an indelible mark on the development of both biological and integrated agriculture in the Netherlands and all over Europe, as well as on all of us at IOBC.

Frank will always be part of us.

Frank's Legacy

In 2018 Frank, together with others, re-worked the entire IP & IPM section of IOBC-WPRS website. Part of this project was furthermore the huge work of updating the Integrated Production Crop Specific Guidelines, which is now available for download, open to public.

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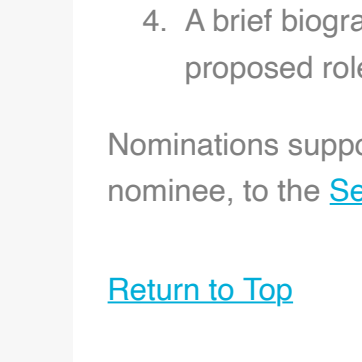

Call for Nominations

Elections for the next
IOBC-Global Executive Committee
will be held prior to the next General Assembly (July 2020).

Nominations are now sought for the positions of President, Vice President (two), Treasurer and Secretary General.

Nominations should include:

1. Name and affiliation of the person being nominated
2. Role the person is being nominated for
3. Name of the person nominating (self-nomination accepted)
4. A brief biography of the nominee and statement describing why the nominee qualifies for the proposed role

Nominations supported by at least 10 regular members may be sent, with the written consent of the nominee, to the Secretary-General no later than **15th February 2020**.

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Website update

IOBC-Global.org: Recent Improvements in Website Security and Privacy Settings

Dr Madeleine Bühler, e-maintenance, Switzerland

You may have noticed the small notification at the top of the website when it's loaded in your browser first time: "This website uses cookies to ensure you get the best experience on our website." This is just one of the actions we recently implemented in order to comply with General Data Protection Regulation (GDPR) in the EU. A website visitor must be informed in advance if the website stores cookies – and the user must actively consent.

The General Data Protection Regulation (GDPR) is a European Union regulation that harmonizes the rules for the processing of personal data by private companies and public bodies throughout the EU.

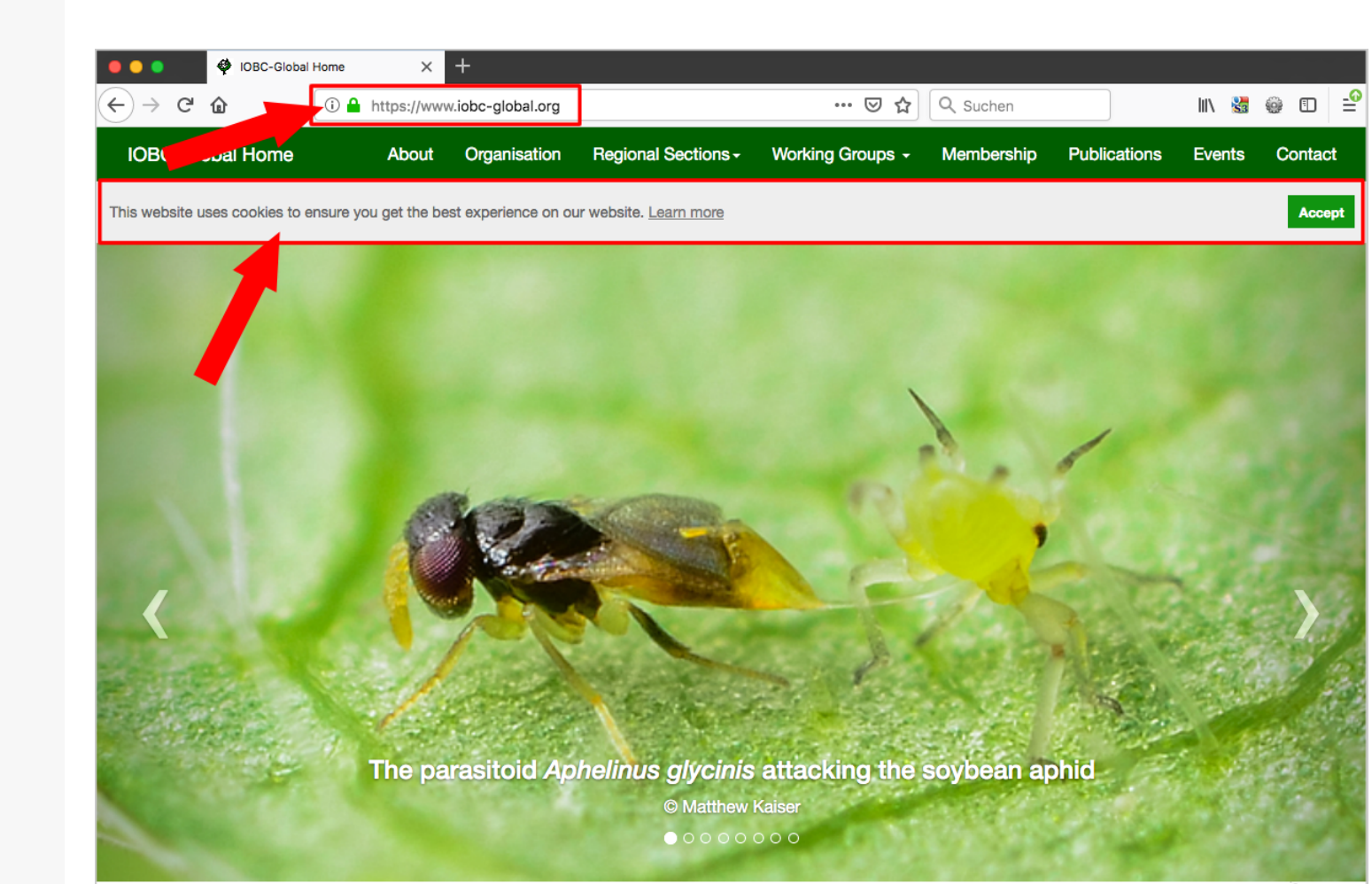
Who is affected?
Numerous companies outside the EU are directly affected by the regulation, e.g. all companies that offer goods, services or information to EU citizens on their websites. Although IOBC-Global is a non-profit organization that only provides information (and "sells" memberships through its Regional Sections) and EU citizens are only part of the target group, the regulation also applies to IOBC-Global, albeit not at the highest risk.

Who is responsible?
The owner, i.e. the company, organization or person to whom the website belongs, is always responsible for the website. Regardless of who manages the website or where it is hosted. The website owner is responsible for compliance with the law and data protection.

Consequences of non-compliance with the GDPR
The GDPR – like all governmental acts that regulate business – is a serious matter and shouldn't be ignored. Fines of up to 20 million Euros or 4% of the worldwide annual global turnover are mentioned.

What actions did we take?
Following a risk analysis we discovered several necessary actions, which we prioritized and implemented in recent weeks. The most important actions were:

- Created legal notice & privacy policy
- Implemented cookie warnings on every web page
- Moved the website to a hosting server which provides SSL certificates. The website is now reachable by HTTPS secure internet connection.



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The parasitoid *Aphelinus glycinis* attacking the soybean aphid
© Matthew Kaiser

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Security actions and privacy settings implemented on the IOBC-Global website: HTTPS secure internet connection (top arrow), cookie warning (bottom arrow). Further down, in the footer of the pages: Links to the new legal notice and privacy policy.

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Announcing the 2nd International Congress of Biological Control, Davos 2021

We are happy to announce the **Second International Congress of Biological Control (ICBC2)**, which will be held in **Davos Switzerland April 26 – 30, 2021**. So please **save these dates**!

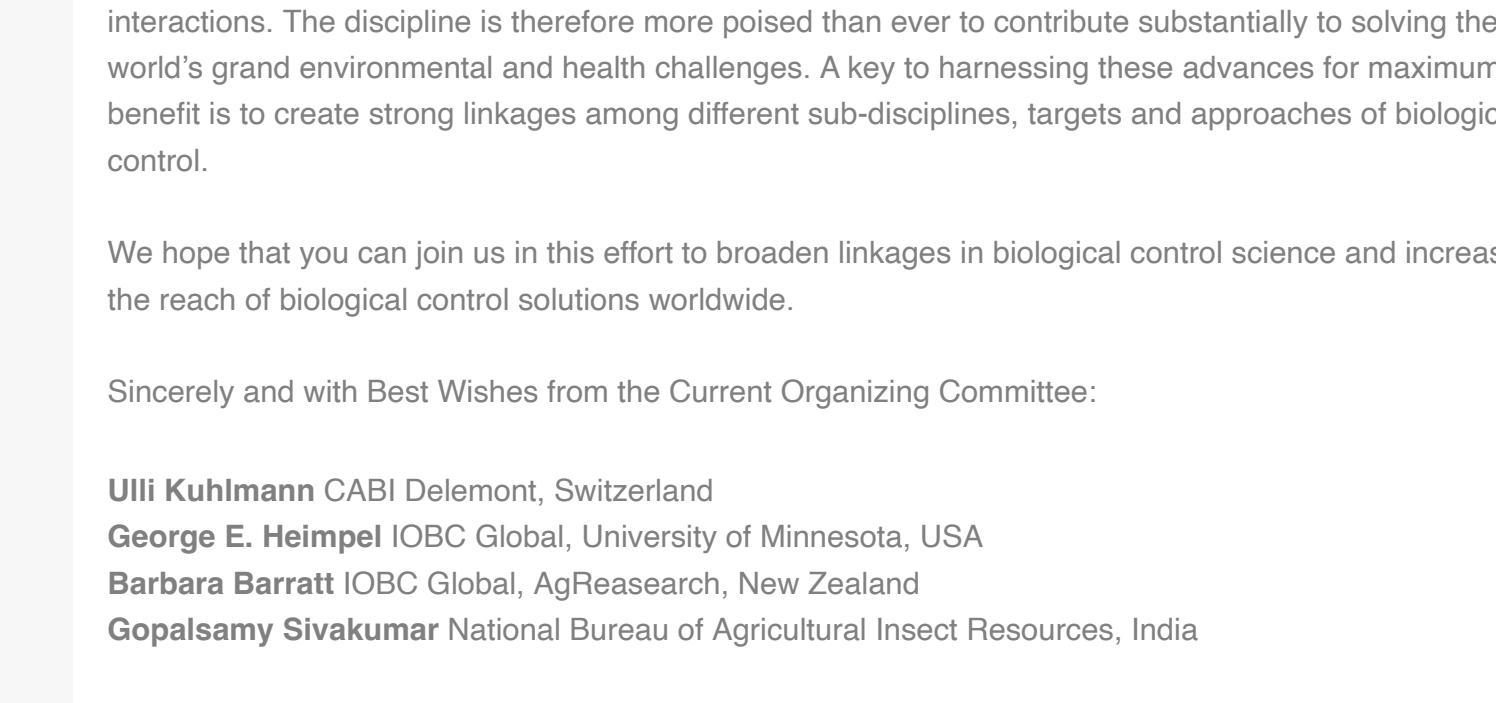
This congress builds upon the first International Congress on Biological Control (held in Beijing in 2018), and the First International Conference of Biological Control (held in Bengaluru, India in 2018). Following the lead of these two meetings, the combined ICBC2 will provide a platform for multi- and inter-disciplinary biological control research and application. This congress is unique in serving as a meeting point for scientists and practitioners that are working on a wide breadth of biological control targets including insect pests, plant and animal diseases, weeds and invasive vertebrates.

Biological control science has experienced transformational advances in various critical areas over the past decades including risk assessment, commercial mass-rearing, and the elucidation of complex interactions. The discipline is therefore more poised than ever to contribute substantially to solving the world's grand environmental and health challenges. A key to harnessing these advances for maximum benefit is to create strong linkages among different sub-disciplines, targets and approaches of biological control.

We hope that you can join us in this effort to broaden linkages in biological control science and increase the reach of biological control solutions worldwide.

Sincerely and with Best Wishes from the Current Organizing Committee:

Ulli Kuhlmann CABI Delemont, Switzerland
George E. Heimpel IOBC Global, University of Minnesota, USA
Barbara Barratt IOBC Global, AgReasearch, New Zealand
Gopalsamy Sivakumar National Bureau of Agricultural Insect Resources, India



Davos and the Congress Center

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Feature article

Current distribution range of the leaf-feeding beetle *Zygogramma bicolorata* on *Parthenium hysterophorus* in Nepal

Seerjana Maharjan[1,2] and Pramod Kumar Jha[1]

[1]Central Department of Botany, Tribhuvan University, Kirtipur, Nepal

[2]Ministry of Forests and Environment, Singhadurbar, Kathmandu, Nepal

Parthenium hysterophorus L. was first introduced into Nepal in 1967. Since 1990, the weed has spread alarmingly to almost the entire southern part of Nepal and it is currently spreading towards the north, in high altitude areas, and along road networks. The weed is abundant along roadsides, in grasslands, and fallow and abandoned lands of lowland and midhills of Nepal. It is dominant mainly in the urban areas of Nepal but is gradually spreading within protected areas in the Tarai and Siwalik regions.

The leaf-feeding beetle, *Zygogramma bicolorata* Pallister was first observed in 2009 in Nepal, at Hetauda at around 500m asl elevation. It was assumed that the beetle had spread naturally from India, where it had been deliberately introduced, into Nepal. The countries share an open international border with free vehicular movement. The probable timing of entry of the beetle into Nepal was estimated to be between the years 2004 to 2006, based on the date of release in India and date of significant defoliation observed in Australia and India. The beetle was subsequently observed in 2009 in other lowland areas of Nepal such as Chitwan, Nawalparasi, Rupandehi. In 2010, the beetle was observed in Kathmandu at around 1300 m asl. At all of the above locations, significant defoliation of parthenium weed plants by the beetle was observed. During field surveys conducted in June 2018, the beetle was observed at the uppermost altitudinal limit of parthenium weed in Central Nepal, at 1750 m asl in the Rasuwa district. Vehicular movement is suspected to be one of the vectors of spread of the beetle from India to the lowland and then to the midhills of Nepal. The spread of parthenium weed as well as the beetle towards the higher altitudes in Nepal has been observed with time. However, the effectiveness of the beetle at the uppermost elevation limits has yet to be studied.

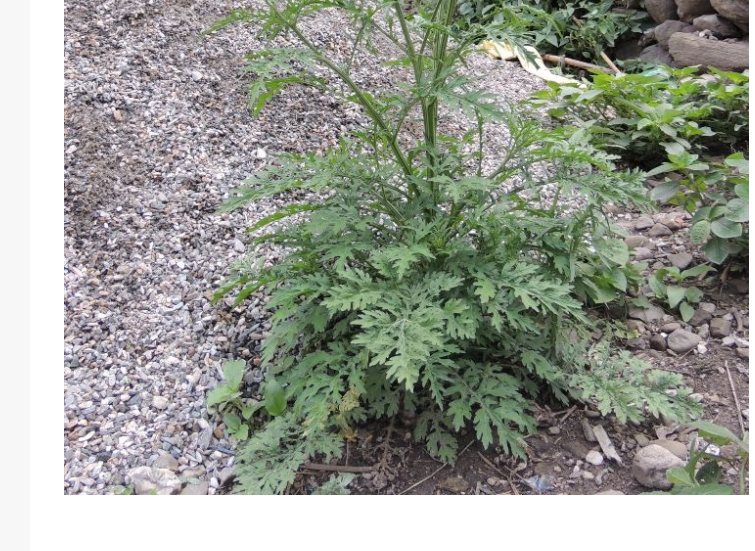


Figure 1: *Parthenium hysterophorus* infestation in an abandoned residential area of Bara district at around 300m asl, Nepal

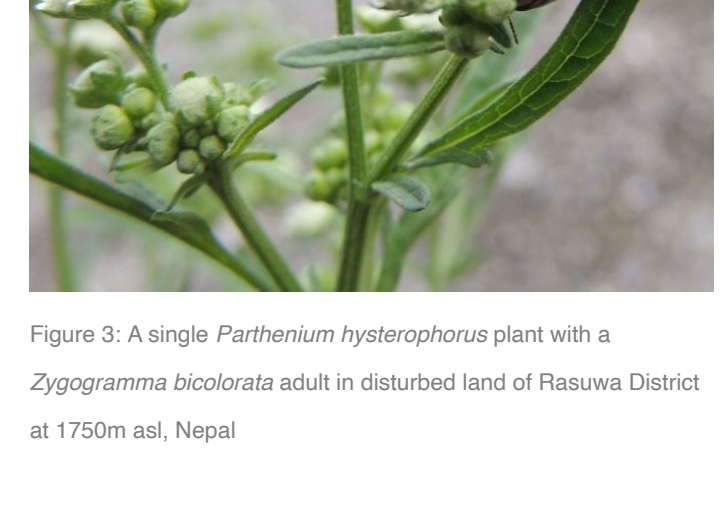
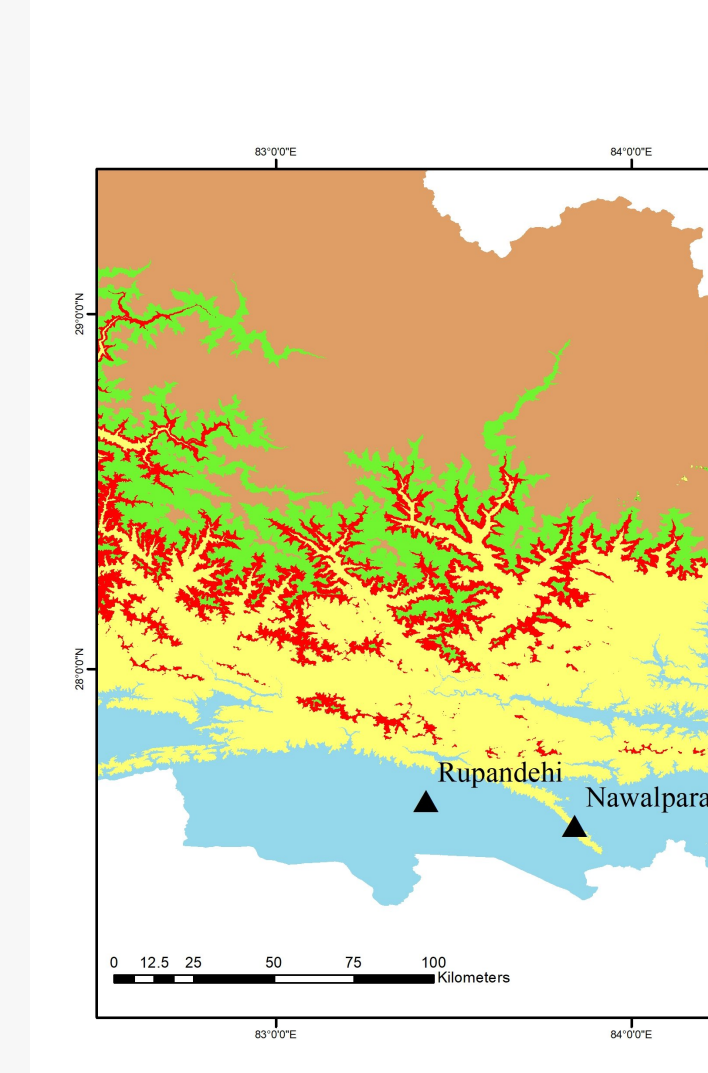


Figure 2: *Parthenium hysterophorus* infestation in abandoned land in Gorkha district at around 300m asl, Nepal



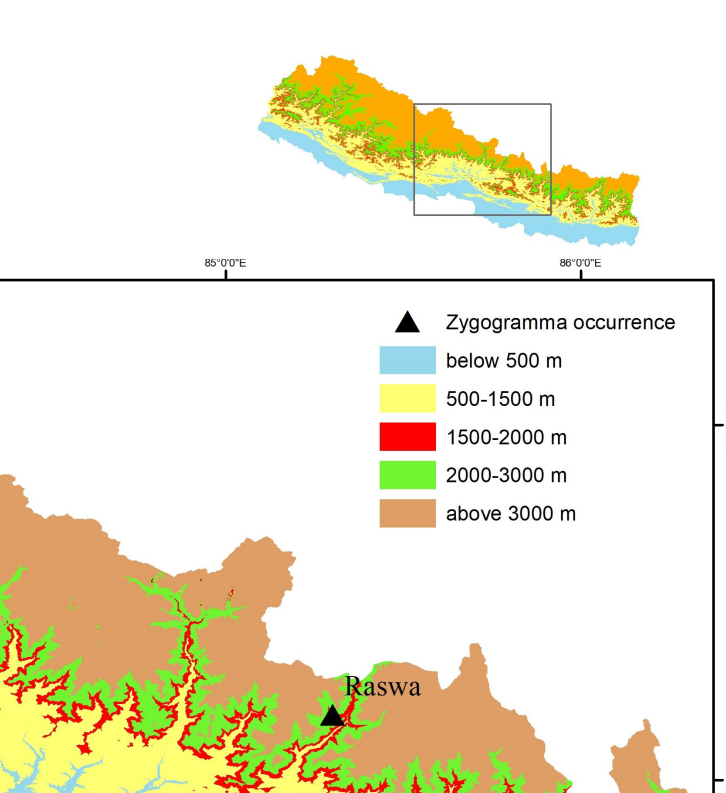


Figure 3: A single *Parthenium hysterophorus* plant with a *Zygogramma bicolorata* adult in disturbed land of Rasuwa District at 1750m asl, Nepal

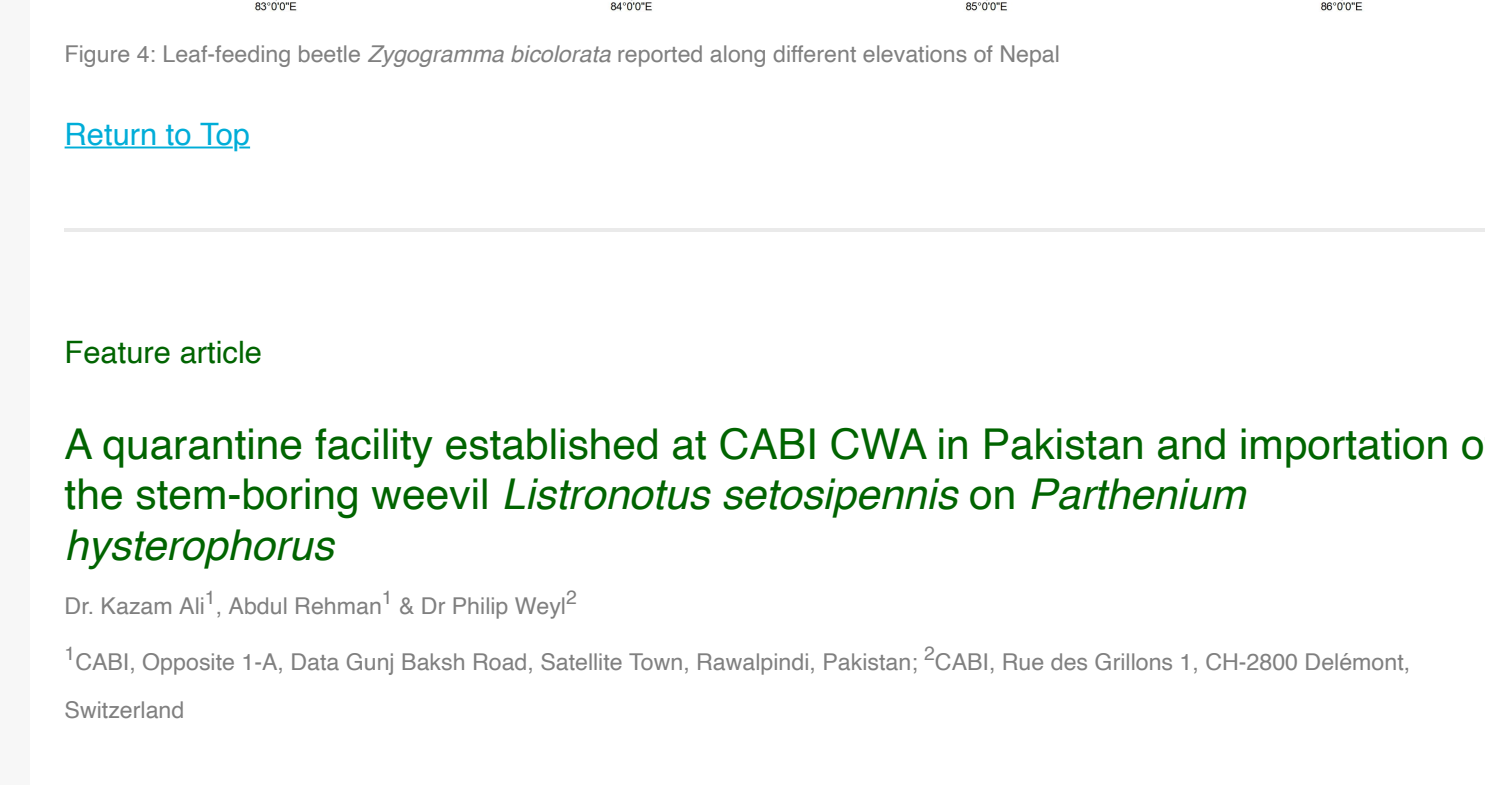


Figure 4: Leaf-feeding beetle *Zygogramma bicolorata* reported along different elevations of Nepal

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Feature article

A quarantine facility established at CABI CWA in Pakistan and importation of the stem-boring weevil *Listronotus setosipennis* on *Parthenium hysterophorus*

Dr. Kazam Ali[1], Abdul Rehman[1] & Dr Philip Weyl[2]

[1]CABI, Opposite 1-A, Data Gunj Baksh Road, Satellite Town, Rawalpindi, Pakistan; [2]CABI, Rue des Grillons 1, CH-2800 Delémont, Switzerland

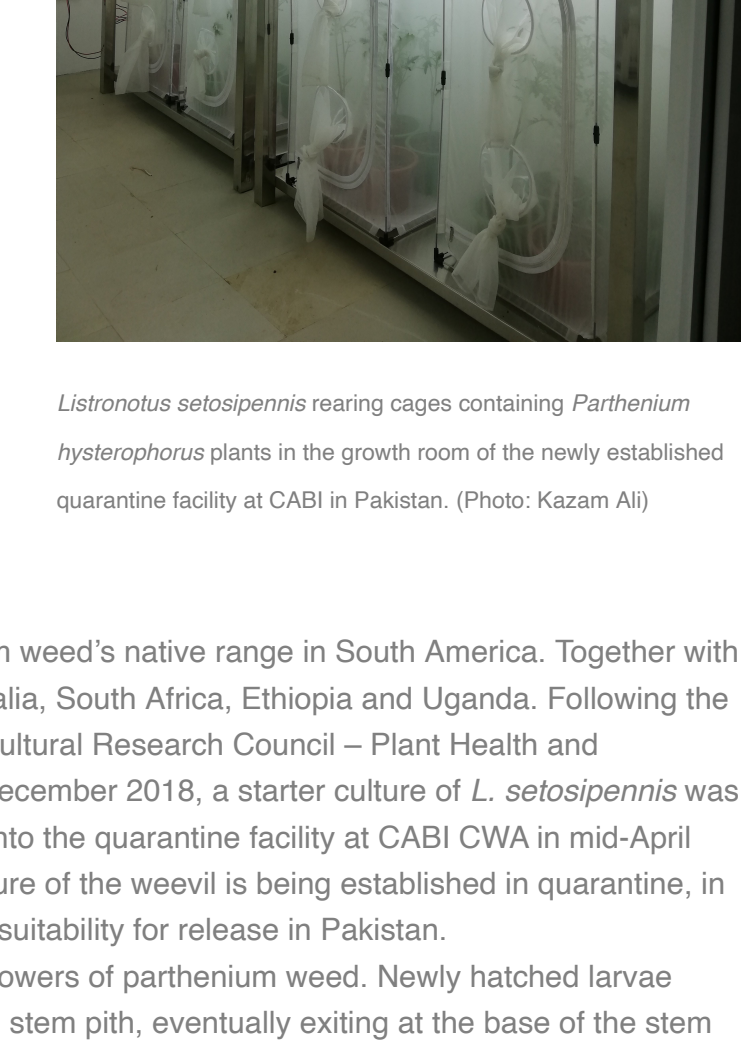
CABI has launched a unique, global programme "Action on Invasives", which aims to protect and improve the livelihoods of 50 million poor rural households impacted by invasive species. This programme champions an environmentally sustainable, cross-sectoral and regional approach to dealing with invasive species. Invasive species are estimated to cost the global economy more than US $1.4 trillion annually. They disregard international borders and undermine investments in development. Invasive pests and diseases also significantly affect the livelihoods of vulnerable rural communities who depend on natural resources and ecosystem health for their survival.

Under this programme, CABI Central and Western Asia (CWA) in Rawalpindi, Pakistan are targeting the invasive plant *Parthenium hysterophorus* (parthenium weed) in Pakistan, using local and imported natural enemies. This aggressive weed causes devastating impacts in pastures, crops and woodlands. It can significantly decrease crop yield; for example, a 97% reduction in sorghum yield has been reported in Ethiopia and up to 40% yield losses in various crops in India. CABI has recently increased its capacity to fight parthenium weed by establishing a quarantine facility at its CWA office in Rawalpindi, Pakistan. The new quarantine facility will help to prevent the growth and spread of parthenium weed, as well other invasive species in future, by providing appropriate facilities to enable investigation of effective biological control options to manage these weeds.

The quarantine facility, under the auspices of the Action on Invasives (AoI) programme, will allow scientists to investigate a range of biocontrol options, the first of which is the stem-boring weevil *Listronotus setosipennis* on parthenium weed. This weevil is intended to supplement the leaf-feeding beetle *Zygogramma bicolorata*, which has spread through the sub-continent, including in Pakistan. The leaf-feeding beetle is currently being mass-reared and redistributed into areas of Pakistan where it has not yet reached.

Collection of eclosed *Listronotus setosipennis* adults during training on biological control of *Parthenium hysterophorus* in December 2018 at the Agricultural Research Council – Plant Health and Protection, Cedara in South Africa.

Left to Right: Dr Kazam Ali (CABI Pakistan), Dr Ehsan ul Haq (Pakistan Agricultural Research Council – National Agricultural Research Centre), Mr Tahir Qureshi (Ministry of National Food Security and Research), Ms Xolile Magoso (ARC-PHP), Miss Ammara Blouch (Pakistan Agricultural Research Council – National Agricultural Research Centre). (Photo: Lorraine Strathie, ARC-PHP)



Listronotus setosipennis rearing cages containing *Parthenium hysterophorus* plants in the growth room of the newly established quarantine facility at CABI in Pakistan. (Photo: Kazam Ali)

Listronotus setosipennis originates from parthenium weed's native range in South America. Together with *Zygogramma bicolorata*, it is already used in Australia, South Africa, Ethiopia and Uganda. Following the training of four scientists from Pakistan at the Agricultural Research Council – Plant Health and Protection near Pietermaritzburg, South Africa in December 2018, a starter culture of *L. setosipennis* was imported from the ARC-PHP South Africa directly into the quarantine facility at CABI CWA in mid-April 2019 by Dr Philip Weyl of CABI Switzerland. A culture of the weevil is being established in quarantine, in preparation for host range testing to investigate its suitability for release in Pakistan.

Listronotus setosipennis oviposits primarily in the flowers of parthenium weed. Newly hatched larvae tunnel into the stem and continue to feed within the stem pith, eventually exiting at the base of the stem to pupate in the soil. Several larvae feeding within the stem can kill rosette stage and mature plants of parthenium weed. CABI CWA scientists Mr Abdul Rehman and Dr Kazam Ali have initiated work on host-specificity testing of *L. setosipennis* to assess a predetermined list of economically important plant species. In time, should the host-specificity tests demonstrate the suitability of *L. setosipennis* for release in Pakistan, approval for its release will be sought from the Ministry of Climate Change.

Further reports on this project are available at:

https://blog.invasive-species.org/2019/05/13/cabis-new-quarantine-facility-creates-greater-capacity-for-parthenium-research-in-pakistan/

https://blog.invasive-species.org/2019/04/30/cabi-publishes-recommendations-to-fight-scourge-of-parthenium-weed-in-central-west-asia/

https://blog.invasive-species.org/2019/01/16/zygogramma-released-at-selected-sites-in-pakistan-as-biological-control-of-parthenium/

Dr Kazam Ali collecting *Listronotus setosipennis* adults from previously exposed *Parthenium hysterophorus* plants to place onto new plants for oviposition within the quarantine facility at CABI in Pakistan. (Photo: Saad Ahmad Khan)

Release of the newly imported stem-boring weevil *Listronotus setosipennis* onto *Parthenium hysterophorus* plants for oviposition in insect rearing cages within the quarantine facility at CABI in Pakistan. (Photo: Kazam Ali)

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Feature article

Report on the First International Advanced Course on Using Managed Pollinators for Dissemination of Biological Control Agents for Suppression of Insect, Fungal & Other Pests of Crops

Charlotte Coates, Susan Willis Chan, Dr. Peter Kevan, Dr. Ljubiša Stanisavljević & Dr. Guy Smagghe

The First International Advanced Course on Using Managed Pollinators for Dissemination of Biological Control Agents for Suppression of Insect, Fungal & Other Pests of Crops, hosted at the University of Belgrade- Faculty of Biology, Serbia, from 6-10 May 2019 was a great success, pulling around 20 participants and instructors from 10 countries. The course was co-sponsored by the International

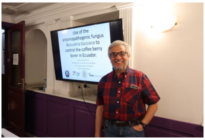
Commission for Plant-Pollinator Relationships (ICPPR), International Organisation for Biological and Integrated Control – West Palaearctic Regional Section (IOBC-WPRS) International Union of Biological Sciences (IUBS) and the Arthur Dobbs Institute based in Cambridge ON. A special thank you goes out to the main organizers, Dr Ljubiša Stanisavljević (University of Belgrade) and Dr Peter Kevan (University of Guelph) for all their work bringing the group together and organizing the curriculum.

Apivectoring/entomovectoring technology, which uses managed bees to disseminate biological control agents to flowering crops can boost crop yields by providing non-chemical protection from pests and disease while enhancing pollination. The advanced course covered the basic principles of pollinator/flower relations, crop pests, the technological development of apivectoring from experimental tests to commercial application, advantages and disadvantages of biological control agents, dosing the vector and crop, dispersal of biocontrol agents through pollinator foraging ranges, monitoring methodology, analysis of the cost-benefits associated with apivectoring, registration of biological control agents considering vector safety, environmental issues, human exposure safety, formulation and labelling.

International examples of apivectoring research trials were presented by participants from Canada, Mexico, Serbia, Colombia, Belgium, and Kenya. Researchers, industry partners, and students shared their respective experiences and showcased their success controlling crop pests on strawberries, raspberries, orchard crops, sunflower and canola oilseed crops, coffee and others crops around the world. Highlights of the course included a field excursion to NS-Seme Institute of Field and Vegetable Crops Novi Sad (IFVCNS), Serbia where successful trials using bumble bees to vector biocontrol agents against head rot in sunflower were completed. The IFVCNS team has now turned its attention to using *Osmia* spp. as vectors in canola. During a trip to the Jevremovac Botanical Garden, course participants where able to see the collection of micro and macro fungal specimens isolated from the garden in University of Belgrade mycology lab. The group also visited the Institute for Crop Protection to examine the collection of crop pathogens and entomopathogens. During a field trip, course participants set up several *Bombus terrestris* BioBest Flying Doctor® hives with a *Clonostachys rosea* formulation to control grey mold (*Botrytis* cinereal) on raspberries. These educational, hands-on experiences were complimented by a visit to the Museum of Beekeeping and Wine Cellar Zivanoci where the group learned about traditional Balkan beekeeping and tasted a variety of Serbian honeys and wines.

In addition to the excellent discussions and presentations throughout the week, participants of the First International Advanced Course on Using Managed Pollinators for Dissemination of Biological Control Agents for Suppression of Insect, Fungal & Other Pests will continue to work together to write a white paper detailing the next steps for apivectoring implementation research worldwide. For the three participants from Ontario, the course offered the opportunity to network and exchange ideas with other researchers from around the world. To read more please go to: https://www.icppr.com/

Course participants and instructors and raspberry farmers after setting up two bumble bee hives on a raspberry orchard in Majur, Serbia


Use of the entomopathogenic fungus Beauveria bassiana to control the coffee berry borer in Ecuador.

Dr. Carlos H. Vergara from Universidad de las Américas Puebla presenting work on coffee berry borer in Ecuador

Dr. Christina Mogren from University of Hawaii helping to set up a Flying Doctor ® hive at a raspberry orchard in Majur, Serbia

The apivectoring group enjoying their visit at the Jevremovac Botanical Garden

About the authors

Charlotte Coates is a Research Associate in the School of Environmental Sciences at the University of Guelph contributing to an apivectoring project on greenhouse strawberry crops in Ontario.

Susan Chan is a Ph.D candidate at the University of Guelph studying squash bees.

Dr. Peter Kevan is a Professor Emeritus at the University of Guelph, the current president of the International Commission for Plant-Pollinator Relationships and has played a key role in the research and development of apivectoring technology.

Dr. Ljubiša Stanisavljević is a Professor at the University of Belgrade. In addition to his role as an organizer for the course in Belgrade, he presented results using bumblebees as bioagent vectors to control Sclerotinia head rot on sunflowers in Serbia.

Dr. Guy Smagghe is a Professor at the University of Ghent in the Faculty of Bioscience Engineering and has contributed greatly to the development of apivectoring technology.

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Working Group Reports

WG on Mass Rearing & Quality Assurance (MRQA)

A special collection of new research from the IOBC - MRQA Global Working Group has now been launched

You can find it here

Some of the papers in the special collection also got highlighted further:

- Juan's paper was picked up by Scientific American's "60 second science" podcast. You can listen to the feature here
- Anita's paper was featured in the Entomology blog of the ESA

WG on the Ecology of Aphidophaga

The group is gearing up to hold its International Symposium: Ecology of Aphidophaga 14 in September in Montreal, Canada.

See the 'Upcoming Events' section of this newsletter for more details.
IOBC Early career awards for those aged 35 or under are still available for this symposium. Find out here about how to apply.

WG on *Ostrinia* and other Maize Pests (IWGO)

The call for papers is now open for the 27th IOBC Global IWGO Conference, which will be held in Engelberg, Switzerland, from 14-16 October 2019. Ten Scientific Sessions of 5 talks each are being organized. Each Session is focused on a topic relevant to management of insect pests of maize, including their microbial and biological control agents. Topics include neonicotinoid seed treatments, Bt maize and IPM of lepidopteran pests, emerging lepidopteran challenges, environmentally friendly management of soil pests, insecticide resistance, and emerging technologies in pest surveillance, reporting, and forecasting. In addition, 3 sessions are devoted to the fall armyworm, *Spodoptera frugiperda*, a catastrophic invasive pest of maize and other crops that has spread rapidly through Africa and is recently established in India. These sessions will focus on sustainable methods of fall armyworm control, development of biological control solutions, and an overview of fall armyworm invasion geography. Finally, there will be a free topics session and a poster session rounding out the research presentations. Abstracts for oral and poster presentations can be submitted through the IWGO website until 15 June.

The conference will take place at the Hotel Bellevue-Terminus in Engelberg, a famous mountain resort in Central Switzerland, situated 1050 metres above sea level. Engelberg radiates the special charm of a Benedictine monastery, the wonderfully fresh countryside and an impressive mountain panorama. There is a reduced fee (450 CHF) for **early registration** (by **30 June**), and a substantially discounted fee for students (250 CHF) to encourage their participation. In addition, IOBC-Global is providing a total of 5,000 Euros to support travel by early career researchers to attend the Conference. Travel scholarships are typically about 500 Euros each. Eligibility requirements are that the person must be **<35 years old, a member of IOBC, and presenting a talk or poster as first author on a topic related to biological control (or IPM)**.

We are looking forward to arranging a stimulating IWGO conference and welcome participation by active maize insect researchers from across the globe. Questions about the conference or requests for an invitation letter for visa application purposes can be directed to info@iwgo.org

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WG on Biological Control and Management of Parthenium Weed

Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed

Lorraine Strathie[1] and Prakya Sreerama Kumar[2]

[1]Agricultural Research Council – Plant Health and Protection, Private Bag X6006, Hilton 3245, South Africa; [2]Indian Council of Agricultural Research – National Bureau of Agricultural Insect Resources, Bengaluru, India

Under the auspices of the IOBC, a Global Working Group on Biological Control and Management of *Parthenium hysterophorus* (parthenium weed) was formed in 2009. This followed the establishment of the International Parthenium Weed Network, which reports on parthenium weed activities around the world (https://apwss.org/apwss-ipawn.htm). *Parthenium hysterophorus*, an annual shrub of Central and South American origin, has invaded at least 48 countries in Africa, Asia and Australia, and spread continues. Infestations significantly reduce crop yields, degrade grazing land, impact on protected areas and human settlements, and cause severe allergic reactions (respiratory problems and contact dermatitis) in humans and animals. Biological control using introduced host-specific natural enemies provides cost-effective, sustainable, long-term control and may be integrated with other management methods, for example, chemical control and the use of competitive plant species. A suite of natural enemies targeting various plant parts is required to reduce the weed to manageable levels. In Australia, 11 natural enemies (two rust fungi and nine insect agents) introduced from Central and South America, have markedly reduced the density, spread and impact of parthenium weed in Queensland over time. Other countries are at various earlier stages of implementing biocontrol to manage parthenium weed but awareness of the need to do so is increasing. Following the success in Australia, biocontrol programmes on parthenium weed are underway in South Africa, Ethiopia, Uganda, India, Tanzania and Pakistan. The winter rust fungus *Puccinia abrupta* var. *partheniicola* is present in many countries, although often not deliberately introduced. The summer rust fungus *Puccinia xanthii* var. *parthenii-hysterophorae*, the stem-boring weevil *Listronotus setosipennis*, the leaf-feeding beetle *Zygogramma bicolorata* and the seed-feeding weevil *Smicronyx lutulentus* have been released in South Africa. Ethiopia and Uganda have introduced *L. setosipennis* and *Z. bicolorata*, while *Z. bicolorata* was released and widely distributed in India and has spread into neighbouring countries, and the beetle was also more recently released in Tanzania.

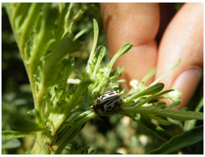
Visit to the Indian Council of Agricultural Research - National Bureau of Agricultural Insect Resources in Bengaluru, India by participants (representing India, Australia, Bangladesh, Uganda, Switzerland, USA, South Africa, China, Nepal, and Italy) of the Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed, 29 September 2018

Young scientists viewing a roadside infestation of *Parthenium hysterophorus* with the leaf-feeding beetle *Zygogramma bicolorata* in Bengaluru, India during the Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed.
From left to right: Aishwarya Andhare (India), Runping Mao (China/Australia), Anju Sharma Poudel (Nepal), Philip Weyl (Switzerland), Preeti Tripathi (India)

The IOBC Global Working Group on Biological Control and Management of Parthenium weed hold workshops every four years to bring together researchers working on parthenium weed around the globe to disseminate information on the weed and its management, to increase regional and global collaboration, to optimise resources for the control of this weed and for technology transfer. The first workshop was held in November 2010 in Nairobi, Kenya and the second workshop in July 2014 in Addis Ababa, Ethiopia. The Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed was held during 27–29 September 2018 in Bengaluru, India, together with the First International Conference on Biological Control: Approaches and Applications which was organised by the Society for Biocontrol Advancement and ICAR–National Bureau of Agricultural Insect Resources. The conference was attended by more than 240 delegates from 20 countries. At least 23 delegates representing 10 countries (India, Australia, USA, South Africa, Ethiopia, Uganda, Switzerland (for Pakistan), China, Nepal and Bangladesh) participated in the IOBC Workshop on parthenium weed. The smaller group enabled active discussions among participants. Several young scientists and representatives of countries that have recently initiated, or are interested in, biocontrol programmes participated in the workshop. Seventeen oral presentations on parthenium weed were presented under three themes (Spread and impact of *Parthenium hysterophorus*; Evaluation of biological control; and New initiatives). Two presentations received 'Best Paper Awards' during the Valedictory function of the International Conference on Biological Control.

Biocontrol programmes on parthenium weed have been ongoing for some time in Australia, India, South Africa and Ethiopia; new programmes were initiated in the past year in Uganda and Pakistan, while countries such as Nepal and Bangladesh have not yet embarked on biocontrol programmes but are interested to do so. Recent or intended biocontrol initiatives are encouraging as biocontrol begins to be more widely utilised. The keynote address by Dr K. Dhileepan discussed the considerable successes in managing parthenium weed in Queensland, Australia. Transfer of this technology has benefitted all other countries. Parthenium weed has increased from 8 to 45 invaded districts of 64 districts in Bangladesh, within a decade, and requires prompt initiation of biocontrol and management intervention efforts there, as do other countries without adequate management interventions. Research by the University of Queensland indicated that elevated CO_2 levels altered parthenium weed seed morphology and dormancy, with implications for its invasive abilities in future. Altitudinal impact, leaf consumption, host range and predicted potential distribution of *Z. bicolorata* were discussed by presenters from India, Ethiopia and Nepal. A combination of pathogen and insect agents were demonstrated to significantly reduce parthenium cover in South Africa, confirming impact as well as the need for a combination of agents. Presentations on ethanolic extracts of other plants and mycoherbicides demonstrated that parthenium growth, germination and seedling growth can be rapidly impeded.

From left to right: Wondi Mersie (USA), Sreerama Kumar Prakya (India) and Quirico Migheli (Italy) searching for the leaf-feeding beetle *Zygogramma bicolorata* on *Parthenium hysterophorus* at a roadside infestation in Bengaluru, India



Adult of the leaf-feeding beetle *Zygogramma bicolorata* on *Parthenium hysterophorus* in Bengaluru, India

A set of recommendations arising from the workshop were developed by workshop participants through group discussion. Highlights of these recommendations were that all countries invaded by parthenium weed are urged to take action to intervene in the spread and impact of the weed, as the current situation will worsen without broader, urgent management interventions. The group recognised that considerable progress has been made through regional projects such as the IPM Innovation Lab project in East Africa and recommended continued efforts and the introduction of additional agents. Countries and regional projects are encouraged to quantify the spread and economic, social and health impacts of the weed and its introduced agents. The FAO code of conduct and internationally accepted guidelines should be followed when importing and releasing introduced biocontrol agents in countries. Countries that have introduced only one or two biocontrol agents are urged to introduce additional agents as a suite of natural enemies are required to achieve desirable levels of control. Damaging agents besides *Z. bicolorata* are known and available. Area-specific selection of agents as some agents may be more suitable for certain conditions than others. Regional and international collaborative programmes are encouraged for cost effective technology transfer, and donor agencies are urged to support such programmes. Countries without biocontrol programmes such as Pakistan, Nepal, Bangladesh, Sri Lanka, Kenya, Swaziland, Mozambique and others are encouraged to urgently initiate programmes. Technical support including capacity building and training should be provided to interested countries to develop biocontrol and other management options. The workshop recognised that disturbance and lack of competitive vegetation cover hamper the management of parthenium weed and encourage the development of improved land management practices.

Discussion on future activities of the Parthenium weed Working Group concluded that workshops be combined with the IOBC Global Working Group on *Chromolaena odorata* and Eupatorieae weeds if suitable combinations arise, at alternative times to major international biological control conferences. Nepal or South Africa are possible venues for consideration. Summarised information on parthenium weed and management practices is to be developed for the IOBC Global Working Group on Parthenium weed.

IOBC Global supported a field visit on the final day of the workshop. Extensive larval damage by the invasive moth *Tuta absoluta* was observed on tomato plants in the glasshouse of the ICAR–NBAIR experimental farm in Bengaluru. Later, workshop participants eagerly scouted a roadside infestation of parthenium weed within the Bengaluru urban area, revealing several *Z. bicolorata* adult beetles, eggs and characteristic feeding damage on leaves. For some workshop participants, including young scientists, this was their first encounter with a biocontrol agent on parthenium weed. While the low levels of defoliation by the beetle observed at this site were disappointing, this situation together with the dense infestations of parthenium weed observed en route, reinforced the need for a suite of natural enemies to be utilised to consistently achieve measurable control throughout all seasons and habitats throughout the invasive range of parthenium weed.

Support of the Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed by the IOBC and the IPM Innovation Lab at Virginia Tech, USA is gratefully acknowledged. Workshop participants found the opportunity to exchange information and broaden networks to be most useful.

THIRD INTERNATIONAL WORKSHOP OF THE IOBC GLOBAL WORKING GROUP
ON BIOLOGICAL CONTROL AND MANAGEMENT OF PARTHENIUM WEED
2018

Participants of the Third International Workshop of the IOBC Global Working Group on Biological Control and Management of Parthenium Weed (held in combination with the First International Conference on Biological Control: Approaches and Applications), Le Meridien Hotel, Bengaluru, India, 27-29 September 2018

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WG on Biological Control and Management of Eupatorieae Weeds

The 9th IOBC International Workshop on the Biological Control and Management of Eupatorieae species was held at the Everly Hotel, Kuala Lumpur, Malaysia from 19-22 March 2019. The workshop was organised by CABI Malaysia and was attended by over 40 people, representing nine countries from Africa, Asia and the Pacific regions.

The workshop was officially opened by Datuk Dr. Mohamed Roff bin Mohd. Noor, Director General, Malaysian Agricultural Research and Development Institute (MARDI). There were numerous talks on the impact of various agents on *Chromolaena odorata* and *Mikania micrantha* in several countries. The gall fly *Cecidochares connexa* has been intentionally released in 12 countries and has established in 10 countries. However, it has now spread naturally to six countries, including into Malaysia from north Sumatra. In countries where impact studies have been conducted, it is reducing populations of chromolaena to where the weed is no longer causing severe economic and environmental impacts.

In Indonesia, the gall fly is proving effective in some regions but around Bogor, where it is cooler, wetter and at a higher elevation, the gall fly is not controlling chromolaena as well. More research is being conducted by BIOTROP and there is discussions on whether there is a need to import other effective agents from elsewhere.

The Plant Protection Research Institute (PPRI) in South Africa has been under taking research on chromolaena for over 20 years. Unfortunately, South Africa has a different biotype of chromolaena to Asia and West Africa and the gall fly does not attack it. PPRI have successfully released two other biological control agents that have established and providing some degree of control. PPRI are also working on several other potential candidtes, including another species of gall fly in the hope of achieving better control. If successful, these additional agents could be utilized by other countries where chromolaena is a problem.

The rust *Puccinia spegazzinii*, a biological control agent for *Mikania micrantha*, has been released in nine countries, establishing in six countries. In Papua New Guinea and Vanuatu where monitoring has been conducted, mikania populations have decreased by about 50%.

There were also presentations on the status of biological control of mikania in India, Fiji, and the Cook Islands. In India, the rust failed to establish and there are plans to re-introduce the rust, based on its effectiveness in other countries. In Fiji, studies are being conducted to monitor its spread and impact, following its release 10 years ago. The rust has recently been introduced into the Cook Islands and already, it is showing potential to reduce populations in areas where it has been released.

Dr Sivapragasam Annamalai, from CABI, fielding questions from the audience during the IOBC meeting

Participants looking at weeds and their biocontrol agents during the field trip

Both the gall fly for chromolaena and the rust for mikania have been released in only a fraction of the countries in which the respective weeds occur. Thus, there is scope to promote their usefulness and opportunities to introduce them into other countries where either or both weeds occur.

Peripheral to the biological control talks, there were presentations on regional cooperation, networking and the Nagoya Protocol. These presentations were highly relevant to promoting biological control in the Asian-Pacific region, as well as elsewhere. The third day of the workshop was spent listening to presentations on, and discussing other weeds, such as salvinia, parthenium and species which have the potential to become weedy.

On the fourth day, participants were taken into the field to observe biological control agents in action, particularly the gall fly on chromolaena. Biological control agents were also observed on *Lantana camara* and *Mimosa pigra*. Numerous other weeds such as *Mikania micrantha* and *Mimosa diplotrica* for which effective biological control agents are available were seen.

The workshop was designed to maximize discussions. As well as 5 minutes following each presentation, there was half an hour allocated at the end of each session for general discussion. The participants found this most useful to air views on various topics.

Some of the actions to arise from the workshop were that CABI is to take a lead role in increasing the awareness and promoting biological control in the region. MARDI has indicated it wants to re-establish biological control projects and have already met with researchers from Manaaki Whenua - Landcare Research NZ Ltd to collaborate on a new project based in the Pacific, working on weeds native to SE Asia.

See also CABI's blog post about the workshop.

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WG on Management of Cactus Species

CACTUS WORKING GROUP MEETING 2020
The IOBC Cactus Working Group would like to invite those interested in biological control of cactus weeds to join us for a meeting in Windhoek, Namibia, in March 2020. Invasive alien Cactaceae are a serious environmental threat in Namibia, but biological control can provide an environmentally friendly and sustainable solution. The meeting will be held over three days and will include presentations, discussions and excursions into the field to see some of agents that have recently been released in Namibia.
The intention of the Cactus Working Group is promoting the use of biological control to reduce the negative impacts of invasive alien Cactaceae and to develop a global network to deal with common problems. This meeting will focus on the use of biological control for Cactaceae in sub-Saharan Africa but we hope to attract delegates from every continent in order to bring together global expertise on the Cactaceae.
The meeting aims to:

- Raise awareness about the threat of invasive alien Cactaceae to natural and agricultural ecosystems
- Raise awareness about recent research and developments in cactus biological control

- Encourage collaboration on common problems and the sharing of effective biological control agents with countries that need them
- Developing an early warning network for new species that do not have effective biological control agents
- Standardizing techniques to control and evaluate negative impacts of cactus and the efficacy/success of biological control

If you are interested in giving a talk, facilitating a discussion or attending the meeting please email Iain Paterson.

To join the working group contact the convenor

Opuntia sulphurae invading indigenous vegetation near Windhoek, Namibia. There are no records of this cactus in South Africa or Botswana, but it is present in Australia. No biological control agents have been released anywhere in the world against this species but it has become one of Namibia's worst invasive alien Cactaceae

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Call for Biocontrol Training Initiatives

Keen to organise a practical training courses in biological control? IOBC-Global is keen to assist!

We would like to offer financial assistance to support participation of early-career practitioners/researchers in up to three training courses per year.

Proposals for training courses for 2020 should be sent to the Secretary General email address (secretary-general@iobc-global.org) for consideration by 30th November 2019. Successful proposals will be notified by 15th February 2020.

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BioControl

BioControl, the Official Journal of IOBC

Hot off the Press: BioControl Impact Factor for 2018 has just been released, and it is on the rise again! **The new Impact Factor is 2.191**.

Congratulations ot our Editor in Chief Eric Wajnberg and the wonderful Editorial Team on this achievement.

And thank you, all of the authors and contributors for continuing to choose BioControl as the home for your important manuscripts.

Browse the latest issue (June 2019)

Submit your best work to BioControl!
BioControl, the official journal of the International Organisation for Biological Control, presents original papers on basic and applied research in all aspects of biological control of invertebrate, vertebrate and weed pests, and plant diseases.

Have an idea for a Special Issue? The Editorial Team is encouraging proposals!
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News from the regions

APRS

IOBC-APRS Predatory Mites as Biological Control Agents Working Group

Announcing the 2nd International Workshop:
“Phytoseiid mites: as or beyond natural enemies”

Save the Dates: October 16-19th, 2019
College of Plant Protection, Southwest University (CPP-SWU)
Chongqing, China

THEME:
This workshop was organized by Institute of Plant Protection, Chinese Academy of Agricultural Sciences (IPP-CAAS) under the support of the International Organization for Biological and Integrated Control (IOBC) in 2014. This workshop provides opportunities to bring together international students, researchers and pest management practitioners dealing with all aspects of predatory mites and other biological control related fields. The purpose is to promote international communications and collaborations in research and application using predatory mites as well as other fields in biological control, and to promote greater development in natural enemy research and industry worldwide.
The theme of the 2nd workshop is “Phytoseiid mites: as or beyond natural enemies”. This topic implies our interest and endeavor in utilizing predatory mite as biological control agents against more target pests, as well as excellent experimental materials of more fundamental and theoretical research. We will especially focus on how we should utilize rich predatory mite resources and develop the predatory mite research in the Asia-Pacific region.

Topics for contributed oral papers and posters include but are not limited to the following list:

1. Taxonomy, Phylogenetics and Evolution
2. Resource Survey, Optimization and Evaluation
3. Product Development and Application
4. Physiological Regulation and Gene Function

Abstract submission is now open.
For information about abstract submission and registration contact the international scientific committee, Prof. Dr. Huai Liu.

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NTRS

NTRS activities implemented in early 2019

Biological control training course, Chiclayo, Peru – March 2019

A Biological control training course was implemented from 27-29 March 2019 in Chiclayo, Peru, organized by the INIA-CABI-Plantwise programme and the IOBC NTRS, implemented by INIA and CABI scientists from South and Central America, with the participation of Dr. Yelitza Colmenarez, past-president of the IOBC NTRS. It was a successful training course with the participation of 28 technicians from Chiclayo, Tarapoto, Puno, Huancayo, Cusco, Huaral, Lima and Ayacucho. The Fall Army Worm Biological control programme was discussed among the Biological Control programmes as part of the IPM packages of key pests in the country.

Group of participants of the training course

Participants during the practical sessions of the training course

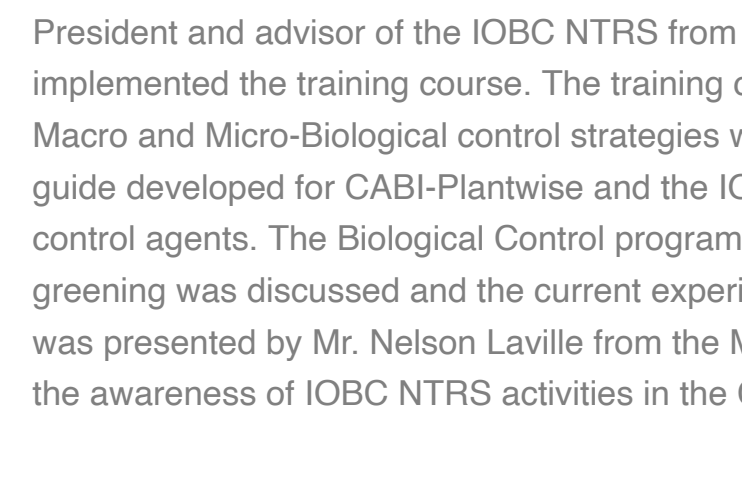
Participation of IOBS-NTRS in the XVI International Congress of Integrated Pest Management Congress – IPM: Innovation, Prosperity and Sustainability. Guatemala City April 2-5 2019

The organization of the XVI IPM Congress invited Dr. Germán Vargas, president of the IOBC-NTRS, to deliver a lecture on the biological control of sugarcane pests, which gave the chance to promote the activities of the organization among participants, the goal is to have representatives for the organization from Guatemala in the near future. In a meeting that emphasized the topic of innovation, introductory lectures highlighted the role of new technologies in the remaking of agriculture – and by the way of IPM, defining three main areas of interest in such purpose: mobile apps, artificial intelligence and internet of things. In Guatemala the private sector is strongly investing in promoting a biological control industry, where standardized production systems will allow manufacturing of high quality products not only for regional markets but also worldwide. In this, a novel cooperative effort in taken place in the country between international cooperation agencies (USAID) and the private sector (Agropecuaria Popoyán) in promoting biological control use among small farmers, searching for allowing access to these technologies, while pursuing a cleaner agriculture, but without forgetting a financial analysis in comparison to conventional ways of production. As a resultant of this partnership the Microbial Center for Excellence - CENEM works outstandingly on purification of entomopatogenic and/or biostimulant microorganisms, using cutting edge molecular techniques and high efficacy production equipment with the goal of obtaining high quality products to enhance pest management and higher yields in the fields. It will be of great interest for the IOBC-NTRS to have a closer look on the Guatemalan case where this partnering for innovation is heading a new road for the biological control in the region.

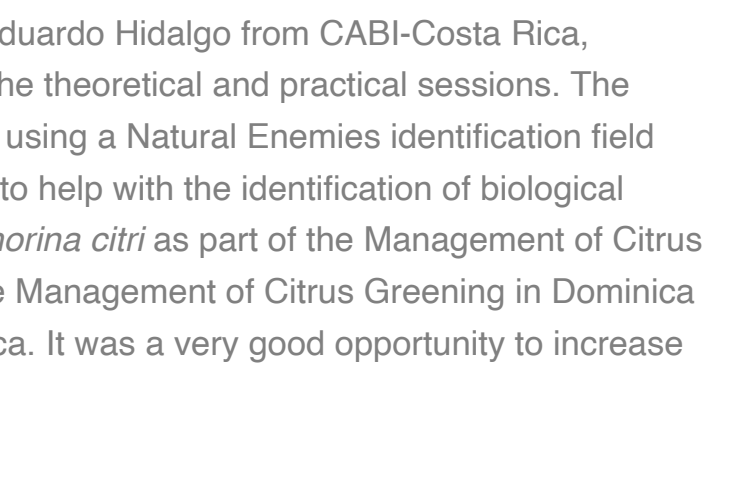
Visit of Germán Vargas (right) to the Microbial Center for Excellence – CENEM from Agropecuaria Popoyán and USAID, in company of Popoyan's representative, Wilson Pineda

Biological Control training course in Grenada- Caribbean

A Biological Control Training course was implemented by the IOBC-NTRS, CABI-Plantwise and the Ministry of Agriculture- Grenada on the 10 and 11 April 2019. Dr. Yelitza Colmenarez (IOBC Past President and advisor of the IOBC NTRS from CABI, Dr. Eduardo Hidalgo from CABI-Costa Rica, implemented the training course. The training course has the theoretical and practical sessions. The Macro and Micro-Biological control strategies were review, using a Natural Enemies identification field guide developed for CABI-Plantwise and the IOBC NTRS, to help with the identification of biological control agents. The Biological Control programme of *Diaphorina citri* as part of the Management of Citrus greening was discussed and the current experiences in the Management of Citrus Greening in Dominica was presented by Mr. Nelson Laville from the MoA Dominica. It was a very good opportunity to increase the awareness of IOBC NTRS activities in the Caribbean.



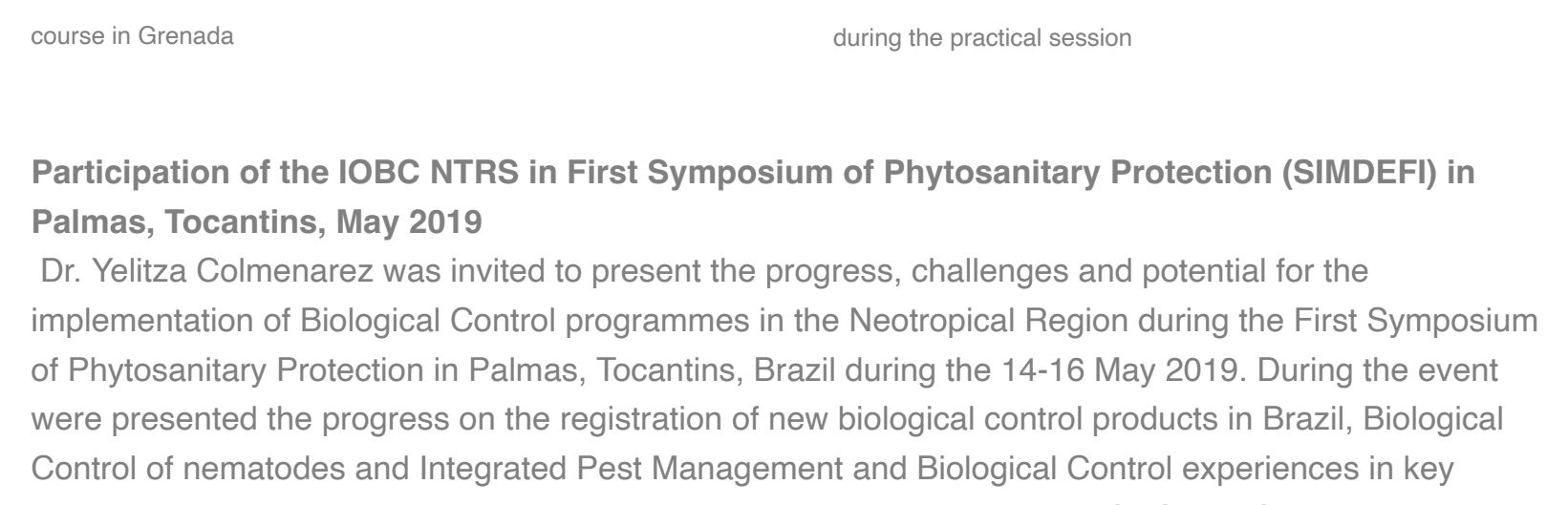
Group picture- Participants of the Biological Control training course in Grenada



Participants using the natural enemies identification Field Guide during the practical session

Participation of the IOBC NTRS in First Symposium of Phytosanitary Protection (SIMDEFI) in Palmas, Tocantins, May 2019

Dr. Yelitza Colmenarez was invited to present the progress, challenges and potential for the implementation of Biological Control programmes in the Neotropical Region during the First Symposium of Phytosanitary Protection in Palmas, Tocantins, Brazil during the 14-16 May 2019. During the event were presented the progress on the registration of new biological control products in Brazil, Biological Control of nematodes and Integrated Pest Management and Biological Control experiences in key commodities in Brazil. The opportunity allowed to raise awareness of the IOBC NTRS in the country.



Dr. Yelitza Colmenarez, Brazilian Scientists and the Organizing committee of the SIMDEFI 2019

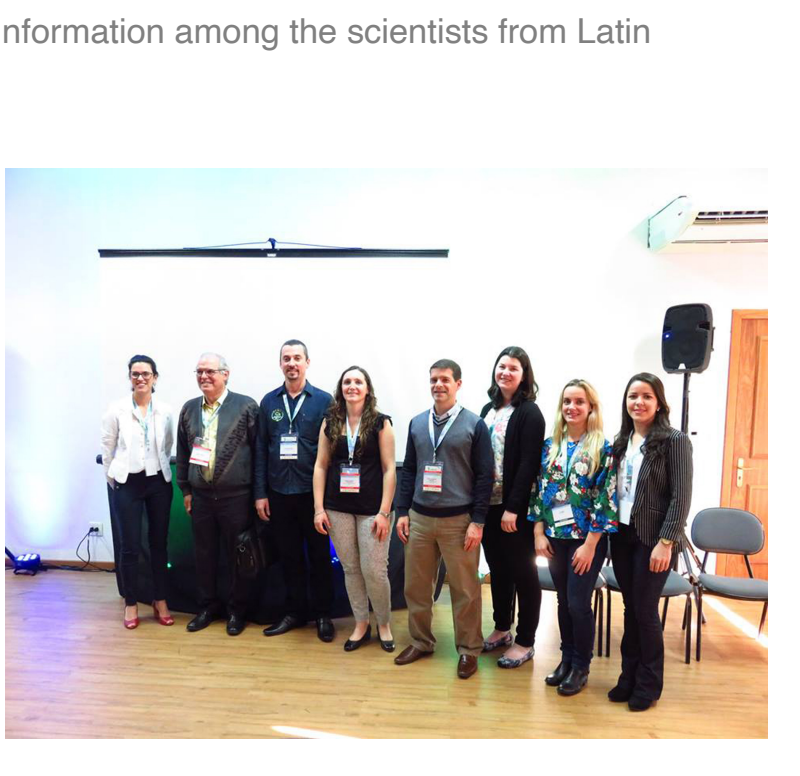
Working Group- Parasitoides of the Neotropic

The IOBC NTRS and the working group on *Parasitoids of the Neotropical region* have organized 5 round tables during the XXVII Brazilian and X Latin American Congress of Entomology in September 2018. The event was an excellent opportunity to strengthening links with the Brazilian Entomological Society, which is also a member of the IOBC NTRS and to exchange information among the scientists from Latin America.

Participants of the round table about Biological Control applied in key commodities

Students and specialists who participated in a round table about Biological Control- Free topics

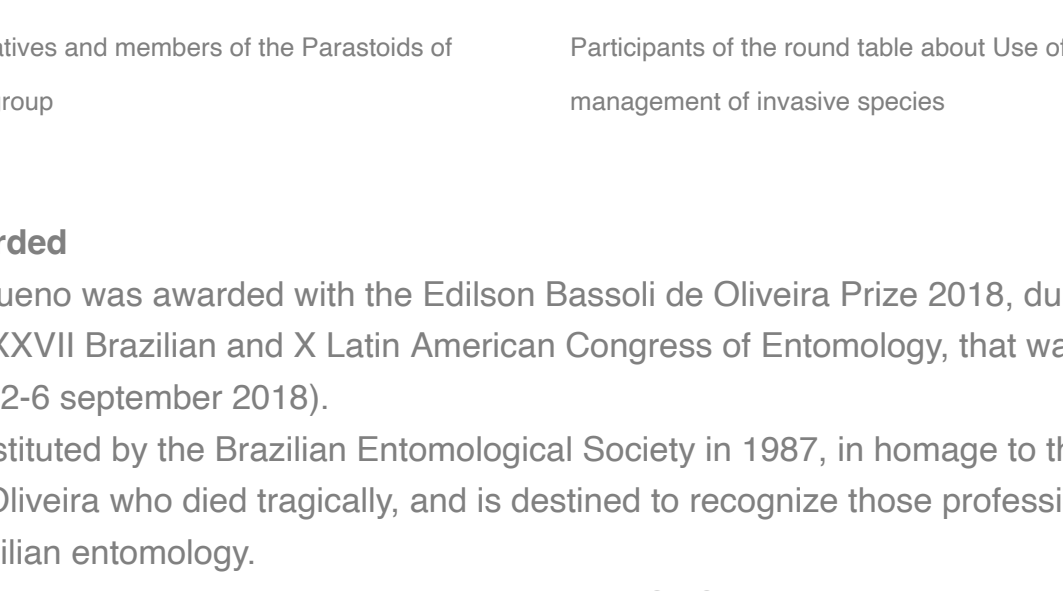
IOBC NTRS representatives and members of the Parastoids of the Neotropic working group



Participants of the round table about Use of Biocontrol for the management of invasive species

Researcher awarded

Dr. Vanda H. P. Bueno was awarded with the Edilson Bassoli de Oliveira Prize 2018, during the opening ceremony of the XXVII Brazilian and X Latin American Congress of Entomology, that was held at Gramado, Brazil (2-6 september 2018).
This Prize was instituted by the Brazilian Entomological Society in 1987, in homage to the young entomologist de Oliveira who died tragically, and is destined to recognize those professionals who contribute to Brazilian entomology.
In addition to her merits in the field of entomology in Brazil, IOBC is proud of this recognition that has made to Dr. Bueno, who has worked in the Neotropical Section (NTRS) as Treasurer (1994-1998), President (2006-2010), and then integrated successive Boards of Directors as Vice President and Consultant for our Section. She currently serves as Vice President of IOBC Global (2016-2020).
From her extensive professional curriculum, we wish to highlight the relevant scientific experience and training of human resources of Dr. Bueno on augmentative biological control, mainly in protected crops, and the mass rearing and quality control of parasitoids and predators, especially Heteroptera predators (Miridae and Anthocoridae) and parasitoids of aphids.
Our most sincere congratulations!



Dr. Vanda H. P. Bueno was handed the Edilson Bassoli de Oliveira

Activities at NTRS for the reminder of 2019

V Congresso Brasileiro de Fitossanidade
Curitiba - PR, Brazil
07-09 August, 2019
www.conbraf2019.com.br

XVI SICONBIOL (Symposium of Biological Control)
Londrina, Brazil
11 – 15 August, 2019
https://siconbiol.com.br/

The IOBC-NTRS is organizing a round table to be held at the XVI SICONBIOL, which is been organized by the Brazilian Entomological Society. Several members of the Executive Committee of IOBC-NTRS will present their Work.

VII RAP (Argentinian Meeting of Parasitoidologists)
Santa Rosa, Argentina
11 - 13 September, 2019
viiraplapampa@gmail.com

Several members of IOBC-NTRS will present their Work.

VI International Symposium of Entomology
Viçosa, Brazil
15-20 September, 2019
http://www.simposioentomologia.ufv.br/2019/#inicio

Yelitza Colmenarez will be representing IOBC-NTRS

I Latin American and IV Chilean Symposium of Biological Control
Chillán, Chile
8-10 October, 2019
https://www.simposiocontrolbiologico.com/

Several members of the Executive Committee of IOBC-NTRS will present their Work.

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Upcoming Events

4th International Symposium on Biological Control of Bacterial Plant Diseases (BIOCONTROL2019)
Viterbo (I) at Dipartimento di Scienze Agrarie e Forestali (DAFNE), Università della Tuscia, **9 - 11 July, 2019**

Topics include

- Interactions between plants and microbiomes
- Genetics and Genomics: Basis for innovative control strategies
- Epidemiology and forecasting models
- Fire blight control: innovation from science to field applications
- Improvements in Bacterial Wilt biocontrol
- Sustainable strategies for the control of fastidious bacteria and their insect vectors
- Science and Politics meet Industry

The 6th International Entomophagous Insects Conference
Perugia, Italy, **9-13 September 2019**

For more information contact: eventi@consultaumbria.com

14th International Symposium Ecology of Aphidophaga
Montreal (Quebec) Canada, **16-20 September 2019**

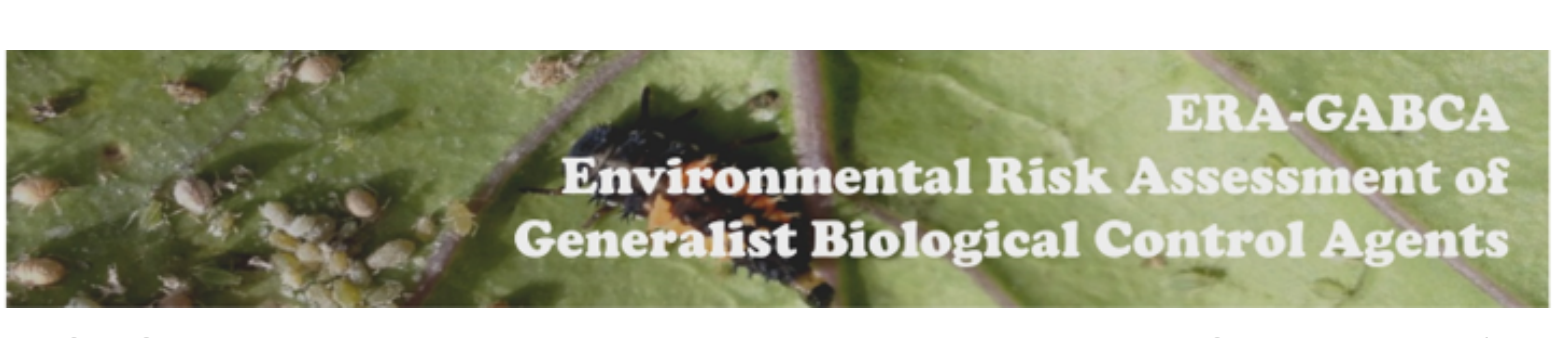
Aims & Topics
The purpose of Ecology of Aphidophaga conferences is to provide an international forum for the presentation and discussion of research on the biology, ecology and behaviour of organisms contributing to mortality of aphids (Hemiptera: Aphididae). Acceptable topics include the following:

- Life cycle, voltinism and diapause
- Food relations (including non-aphid food of aphidophaga)
- Behaviour
- Systematics and morphology
- Phylogeny
- Population dynamics
- Modelling
- Distribution and seasonal adaptation
- Parasitoids and pathogens of aphidophaga
- Parasitoids and pathogens of aphids
- Tritrophic interactions
- Intraguild interactions
- Invasive aphidophaga
- Chemical ecology
- Integrated pest management
- Climatic changes

Contact: aphidophaga14@uqam.ca More information at: http://www.aphidophaga14.uqam.ca/

International Union of Forest Research Organizations IUFRO meeting working party Biological Control of Forest Insects and Pathogens Pretoria, South Africa, **6-8 November 2019** (post meeting field trip 8-11 November).
Abstract submission deadline: **1st July** 2019

Entomology 2019: ESA's Annual Meeting.
St. Louis, Missouri, November 17-20 2019.
Connect with more than 3,600 scientists and researchers from across the globe Early bird registration open until 23rd September.


ERA-GABCA
Environmental Risk Assessment of
Generalist Biological Control Agents

ERA-GABCA will hold a symposium and a workshop during Entomology 2019 in St Louis Missouri (see above).

ERA-GABCA is a multicountry and multidisciplinary expert group discussing online during a 12-month period criteria for environmental risk assessment (ERA) of exotic generalist arthropod biological control agents (GABCA). The aims are to develop a consensus on a scientifically sound and practical ERA-GABCA method, building on previous methods, to help to support regulation of exotic GABCAs in some countries, and contribute to capacity building.

18th Nov 2019: Symposium - **Generalist Arthropod Biological Control Agents: Effective, but are they safe?**
Joop van Lenteren (Wageningen University, Netherlands) Development and impact of Environmental Risk Assessments on registration and use of biocontrol agents
Antoon Loomans (National Plant Protection Organization, NL) Every generalist requires a special risk assessment
William Snyder (Washington State University, USA) Give predators a complement: rebalancing positive and negative predator diversity effects to strengthen biocontrol
Barbara Barratt and Pip Gerard (AgResearch New Zealand) Risk assessment for biological control, the NZ approach
Johannette Klapwijk and Lieselot van der Veken, International Biocontrol Manufacturers Association, Brussels, Belgium. Generalist predatory mites, the key to successful augmentative biocontrol
Jacqui Todd and Barbara Barratt (Plant and Food Research, NZ) Generalist insects: what can we learn from food webs?
Andrew Howe and Edward Evans (University of Copenhagen, DK) Interspecific exploitative competition and GABCA: *Harmonia axyridis* and beyond
Robert Pfannenstiel (USDA APHIS PPQ, USA) Evaluation of exotic generalist biological control agents for importation and release: North American regulatory perspectives
Ying Huang, Xubin Pan and Jin Yan (Institute of Plant Quarantine, Chinese Academy of Inspection and Quarantine, Beijing, China). Risk assessment and the importation of biocontrol agents in China
James Nechols (Kansas State University) Potential repercussions of climate change on non-target effects of generalist biological control agents
Débora Pires Paula (Embrapa, Brazil), David Andow (University of Minnesota, USA), Barbara Barratt, Robert Pfannenstiel and Joop van Lenteren, Revisiting the biosafety of exotic generalist biological control agents

19th Nov 2019: Workshop - **Using Generalist Arthropod Biological Control Agents: Ensuring Effectiveness and Safety.** Aim: Resolve conflicts, identify research needs and form potential collaborations

International Congress of Entomology
XXVI ICE, Helsinki , 19-24 July 2020.
Congress theme: Entomology for our planet. More information at: www.ice2020helsinki.fi

ICE is an important event on IOBC calendar. On top of IOBC-sponsored symposia, we will hold our General Assembly and social gatherings for IOBC members. Stay tuned for further announcements in the next editions of the Newsletter.

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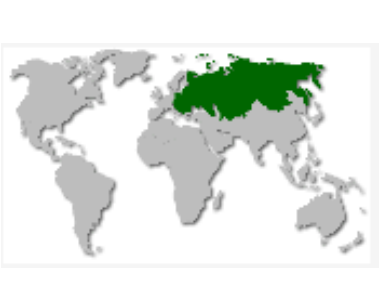
Regional Sections Contacts

Asia-Pacific Regional Section (APRS)

Afrotropical Regional Section (ATRS)



East Palearctic Regional Section (EPRS)

Nearctic Regional Section (NRS)

Neotropical Regional Section (NTRS)

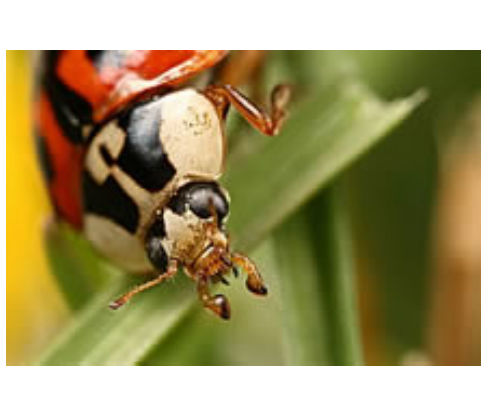
West Palearctic Regional Section (WPRS)

Global Working Groups Contacts

Mass Rearing and Quality Assurance (MRQA)

Ecology of Aphidophaga

Biological Control and Management of Eupatorieae Weeds



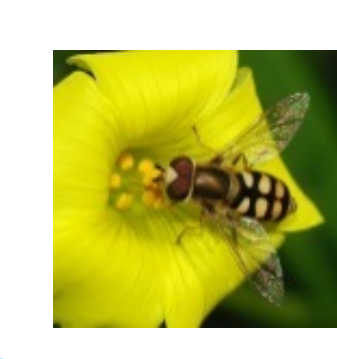
Benefits and Risks Associated with Exotic Biological Control Agents

IWGO - Biocontrol of Ostrinia and Other Maize Pests

Biological Control and Management of Parthenium Weed

Biological Control of Diamondback Moth & other Crucifer Insects

Management of Cactus Species



CroProPol - Using Managed Pollinators to Disseminate Biological Control Agents & Natural Products

Commission on Biological Control and Access and Benefit Sharing

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.
- 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.

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

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