CABI in the Americas and Caribbean

KNOWLEDGE FOR LIFE

Projects and Activities by Country

USA

Introduction

As an intergovernmental organisation, CABI's strategies, programmes and projects are driven by the concerns and needs of its 49 member countries. The regional consultations are an important process that significantly shape future collaborations between CABI, its member countries and partners. These triennial consultation meetings aim to align CABI's work more effectively with national and regional needs, and help to develop mutually agreed frameworks for appropriately funded and resourced activities, with commitment from both CABI and our national partners.

At the last regional consultations, held in 2015 and 2016, CABI was mandated to provide support in FIVE priority areas, plus FOUR cross-cutting areas to fit with CABI's capabilities and to address donors' priorities:

Five priority areas

1. Trade and market access
2. Knowledge management, communication and use
3. Food and nutrition security
4. Plant health systems
5. Biodiversity and ecosystem management (incl. Invasives species management)

Four cross-cutting issues

1. Capacity building and governance
2. Public-private partnerships
3. Women and youth empowerment
4. Support for monitoring, evaluation and impact analysis

CABI's medium term strategy from 2017 to 2019 has addressed member country priorities and linked these with the Sustainable Development Goals (SDGs) (see Appendix).

The outcomes of the regional consultations will feed into CABI's next Review Conference, scheduled for 12-13th September 2019, and guide the revisions of CABI's next medium term strategy from 2020 to 2022.

This document summarises CABI's projects, programmes, initiatives and activities which have addressed these priority areas since 2016. Some priority areas may change following review at the regional consultations in 2018 and 2019.

1 Development of trade and market access for safe food, domestically, regionally and internationally

- Provide advice and support for farmers on aspects such as GAP compliance, Phytosanitary standards and compliance, advice on crop diversification (e.g. HVH), post-harvest management, improving quality of agricultural inputs, access to market information, improved technology, improved range management for livestock
- Support for market access along value chains, including SPS compliance and standards harmonisation, food safety
- Stimulate the creation of farmer organisations, developing entrepreneurial and commercial skills, risk management, access to affordable credit
- Strengthen support for food safety, including information on legislative and regulatory requirements, prevention of mycotoxins, maximum residue levels, heavy metal contamination, animal health and welfare, zoonotic diseases and the safe use of veterinary drugs
- Develop public-private partnership to support smallholder market access along value chains, including SPS compliance and standards harmonisation, food safety

2 Knowledge management, communication and use

- Improve communication with development stakeholder groups for greater reach, frequency and impact of messaging to stimulate technology uptake and deliver new knowledge to farmers using mixed methods (including mass media such as mobile and social media as well as extension approaches based on face-to-face interactions), gender inclusive approaches for all stakeholder groups, particularly use of ICTs (including e-M&E; e-statistics and e-vouchers)
- Expand the scope of CABI's support to advisory services to include soil health, selection of crop and seed varieties, integrated water and land management, animal health and welfare
- Assist national services with information and data management, e.g. publication of and access to authoritative information resources, archiving and managing research data, awareness-raising and policy development for open and big data policies

3 Systems approach to Plant Health

- Support farmers for informed decision-making at the farm level through strengthened extension services able to advise on IPM in high value and staple crops, rational use of agrochemical inputs including biofertilizers, biotechnology applications for pests and diseases including biopesticides and biological control agents
- Develop better approaches to manage pollinators, soil health and ecosystem services supporting agriculture
- Support plant health systems including aspects such as improved diagnostic skills at all levels, informed advice on new resistant varieties, seed selection, and GM crops, informed policy leading to an improved regulatory and legislative environment, optimising links between different sectors
- Build resilience in farming systems at all levels to better adapt to climate and other changes, including the management of a range of biophysical stressors including pests (IPM), water (IWM), and soil nutrients (INM), and early warning and rapid response systems for newly emerging / key pests and diseases
- Promote access to quality controlled agricultural inputs (seeds, fertilizers, chemicals)
- Strengthening support for livestock management, including improved range management, advice regarding zoonotic diseases, and the safe use of veterinary drugs

4 Food and nutrition security

- Contribute to improved food security at all levels by the application of technology including new crop varieties to improve efficiency and productivity, reduction of post-harvest losses through improved storage, post-harvest processing and preservation
- Promote the development of nutrition sensitive agriculture through support to aspects such as awareness raising and policy development, human health and food safety, advice on nutraceuticals and bio-fortification advice, food preparation, food / diet diversification
- Strengthening seed systems, including aspects such as improved genetic materials, availability of neglected crops, and improving self-saved seed
- Promote Climate Smart Agricultural practices that reduce greenhouse gas emissions, adapt to changing conditions and improve resilience
- Promote agricultural diversification and the use of indigenous crops
- Support cash crops, fodder, fuel, and fibre production and ornamentals

5 Biodiversity and ecosystem management

- Improve prevention and management of invasive species using national and regional approaches, including capacity building in remote diagnostics, strengthen capacity for management and control of terrestrial and aquatic invasives
- Develop capacity to use microbial resources, e.g. pharmaceutical and nutraceutical production, biopesticides, composting and waste management
- Comply with Nagoya Protocol, and promote its use, in support of Convention on Biological Diversity
- Build a coalition of funding partners to prevent, eradicate or manage the invasive insects and weeds constituting the greatest threats to food security, livelihoods and biodiversity

Four cross-cutting issues

1. Capacity building and governance

2. Public-private partnerships

3. Women and youth empowerment

4. Support for monitoring, evaluation and impact analysis

Action on Invasives

Location: Global

Dates: Ongoing

CABI Project Manager: Roger Day

CABI Project Team: Julien Godwin, Abdul Rehman, Gareth Richards

Donors: Department for International Development (DFID); Directorate-General for International Cooperation (DGIS)

Partners: Plant Protection and Regulatory Services Directorate – Ministry of Food and Agriculture, Ghana; Local partners in Ghana and Pakistan

Invasive species impact the livelihoods of the rural poor who are dependent on natural resources for income and food security. CABI is implementing an ambitious programme to address this complex issue. We are working with local, national and regional partners, and across agriculture, environment and other sectors, to create an integrated and sustainable framework for addressing the problem of invasive species, generating growth, creating jobs and helping to reduce poverty.

Initial focus species are Fall armyworm, Parthenium and tomato leaf miner. We have supported national planning in Ghana and Pakistan, and have produced an Evidence Note on Fall armyworm (commissioned by DFID) that has been widely referred to.

Control methods, including classical biological control for both Parthenium and Fall armyworm, are being tested and we are identifying priority pest risks species in Kenya that we can either prevent or detect. We have completed baseline surveys of farmers' practices, knowledge and losses have been completed.

We have also conducted major communication campaigns to promote awareness and management of Fall armyworm (Ghana, Uganda, Zambia) and Parthenium (Pakistan); reaching large numbers of people through multiple communication channels.

Our free Invasive Species Compendium is also being substantially enhanced through the project. It will include specialised portals for high priority species, a horizon scanning tool which has been launched and we are soon releasing a pest risk analysis tool which we are training National Plant Protection Organisations on who contributed to its design.

We would soon like to expand the programme to additional countries and species in South Asia and Africa.

www.cabi.org/action-on-invasives

SYSTEMS APPROACH TO PLANT HEALTH

AgPortal

Location: Global

Dates: 01/02/2017 – Ongoing

CABI Project Manager: Trevor Nicholls

CABI Project Team: Mary O'Connor, Derek Tapp, Tim Khouri, Phil Abrahams, Henry Mibei, Cambria Finegold, Ulli Kuhlmann, Melanie Bateman, Mike Frewin

AgPortal is designed to be an agri-advisory service that assists intermediaries, such as agronomists, to accurately diagnose, manage and report on pests and diseases when in the field. The service will help them to identify pests and diseases, and record any observations they might make in the field. The service will provide information on what control methods can be used, as well as tools to determine the appropriate pesticide dosage. It will also provide traceability reports to show what pesticide was applied when. The service is designed to increase the professional capability of those that interface with the farmer.

So far, we have built a prototype and we are currently identifying the right business model.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

An old problem revisited: biological control of toadflaxes

Location: Canada, USA

Dates: 01/01/1987 – Ongoing

CABI Project Manager: Hariet L Hinz

CABI Project Team: Ivo Toševski

Donors: Agriculture and Agri-Food Canada (AAFC); British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada; Montana Noxious Weed Trust Fund through Montana State University, USA; South Dakota Department of Agriculture; United States Department of Agriculture (USDA), USDA – Animal and Plant Health Inspection Service (APHIS); USDA-APHIS – Center for Plant Health Science and Technology (CPHST); US Forest Service through Montana State University; Wyoming Biological Control Steering Committee, USA

Partners: Dr Roberto Caldara, Milan, Italy; Dr Brent Emerson, Island Ecology and Evolution Research Group, Spain; IPNA-CSIC, La Laguna, Spain; Dr Rosemarie De Clerck-Floate, Agriculture and Agri-Food (AAFC), Canada; Dr Sharlene Sing, US Forest Service; Rocky Mountain Research Station, USA

Native to Europe, toadflaxes were introduced to the USA and Canada over 100 years ago as ornamental plants. They now occur over much of temperate North America and are declared noxious in eight US states. CABI is part of an effort to identify specific natural enemies that can be introduced into North America as biological control agents to reduce the vigour, density and spread of this invasive plant.

Following research, a shoot-galling weevil, *Rhinusa pilosa*, has been released in Canada and release in the USA is still pending. Testing with its sister species, *R. rara*, on Dalmatian toadflax has been completed and data sent to our North American counterparts. Further work is still being carried out on other insects which attack the plant in its native range.

www.cabi.org/toadflax

Agroecology assessment for three Caribbean Islands

Location: Trinidad & Tobago, Jamaica, St Lucia

Dates: 11/01/2018 – 30/10/2018

CABI Project Manager: Naitram (Bob) Ramnanan

Partners: The Food and Agricultue Organizations (FAO); Ministries of Agriculture in Jamaica; Trinidad and Tobago and St. Lucia.

Agroecology applies ecological principles to agricultural production systems, providing new ways of managing the land. We are assessing three islands: Jamaica, Trinidad and Tobago, and Saint Lucia and plan to undertake three baseline studies to describe the major crops, livestock, forestry and aquaculture production systems and their potential for integrated agroecological production. We will also assess the opportunities and obstacles that will help improve the current status of rural youth employment. This will be followed by group discussions, webinar series and a regional workshop. A final report will then be submitted to FAO in order to develop a full size project.

So far, three baseline reports have been completed and group discussions have begun. The six part webinar series will be completed in September 2018 and a regional workshop will follow.

Assessing a biocontrol agent for Jatropha gossypiifolia

Location: Trinidad and Tobago, Australia, UK

Dates: 01/07/2008 – Ongoing

CABI Project Manager: Kate Pollard, Marion Seier

CABI Project Team: Nikolai Thom, Naitram (Bob) Ramnanan

Donors: Department of Agriculture and Fisheries (DAF), Australia

Jatropha gossypiifolia (bellyache bush) is a major invasive plant in northern Australia. Previous biocontrol efforts have focused on insects but the Australian Government is now also keen to explore fungal pathogens. As experts, CABI is carrying out safety and efficacy experiments with the rust pathogen, *Phakopsora arthuriana*, using a strain originating from Trinidad. Results will help the Australian authorities decide whether this rust is suitable for biocontrol of *J. gossypiifolia* in Australia.

Tests show that the rust fungus, *P. arthuriana*, is specific but we are still determining the life-cycle of the rust to confirm whether it can complete its development on just *J. gossypiifolia*, or whether it needs an alternative host.

The culmination of this research will inform a decision by the Australian quarantine authorities as to whether it is suitable as a biocontrol agent and whether to grant permission for its import and release.

www.cabi.org/jatropha

Biological control of apple leaf-curling midge in Canada

Location: Canada

Dates: 01/01/2016 – 31/03/2019

CABI Project Manager: Tim Haye

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC)

A European biological control agent may help control an exotic pest of apple trees in western Canada. Damage from the apple leaf-curling midge in eastern Canada was effectively reduced by introducing a European natural enemy, *Platygaster demades*, in the 1990s. The pest arrived in British Columbia more recently, where releases of *P. demades* are now being considered. First, however, the identity of *P. demades* needs to be confirmed with molecular tools and its host range defined.

So far, we have collected several thousand midge larvae in infested apple orchards in Switzerland, Germany, northern Italy, and Holland from which plenty of parasitoids emerged, including *Platygaster demades*. The molecular analysis of these specimens is in progress.

www.cabi.org/apple-leaf

Biological control of brown marmorated stink bug

Location: China, Canada, Switzerland, Italy, Georgia

Dates: 01/01/2013 – 31/03/2019

CABI Project Manager: Tim Haye

CABI Project Team: Jinping Zhang, Feng Zhang

Donors: Agriculture and Agri-Food Canada (AAFC); European Commission, Ferrero

Partners: Agriculture and Agri-Food Canada (AAFC); Western University, Canada; University of Torino, Italy

International trade is a common way for insects to 'hitch-hike' their way to new countries. The brown marmorated stink bug, originally from East Asia, has become a harmful invasive pest of many fruit and vegetable crops in North America and Europe. Biological control using Asian or European natural enemies may be the answer, so CABI is drawing on its network of expertise in Europe and China to explore best options.

Results, so far, show that *Trissolcus japonicus* (a type of parasitoid wasp) is not restricted to Chinese forest and fruit trees. Exposed stink bug egg masses in field crops were frequently parasitised and more types of crops are being tested. *Anastatus bifasciatus* is also being mass-reared and the team are planning to make their first inundative releases in apple orchards to evaluate the parasitoids potential for biological control in Europe. Releases of other parasitoids are continuing.

www.cabi.org/stink-bug

Biological control of diamondback moth in Canada

Location: Canada

Dates: 01/04/2014 – 31/03/2019

CABI Project Manager: Tim Haye

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC)

The diamondback moth is a global pest. Canadian farmers often have to use chemicals to protect their crops. This is costly and the pest is becoming immune, meaning additional control options are needed. In Europe, Asia and Africa, *Diadromus collaris*, is a major parasitoid of the moth. It has been introduced to several countries or regions and has established as a successful biocontrol. CABI is therefore carrying out life-table studies in Europe to determine if its introduction is a viable strategy.

Three forest species were assessed for their invasiveness: *Acacia mangium*, *Leucaena leucocaphala* and *Tectona grandis*, and all were found to displace native biodiversity. In all the plots sampled, these species had been established in clumps with self-sustaining populations.

www.cabi.org/diamond

Biological control of flowering rush

Location: Canada, USA

Dates: 01/01/2013 – Ongoing

CABI Project Manager: Patrick Häfliger

CABI Project Team: Ivo Toševski, Hariet L Hinz, Carol Ellison

Donors: US Army Corps of Engineers; Montana Noxious Weed Trust Fund through the University of Montana, USA; US Forest Service through the University of Montana; Washington State Department of Agriculture, USA; Washington State Department of Ecology, USA; Washington State Department of Natural Resources, USA; British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada; Montana Department of Natural Resources and Conservation through the University of Montana, USA

Partners: Washington State University, USA; University of Montana, Missoula, USA; United States Department of Agriculture, Agricultural Research Service (USDA-ARS), USA

Attractive pink flowers make the Eurasian plant flowering rush a popular aquatic ornamental. But since its introduction to North America, it has become an aggressive invader of freshwater systems in the midwestern/western USA and western Canada; likely due to the absence of the natural enemies that normally keep it in check. CABI is searching for natural enemies that could be introduced to reduce its vigour and spread in North America.

Our wide-ranging field surveys have found that the semi-aquatic weevil, *Bagous nodulosus*, is the most promising candidate so far. So, we have established a rearing colony and are undertaking tests on it in the hope that it can be released in North America in the near future.

A second weevil, *B. validus*, and an agromyzid fly, *Phytoliriomyza ornata*, and a white smut fungal pathogen, *Doassansia niesslii*, look promising.

www.cabi.org/flowering-rush

Biological control of hawkweeds

Location: Canada, USA

Dates: 01/01/2000 – Ongoing

CABI Project Manager: Ghislaine Cortat

Donors: Agriculture and Agri-Food Canada (AAFC); British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada; Montana Noxious Weed Trust Fund through Montana State University, USA; United States Department of Agriculture, Animal and Plant Health Inspection Service – Center for Plant Health Science and Technology (USDA-APHIS-CPHST)

Partners: Agriculture and Agri-Food Canada (AAFC); Institute of Botany, Academy of Sciences of the Czech Republic; Montana State University, USA; University of Idaho, USA; USDA-ARS Northern Plains Agricultural Research Laboratory, Montana

European hawkweeds are invasive in North American pastures, where they escape mowing and even profit from mechanical disturbance. Chemical control with broad-spectrum herbicides is not selective and is relatively expensive, and hawkweeds may recolonise pastures from untreated areas. Insects that feed on hawkweeds in Europe have been studied as potential biological control agents for North America since 2000. The first agent, a gall wasp, *Aulacidea subterminalis*, was released in 2011 followed by a root-feeding hoverfly, *C. urbana*.

Along with Dr Rosemarie DeClerck-Floate (Agriculture and Agri-Food Canada (AAFC), Lethbridge) and Dr Jeffrey Littlefield (Montana State University, Bozeman) we are currently investigating another gall wasp, *Aulacidea pilosellae*.

www.cabi.org/hawkweeds

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Biological control of oxeye daisy

Location: Canada, USA, Australia

Dates: 01/01/2008 – Ongoing

CABI Project Manager: Sonja Stutz

Donors: British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada; Montana Noxious Weed Trust Fund through Montana State University, USA; Australian Government Department of Agriculture and Water Resources as part of its Rural Research & Development for-profit programme

Partners: McClay Ecoscience, Alberta, Canada; New South Wales Department of Primary Industries, Australia

Although closely related, Oxeye daisy is an invasive weed in North America and Australia, while Shasta daisy remains a garden favourite. CABI is investigating whether specialist natural enemies from its Eurasian area of origin could be introduced as biological control agents. In North America, the popularity of Shasta daisy makes this a challenge because any introduced agent must damage only oxeye daisy.

Many insects have not been specific enough but a root-mining tortricid moth, *D. aeratana*, proved to be more promising and we plan to apply for permission to introduce in North America once testing is finished. In addition, we will also start to conduct tests using native Australian plants as well as important horticultural species.

We have started tests with a root-galling tephritid fly, *O. nebulosa*, which are so far encouraging so we will continue working with this insect.

www.cabi.org/daisy

Biological control of perennial pepperweed in the United States

Location: USA

Dates: 01/01/2004 – Ongoing

CABI Project Manager: Sonja Stutz

Donors: Wyoming Biological Control Steering Committee, USA; United States Department of Agriculture, Animal and Plant Health Inspection Service – Center for Plant Health Science and Technology (USDA-APHIS-CPHST); Missoula County (Montana)

Partners: Biotechnology and Biological Control Agency (BBCA); Italy; United States Department of Agriculture, Agricultural Research Service (USDA-ARS); University of Belgrade, Serbia; University of Idaho, USA

Weeds like perennial pepperweed that have creeping root systems and prolific seed production are among the most difficult to control. This Eurasian mustard plant was accidentally introduced into North America with crop seed and without its natural enemies to keep it in check, it's now a major problem. CABI is identifying specialist natural enemies from Eurasia that can be introduced into North America as biological control agents.

A number of insects (three weevils, a fly and a mite) are being tested for their efficacy, specificity and safety and we are also hoping to re-visit some sites to collect new potential biocontrol agents.

www.cabi.org/pepperweed

Biological control of garlic mustard

Location: Canada, USA

Dates: 01/01/1998 – Ongoing

CABI Project Manager: Ghislaine Cortat

CABI Project Team: Ivo Toševski, Hariet L Hinz

Donors: Minnesota Environmental and Natural Resources Trust Fund, USA; Minnesota Department of Natural Resources, USA; United States Department of Defense, Strategic Environmental Research Development Program (SERDP); US Forest Service; United States Department of Agriculture, Animal and Plant Health Inspection Service – Center for Plant Health Science and Technology (USDA-APHIS-CPHST); Wisconsin Department of Natural Resources, USA

Partners: Agriculture and Agri-Food Canada (AAFC); Colorado State University, USA; Cornell University, USA; Michigan State University, USA; Minnesota Department of Natural Resources, USA; University of Minnesota, USA; United States Department of Agriculture – Agricultural Research Service (USDA-ARS)

Crushed garlic mustard leaves and seeds smell like cultivated garlic and have been used as flavouring in cooking for centuries. Garlic mustard is a brassica from Eurasia that was accidentally taken to North America and became invasive in many of its forests. Together with partners, CABI is exploring the possibility of using specially selected and tested insects from the native range in order to safely control the plant's spread and impact in the introduced range. So far, a root-crown weevil, *C. scrobicollis*, has been tested and is being considered for release in the US and Canada. We are still completing testing on other potential biocontrol agents in collaboration with the University of Minnesota.

www.cabi.org/garlic-mustard

Biological control of Red Clover casebearer

Location: Canada

Dates: 01/04/2014 – 31/03/2016

CABI Project Manager: Tim Haye

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC)

The red clover casebearer, *Coleophora deauratella*, is a common pest of clover which is grown for its seed in North America. It is native to Europe, eastern Siberia and the Middle East and was accidentally introduced and is now a significant pest. CABI looked for a natural enemy which can be used as a biocontrol. Although insect parasitoids had been successfully released elsewhere, the team had to look for something that would be effective, specific and safe to release in North America.

The team started to survey for red clover casebearer populations in Switzerland, but densities were very low. The surveys extended to locations in Scandinavia where climatic conditions are more similar to Canada, however, the search was not promising and the initiative stopped.

CABI contributes to Caribbean Plant Health Directors' Forum

Location: Caribbean

Dates: 11/07/2017 – 13/07/2017

CABI Project Manager: Yelitza Colmenarez

Donors: CABI Development Fund

Partners: United States Department of Agriculture (USDA); USDA-Animal Plant Health Inspection Service (APHIS); Greater Caribbean Safeguarding Initiative (GCIS); the Caribbean Community (CARICOM) Secretariat; Food and Agriculture Organization (FAO); Inter-American Institute for Co-operation on Agriculture (IICA); Organization of the Eastern Caribbean States (OECS); Caribbean Agricultural Research and Development Institute (CARDI); The University of the West Indies; CABI

CABI joined plant health directors from more than 20 countries and territories along with several partner organisations for the 10th annual Caribbean Plant Health Directors, Forum meeting in the Dominican Republic. The Caribbean is known for its vital and diverse agriculture and natural resources; protecting them from potentially devastating invasive pests and diseases is critical to the health and prosperity of the region. During the meeting, plant health officials had discussions on how Caribbean countries can identify, exclude, and respond to pests and diseases that threaten regional agriculture and resources, and how to resolve issues that might impede agricultural trade, regionally and internationally. At the meeting, CABI presented on Plantwise activities in the region and other project initiatives, integrated pest management of *Tuta absoluta* and our diagnostic advisory and microbial identification services offered through Plantwise.

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE | BIODIVERSITY AND ECOSYSTEM MANAGEMENT

CABI co-organises the 3rd International Congress on Biological Invasions

Location: China

Dates: November 2017

CABI Project Manager: Feng Zhang

CABI Project Team: Rui Tang, Hongmei Li

Donors: Ministry of Science and Technology; Ministry of Agriculture and Rural Affairs, P.R China

Partners: Co-organised by Chinese Academy of Agricultural Sciences, Zhejiang University and CABI in collaboration with 23 national and international research organisations

Following CABI's involvement in the highly successful 2009 and 2013 International Congress on Biological Invasions (ICBI), CABI continued its involvement in 2017 by co-sponsoring and co-chairing the ICBI. ICBI provides a forum for the presentation of scientific developments in the management of invasive alien species. The 2017 theme was 'Building capacity to manage biological invasions and facilitate trade', two areas of knowledge and expertise for CABI, provided an exciting opportunity for all those involved in tackling invasive alien species to meet and exchange knowledge and ideas.

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE | SYSTEMS APPROACH TO PLANT HEALTH | BIODIVERSITY AND ECOSYSTEM MANAGEMENT

CABI sponsors 1st International Conference on Biological Control in Bangalore

Location: Global

Dates: 27/09/2018 – 29/09/2018

CABI Project Manager: Malvika Chaudhary

CABI Project Team: Stefan Toepfer, Djami Djeddour, Richard Stouthamer, David Smith, Steve Edgington

Partners: ISociety for Biocontrol Advancement (SBA); ICAR-National Bureau of Agricultural Insect Resources (NBAIR); Indian Council of Agricultural Research (ICAR); The International Association for the Plant Protection Sciences (IAPPS); IOBC Parthenium Working Group

Globally, up to 30% of agricultural yields are affected by pests and diseases despite intensive chemical pesticide use. Biological control of insect pests and diseases is one of the major ecosystem services provided to agriculture. Natural enemies such as predators, parasitoids and pathogens play a major role in limiting damage caused by non-native pests.

The main theme of this 1st International Conference on Biological Control will address issues related to biological control approaches in the context of biodiversity, increased chemical pesticide pressures and climate change. The emphasis will also be on the challenges faced in implementing biological control programmes.

CABI is sponsoring this event, delivering keynote sessions and acting as session chairs.

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE | SYSTEMS APPROACH TO PLANT HEALTH | BIODIVERSITY AND ECOSYSTEM MANAGEMENT

CABI shares its expertise on biological control at international congress in Beijing, China

Location: China

Dates: 14/05/2018 – 16/05/2018

CABI Project Manager: Feng Zhang

CABI Project Team: Ulrich Kuhlmann, Hariet L Hinz

Partners: The congress was sponsored by Chinese Academy of Agricultural Sciences, International Organization for Biological Control (IOBC), China Society of Plant Protection

At the 1st International Congress of Biological Control held in Beijing, China in May 2018, CABI scientists shared their expertise on biological methods used to tackle a range of agricultural pests and diseases that threaten global food security. The event brought together scientists from around the world to highlight their expertise on themes including 'Evolution and genetics in biological control' and 'Biological control as a means of preserving biodiversity.' The congress aimed to be interdisciplinary in its approach by bringing various different biocontrol disciplines (weeds, pathogens and insects) together who employ different approaches (classical, augmentative and conservation). We were represented by Global and Country Directors who presented and co-organised sessions, whilst scientists shared their knowledge and expertise through specialist-led presentations.

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

CAB Thesaurus

Location: Global

Dates: Ongoing

CABI Project Manager: Anton Doroszenko

CABI Project Team: Tony Pittaway

The widely acclaimed CAB Thesaurus is the largest life sciences thesaurus in existence. It provides a controlled vocabulary approaching 2.7 million descriptive terms and represents the fundamental substructure that all our information products, adding substantial value. It contains 651,201 terms, includes 166,395 distinct concepts (preferred terms) and 132,109 synonyms, as well as translations into ten European languages.

The thesaurus is a key tool for librarians who use it to navigate, retrieve and index vast amounts of data. It is also a core part of our database production system as it provides data validation and a controlled vocabulary This enhances the ability to retrieve biographic records through our direct online platform, CAB Direct, and via our online hosts. It is also used in Compendia, Plantwise and other projects to harmonise data and is increasingly in search APIs (Application Programming Interfaces), linked data and ontologies.

www.cabi.org/thesaurus

Cocoa pollination for optimized yields and income generation (CocoaPOP)

Location: Trinidad & Tobago, Jamaica

Dates: 01/12/2012 – 30/04/2016

CABI Project Manager: Sean Murphy

CABI Project Team: Alan Buddie, Giovanni Cafa

Donors: EU

Partners: The University of Trinidad and Tobago (UTT); University of Greenwich - Natural Resources Institute (UoG-NRI); Cocoa Industry Board of Jamaica (CIB)

Pollination rates are generally poor for cocoa and inconsistent across the year. However, recent evidence has indicated that improving pollination can improve yield. For example, manual pollination of cocoa has been shown to increase fruit set, the number of mature pods and the number of seeds per pod. Whilst controlled studies showing the effects of variable midge pollinating rates are not available, it is widely recognised that midges should be encouraged on cocoa farms. CABI's involvement was to identify insects initially morphological, then by DNA barcoding, generating knowledge about midges, their role in cocoa pollination, and how this information can be used to optimise cocoa yields.

Collecting data on Caribbean invasive plants

Location: Caribbean

Dates: 01/01/2014 – Ongoing

CABI Project Manager: Gareth Richards

CABI Project Team: Lucinda Charles, David Simpson, Hannah Fielder, Ana Luisa Sumares da Cruz Nunes, Mark Palmer, Mike Amphlett

Donors: United States Department of Agriculture – Animal and Plant Health Inspection Service (USDA-APHIS)

Partners: Smithsonian Institution; Effective Environmental Restoration Inc., Puerto Rico; Julissa Rojas Sandoval (consultant, Costa Rica)

The Caribbean Islands are a biodiversity hotspot. It has over 650 critically endangered or endangered species. So, collating and disseminating knowledge of them is necessary as this will help stop them being a driving force of species extinction and their many other serious socio-economic impacts.

Building on the seminal work, 'Catalogue of seed plants of the West Indies' and analysis of over 14,300 georeferenced accessions at the Smithsonian's herbarium, we will collate data on over 600 invasive plant species that were prioritised from 1,879 plants identified as non-native to the region. Expert authors will then compile datasheets on each species. These are peer reviewed and published in our open access Invasive Species Compendium.

So far, over 600 datasheets have been written and peer reviewed, and the majority published. Particular focus is given to risk assessment, management of pathways, public awareness, policy development, identification, detection and options for control.

Controlling Canada's swede midge problem

Location: Canada

Dates: 01/04/2009 – 31/03/2016

CABI Project Manager: Tim Haye

CABI Project Team: Matthew Cock, Ulrich Kuhlmann

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC); Carleton University, Canada; Simon Fraser University, Canada; University of Alberta, Canada; University of Manitoba, Canada

The swede midge, a pest of Eurasian origin, causes severe damage to crops in Canada and North America including broccoli, cabbage, cauliflower and turnips. Since its arrival in the main cabbage growing areas of eastern Canada, pesticide applications have increased, threatening existing biological control programmes. By initiating life-table studies to establish and compare mortality factors for the midge, we have taken key steps towards identifying effective and sustainable control methods. Since beginning the project, a team from CABI defined what was controlling the swede midge in Europe – its parasitoid complex. However, the impact of the predominant parasitoids was considered to be too low for classical biological control in Canada to be attempted.

Controlling earwigs in the Falklands

Location: Falkland Islands

Dates: 01/06/2013 – 01/05/2017

CABI Project Manager: Norbert Maczey

CABI Project Team: Steve Edgington, Nikolai Thom, Tim Haye, Pablo González-Moreno

Donors: Falkand Island Government; Darwin Plus

The European earwig has become a considerable nuisance in the Falkland Islands, causing significant problems for local horticulture. As a sustainable and environmentally friendly solution to this problem, CABI investigated the possibility of using two parasitic fly species. We conducted a range of activities to raise the awareness of local stakeholders, and carried out extensive host range tests and pest risk assessments.

We undertook a wide range of awareness raising activities that demonstrated the benefits and safety of biological control which helped to successfully overcome initial skepticism. After thorough safety tests, administrative institutions and the wider public endorsed the release of two tachinid fly species that could control the earwigs. Both species were reared in the UK, shipped to the Falkland Islands and released in Stanley, the centre of the earwig infestation. We are continuing to monitor them and their impact on the earwig population.

www.cabi.org/earwigs

Controlling floating pennywort in a safe and sustainable way

Location: Argentina, Paraguay, UK

Dates: 01/04/2011 – 01/04/2020

CABI Project Manager: Djamila Djeddour

CABI Project Team: Suzy Wood, Kate Constantine, Richard Shaw, Marion Seier, Nikoli Thorn

Donors: Department for Environemtn, Food and Rural Affairs (DEFRA)

Partners: EMBRAPA-Brazil; UNESP-Brazil; Fundación para el Estudio de Especies Invasivas (FuEDEI)

Floating pennywort is an invasive aquatic plant in the UK that is threatening habitats, native plants, fish and insects. Also a problem across much of Europe, this plant has rapid growth and can regenerate from small fragments. Management is mainly limited to mechanical clearance which is expensive and often ineffective. Through comprehensive testing, we aim to identify the safest and most effective biocontrol agent to control the plant.

After several years of research and host range testing with over 75 non-target species, a comprehensive Pest Risk Analysis (PRA) was completed and submitted to the regulators. Research now focuses on addressing feedback relating to the weevil's establishment and overwintering as well as consolidating specificity data about rare UK and European natives. Once satisfactorily completed, the dossier will be re-submitted and peer reviewed before any decision is made about its release. If approved, the weevil could be released in the near future.

www.cabi.org/pennywort

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Controlling hoary cress in the North America

Location: Canada, USA

Dates: 01/04/2001 – Ongoing

CABI Project Manager: Philip Weyl

CABI Project Team: Cornella Cloşca, Hariet L Hinz

Donors: Wyoming Biological Control Steering Committee, USA; Montana Noxious Weed Trust Fund through Montana State University, USA; South Dakota Department of Agriculture, USA; United States Department of the Interior Bureau of Land Management (USDI BLM), USA; United States Department of the Interior Bureau of Land Management (USDI BLM), USA; British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada

Partners: University of Idaho, USA; USDA-ARS Northern Plains Agricultural Research Laboratory, Montana; USDA-ARS European Biological Control Laboratory, Montpellier, France; Biotechnology and Biological Control Agency (BBCA), Rome, Italy; Institute of Biological Research, Iasi, Romania; Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia

Trade in seed brought crops to new regions, but many weeds were spread by this route too. Whitetops, also known as hoary cresses, arrived in the USA as contaminants of seed from Eurasia. They are now aggressive invaders of crops, rangeland and riverbanks. One reason for this is the absence of the natural enemies that keep them in check in their area of origin. CABI staff in Switzerland are looking into the prospects for biological control of these invasive plants.

We are currently focusing on two weevil species and are applying to release a gall-former, *Ceutorhynchus cardariae*, whilst continuing tests on the very specific seed feeder, *C. turbatus*.

www.cabi.org/hoary-cress

Controlling noxious Russian knapweed in North America

Location: Canada, USA

Dates: 01/01/1999 – Ongoing

CABI Project Manager: Philip Weyl

CABI Project Team: Urs Schaffner

Donors: Montana Weed Trust Fund through Montana State University, USA; United States Department of Agriculture, Animal and Plant Health Inspection Service – Center for Plant Health Science and Technology (USDA-APHIS-CPHST); Wyoming Biological Control Steering Committee, USA

Partners: Biotechnology Biocontrol Control Agency, Italy; Ferdowsi University of Mashhad, Iran; University of Belgrade, Serbia

Russian knapweed is one of several invasive plants of rangelands that arrived in North America as a seed contaminant in the 19th century, in this case from Asia. Biological control is often a good approach for these plants, but a nematode species introduced in the 1970s proved ineffective against Russian knapweed. Funded by a US and Canadian consortium, CABI has been tasked with researching new biological control agents for introduction, some of which are already showing promise.

So far, two new biological control agents have been approved for release in the USA and Canada: the gall wasp, *Aulacidea acroptilonica*, and the gall midge, *Jaapiella ivannikovi*. Both species have successfully established, and a distribution programme covering eight US states has been initiated by USDA-APHIS.

We are currently focusing on a flowerbud-galling eriophyid mite, *Aceria acroption*, investigating its specificity, biology and overwintering requirements.

www.cabi.org/knapweed

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Controlling swallow-worts the sustainable way

Location: Canada, USA

Dates: 01/01/2006 – Ongoing

CABI Project Manager: Ghislaine Cortat

CABI Project Team: Hariet L Hinz

Donors: Agriculture and Agri-Food Canada (AAFC); United States Department of Agriculture, Agricultural Research Service (USDA-ARS), USA

Partners: The University of Rhode Island, USA; United States Department of Agriculture, Agricultural Research Service (USDA-ARS), USA; European Biological Control Laboratory (EBCL), France

Swallow-worts (*Vincetoxicum nigrum* and *V. rossicum*) are Eurasian plants that have become invasive in North America. The overall goal of the project is to identify specific natural enemies that can be introduced to North America as biological control agents.

We tested two leaf-feeding moths, *H. opulenta* and *A. asclepiadis*, on over 80 plant species and they have now been released and are being monitored in eastern Canada and in the eastern United States. Further work on other potential biocontrols (a root-feeding beetle, *Chrysochus (Eumolpus) asclepiadeus*, a seed-feeding fly, *Euphranta connexa* and a leaf-feeding beetle, *Chrysolina aurichalcea asclepiadis*) is ongoing.

www.cabi.org/swallow-worts

Controlling the cabbage seedpod weevil in Canada

Location: Canada

Dates: 01/04/2009 – 31/03/2016

CABI Project Manager: Tim Haye

CABI Project Team: Ulrich Kuhlmann

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC)

The cabbage seedpod weevil is a widely distributed pest of cruciferous crops in Europe and North America, causing substantial economic losses in canola crops in Canada. Current control measures still rely on applying broad-spectrum insecticides. We are collecting European distribution data for a parasitic wasp that is the weevil's most effective natural enemy in Europe, to find out whether it may prove successful in Canada.

Surveys for cabbage seedpod weevil parasitoids were conducted across Europe to determine their geographical distribution and abundance. The most common parasitoids were: *Trichomalus perfectus*, *Mesopolobus morys*, *Stenomalina gracilis* and *Eurytoma spp. Trichomalus perfectus* was found at 121 locations in Europe and our data suggest that *T. perfectus* is dominant in the northern parts of Europe, whereas *M. morys* is more common in the South. Bioclimatic models for *T. perfectus* and *M. morys* have been finalised.

www.cabi.org/NA_cabbage

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Controlling the invasive blackberry on the Galápagos Islands

Location: Ecuador

Dates: 01/01/2015 – 31/12/2018

CABI Project Manager: Carol Ellison

CABI Project Team: Kate Pollard, Alan Buddie, Lukasz Tymo

Donors: Fondo para el control de las especies invasoras de Galapagos (FEIG)

Partners: Galapagos National Park Directorate (GNPD)

The unique wildlife and farmland on the Galapagos Islands, Ecuador, are threatened with a non-native invasive weed. The invasive blackberry now covers around 30,000 hectares and can grow up to 3m tall. CABI scientists are searching for potential biocontrol agents from the Asian native range of the blackberry to introduce here.

www.cabi.org/blackberry

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Controlling wild ginger

Location: New Zealand, India, USA, UK

Dates: 01/07/2017 – 01/07/2021

CABI Project Manager: Djamila Djeddour

CABI Project Team: Corin Pratt, Norbert Maczey, Nikolai Thom

Donors: Landcare Research; United States Department of Agriculture, Forest Service (USDA-FS); The Hawaii Department of Land and Natural Resources

Partners: Indian Council of Agricultural Research (ICAR/NBAIR); Department of Forest, Environment and Wildlife Management (DFEWM); Sikkim Government; Sikkim University

Plants from the *Hedychium genus* are widely loved and cultivated as ornamentals but a few are threatening delicate ecosystems in Hawaii, New Zealand, the Macaronesian Archipelago (Azores, Madeira and the Canaries), Brazil, Australia and La Réunion. We are researching natural ways to manage these plants which involves returning to their original home range in the North eastern Himalayan foothills to try to find damaging and specific insects and/ or pathogens which may prove suitable for release in the invaded areas.

Surveys for natural enemies have been conducted in India each year since 2011/12 and insects exported for further testing. Host range testing in the UK and field testing in India have concentrated on the highly specific Merochlorops fly and Prodioctes weevil with a view to submitting an application to the New Zealand Environmental Protection Authority when sufficient evidence on their specificity has been gathered.

www.cabi.org/wildginger

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE | BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Co-organisation of major scientific maize pests conference in China

Location: China

Dates: 10/04/2017 – 12/04/2017

CABI Project Manager: Ulrich Kuhlmann

CABI Project Team: Stefan Toepfer, Dirk Babendreier, Feng Zhang

Donors: Sponsored by China's Donation to CABI Development Fund, Longping High-Tech, Dabeinong Com., Bayer, Monsanto, Syngenta

Partners: Co-organised by CABI, Institute of Plant Protection (IPP) of the Chinese Academy of Agricultural Sciences (CAAS), International Organisation of Biological Control (IOBC), China Society of Plant Protection and MARA-CABI Joint Laboratory for Bio-safety

CABI co-organised the 26th IWGO (International Working Group on Onstrinia and other maize pests) conference with the Institute of Plant Protection of the Chinese Academy of Agricultural Sciences (CAAS) in April 2017. IWGO is a global working group of the International Organisation of Biological Control.

The conference provided a valuable international platform for the exchange of research, experiences, and ideas on the integrated management of maize pests through the use of chemical, cultural, and biological control measures. The programme featured 10 scientific sessions on a range of related topics with presentations given by leading experts in the field.

IWGO convenor, CABI's Executive Director for Global Operations, Dr Ulrich Kuhlmann, gave a welcome address, CABI's Dr Stefan Toepfer co-organised a session on the ecology of maize pests whilst CABI's Dr Dirk Babendreier co-organised a session on biological control.

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE | SYSTEMS APPROACH TO PLANT HEALTH

Developing a Pest Risk Assessment Tool for the Action on Invasives Programme

Location: Global

Dates: 01/02/2018 – Ongoing

CABI Project Manager: Gareth Richards

CABI Project Team: Laura Doughty, Lucinda Charles, Nicola Wakefield, Mike Frewin, Corrie Gray, Michelle Jones, Neil Docherty, Phil Barton, Hannah Fielder, and many others.

Donors: Department for International Development (DFID)

A Pest Risk Analysis tool will be developed as part of CABI's Action on Invasives Programme. It will provide quarantine officers, plant protection officers and risk assessors with accessible decision support for pest risk analysis in accordance with ISPM 11, particularly in developing countries where resources are limited. In the first phase of development, we will focus on assessing the risks of importing a crop from one country to another.

Using CABI's Crop Protection Compendium, the tool will draw on scientific information from over 2,800 detailed datasheets on pests, diseases and weeds.

We have gathered requirements through online questionnaires and workshops, and in 2018 we are aiming for it to be used by quarantine/ plant protection staff in five countries. We will also teach master trainers how to use the tool, together with other invasive species content, tools and best practice solutions.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Enhancing biosecurity and biological control capacity in the Falkland Islands and St Helena

Location: St Helena, Falkland Islands

Dates: 01/04/2018 – 31/03/2020

CABI Project Manager: Norbert Maczey

CABI Project Team: Pablo Gonzalez-Moreno

Donors: Darwin+ (via DEFRA)

Partners: Department of Agriculture of the Falkland Island Government; Environment and Natural Resources Directorate; (ENRD) of St Helena

St Helena and other UK overseas territories in the South Atlantic rank highly for unique worldwide biodiversity. New pests here can be devastating, so we need to protect the islands from incursions. In this two-year project, we will develop Pest Risk Assessment (PRA) procedures and build capacity to use them for individual territories. St Helena and the Falkland Islands will provide case studies.

These improved procedures will make use of a new horizon scanning and pathway analysis tool, currently under development at CABI. Initially, specific requirements for improved procedures will be discussed at a regional workshop and we will then test their implementation during the second half of the project.

The project is still in its initial phase and first results are expected to be delivered in the summer of 2019.

Exploring funding opportunities for the Caribbean at the Caribbean Week of Agriculture

Location: Caribbean

Dates: 23/10/2016 – 28/10/2016

CABI Project Manager: Danny Romnie

CABI Project Team: Naitram (Bob) Ramnanan, Qiaoqiao Zhang

Donors: CABI Development Fund

While CABI's activities in the Caribbean and the Latin America have increased over the past three years, which has been appreciated by our member countries in the region, the regions remain a challenge in terms of further project and programme development as all major donors now focus their funding largely on Africa and Asia. In order to develop a sound, realistic and actionable fund-raising strategy for the Caribbean and Latin America, CABI carried out desk studies to obtain an overview of the donor funding in the region, discussions with potential donor agencies, and missions to some member countries of these two regions. Two CABI representatives attended the Caribbean Week of Agriculture held on 22-28 October, 2016 in Cayman Island to better understand the needs of sustainable development of agriculture in the Caribbean, and identify project and funding opportunities. It is clear from the ground work undertaken so far that climate change is an important topic for the region and receives a relatively higher amount of interest and funding from donors. CABI will, therefore, continue to internally build its expertise in climate smart agriculture and apply this to support key partners and develop projects in the area.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Formulating Trinidad and Tobago's national biodiversity strategy and action plan

Location: Trinidad and Tobago

Dates: 15/08/2016 – 15/02/2018

CABI Project Manager: Naitram (Bob) Ramnanan

Partners: International Union for Conservation of Nature (IUCN); Environmental Management Authority of Trinidad and Tobago

National biodiversity strategies and action plans are the principal instrument for implementing the overall Convention on Biodiversity (CBD) strategy. These ensure that biodiversity is considered in all sectors whose activities can have impact. The objective of this particular project in Trinidad and Tobago was to support its government in its obligations to the CBD by producing the fifth National Biodiversity Strategy and Action Plan. This will summarise existing and new information on its agricultural sector that relate to biodiversity, the environment, and access and benefit sharing. This means consulting with national stakeholders and making recommendations on national targets, principles and priorities in order to formulate a new strategy and action plan, and provide new information to the CBD in the form of a fifth national report.

So far, we have participated in two national consultations and submitted an updated report that assessed the impact of its agriculture on biodiversity.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Finding a biocontrol for Himalayan raspberry

Location: China, India, USA, UK

Dates: 01/07/2018 – 30/09/2019

CABI Project Manager: Marion Seier

CABI Project Team: Corin Pratt, Harry Evans, Nikolai Thom

Donors: United States Department of Agriculture, Forest Service (USDA-FS); State of Hawaii; Department of Land and Natural Resources (Watershed Partnerships)

Partners: Indian Agricultural Research Institute (IARI); National Bureau of Agricultural Insect Resources (NBAIR), Indian Council of Agricultural Research (ICAR)

Yellow Himalayan raspberry is a major threat to native Hawaiian forests. A single plant can grow into a 4m tall impenetrable thicket, and its aggressive growth and rapid colonisation enables it to outcompete native species. Current control methods are both labour intensive and costly. The aim of this project is to find biological control agents (both arthropod and fungal) from the plant's native Indian and/or Chinese region of the Himalayas to control its spread in the Hawaiian introduced range.

Based on our research and formal identification, seven insect species and a rust and a leafspot fungus were prioritised. The survey conducted in China prioritised several insects as well as a rust and a leafspot pathogen as potential biocontrol agents. We hope to export all agents for further evaluation and collect and test more insects and pathogens. In 2018-19, further studies in India will be conducted.

www.cabi.org/himalayan-raspberry

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

Free access to publishing products for member countries in bands 1-4, and discounts for all member countries

Location: Global

Dates: Ongoing

CABI Project Manager: Qiaoqiao Zhang

CABI Project Team: Lina Yip, Shirley Baker, Claudio Plaza, Manish Singh, Michael Chimalizeni, Christine Alokit, Peace Tusasirwe, Sarah Reed

We publish world-renowned, high-quality scientific information resources. CAB Abstracts, containing over 12 million records on applied life sciences, is just one of them. As part of our member country benefits, every member country with contributions at bands 1-4, is eligible for one free access to a range of CABI publishing products, a total package worth £19.8k. Currently, 19 member countries are benefiting from this free access and trials are being undertaken to allow specialist agencies within member countries to access CABI compendia. Further discounts of 20% (or more) on CABI books, compendia and databases is available to all member countries.

www.cabi.org/benefits

SYSTEMS APPROACH TO PLANT HEALTH

Free identification services for member countries in bands 1-4

Location: Global

Dates: Ongoing

CABI Project Manager: Qiaoqiao Zhang

CABI Project Team: Thelma Caine, Esther Madden, Matthew Ryan

We are a leading provider of microbial services and, on behalf of our member countries, maintain a culture collection of over 30,000 living microorganisms of importance to agriculture and the environment. As part of our member country benefits, we offer a free identification service of microbial samples. At our UK laboratories, we identify plant pathogenic fungi and bacteria that are agriculturally and horticulturally important, relate to food security and/ or plant health including quarantine organisms. The UK is a signatory to the Convention on Biodiversity (CBD) and a party to the Nagoya Protocol on Access and Benefit Sharing. CABI operates in accordance with European legislation to implement these requirements. Since 2015, we have carried out 381 free identifications for 31 institutions in 15 member countries.

www.cabi.org/benefits

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

GODAN

Location: Global

Dates: 01/01/2015 – 31/12/2019

CABI Project Manager: Martin Parr

CABI Project Team: Ruthie Musker, Juliet Tumeo, Ben Schaap, Johannes Keizer

Donors: CGIAR; The Technical Centre for Agricultural and Rural Cooperation (CTA); Department for International Development (DFID); Food and Agriculture Organization of the United Nations (FAO); The Global Forum on Agricultural Research (GFAR); Government of The Netherlands; Open Data Institute (ODI); Federal government of the United States

Partners: Collaboration of over 700 partners

Open data – data that is freely available and machine-readable for everyone to use – is a vital resource for improving global food security and human health. The Global Open Data for Agriculture and Nutrition (GODAN) programme has been set up to take pioneering agriculture and nutrition research information and make it openly accessible – together with up-to-date information on soils, weather, land ownership, market prices and similar – to the people who need it most.

The initiative focuses on building high-level support among governments, policymakers, international organisations and business. It promotes collaboration to harness the growing volume of data generated by new technologies to solve long-standing problems and to benefit farmers and the health of consumers.

www.cabi.org/GODAN

Giving dyer's woad the blues

Location: USA

Dates: 01/01/2004 – Ongoing

CABI Project Manager: Philip Weyl

CABI Project Team: Cornella Cloşca, Hariet L Hinz

Donors: Wyoming Biological Control Steering Committee, USA; United States Department of Agriculture, Animal and Plant Health Inspection Service - Center for Plant Health Science and Technology (USDA-APHIS-CPHST); United States Department of the Interior Bureau of Land Management (USDI BLM), USA

Partners: Biotechnology and Biological Control Agency (BBCA); Italy University of Belgrade, Serbia

Dyer's woad is an ancient source of blue dye and was grown as a textile dye crop in Europe and Asia for centuries. It was introduced to North America by early colonists, but today is recognised as a serious weed in western USA. CABI is searching for specialist natural enemies in Europe that could potentially be introduced for its biological control.

Current work concentrates on two weevils which have been tested on over 100 plant species, two-thirds of which are native to North America and include species of conservation concern. We are also testing their efficacy at destroying seeds and reducing the overall number of plants and think that a combination of both agents would be ideal to control dyer's woad in North America.

We have also begun working on an eriophyid mite species which is probably new to science.

www.cabi.org/dyers-woad

Hope for biological control of houndstongue in North America

Location: Canada, USA

Dates: 01/03/1998 – Ongoing

CABI Project Manager: Hariet L Hinz

CABI Project Team: Cornelia Cloşca

Donors: United States Department of Agriculture, Animal and Plant Health Inspection Service – Center for Plant Health Science and Technology (USDA-APHIS-CPHST); United States Department of the Interior Bureau of Land Management (USDI BLM), USA; Wyoming Biological Control Steering Committee, USA; South Dakota Department of Agriculture, USA

Partners: Agriculture and Agri-Food Canada (AAFC); University of Idaho, USA

An invasive weed with close relatives among native species is a challenge for biological control. Houndstongue was introduced accidentally to North America from Eurasia in the mid-19th century. It has since invaded most Canadian provinces and adjacent US states. There are many native plants in the USA in the same family as houndstongue. CABI staff in Switzerland are investigating specialised natural enemies in the area of origin of the weed that could be introduced as biological control agents.

We have, so far, tested and discarded four species and are working with the University of Idaho to concentrate on the seed-feeding weevil *Mogulones borraginis*. It appears to be highly specific and inflicts significant damage on the target plant, so, we are now seeking permission to introduce it.

www.cabi.org/houndstongue

The Horizon Scanning Tool

Location: Global

Dates: 01/02/2017 – 01/09/2018

CABI Project Manager: Gareth Richards

CABI Project Team: Laura Doughty, Lucinda Charles, Nicola Wakefield, Mike Frewin, Tim Beale, Michelle Jones, Neil Docherty, Phil Barton, Hannah Fielder, and others.

Donors: Department for International Development (DFID); CABI Core Development Fund; United States Department of Agriculture – Animal and Plant Health Inspection Service (USDA-APHIS)

The Horizon Scanning Tool, designed for plant protection officers, risk assessors, quarantine officers and protected area managers, allows users to create lists of species that may pose a threat due to trade etc. The tool, which can be filtered in numerous ways, allows the user to target species for further analysis, prevention or contingency planning.

We have already built and launched a beta version, so we now want to undertake user tesing and add more content and functionality to it.

So far, we have conducted:

- Eight detailed user interviews
- An online questionnaire completed by 50 users
- Analysis using Google analytics
- User behaviour analysis using FullStory

We are now making improvements and hope to launch the final tool soon.

Invasive species data

Location: UK, USA

Dates: 01/12/2012 – 29/09/2018

CABI Project Manager: Gareth Richards

CABI Project Team: Lucinda Charles, Nicola Wakefield, Kate Day, David Simpson, Mark Palmer, Kathryn Pollard, Suzy Wood, Mike Amphlett, Sarah Reed, Sally Moore

Donors: United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS)

Partners: USDA's Invasive Species Coordination Program National Marine Fisheries Service; US Fish and Wildlife Service; IUCN SSC Conservation Breeding Specialist Group

Invasive species are causing species extinction. We are trying to address this problem by providing sound scientific information that will be used by endangered species managers to improve their efforts to recover listed and candidate species affected by invasive species. The information will also be used by invasive species managers to control invasive species that are causing species extinction in the USA.

To-date, we have produced and published over 300 new datasheets and indexed and uploaded more than 200 US Fish and Wildlife Service Recovery Plans.

Through this work, we will improve our coverage of over 640 threatened species that are affected by relevant invasive species.

We also need to check and publish 3,500 records of threatened species relationships and impact mechanisms and have reviewed a further 2,470 relationships for federally listed species. Our hope is that this work is replicable in other parts of the world.

www.cabi.org/species-data

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

Launch of Open Access Book Programme

Location: Global

Dates: Ongoing

CABI Project Manager: Caroline Makepeace

Launched in 2016, CABI Open Books is a programme that supports authors and collaborating organisations who wish to publish open access books across a wide range of subject areas within applied life sciences and sustainable tourism. As an international not-for-profit, we aim to improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. We believe that a crucial way to solve problems in these fields is by creating, managing, curating and disseminating information. With experience in scientific research, publishing, knowledge management and communications, our goal is to put scientific know-how into the hands of the people who need it most; open access books is helping to do this.

The programme is freely available online at CAB eBooks upon publication and is accessible to anyone worldwide.

www.cabi.org/open

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Managing invasive rubbervine in Brazil

Location: Brazil, Kenya, UK

Dates: 01/01/2013 – 28/02/2022

CABI Project Manager: Marion Seier

CABI Project Team: Yelitza Colmenarez, Harry Evans, Kate Pollard, Richard Shaw

Donors: Agência do Desenvolvimento do Estado do Ceará (ADECE); SINDCARNAÚBA; SC Johnson

Partners: Associação Caatinga; Universidade Federal de Viçosa

Invasion by the alien plant rubbervine (devil's claw) is endangering native flora and fauna in northeastern Brazil. In the Caatinga, the endemic Carnauba palm, with its highly valued wax, has come under threat. CABI, in collaboration with Brazilian counterparts, is seeking to evaluate the rust, *Maravalia cryptostegia*, as a potential biocontrol agent. The same rust has been used in Australia to successfully control another invasive alien rubbervine species.

The rust fungus will be assessed as a potential biological control agent under quarantine conditions at CABI in the UK. Field collections in Madagascar will take place and the strain best matched to Brazilian biotypes of devil's claw will be prioritised. Following this, stringent safety testing will take place to ensure that it is host-specific.

If released, we expect the fungus to defoliate the plant, reducing its growth, flowering and seed production – ultimately curbing the invasion in the Caatinga ecosystem.

www.cabi.org/rubbervine

Managing the pests of Ontario's strawberries

Location: Canada

Dates: 01/04/2009 – 31/03/2016

CABI Project Manager: Tim Haye

CABI Project Team: Ulrich Kuhlmann

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC); Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

Plant bugs of the genus *Lygus (Hemiptera: Miridae)* includes over 10,000 known species, and new ones are constantly being described. They are notorious agricultural pests in North America's fields and greenhouses. Native parasitoids are not sufficiently suppressing populations so we are introducing a European Peristenus species to North America in a bid to provide control in a sustainable way.

One of the parasitoids, *Peristenus digoneutis*, was successfully released in the 1980s in the north-eastern USA, where it caused high levels of parasitism and significantly decreased Lygus populations. Since it was originally established, it continued to spread and is now present in 11 northeastern states and the Canadian provinces of Ontario, Quebec and Nova Scotia.

A CLIMEX model (modelling the climate and population) was developed for *Peristenus digoneutis* and was published in 2013.

Masters of Advanced Studies (MAS) in Integrated Crop Management (ICM)

Location: Global

Dates: Ongoing

CABI Project Manager: Hariet L Hinz

Partners: Université de Neuchâtel, Switzerland

Food security, food safety and environmental sustainability are critical challenges for the growing population. It's time to engage with education as a pathway to new expertise, and new solutions.

The MAS in ICM course, held in Switzerland and designed for development professionals, aims to address these challenges. This interdisciplinary study programme provides knowledge on ICM as a sustainable agricultural production system that improves overall crop health and also addresses its wider implications, particularly the socio-economic and ecological aspects, which form the backdrop of this holistic agricultural production system. Topics include: soil management, seed selection, crop nutrition, cropping strategies, pest and landscape management, water management, statistics, national and regional agricultural policies, and rural economics.

www.cabi.org/mas-icm

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

New Invasive Species Compendium datasheets on US invasive plant pathogens

Location: USA

Dates: 30/03/2017 – Ongoing

CABI Project Manager: Gareth Richards

CABI Project Team: Lucinda Charles, Hannah Fielder, Ana Luisa Sumares da Cruz Nunes, Mark Palmer, David Simpson, Mike Amphlett

Donors: United States Department of Agriculture – Animal and Plant Health Inspection Service (USDA-APHIS)

Partners: Hilda Díaz-Soltero, Caribbean Advisor to the APHIS Administrator; Federal Interagency Committee on Invasive Terrestrial Animals and Pathogens (ITAP) Subcommittee on Plant Pathogens; Julius Fajardo, USDA-Office of Pest Management Policy, Washington, DC, USA; Rosemarie Hammond, USDA ARS NEA BARC Molecular Plant Pathology Laboratory, Beltsville, USA

Invasive plant pathogens are threatening US agriculture, forestry and the environment. We require accurate information on their biology, distribution range, hosts, impacts, diagnosis and management to help prevent their introduction, eradicate new incursions or mitigate the damage they cause. The US Federal Interagency Committee on Invasive Terrestrial Animals and Pathogens (ITAP) Subcommittee on Plant Pathogens has identified the worst culprits that are either in the USA and have the potential to spread further, or represent a likely new threat. CABI will compile and publish data on 50 of these plant pathogens on its Invasive Species Compendium (www.cabi.org/isc).

So far,17 new datasheets have been commissioned from experts and their editing, peer review and publication has begun. The final phase will address the other 33 species.

SYSTEMS APPROACH TO PLANT HEALTH | BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Partnership and Project Development Mission to Colombia

Location: Colombia

Dates: 10/06/2018 – 15/06/2018

CABI Project Manager: Yelitza Colmenarez

CABI Project Team: Belinda Luke, Qiaoqiao Zhang

Donors: CABI Development Fund

Partners: National Federation of Coffee Growers of Colombia; (FNC)/ CENCAFE; CORPOICA- AGRISAVIA; ICA; Universidad Nacional de Colombia

To address the needs of Colombia's post-conflict development, particularly sustainable agricultural development, CABI funded a mission to Colombia in June 2018 to extend partnerships and explore opportunities for further collaboration with Colombia agencies and institutions. A wide range of areas for possible collaboration were identified through discussions, which included management of invasive species, IPM, Climate Smart Agriculture, plant health system improvement through the Plantwise, biological control of key pests of coffee, biopesticides development, and access and benefit-sharing of microbiological resources. Possible funding sources were also identified. The development of a project proposal on early warning system and modelling tools for the biological control of Coffee Berry Borer is now under way.

PestSmart

Location: Global

Dates: 09/07/1905 – Ongoing

CABI Project Manager: Carol McNamara

CABI Project Team: Mary O'Connor, Michelle Davies, Phil Taylor, Anne Wilson, Amy Lodowski-Hilsdon, Kelly Snell, Wade Jenner

PestSmart is designed to be an e-Learning course that focuses on the skills and methodologies required for field-based diagnosis. It will teach students to recognise the symptoms of major pathogen and pests and to relate them to various causes that can then be dealt with. The online course contains high-resolution images, case studies and knowledge checks to reinforce learning and enable diagnosis of key crop problems. The package aims to help plant health professionals and students to develop and improve their knowledge through practical, independent learning. We hope to launch the product soon.

Plantwise in the Americas and Caribbean

Location: Barbados, Bolivia, Brazil, Costa Rica, Grenada, Honduras, Jamaica, Nicaragua, Peru, Trinidad & Tobago

Dates: Ongoing

CABI Project Manager: Yelitza Colmenarez

CABI Project Team: Natália Corniani (M&E), Eduardo Hidalgo (Central America), José Gómez (Caribbean, M&E), Javier Franco and Claudia Sainz (CABI Associate – South America)

Donors: United Kingdom Department of International Development (DFID); Swiss Development Cooperation (SDC); Crop Health and Protection (CHAP); Government of the Netherlands Directorate-General for International Cooperation, (DGIS)

Partners: Various ministries of agriculture, NGOs, extension services and research institutes

Due to its huge latitudinal range, varied topography and rich biodiversity, Latin America and the Caribbean has one of the most diverse and complex ranges of farming of any region in the world.

Pests and diseases mean that crops suffer and yields are often less than half what they could be. Extension services can't possibly meet all the wide-ranging information needs of smallholder farmers, and providing timely and relevant advice can significantly improve food security.

With Plantwise, we are boosting the extension services of 10 countries. Working with the various agricultural ministries, we are able to reach many more farmers, giving them the timely and relevant advice and information that they need to grow more and better crops.

Results so far:

- **Barbados**: Plantwise and the Ministry of Agriculture, Food Fisheries and Water Resources established 38 plant clinics, training 21 plant doctors. In collaboration with three agro-input suppliers, a wholesale supplier and government institutions, there is a core group of 29 people that contribute to deliver the Rational Use of Pesticide plant health campaign in the country. In support, 14 pest management guides and 23 fact sheets have been written.
- **Bolivia**: Implemented in four departments through regional governments, Plantwise has 44 clinics here and 371 trained plant doctors. They have 138 fact sheets and 29 guides. Former plant doctors from regional governments have moved on and provide clinic services as part of their private initiative.
- **Brazil**: Partnering with EMBRAPA Mato Grosso, Plantwise has six plant clinics here run by 39 trained plant doctors. Experts here have written 17 fact sheets and 10 guides. The national forum is reviewing and planning activities. Plantwise has been able to establish a group of graduate students to follow up production of extension materials in Portuguese.
- **Costa Rica**: Operating in four provinces through the Extension Service with technical backup from the Plant Health Department of the Ministry of Agriculture. Plantwise runs 24 plant clinics. Around 57 plant doctors have been trained and have 37 guides.
- **Grenada**: Operated by the Ministry of Agriculture, Forestry, Fisheries and the Environment, Plantwise has around 27 trained plant doctors, from which 16 had been trained by national trainers and five clinics currently spread across the country. There are 24 fact sheets and 18 guides to support the clinics.
- **Honduras**: Operating in 10 departments through the Plant Health Secretariat of the Ministry of Agriculture, NGOs and private sector, Plantwise runs 20 plant clinics. Around 106 plant doctors have been trained and have 19 fact sheets and 74 guides. Plant health rallies have been helpful to deliver extension messages to indigenous farmers in Intibucá, leading to less reliance on toxic pesticides (class III and IV).
- **Jamaica**: Operating in 14 parishes through the Rural Agricultural Development Authority and the Research and Development Division of the Ministry of Industry Commerce, Agriculture and Fisheries. There are five fixed plant clinics; around 51 out of 99 extension areas are covered by 59 plant doctors.
- **Nicaragua**: Operated through farmer cooperatives, universities and NGOs in five departments, Plantwise established 29. Around 140 plant doctors have been trained and have 40 fact sheets and 126 guides.
- **Peru**: Plantwise in Peru is the most developed programme. It has 41 clinics with more than 370 plant doctors supported by 84 fact sheets and 34 guides. The introduction of the e-plant clinic has helped to reduce the waiting time of when data becomes available from approximately 170 days to 21 days.
- **Trinidad and Tobago**: The Ministry of Agriculture, Lands and Fisheries, through the for Extension Training and Information Services Division and the National Agricultural Marketing and Development Corporation has helped Plantwise establish over eight plant clinics with 133 trained plant doctors, supported by 36 fact sheets and nine guides.
- **E-plant clinics**: E-plant clinics have been introduced using government sponsored equipment to improve data collection in Jamaica, Honduras and Costa Rica. Data collection has improved the quality of the data.

www.plantwise.org

Protecting North America's wetlands from common reed

Location: USA

Dates: 01/01/1998 – Ongoing

CABI Project Manager: Patrick Häfliger

Donors: US Army Corps of Engineers; US Fish and Wildlife Service through Cornell University; New York State Department of Transportation through Cornell University, USA; New York State Department of Environmental Conservation, USA; British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada

Partners: Cornell University, Ithaca, USA; University of Rhode Island, USA

Common reed is one of the most widespread plant species in the world. It is invasive in North America where it forms large monocultures in wetlands and along riverbanks and lakesides, which reduce native biodiversity. One reason for its dominance is an absence of natural enemies to check its vigour and spread. CABI is studying several stem-mining moths not currently present in North America to see whether they would be safe and effective biological control agents if introduced.

Tests with two shoot-mining moths, *Archanara geminipuncta* and *A. neurica*, are going well and petition for their release in North America is currently being prepared by our North American collaborators.

www.cabi.org/common-reed

Preventing COSTS of invasive species

Location: Caribbean, Barbados, Grenada

Dates: 01/01/2017 – 30/04/2018

CABI Project Manager: Arne Witt

CABI Project Team: Naitram (Bob) Ramnanan

Donors: UN Environment

Partners: Ministries and Departments of the Environment in Barbados; Antigua and Barbuda; St. Kitts and Nevis; Dominica; Grenada; St. Lucia and St. Vincent and the Grenadies.

Invasive alien species can pose a significant threat, especially to fragile island ecosystems, as they can grow and spread unchecked by natural enemies and damage delicately balanced ecosystems. In this project in Barbados and surrounding islands, we are aiming to develop strategies that prevent, detect them early, or control and manage them in a way that focuses on the highest risk invasion pathways.

The inception workshop will be held in Barbados in September 2018 but in preparation, national consultation workshops have been held in all seven of the participating countries. Baseline surveys have also been undertaken in Barbados, Antigua and Barbuda, and St. Kitts and Nevis to determine the levels of awareness of invasive species. A regional workshop was also held to finalise the workplan for the future full size project. A project document was submitted to the Global Environment Facility (GEF) via the United Nations Environment Programme (UN Environment).

Protecting leeks and onions from pests

Location: Paraguay

Dates: 01/04/2009 – 31/03/2016

CABI Project Manager: Tim Haye

CABI Project Team: Wade Jenner, Ulrich Kuhlmann

Donors: Agriculture and Agri-Food Canada (AAFC)

Partners: Agriculture and Agri-Food Canada (AAFC)

The invasive leek moth poses a significant and immediate threat to producers of leeks, onions, garlic and chives in North America. The larvae mine the green tissues, reducing the marketability of crops. The pest's distribution is expanding, with no signs of suppression by indigenous natural enemies. We are supporting an integrated pest management (IPM) programme run by Agriculture and Agri-Food Canada to combat the leek moth using specialised natural enemies from its area of origin.

Following host-specificity testing carried out between 2006 and 2008, releases have been made in Ontario from 2010 onwards. The species is now established in Canada, but each year CABI is collecting new genetic material for refreshing rearing colonies for releases.

www.cabi.org/leek-moth

Reducing the impacts of tobacco farming

Location: Brazil, Argentina, Colombia, Mexico, Greece, Turkey, China, Indonesia, Malawi

Dates: 01/01/2018 – 31/12/2018

CABI Project Manager: Anna Wood

Tobacco farming can have a number of impacts, not least on the environment and the health of its workers due to pesticides and other crop management techniques. We are working with Philip Morris International (PMI) in an ongoing programme to provide support in rolling out a global integrated pest management (IPM) programme across all of its tobacco leaf growing regions: IPM@PMI. This broad-based approach integrates practices to control pests and carefully considers control options. Our ambition is to promote more responsible management of crop protection agents in order to reduce the health and safety risks of the contracted tobacco farmers and farm workers, and to minimise their impact on the environment.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Rescuing and restoring the native flora of Robinson Crusoe Island

Location: Chile

Dates: 01/04/2015 – 31/03/2018

CABI Project Manager: Steve Edgington

CABI Project Team: Yelitza Colmenarez, Sean T Murphy, Belinda Luke

Donors: Department for Environment, Food and Rural Affairs (DEFRA); Darwin Institute

Partners: Chilean National Forestry Corporation (CONAF); Chilean Ministry of the Environment (MMA); Oikonos Ecosystem Knowledge; Instituto de Investigaciones Agropecuarias (INIA)

Robinson Crusoe Island, part of the Juan Fernández Archipelago in Chile, is under threat from invasive species. So, action needs to be taken. As part of a larger management programme for the whole Archipelago, a team from CABI will help conserve and re-establish native species on the island. In the long term, this project will provide the biological resources and protocols for replanting larger areas of land, and will work with the Chilean Government to coordinate the systematic removal of invasive species from the Archipelago. Our work specifically will enable the conservation, production and re-establishment of native species on the island.

www.cabi.org/crusoe

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

Research for Development (R4D)

Location: Global

Dates: 01/01/2005 – 31/10/2017

CABI Project Manager: Martin Parr

CABI Project Team: Debbie Cousins

Donors: Department for International Development (DFID)

Partners: CommsConsult; Euforic Services; International Food Policy Research Institute (IFPRI)

The UK Department for International Development (DFID) supports many programmes and projects that aim to improve access to knowledge that furthers sustainable development. So, to better communicate their research impacts and outputs and to ensure that everyone working for, and with, DFID has access to the right information, CABI designed and built a research portal. This portal brings together information across all DFID-funded research projects and programmes and has a distinctive presence in the global knowledge marketplace.

www.cabi.org/r4d

Researching introduced forest species in Trinidad

Location: Trinidad and Tobago

Dates: 01/02/2015 – 31/01/2016

CABI Project Manager: Naitram (Bob) Ramnanan

CABI Project Team: Arne Witt

Donors: Food and Agriculture Organization of the United Nations (FAO)

Many introduced species can have an adverse effect on native biodiversity, especially on a delicate island habitat such as Trinidad and Tobago. Three forest species are being particularly troubling, namely, *Tectona grandis* (teak), *Acacia mangium* (brown salwood) and *Leucaena leucocephala* (white leadtree). So, with funding from the FAO, CABI is researching the species to find out how they behave and where they have invaded with a view to controlling them sustainably.

Roadside surveys showed that *Pueraria phaseoloides (Roxb.) Benth*. is widespread and abundant and poses a significant threat to native forests. However, grasses such as Guinea grass (*Urochloa maxima (Forssk.) Nguyen*), itchgrass (*Rottboellia cochinchinensis*), paragrass (*Brachiaria mutica*), probably pose the most significant threat.

www.cabi.org/tt_invasives

Revisiting biological control of field bindweed

Location: USA

Dates: 01/01/2009 – Ongoing

CABI Project Manager: Ghislaine Cortat

CABI Project Team: Ivo Toševski

Donors: United States Department of Agriculture, Animal and Plant Health Inspection Service - Center for Plant Health Science and Technology (USDA-APHIS-CPHST)

Partners: Institute for Plant Protection and Environment; Department of Plant Pests, Zemun; Serbia; Slovak Agricultural University, Nitra

Field bindweed is a Eurasian vine whose dense creeping and twining growth smothers other vegetation and its long-lived seeds and deep roots make it hard to control. It is a noxious weed of agricultural fields in temperate regions and has become invasive in North America. CABI is studying sustainable control methods using host-specific natural enemies, which could be introduced into North America as biological control agents.

Many insects have so far been tested and rejected due to their lack of specificity but we are continuing tests with a stem-mining agromyzid fly, *Melanagromyza albocilia*, and a root-mining clear-wing moth, *Tinthia brosiformis*.

www.cabi.org/bindweed

KNOWLEDGE MANAGEMENT, COMMUNICATION AND USE

SciDev.net

Location: Global

Dates: Ongoing

CABI Project Manager: Ben Deighton

CABI Project Team: 3 staff, 21 CABI consultants

Donors: Swedish International Development Cooperation Agency (Sida); São Paulo Research Foundation (FAPESP); Robert Bosch Stiftung; The Rockefeller Foundation; Inter-American Institute for Global Change Research (IAI); Bill & Melinda Gates Foundation

CABI and SciDev.Net, the world's leading source of reliable and authoritative news, views and analysis about science and technology for global development, merged in 2017, creating a stronger and more diverse combined organisation. Reaching 100 million readers per year, SciDev.Net produces around 20 articles per week in four languages and has regional hubs in the Middle East, Africa, Latin America and Asia. The merger has led to innovations in the way in which research is published and shared, contributing to better development communications and extension.

www.scidev.net

FOOD AND NUTRITION SECURITY

Secretariat for the International Research Consortium on Animal Health (SIRCAH)

Location: Global

Dates: 01/10/2016 – 01/10/2021

CABI Project Manager: Robert Taylor

Donors: STAR-IDAZ International Research Consortium on Animal Health

Partners: DEFRA (UK Department for Environment, Food and Rural Affairs); World Organisation for Animal Health (OIE); CABI; Biotechnology and Biological Sciences Research Council (BBSRC); International Federation of Animal Health – Europe (IFAH-Europe)

In 2016, CABI joined 15 other organisations from 12 countries to establish a Scientific Secretariat for the International Research Consortium on Animal Health. The Secretariat, approved by the European Union's Horizon 2020 programme for Research and Innovation, aims to deliver measurable advances to control animal diseases. It will do this by aligning both public and privately funded animal health research around the world. Partners of the Secretariat have agreed to coordinate research programmes to address agreed research needs, share results and together seek new and improved animal health strategies for at least 30 priority diseases, infections or issues. These include candidate vaccines, diagnostics, therapeutics and other animal health products, procedures and/ or key scientific information and tools to support risk analysis and disease control.

Sentinel nurseries as early warning system against alien tree pests

Location: Global

Dates: 03/12/2014 – 02/12/2018

CABI Project Manager: Rene Eschen

CABI Project Team: Marc Kenis, Iva Franic

Donors: COST – European Cooperation in Science and Technology (H2020); Swiss National Science Foundation

Partners: Consortium of over 45 countires around the world; European and Mediterranean Plany Protection Organisation (EPPO); The international Plant Sentinel Network

Many of the alien pests and diseases of woody plants were unknown before they were established in new countries. No policy or measures to avoid their introduction and spread were therefore implemented. Recently, monitoring sentinel plants in exporting countries has been proposed as a valuable tool to identify harmful organisms prior to their arrival. This project advances the use of sentinel plants through international collaboration of scientists and regulators.

Our work has already resulted in several scientific publications and we have organised two training schools (about import regulations for plants for planting and pest risk analysis and about classical techniques for fungal identification).

Recently, an open-access identification guide on the damaging agents of woody plants was developed by members of this project from around 25 countries and will be used by practitioners worldwide.

www.cabi.org/sentinel

Stemming the spread of Russian olive

Location: USA

Dates: 01/01/2007 – Ongoing

CABI Project Manager: Philip Weyl

CABI Project Team: Urs Schaffner

Donors: Montana Noxious Weed Trust Fund through Montana State University (MSU), USA; Wyoming Biological Control Steering Committee; US Department of the Interior Bureau of Land Management (USDI BLM) through MSU, USA; British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada

Partners: Biotechnology Biocontrol Control Agency (BBCA), Italy; Erciyes University, Turkey; Ferdowsi University of Mashhad, Iran; University of Belgrade, Serbia

Russian olive is a significant invasive weed in North America but some perceive it as a useful and attractive tree. It is especially a problem in western parts of the USA where it affects many natural habitats, altering the ecosystem and its functions. Biological control is a useful approach in such circumstances because scientists can look for natural enemies that damage reproduction, and thus future spread, without damaging established trees.

Our tests show that a mite, *Aceria angustifoliae*, is very specific and seems to damage the weed successfully so we have sent data to our North American collaborators to prepare a release petition.

Although a moth, *Anarsia eleagnella* looks promising and we are conducting tests to see if it will be suitable as a biological control agent.

Finally, we are planning to extend field surveys to other regions, including Uzbekistan and Kazakhstan to find additional potential biological control agents.

www.cabi.org/olive

Tackling common tansy in North America

Location: Canada, USA

Dates: 01/01/2006 – Ongoing

CABI Project Manager: Sonja Stutz

Donors: British Columbia Ministry of Forests, Lands and Natural Resource Operations, Canada; Montana Noxious Weed Trust Fund through Montana State University, USA; Saskatchewan Ministry of Agriculture, Canada; Canada-Saskatchewan Growing Forward 2 Bi-Lateral Agreement; Alberta Invasive Species Council, Canada

Partners: Zoological Institute, Russian Academy of Sciences; McClay Ecoscience, Alberta, Canada

Common tansy is an aromatic Eurasian plant species with a long history of use as a medicinal herb. Introduced for this purpose to North America, it has since become invasive. One reason for this could be the absence of the natural enemies that keep it in check in its area of origin. CABI has been tasked with identifying specialist natural enemies from Eurasia that can be introduced into North America as biological control agents.

Tests showed most insects were not specific enough for release in North America. But tests with the stem-mining weevil, *M. millefolii*, showed more promise. Although it has a complicated life cycle, we are continuing to work with the shoot-tip-boring moth *P. ochrodactyla*. Work with the leaf feeding beetle, *Chrysolina eurina*, also looks promising so far.

www.cabi.org/tansy

Unknotting Canada's knotweed problem

Location: Canada, Japan, UK

Dates: 01/04/2007 – 31/03/2018

CABI Project Manager: Marion Seier

CABI Project Team: Corin Pratt, Kate Constatine, Nikolai Thorn, Pablo González-Moreno, Kate Pollard, Sarah Thomas

Donors: British Columbia Ministry of Forests, Lands and Natural Resource Operations

Partners: Agriculture and AgriFood Canada (AAFC); Lethbridge Research Centre; University of Reading

Originally from Japan, Japanese knotweed is a fast-growing plant species that is causing a great deal of damage in Europe and North America. This herbaceous plant forms dense, impenetrable thickets and its impacts are varied. Our scientists have already carried out a considerable amount of research in Europe and found both an insect and rust fungus that controls the plant here. So, we will adapt our research and ensure any native or important species in Canada are not affected.

Additional testing with native and economically important North American plant species showed that the psyllid poses no risk to non-target species. Consequently, the insect has been released in British Columbia (Canada) and its spread and impact has been closely monitored.

Research on a hybrid of this culture is continuing and we are still looking at a leafspot fungus. Based on our results, we will be able to evaluate their suitability for Canada.

www.cabi.org/knotweed

Using beneficial maize-rhizosphere microbials against western corn rootworm

Location: Hungary, France, USA

Dates: 01/07/2016 – 30/06/2019

CABI Project Manager: Stefan Toepfer

Donors: Groupement National Interprofessionnel des Semences et plants (GNIS); section maïs et sorgho; gestionnaire du Fonds Diabrotica

Partners: Genective, France and Germany; Biogemma, France and USA; Genoscope; CEA/DRF/IG, France; UMR 7265 CNRS-CEA-AMU CEA/DRF/BIAM/ LEMiRE, CEA Cadarache, France; Proteus, France; Crop Characteristics Inc., USA

The western corn rootworm is a major invasive maize pest in North America and Europe. The phase-out of certain pesticides means control options are increasingly limited. In collaboration with five French partners, we are investigating bacterial proteins with insecticidal effects to find new ways of controlling the pest. Promising strains are then screened in vitro to develop biopesticidial or biotechnological control options.

So far, experiments from existing microbial collections and a literature search have identified the project's first bacterial species/ strains likely to possess insect toxin-related genes. We have also carried out a survey of infested fields in central Europe to obtain samples of microbial species/ strains from the roots and surrounding soil. The genomes we've found are being sequenced by project partners and promising proteins are being screened.

www.cabi.org/corn-rootworm

CABI in the Americas and Caribbean

Acknowledgements

CABI values the partnership with our member countries from the American and Caribbean region.


Anguilla*


Bahamas


Barbados


Bermuda*


British Virgin Islands


Canada


Chile


Colombia


Grenada


Guyana


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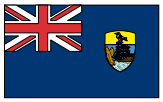
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Agriculture and Agri-Food Canada

Ministry of Foreign Affairs of the Netherlands

Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

We acknowledge the valuable contributions from all funders and partners who support our work globally, and in the Americas and Caribbean, as described in the document.

In addition, we appreciate the support from several Americas and Caribbean-based funders, who have funded various projects and programmes in Africa and Asia-Pacific.

- In Africa:
  - DowDuPont provided funding for the development of Plantwise e-plant clinics
  - The Bill & Melinda Gates Foundation funded the development of African Soil Health Consortium
  - The International Development Research Centre (IDRC), Canada has funded the workshop on Scaling up Food Security Innovations in Africa, and the project Scaling-up improved legume technologies in Tanzania
  - Rockefeller Foundation has provided funding for the SciDev.Net Bellagio Residency Project
  - USAID has funded the development of Fall Armyworm Pest Management Decision Guides for Africa, East Africa Trade Hub, and Scaling up interactive ICT to increase agricultural innovation in Tanzania
- In Asia:
  - USAID via USDA has funded the Citrus Grove Management project, and Phytosanitary Risk Management Programme in Pakistan
  - The World Bank has provided funding for the Insect Pest and Plant Disease Survey in Afghanistan

Appendix

Extracted from the CABI Medium-term Strategy 2017-2019:

Linking Member Country Requests to the Sustainable Development Goals

Appendix	Linking Member Country Requests to the Sustainable Development Goals	
SDG	**Key Targets**	**Member Country Requests**
 **End poverty in all its forms everywhere**	**1.4** By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services, including microfinance **1.5** By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate- related extreme events and other economic, social and environmental shocks and disasters	• Improve communication with development stakeholder groups for greater reach, frequency and impact of messaging to stimulate technology uptake and deliver new knowledge to farmers using mixed methods (including mass media such as mobile and social media as well as extension approaches based on face-to-face interactions), gender inclusive approaches for all stakeholder groups, particularly use of ICTs (including e-M&E; e-statistics and e-vouchers) • Build resilience in farming systems at all levels to better adapt to climate and other changes, including the management of a range of biophysical stressors including pests (IPM), water (IWM), and soil nutrients (INM), and early warning and rapid response systems for newly emerging/key pests and diseases
 **End hunger, achieve food security and improved nutrition and promote sustainable agriculture**	**2.3** By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition, and non-farm employment **2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality **2.5** By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed	• Provide advice and support for farmers on aspects such as GAP compliance, Phytosanitary standards and compliance, advice on crop diversification (e.g. HVH), post-harvest management, improving quality of agricultural inputs, access to market information, improved technology, improved range management for livestock • Stimulate the creation of farmer organisations, developing entrepreneurial and commercial skills, risk management, access to affordable credit • Strengthen support for food safety, including information on legislative and regulatory requirements, prevention of mycotoxins, maximum residue levels, heavy metal contamination, animal health and welfare, zoonotic diseases, and the safe use of veterinary drugs • Promote Climate Smart Agricultural practices that reduce greenhouse gas emissions, adapt to changing conditions and improve resilience • Expand the scope of CABI's support to advisory services to include soil health, selection of crop and seed varieties, integrated water and land management, animal health and welfare • Promote agricultural diversification and the use of indigenous crops

Appendix	Linking Member Country Requests to the Sustainable Development Goals	
SDG	**Key Targets**	**Member Country Requests**
	2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development, and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	• Strengthen seed systems, including aspects such as improved genetic materials, availability of neglected crops, and improving self-saved seeds • Promote access to quality controlled agricultural inputs (seeds, fertilizers, chemicals) • Support plant health systems, including aspects such as improved diagnostic skills at all levels, informed advice on new resistant varieties, seed selection, and GM crops, informed policy leading to an improved regulatory and legislative environment, optimizing links between different sectors
 **Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**	**4.3** Ensure access for all women and men to affordable and quality technical, vocational and tertiary education, including university **4.4** Substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship **4.9** Substantially expand globally the number of scholarships available in developing countries, in particular least developed countries, small island developing states, and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes in developed countries and other developing countries	• Maintain a strong core Publishing programme targeted at academic, commercial and government scientists in the fields of agriculture, human and animal health • Ensure equal access for all women and men to good quality, affordable technical, vocational and tertiary education, including university • Develop new products and services to support lifelong learning and professional development in agricultural and environmental sciences • Support technical and vocational training, through the use of ICTs, to increase the number of youth and adults who have relevant skills for employment, decent jobs and entrepreneurship, both on and off farm, in rural communities • Offer secondment and teaching opportunities through linkage between CABI centres, local universities and member countries

Appendix	Linking Member Country Requests to the Sustainable Development Goals	
SDG	**Key Targets**	**Member Country Requests**
 **Ensure sustainable consumption and production patterns**	**12.2** By 2030, achieve the sustainable management and efficient use of natural resources **12.3** By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses **12.a** Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production **12.b** Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	• Support farmers for informed decision-making at the farm level through strengthened extension services able to advise on IPM in high value and staple crops, rational use of agrochemical inputs, including biofertilizers, biotechnology applications for pests and diseases, including biopesticides and biological control agents • Develop better approaches to manage pollinators, soil health and ecosystem services supporting agriculture • Support cash crops, fodder, fuel, fibre production, and ornamentals • Contribute to improved food security at all levels by the application of technology including new crop varieties to improve efficiency and productivity, reduction of post-harvest losses through improved storage, post-harvest processing and preservation • Promote the development of nutrition sensitive agriculture through support to aspects such as awareness raising and policy development, human health & food safety, advice on nutraceuticals and bio-fortification advice, food preparation, food /diet diversification • Provide information and training resources to support sustainable agro-tourism and other non-farm rural employment, particularly for women and youth
 **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage**	**15.5** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species **15.6** Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed **15.a** Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems	• Improve prevention and management of invasive species using national and regional approaches, including capacity building in remote diagnostics, strengthen capacity for management and control of terrestrial and aquatic invasives • Develop capacity to use microbial resources, for e.g. pharmaceutical and nutraceutical production, biopesticides, composting and waste management • Adopt the Nagoya Protocol, and promote its use, in support of CBD • Build a coalition of funding partners to prevent, eradicate or manage the invasive insects and weeds constituting the greatest threats to food security, livelihoods and biodiversity

Appendix	Linking Member Country Requests to the Sustainable Development Goals	
SDG	**Key Targets**	**Member Country Requests**
forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		
 **Ensure sustainable consumption and production patterns**	**17.6** Enhance North-South, South-South and Triangular regional and international cooperation on and access to science, technology and innovation, and enhance knowledge sharing on mutually agreed terms, including through improved coordination amongst existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism **17.8** Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology **17.17** Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships **17.18** By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data	• Facilitate knowledge transfer in South-South interactions involving member countries • Build individual, institutional and regional capacity to develop and govern agricultural innovation systems • Reinforce linkages between the scientific community, universities, government, and farmer associations • Develop public-private partnership to support smallholder market access along value chains, including SPS compliance and standards harmonization, food safety • Assist national services with information and data management, e.g. publication of and access to authoritative information resources, archiving and managing research, production and statistical data, awareness-raising, and policy development for open and big data policies

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