General News

BNI News in 2010

The new decade brings changes for *BNI*. The news and review sections are now on the main CABI website, at www.cabi.org/BNI, along with a link to the abstracts database on CAB Direct. To bring *BNI* in line with CABI's other news and information journals, the news section has been re-organized and rationalized. Although now shorter than before, we hope it will be no less useful; our challenge is to use the space wisely to keep readers up to date with what is happening in the biocontrol world. We will continue to welcome readers' contributions, although long articles will be rare and need to be agreed in advance. Please contact the Editor (bni@cabi.org) about potential news items, conference announcements and reports, and new publication notices.

New Cochineal Strain tested against Cactus in Australia

Recent research in South Africa lies behind a new biocontrol project aimed at containing the spread of Hudson pear (*Cylindropuntia rosea*) in Australia. Infestations of the cactus are most severe in New South Wales, where it was probably introduced by opal miners, but it is also now found in other states and is expected to spread. The biggest problem with this densely branched, highly invasive cactus is its long, strong spines, which injure and even kill native and farm animals, and are a serious nuisance to bush walkers and farm vehicles because they can penetrate boots and tyres.

Biological control of cactus species has a well-known history. The cochineal insect, *Dactylopius tomentosus,* has been associated with *Opuntia/ Cylindropuntia* spp. and used in biological control programmes for a very long time – sometimes with spectacular success, but not invariably. Recent research by Catherine Mathenge has provided insight into this variation by revealing that cochineal insects are highly specific to individual host species. Thus for biological control introductions, biotypes need to be collected from the specific target weed. This research has underpinned the successful control of *C. fulgida* var. *fulgida* in South Africa. [see articles in *BNI* 30(2), 17N–19N (June 2009).]

Mathenge's findings may explain why *D. tomentosus* already present in Australia (it was introduced against the related weedy cactus *C. imbricata* with some success) attacks Hudson pear but is not particularly damaging to it. Under the new project funded by NSW (New South Wales) Department of Industry & Investment, a strain of *D. tomentosus* collected from Hudson pear by collaborators in Mexico will be host tested in the quarantine facility at the Alan Fletcher Research Station in Queensland.

Given the new understanding of cochineal–host plant specificity, the prospects for successful biological control of Hudson pear seem good. In addition, the newly revealed host specificity of the cochineal insect should make testing relatively straightforward, especially as there are no Australian native Cactaceae, and a different biotype of *D. tomentosus* has previously been approved for introduction.

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Biocontrol Agent Provides Canadian Lilies with Protection against the Lily Leaf Beetle

The parasitic eulophid wasp *Tetrastichus setifer* was recently approved by the Canadian Food Inspection Agency for release in Canada for biological control of the lily leaf beetle, *Lilioceris lilii*. This biological control agent attacks lily leaf beetle larvae and kills its host in the prepupal stage, reducing overall adult emergence and infestation of lilies.

The lily leaf beetle, a pest of cultivated and native lilies, was accidentally introduced into North America in Montreal, Canada, in the 1940s. Over the past seven decades it has expanded its range considerably. It is now a common pest throughout eastern Canada and the northeastern USA, and it has been reported as far west as Alberta. Its extensive native range – northern Africa to Scandinavia and east to the Pacific – suggests that lily leaf beetle is capable of becoming established throughout the North American continent.

The lily leaf beetle feeds mainly on true lilies (genus *Lilium*) and several species in the closely related genus *Fritillaria*. Populations of the beetles reach high densities and complete defoliation of plants is common. Because cultivated lilies are themselves introduced from Asia and *Fritillaria* does not occur outside of cultivation in Canada, the lily leaf beetle is primarily a horticultural pest. However, considering the enormous popularity of lilies in urban and suburban gardens, its importance as a pest should not be underestimated.

Even more worrisome is the fact that the lily leaf beetle has recently been reported infesting populations of Canada lily, *Lilium canadense*, in Quebec and New Brunswick. This native species is listed as threatened or vulnerable throughout its range. Although the beetle has not yet been reported from populations of the native wood lily *L. philadel-*

phicum, which is threatened or endangered in parts of its range, the larvae survived well on the plant in the laboratory. Moreover, as the range of the lily leaf beetle expands westward, it will eventually come into contact with several other native lilies, roughly half of which are threatened or endangered. Thus, lily leaf beetle, now considered a garden pest, is on the verge of becoming a threat to native plant biodiversity as well.

No effective native natural enemies have been observed in North America and control measures for the beetle have relied mostly on pesticide applications or picking beetles by hand. In 1998, a collaborative biological control programme directed against lily leaf beetle was initiated between the University of Rhode Island, USA, and CABI Europe – Switzerland (CABI E-CH). Surveys throughout central Europe, where the pest and lilies are native, showed that the beetle is well controlled by three larval parasitoids, not only at natural sites but also in private gardens and lily plantations. In 2001, following host-specificity screening tests, classical biological control of lily leaf beetle was begun in North America, with the release of over 3000 females of the larval parasitoid *T. setifer* in eastern Massachusetts. *Tetrastichus setifer* is now well established at several release sites throughout New England, and has spread more than 10 km from the original release sites. Parasitism rates up to 100% have been recorded and local beetle densities have declined.

Increasing problems for lily growers with lily leaf beetle, the threat to lily species native to Canada, and the success of *T. setifer* in the USA have generated interest in introducing the parasitoid into Canada. Therefore, researchers from Carleton University (Ottawa, Canada), Agriculture and Agri-Food Canada (AAFC), CABI E-CH and the University of Rhode Island submitted a petition to the Canadian Food Inspection Agency in November 2009 to release *T. setifer* for biological control of lily leaf beetle in Canada. Approval was granted in January 2010. Release is planned for spring 2010 and a post-release monitoring project will be implemented. The host specificity of *T. setifer* and its capacity to parasitize a significant proportion of available hosts is expected to have a substantial impact on lily leaf beetle in Canada.

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Coccinellids for Combating Cycad Scale: Promising News from Palau and the USA

The Pacific Biocontrol Strategy Development Workshop held in Auckland, New Zealand, in November 2009 heard how introduction of the coccinellid beetle, *Rhyzobius lophanthae* against the cycad aulacaspis scale (*Aulacaspis yasumatsui*) in Palau is showing promising results. Ornamental cycad plants that had been reduced to withered brown remnants following attack by the scale are showing signs of regeneration, and it is hoped that the releases will slow further spread of the pest.

Aulacaspis yasumatsui has been identified as a major threat to wild cycad populations and conservation collections around the world, as well as a costly pest for horticultural sectors. The scale, which attacks primarily species in the genus *Cycas,* is native to Southeast Asia but has been introduced to other countries in the New World (where it was first reported as a pest in Florida, USA, in 1996), Africa and Asia, as well as the Pacific.

Following the pest's arrival in Guam in 2003, Palau banned imports of cycads in an effort to prevent invasion, but it eventually evaded these quarantine restrictions and was found in Palau in 2008. As of October 2009, 36 infested sites had been recorded, all involving introduced cycad species on the main islands of Koror and Babeldaob. At risk, however, are the abundant native cycads found on the isolated Rock Islands; in Guam, it has been reported that some 60% of native cycads have died as a result of *A. yasumatsui* infestation.

Rhyzobius lophanthae, a generalist predator of diaspid (armoured), scales from Australia has been introduced as a control agent for diaspids to many countries since it was first introduced to the US state of California in 1892. More recently, it was introduced to Guam as part of the biocontrol effort against *A. yasumatsui* in 2003. The material released in Palau was sourced from there. With help from University of Guam entomologist Dr Aubrey Moore, cultures of the biocontrol agent were successfully established and releases made at 29 sites (including the Rock Islands). The coccinellids were subsequently found at 26 of these with evidence of local dispersal, and at a further 7 sites where no releases had been made.

The *R. lophanthae* culture is being maintained to allow releases when new infestations are found. As well as maintaining vigilance for new outbreaks, the project has conducted a public awareness campaign asking people not to cut down their cycad plants to allow *R. lophanthae* to feed on the scale.

The biocontrol project in Palau is a collaborative venture involving the University of Guam, the US Department of Agriculture (USDA) Forest Service, and the Secretariat of the Pacific Community (SPC).

Meanwhile, the search for new and effective natural enemies of the cycad aulacaspis scale continues to be conducted by Dr Ronald D. Cave of the University of Florida and Dr Ru Nguyen of the Florida Depart-

ment of Agriculture and Consumer Services. During exploration in Thailand in October 2007, they found a bright orange coccinellid causing devastation to cycad aulacaspis scale populations on *Cycas siamensis* in a forest near Sub Tao. Predation by beetles on infested plants in this area was widespread. Numerous larvae, pupae and adults were shipped to Florida where colonies are now maintained in quarantine in Gainesville and Fort Pierce. A return trip to the same area in June 2009 resulted in the collection of numerous adults and larvae on *C. siamensis* in a dipterocarp forest on the grounds of the Sakaerat Environmental Research Center and the effectiveness of the predator to control the scale insect was again observed. The predatory beetle belongs to the genus *Phaenochilus* but is new to science; Dr Natalia Vandenberg (USDA taxonomist) and graduate student Adriano Giorgi (University of Georgia, USA) are formally naming and describing the species. Adults and larvae of *Phaenochilus* n. sp. have been exposed to other armoured scales, soft scales, whitefly nymphs, aphids, mealybugs, psyllids, thrips, citrus leafminer larvae, other coccinellid larvae, and green lacewing larvae. Predation was noted only on other armoured scale species and a few whitefly nymphs. Due to its host specificity, voracious consumption rate, and extended adult longevity, it is a good candidate for biological control of the pest. A petition for field release of *Phaenochilus* n. sp. was submitted to APHIS PPQ (USDA Animal and Plant Health Inspection Service – Plant Protection and Quarantine) in January 2010 and is awaiting decision.

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Buddleia Leaf Weevil off to a Promising Start in New Zealand

Adorned with long panicles of purple flowers and abundant blue-green leaves, *Buddleja davidii* (buddleia or butterfly bush) is an attractive shrub that is native to China. It is also a major weed species that has filled most of its potential distribution in Europe, and has the potential to spread much further in Africa, North and South America and Australia. In New Zealand it was first recorded as naturalized in 1946. It has become a serious problem in forests of the central North Island, where it hinders the establishment of native and exotic trees. It is especially problematic in valued *Pinus radiata* plantations, where it reduces growth of young plants by shading. Successful biological control of buddleia could lead to a reduction in the use of herbicides currently employed as the only effective means of weed control in establishing pine plantations, and result in significant cost savings to forestry companies.

Two weevils were identified in China as potential biological control agents for buddleia, based on their apparent host specificity, dispersal and abundance. Of these, a small external leaf-feeding weevil *Cleopus japonicus* (buddleia leaf weevil), belonging to the very host-specific tribe Cionini, became the focus partly due to ease of rearing. *Cleopus japonicus* is multivoltine, and both the slug-like larva and the adult cause damage. Approval to release *C. japonicus* was attained from the Environmental Risk Management Authority in November 2005. In 2006, New Zealand Forest Research Institute (Scion) entomologists released the weevil as the first biological control agent worldwide for buddleia.

Prior to its release, a population dynamics model developed for the weevil indicated potential for positive benefits from releasing it in New Zealand (see [1] and references therein). However, buddleia has an impressive ability to respond positively to the effects of defoliation.

Five sites within commercial forests in the North Island were chosen for initial releases in 2006, and establishment was confirmed in all sites the following spring. The edge of the population has been measured to be moving outwards at a rate of approximately 100 m per annum. Population density built up relatively rapidly, and the first appearance of significant buddleia defoliation, with the removal of up to 95% of green leaf tissue in localized areas, was recorded in the autumn of 2008. Cautious excitement after this event was replaced by optimism, when the pattern of defoliation was repeated in the autumn of 2009. Leaf damage recorded on buddleia peaked in March and April (early autumn in New Zealand), corresponding with an increase in the number of larvae.

To a greater extent than expected, *C. japonicus* appears to be undergoing a summer aestivation, even in central New Zealand's relatively mild summers. This was not apparent in the first year of monitoring, but in the following two years when summer above-average daily maximum temperatures of 30°C were attained, only one single larva was recorded on buddleia in January (mid summer).

Recent research by Thomas *et al.* [2, 3] on the impact of leaf removal on *B. davidii* has revealed that continued defoliation across multiple growing seasons is needed to suppress buddleia. One complete season of repeated 66% leaf defoliation caused buddleia to compensate with 52% greater total emergent leaf area and longer leaf retention. The promising results from these and other studies are that repeated defoliation induces changes in nitrogen remobilization in the plant, and causes a subsequent decline in biomass production of roots and flowers. The next step will be to examine the interactions between buddleia growth and reproductive traits and defoliation by *C. japonicus*.

Concern arose during the original host-specificity testing of *C. japonicus* surrounding a potential threat to *Hebe speciosa*, which is a culturally important native plant to New Zealand Maori, because a single *C. japonicus* larva developed into an adult on it. During the ensuing additional testing, no further individuals developed on either *H. speciosa* or other *Hebe* species that were tested. However this example

heightened the importance of monitoring field host ranges of weed biological control agents post-release. The laboratory host testing of *C. japonicus* revealed that, apart from ornamental *Buddleja* species, plants most at risk from non-target attack in New Zealand are exotic weed species in the Scrophulariaceae, *Scrophularia auriculata* and *Verbascum virgatum*, followed to a much lesser extent by *Myoporum laetum* (Myoporaceae) and species in the *Hebe* genus (previously placed in the Scrophulariaceae). *Verbascum virgatum* was the only non-target species present in New Zealand outside the genus *Buddleja* which was found to be a complete host for *C. japonicus*. The other species are likely to suffer from light feeding damage only, with no possibility of self-sustaining populations of *C. japonicus*.

It was predicted that *C. japonicus* larvae pose the most immediate threat by either dropping from the buddleia canopy onto non-target plants beneath, or falling upon abscised leaves of buddleia onto foliage of other plants below. Adult *C. japonicus* were predicted to be a minimal threat to non-target plants, unless buddleia plants become locally scarce, as they are able to fly to new buddleia host plants and are thus more selective.

This was studied further at four of the release sites using three selected *B. davidii* plants that harboured *C. japonicus* and were within 20 m of the release area. One each of four non-target plants (*S. auriculata, V. virgatum, H. speciosa* and *M. laetum*) were planted at the edge of each buddleia canopy (as these plants are otherwise not sufficiently abundant locally to allow effective non-target monitoring). There was evidence that adult weevils visited all non-target plants occasionally during the trial, but numbers recorded were too low on the non-target plants for meaningful analysis. The suspicion that larvae would be able to spill over onto plants growing directly beneath the buddleia canopy was borne out as larvae were recorded on all non-target species during the trial, with *S. auriculata* carrying the greatest number. However, the number of larvae on *B. davidii* was substantially higher at all times. It was at the warmest sites that spill-over of larvae from heavily defoliated buddleia onto non-target plants was greatest. This field trial has verified the results of host-specificity testing of *C. japonicus* in both the laboratory and previous open-field trials. Feeding damage and survival on the exotic weeds *V. virgatum* and, to a lesser extent, *S. auriculata* were predicted in the laboratory testing, with a clear preference being shown for the target weed, buddleia. Thankfully no New Zealand native plants, including *H. speciosa*, are likely to receive any non-target impacts from *C. japonicus*.

It remains uncertain whether the rates of dispersal and population increase measured to date by *C. japonicus* will be sufficient for this agent to be considered a success for New Zealand forest managers. This is because the criteria for economic success require *C. japonicus* to be able to exert sufficient defoliation pressure to suppress buddleia height within the first three years within newly planted forests, a big ask! What is certain is that *C. japonicus* has established rapidly and is off to a promising start.

[1] Kriticos, D.J., *et al.* (2009) A process-based population dynamics model to explore target and non-target impacts of a biological control agent. *Ecological Modelling* **220**(17), 2035–2050.

[2] Thomas, M.M., *et al.* (2008) The impact of defoliation on nitrogen translocation patterns in the woody invasive plant, *Buddleja davidii*. *Functional Plant Biology* **35**, 462–469.

[3] Thomas, M.M., *et al.* (2008) Influence of defoliation on reproductive capacity and growth of *Buddleja davidii*. *Weed Research* **49**, 67–72.

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DFID's Biocontrol Best Bets

Biocontrol technologies figure in two of the projects selected for funding under the first round of the UK Department for International Development (DFID) Research into Use (RIU) 'Best Bets' initiative. This innovative competitive funding mechanism is providing UK£5 million of grant aid to a number of large-scale technology promotion activities.

Developed from a television reality show model, project ideas are pitched to an expert panel which recommends how the programme money should be invested, although the process is far less confrontational than the television version and the application process is intended to be developmental and result in learning for both applicant organizations and RIU. The objective is to identify promising proposals that take existing agriculture research knowledge and put these into use in ways that will benefit the poor (and others) in developing countries through partnerships in which the private sector plays a major role.

In the first round of the Best Bets programme, more than 100 project proposals from East, central and southern Africa were short-listed to eight. Two representatives of each short-listed project then 'pitched' their proposal to an independent panel drawn from leaders in the African business, finance, research and development communities in Nairobi, Kenya, in November 2009. Four of the projects were finally selected for investment totalling more than £1.5 million, and two of these include significant biocontrol components.

'Safe and affordable armyworm control tools' (SAACO-Tools), led by CABI Africa in partnership with the Eco-Agri consultancy services and the Ministry of Agriculture, Tanzania, will tackle armyworm outbreaks in East Africa. Current heavy reliance on imported pesticides and centralized armyworm forecasting does not meet the needs of the rural smallholders. The project will establish a system for the production, distribution and marketing of SAACO-Tools, i.e. a tool for local forecasting of outbreaks, and a cheaper biological pesticide for controlling them.

'Farmer-applied biocontrols and seed treatments', led by the Real IPM Company Ltd (Thika, Kenya), will promote yield improvement in smallholder maize, sorghum and millet in Kenya's Nyanza Province. Working with small-scale farmers who save their own seeds, the project aims to increase productivity by using a mycoherbicide to control the parasitic weed *Striga*, and encouraging seed priming. Integrating the two techniques is expected to facilitate significant increases in yields.

The next round of RIU Best Bets will be held in Ghana in March 2010.

Source: DFID (www.researchintouse.com/index.php?section=5&subsection=74).

Landcare Secures More Beating Weeds Funding

New Zealand's Landcare Research has announced funding for six years from the Public Good Science Fund for a second phase of the 'Beating Weeds' programme. This collaborative venture is led by Landcare with major research inputs from two other Crown Research Institutes (AgResearch and Scion), universities (Auckland, Canterbury, Lincoln and Massey) and the Department of Conservation. Beating Weeds II is divided into two parts: 'Improved targeting of weeds' and 'Improved environmental weed management'.

The targeting component focuses on tackling weeds before they become widespread, and includes continuing current work on prioritizing potential and emerging threats. Research in this area aims to enable end-users to do this by developing a robust, quantitative system using models incorporating the plants' potential distribution, spread rate, difficulty of control, and impacts on the agricultural and conservation sectors. In addition, through analysing successful biocontrol programmes from around the world, it will predict the best targets for biocontrol in New Zealand.

The management component has two objectives. The first is to provide better weed control tools to improve cost-effectiveness and efficacy, and reduce non-target damage. According to the leader of the Beating Weeds programme, Simon Fowler, "More research is needed into factors which limit agent efficiency." Work is planned on improving understanding of biocontrol agent ecology and evolutionary interactions, and exploring the potential of bacteria and viruses as control agents. In addition, recognizing that herbicides are commonly used for weed control, research will also look at substantially improving and refining herbicide efficiency and minimizing damage to non-target species. The second objective is to quantify benefits of weed control for native biota and ecosystem services, rather than focusing on management effort or impacts on target weeds. This will be done by developing bioeconomic models that combine new knowledge of invasive weed and native plant population ecology and the economics of different control methods. The aim is to help managers to maximize ecosystem gains for the amount spent on weed control.

Source: *What's New in Biological Control of Weeds*, No. 50, November 2009. Landcare Research, New Zealand Ltd 2009.

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Conference Report

International Congress on Biological Invasions

The International Congress on Biological Invasions (ICBI; www.icbi2009.org) was held in Fuzhou, China, on 2–6 November 2009, in response to the global challenge of IAS (invasive alien species) and in conjunction with the International Day for Biological Diversity – IAS in 2009, as well as the International Year of Biodiversity in 2010. It was planned, supported and jointly sponsored by the Chinese Academy of Agricultural Sciences (CAAS) and CABI, and organized by the Fujian Agriculture and Forestry University and Fujian Academy of Agriculture Sciences, in collaboration with Agriculture and Agri-Food Canada, CSIRO Australia, Kansas State University, USA, USDA-APHIS (US Department of Agriculture – Animal and Plant Health Inspection Service), FAO/IAEA (UN Food and Agriculture Organization/International Atomic Energy Agency), the Institute of Plant Protection of CAAS, the Chinese Society of Plant Protection, and GISP (Global Invasive Species Programme), with supplementary financial support provided by The Crawford Fund and AusAID. The aim of the congress was to "strengthen international collaboration and work together towards managing biological invasions under global change".

The congress drew more than 500 participants from 44 countries. Australia was particularly well represented, with participants from both the public and private sectors. There were two plenary sessions (with keynote speeches, country reports, case studies and international organization reports), 14 symposia (covering basic research, technology development and knowledge management, etc.), two pre-congress workshops on 'Managing invasive species risks: from assessment of risks to management and recovery' and 'Canada–China Taxonomy Workshop', and a satellite meeting, 'Bio-resource utilization of invasive plants', as well as a poster session.

ICBI 2009 concluded with unanimous support for the 'Fuzhou Declaration' which has three main outcomes. (1) It calls on governments, international organizations and conventions to reaffirm their commitment to implementing Article 8h of the Convention on Biological Diversity (CBD) (www.cbd.int/convention/articles.shtml?a=cbd-08).
(2) It establishes an International Expert Group on Biological Invasions to provide scientific, technical

and policy guidance to ICBI. (3) It recommends that ICBI becomes a regular (four-yearly) international event on biological invasions.

Publications in association with the congress include a 'virtual issue' of the *Journal of Applied Ecology*, edited by Philip E. Hulme, with papers on 'Key perspectives in the management of biological invasions. Access to these papers is free online (www.journalofappliedecology.org/view/0/virtualissueoct09.html). Plans are underway for a special issue of *Biological Invasions* which will include the three best papers from each congress symposium, as judged by the symposium convenors. A book entitled *Research on biological invasions in China*, co-authored by CAAS and CABI staff, with support from the CABI Development Fund, was distributed to the congress participants.

Annual Biocontrol Industry Meeting

The 4th Annual Biocontrol Industry Meeting (ABIM) was held in Lucerne, Switzerland, on 19–20 October 2009. This is the prime international meeting of the biocontrol industry, and novel and safe biological crop protection products were presented and new trends in the global market discussed. With the support of the European Commission, the meeting was organized by the International Biocontrol Manufacturers Association (IBMA) and the Research Institute of Organic Agriculture (FiBL). ABIM-Lucerne provides an annual meeting place specifically adapted to the needs of the biocontrol industry.

During the two days of the conference, over 350 delegates representing more than 200 companies and organizations from all over the globe exchanged experiences and obtained information on the latest products and developments on the world market. The vast majority of company representatives were reported to be highly satisfied with the outcome of the conference.

In the scientific programme, 25 presentations covered the latest developments in market development, regulatory affairs and novel products for plant protection. In addition to these presentations, information was on display on stands and in posters in the exhibition hall. All presentations are now available for downloading.

The 5th ABIM, ABIM-Lucerne 2010, will be held on 25–26 October this year. The keynote themes and programme will be posted on the website.

Web: www.abim-lucerne.ch/

Pacific Biocontrol Workshop

The Pacific Biocontrol Strategy Development Workshop, held in Auckland, New Zealand, in November 2009 was attended by plant health and quarantine specialists from Fiji Islands, Cook Islands, Palau, Guam, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, American Samoa, Samoa, Niue, Solomon Islands, Papua New Guinea (PNG), Vanuatu and Tonga, as well as scientists from New Zealand, Australia, Hawaii and the UK. The workshop developed a draft regional strategy and plans for the immediate future as well as the medium- and long-term on how the region can utilize biological control in agriculture, forestry and environmental management in the Pacific.

Participants learnt about current biocontrol projects in the region, including those against: cycad aulacaspis scale (*Aulacaspis yasumatsui*) in Palau – the subject of an article in the General News section of this issue; *Mikania micrantha* in Fiji Islands and PNG; *Chromolaena* in PNG; coconut scale (*Aspidiotus destructor*) in Cook Islands; and rhinoceros beetle in Samoa. Future targets for biological control that were discussed included African tulip tree (*Spathodea campanulata*) and invasive ants.

A presentation from Mic Julien (CSIRO Australia) demonstrated the potential for simple, cheap and fast results by moving safe biocontrol agents from one Pacific country to another, as illustrated by the control of water hyacinth (*Eichhornia crassipes*) seen in PNG being repeated in Fiji. Similarly, known agents can be introduced from outside the region; e.g. tried-and-tested agents for *Mimosa pigra* from Australia with potential for PNG, and those for noogoora burr (*Xanthium pungens*) for Fiji. The Pacific region could also benefit from on-going research in other countries; e.g. from New Zealand efforts to identify biocontrol agents for banana passionfruit (*Passiflora mollissima*).

Particular challenges for biocontrol work in the region were identified: extreme weather events and climate change; and limited expertise, financial resources and quarantine facilities. However, with biological control often the only logical response to invasive pests for the Pacific, traditional knowledge of rural communities should also be exploited.

Discussions focused on lessons learnt in conducting biocontrol work and ways to develop a strategy for safely using this tool for managing invasive pest threats in the region. For example, based on experiences elsewhere, countries are to be urged to: (a) consider eradication of pests before introducing biocontrol; (b) develop linkages between agriculture and biodiversity sectors so they are not at odds as has happened in the past; (c) strengthen biosecurity systems to stop new invasives entering the islands; (d) assess the extent or size of an invasion, get agreement from all relevant stakeholders if the invasive is a targeted pest, and *not* use vertebrate animals for biocontrol or targets; (e) ensure completion of appropriate host testing, and *not* 'rush in' with biocontrol agents; and (f) take a regional approach and share costs and expertise so individual countries or organizations do not carry the burden.

Public awareness was identified as critical to any successful biocontrol campaign. In some cases, biocontrol agents must be accepted as part of an integrated pest management strategy. Policy makers must also be made aware of the benefits of biocontrol to facilitate the smooth introduction of useful biocontrol agents, host-testing research and field release of proven safe agents.

The Pacific Biocontrol Workshop ended by emphasizing that biocontrol is the only logical and sustainable solution for managing widespread or localized invasive pests in the region, and stressing the need to work together with the larger islands and countries to share knowledge, capacity and best practice techniques.

A steering group has now been set up to develop a regional biocontrol strategy for the Pacific and to seek funding from donors for regional projects.

The workshop was organized by the Secretariat of the Pacific Community (SPC) Land Resources Division (LRD), Landcare New Zealand, the US Department of Agriculture – Forest Service in Hawaii, the Pacific Invasives Initiative, and the Pacific Invasives Learning Network based at SPREP (Secretariat of the Pacific Regional Environment Programme).

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Conference Announcements

ENToM 2o1o

ENToM 2o1o, which takes place in Juan-les-Pins, France, on 5–7 May 2010, aims to bring together the broad community of scientists working on entomophagous organisms, from academics to applied scientists – notably those working in biological control – and thereby strengthen links between the disciplines. Although taking place under the auspices of the 37th Annual Entomophagists' Meeting, the organizers stress that the new name represents an expansion of its traditional remit to include all entomophagous taxa: predators, fungi, nematodes, insectivorous plants and birds, as well as its traditional area of insect parasitoids.

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Web: https://colloque.inra.fr/entom2010

Joint IOBC Nearctic/Neotropical Sections Conference

The Nearctic and Neotropical Regional Sections of the International Organization for Biological Control of Noxious Animals and Plants (IOBC) are hosting a scientific conference on 11–13 May 2010 in Niagara Falls, Ontario, Canada, with the theme 'Biocontrol in the Americas – Past, Present and Future'. The organizers say the current controversy over accessing and benefit sharing of biological resources in other countries makes it important to better understand biological control programmes elsewhere and how technology can be shared to the mutual benefit of all parties. The keynote speaker for the meeting, Dr Jacques Brodeur, President of IOBC Global, will provide an update on the IOBC Commission on Biological Control and Access and Benefit Sharing. The conference will include symposia topics, addressed by invited speakers, on a wide range of topics including invasive pests, risks and benefits of exploration for biocontrol agents in the Americas, ecosystem landscapes and habitat management for integrated pest management, challenges and successes for commercialization and implementation of biocontrol agents, microbial biological control, weed biocontrol, biological control with egg parasitoids and more. Poster presentations are welcomed.

Contact: Les Shipp, President, IOBC-Nearctic Regional Section, Agriculture and Agri-Food Canada. (Les.Shipp@agr.gc.ca).
Web: www.iobcnrs.com/event_5-11-10.htm

Biological Control for Nature

A Conference on Biological Control for Nature is being held in Northampton, Massachusetts, USA, on 3–7 October 2010. This meeting will explore the benefits of classical biological control for the control of invasive insects and weeds in natural forests, and associated habitats such as wetlands, grasslands and deserts. Applications to islands and other natural systems will be included. The meeting will *not* address other forms of biological control (augmentation, conservation, biopesticides), nor use of biological control in plantation forestry. Numbers are limited to just 150 people so early registration is encouraged.

Contact: Mark Hoddle / Roy Van Driesche (mark.hoddle@ucr.edu / vandries@nre.umass.edu).
Web: http://biocontrolfornature.ucr.edu/

Invasive Species in Natural Areas

The Northern Rockies Invasive Plant Council (NRIPC) is holding the 2nd NRIPC Invasive Species in Natural Areas Conference in conjunction with several biocontrol consortia meetings and the W-2185 Regional Workgroup at Coeur d'Alene Resort, Idaho, USA, on 25–29 October 2010. Although the meeting is in the USA, it is by no means restricted to US researchers. Plenum speakers from Europe have been confirmed and colleagues from other continents are encouraged to attend and present.

Web: www.nripc.org/conferences.html
Email: conference@nripc.com

Invertebrate Pathology and Microbial Control

The 10th International Colloquium on Invertebrate Pathology and Microbial Control and 43rd Annual Meeting of the Society for Invertebrate Pathology will be held on 11–15 July 2010 at Karadeniz Technical University, Trabzon, Turkey. With insect-specific pathogens as a subset of biological control agents, the meeting will be of interest to many *BNI* readers.

Web: www.sip2010.org/

Invasive Alien Plants in Mediterranean Type Regions

The 2nd Workshop on Invasive Alien Plants in Mediterranean Type Regions of the World is to be held on 2–6 August 2010 in Samsun, Turkey. Ideas and proposals for sponsors and topics are welcome. This workshop, which is being organized by the Turkish Plant Protection Organization, the Council of Europe and EPPO (European and Mediterranean Plant Protection Organization), will consist of two days of presentations and discussions, and will be followed by two days of fieldwork.

Contact: Sarah Brunel, EPPO (brunel@eppo.fr).
Web: http://archives.eppo.org/MEETINGS/2010_conferences/mediterranean_ias.htm

Combined Chromolaena and Parthenium Workshops

The 8th IOBC International Workshop on Biological Control and Management of *Chromolaena odorata* and Other Eupatorieae, and the 1st IOBC International Workshop on Biological Control and Management of *Parthenium hysterophorus* will be held in Nairobi, Kenya, on 1–5 November 2010.

Contact: Dr Costas Zachariades, ARC-PPRI, S. Africa. (ZachariadesC@arc.agric.za or costaszach@yahoo.co.uk)
Web: www.arc.agric.za 'Quick Links' or www.arc.agric.za/home.asp?pid=5229

Publications

Atkinson, P. W. (Ed) Vector biology, ecology and control. Springer (2010) 260 pp.
ISBN 9789048124572 Price £117, $179, €129.95.

Gisi, U.; Chet, I.; Gullino, M. L. (Eds) Recent developments in management of plant diseases (Plant Pathology in the 21st Century, Vol. 1). Springer (2010) 377 pp. ISBN 9781402088032
Price £117, $169, €129.95.

Prusky, D.; Gullino, M. L. (Eds) Post-harvest pathology (Plant Pathology in the 21st Century, Vol. 2). Springer (2010) 211 pp. ISBN: 9781402089299 Price £90, $129, €99.95.

Gnanamanickam, S. S. Biological control of rice diseases (Progress in Biological Control, Vol. 8). Springer (2009) 108 pp. ISBN 9789048124640 Price: £90, $129, €99.95.

Lundgren, J. (Ed) Relationships of natural enemies and non-prey foods (Progress in Biological Control, Vol. 7). Springer (2009) 460 pp.
ISBN 9781402092343 Price: £117, $199, €129.95.

Bruin, J.; van der Geest, L. P. S. (Eds) Diseases of mites and ticks (Reprinted from Experimental and Applied Acarology, 46:1–4). Springer (2009) 350 pp. ISBN 9781402096945 Price: £112.50, $189, €124.95.

Langor, D. W.; Sweeney, J. (Eds) Ecological impacts of non-native invertebrates and fungi on terrestrial ecosystems (Reprinted from Biological Invasions, 11:1). Springer (2009) 157 pp.
ISBN: 9781402096792 Price: £62.99, $109, €69.95.

Inderjit (Ed) Management of invasive weeds (Invading Nature - Springer Series in Invasion Ecology, Vol. 5) Springer (2008) 364 pp.
ISBN 9781402092015. Price: £99, $149, €109.95.
Web: www.springer.com

Stewart, C. N., Jr. Weedy and invasive plant genomics. Wiley-Blackwell (2009) 272 pp.
ISBN 9780813822884 Price: £120, $199.99, €166.70.

Walters, D. (Ed) Disease control in crops: biological and environmentally-friendly approaches. Wiley-Blackwell (2009) 280 pp. ISBN 9781405169479
Price: £99.50, $199.99.
Web: www.wiley.com/

Clout, M. N.; Williams, P. A. (Eds) Invasive species management: a handbook of principles and techniques. (Techniques in Ecology & Conservation) Oxford University Press (2009) 320 pp.
ISBN: 9780199216321 Price: £65.

Davis, M. A. Invasion Biology. Oxford University Press (2009) 288 pp. ISBN 9780199218769
Price: £32.50, $55.
Web: www.oup.co.uk/

Muniappan, R.; Reddy, G.V.P.; Raman, A. (Eds) Biological control of tropical weeds using arthropods. Cambridge University Press (2009) 508 pp.
ISBN 9780521877916 Price: £70, $126.

Gange, A. C.; Brown, V. K.; (Eds) Multitrophic interactions in terrestrial systems: 36th Symposium of the British Ecological Society (Symposia of the British Ecological Society). Cambridge University Press (2009) 460 pp. ISBN 9780521100557
Price: £29.99, $55.
Web: www.cambridge.org/