

1. Content of the 'Topic Description' document

1.1. Topic area

Management of pest/vector

1.2. Links to the Euphresco Strategic Research Agenda

The topic addresses the following objective(s) of the 2017-2022 Euphresco Strategic Research Agenda

- Objective 2017-R-1.1: to improve knowledge on the biology, epidemiology and ecology of priority invasive and (re)emerging biosecurity threats
- Objective 2017-I-2.1: to support data exchange, data use and re-use for the benefit of plant health research activities
- Objective 2017-C-3.1: to favour knowledge exchange and support common initiatives with relevant players

1.3. Topic title

Preparedness in biological control of priority biosecurity threats

1.4. Description of the problem the research should solve

Non-native invasive species threaten global biodiversity and food security resulting in substantial economic costs reported to be in excess of US\$100 billion annually¹. Approximately 480,000 non-native species have been introduced into different ecosystems worldwide, and the threat posed by invasive species is increasing due to the globalisation of trade, tourism and climate change². Measures have been introduced for prevention and early detection of invasive species, but management tends to be reactive once the pest arrives and an outbreak is discovered. The first management practices are usually aimed at eradication, but if this is unsuccessful, the pest establishes and strategies switch to managing the risk by population suppression and slowing the spread of the invasive species, as exemplified with the management of emerald ash borer (EAB; *Agrilus planipennis*) in North America³ and Citrus and Asian Longhorn beetles (CLB and ALB; *Anoplophora chinensis* and *A. glabripennis*) and Japanese beetle (*Popillia japonica*) both in North America and Europe^{4,5}.

Identifying future risks and preparing to manage those risks are becoming increasingly important to help mitigate the impact that establishment of invasive species have on native ecosystems once established in a new environment. Classical biological control, the introduction of a non-indigenous biological control agent (BCA), is recognised as a key strategy to manage invasive insect pest populations and since the late 1800s there has been over 6000 introductions of BCAs world-wide to control insect pests⁶. The deliberate introduction of an exotic BCA is subject to regulatory measures⁷ including a rigorous risk assessment and review process which may take years before approval is granted, giving additional time for an invasive pest to establish, build up population density and spread. Furthermore, since natural systems are dynamic and BCAs may take a long time to reach equilibrium, post-release evaluations are also needed to evaluate the magnitude of the release⁸.

Recently, the New Zealand Environmental Protection Authority has approved the conditional release of a parasitic wasp *Trissolcus japonicus* for the control of the brown marmorated stink bug (BMSB), *Halyomorpha halys*, in the event of the incursion and establishment of this pest⁵.

This was the outcome of a pre-emptive classical biocontrol programme for BMSB that was initiated in December 2015 as part of preparedness activities for a potential arrival/establishment of BMSB in New Zealand. Pre-emptive biocontrol is a novel approach that has the potential to enhance effective preparedness for a potential invasion of pest species. This could, for example, accelerate response to invasive pests in urban areas before they spread to agricultural areas. With a pre-emptive biological control approach, natural enemies can be selected, screened and pre-approved for release in the eventuality of a pest invasion. This means that natural enemies could be released against a target pest at a much earlier point in the emerging management programme and in some cases, significantly reduce pest densities and slow rates of spread, reducing the economic or environmental damage associated with the pest.

This preparedness for a pest incursion is a management strategy that could be widely adopted and DEFRA (GB) are currently undertaking a similar approach in preparation for the imminent arrival of EAB.

The main aim of this project is to establish a biological control network to share knowledge and information on priority biosecurity threats and BCAs to increase preparedness for incursions of invasive invertebrate species. This will be achieved through the following objectives:

- Review priority pests and the potential for their biological control
- Establish a network and repository for the exchange of information
- Produce a standard risk assessment for the introduction of BCAs

The project will be divided into 4 work packages (WP):

WP1. Priority biosecurity threats and biological control agents:

Catalogue priority pests, not already present in participating countries, and identify potential candidate BCAs for classical biocontrol.

WP2. Standard protocols for risk assessment:

Evaluate current BCA risk assessments and develop standard protocols.

Case study of a selected priority pest BCA using the standard protocol.

WP3. Biocontrol network and dissemination:

Establish a network of organisations/interested parties and means to share and disseminate information on BCAs.

WP4. Project management

1.5. Description of the expected results

The main outcomes of the projects are:

- Biological control strategies developed in preparedness for incursions of priority biosecurity threats
 - Catalogue of key priority biosecurity threats identified through national and international pest risk registers and tools (e.g. EPPO Reporting Service, Defra's UK Plant Health Risk Register, CABI's Plantwise Knowledge Bank)
 - Catalogue of potential BCAs
 - Standard protocol for BCA risk assessment
 - Risk assessment case study of a selected BCA
- EPPO's decision support scheme for import and release of BCAs of plant pests⁹ will be used to assess the information gathered and make recommendations
- Establish a biocontrol network
 - Identify key organisations and experts

- Initiate a web-based knowledge exchange repository for the sharing of information on BCAs (including risk assessments) that could be released to manage populations of an invasive priority pest.

1.6. Beneficiaries of this research product

- Government departments responsible for the management of invasive species and non-native pest risk assessments
- EPPO: information will feed into EPPO's standards on biological control agents and their decision support scheme for import and release of biological control agents of plant pests⁶
- EU and national regulatory agencies responsible for the introduction of non-native species
- Agriculture, Horticulture, Forestry, Urban and Peri-urban sectors at risk from invasive pests

1.7. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
1. Department of Agriculture, Environment and Rural Affairs, United Kingdom Iain Dummett Iain.Dummett@defra.gov.uk	-Project coordination and management; -Priority biosecurity threats and biological control agents; -Risk assessments; Contact person: Neil Audsley E.mail address: neil.audsley@fera.co.uk
2. The New Zealand Institute for Plant & Food Research Limited, New Zealand Gonzalo Avila Gonzalo.Avila@plantandfood.co.nz	-Project coordination and management; -Priority biosecurity threats and biological control agents; -Risk assessments; Contact person: Gonzalo Avila E.mail address: Gonzalo.Avila@plantandfood.co.nz
3. National Institute for Agricultural Research, France Jean-Pierre Rossi Jean-Pierre.Rossi@inra.fr	-Priority pests and biological control agents -Risk assessments -Biocontrol network and dissemination Nicolas RIS, Alexandre BOUT, Nicolas BOROWIEC
4. Benaki Phytopathological Institute, Greece Irene Vlotoglou i.vlotoglou@bpi.gr	-Priority biosecurity threats and biological control agents; -Risk assessments; Contact person: Panagiotis Milonas E.mail address: p.milonas@bpi.gr



<p>5. Council for Agricultural Research and Economics, Italy</p> <p>Luca Riccioni luca.riccioni@crea.gov.it</p>	<p>-Priority biosecurity threats and biological control agents; -Risk assessments;</p> <p>Contact person: Sauro Simoni E.mail address: sauro.simoni@crea.gov.it</p>
<p>6. Ministry of Agriculture Forestry and Food, Slovenia</p> <p>Erika Oresek erika.oresek@gov.si</p>	<p>-Priority biosecurity threats and biological control agents; -Risk assessments;</p> <p>Contact person: Stanislav Trdan E.mail address: stanislav.trdan@bf.uni-lj.si</p>
<p>7. Commonwealth Scientific and Industrial Research Organisation, Australia</p>	<p>-Priority biosecurity threats and biological control agents; -Risk assessments;</p> <p>Contact person: Valerie Caron E.mail address: Valerie.caron@csiro.au</p>
<p>8. Commonwealth Scientific and Industrial Research Organisation, France</p>	<p>-Priority biosecurity threats and biological control agents; -Risk assessments;</p> <p>Contact person: Vincent Lessieur E.mail address: vincent.lesieur@supagro.fr</p>
<p>9. Fondazione Edmund Mach, Italy</p> <p>Claudio Ioriatti claudio.ioriatti@fmach.it</p>	<p>-Priority biosecurity threats and biological control agents; -Risk assessments;</p> <p>Contact person: Claudio Ioriatti E.mail address: claudio.ioriatti@fmach.it</p>
<p>10. University of Torino, Italy</p> <p>Chiara Ferracini chiara.ferracini@unito.it</p>	<p>-Priority pests and biological control agents; -Risk assessments;</p> <p>Contact person Chiara Ferracini E.mail address: chiara.ferracini@unito.it</p>

1.8. Research project partnership outside Euphresco

Euphresco funding ensures a certain level of transnational collaboration among Euphresco member countries. It is possible, if the funding consortium is interested, to contact funding organisations or research groups outside the geographical area covered by Euphresco members. The Euphresco coordinator could advertise the research topic in order to have an enlarged collaboration. If funders are interested in this possibility, please check the case below:

The funding consortium of the topic mentioned in section 1.2 requires that the topic is advertised outside the Euphresco network

Information to define the profile of sought partners could be useful (but not mandatory): country/region (if there are preferences), skills/expertise required, etc.

1.9. Any other relevant information on content

References

1. Sunny LJ, Sanchirico JN (2018). Estimating the cost of invasive species control. *Journal of Environmental Economics and Management* 87: 242–257
2. CABI 2019. Invasive Species: The hidden threat to sustainable development. Available online: <https://www.invasive-species.org/wp-content/uploads/sites/2/2019/02/Invasive-Species-The-hidden-threat-to-sustainable-development.pdf>. Last accessed 2020-08-03.
3. McCullough DG (2019). Challenges, tactics and integrated management of emerald ash borer in North America. *Forestry* 93: 197–211.
4. Hérard F, Ciampitti M, Maspero M, Krehan H, Benker U, Boegel C, Schrage R, Bouhot-Delduc L, Bialooki P (2006). *Anoplophora* species in Europe: infestations and management processes. *Bulletin OEPP/EPPO Bulletin* 36(3): 470-474.
5. EFSA Panel on Plant Health (PLH) *et al.* (2018). Pest categorisation of *Popillia japonica*. *EFSA Journal* 16(11): 5438, 30 pp. <https://doi.org/10.2903/j.efsa.2018.5438>.
6. Kenis M, Hurley BP, Hajek AE, Cock MJW (2017). Classical biological control of insect pests of trees: facts and figures. *Biological Invasions*, 19: 3401–3417
7. Stink bug biocontrol approved. Available online <https://www.far.org.nz/articles/1003/stink-bug-biocontrol-approved>. Last accessed 2020-08-03.
8. Ferracini C, Ferrari E, Pontini M, Hernández Nova LK, Saladini MA, Alma A (2017). Post-release evaluation of non-target effects of *Torymus sinensis*, the biological control agent of *Dryocosmus kuriphilus* in Italy. *Biocontrol* 624: 445-456.
9. EPPO (2018). PM 6/04 (1) Decision-support scheme for import and release of biological control agents of plant pests. *Bulletin OEPP/EPPO Bulletin* 48(3): 352–367.

2. Euphresco management aspects of the project

2.1. Indication of the topic budget

Funding organisation ^a	Mechanism ^b	Total Budget ^c
1. Defra (GB)		€
2. B3 (NZ)		€
3. INRAE (FR)		€
4. BPI (GR)		€
5. CREA (IT)		€
6. MAFF (SI)		€
7. CSIRO (AT)		€
8. CSIRO (FR)		€
9. FEM (IT)		€
10. Unito (IT)		€
total		€

2.2. Expected duration of the project (only for non-competitive topics)

24 months

2.3. Identification of project coordinator

Has the research project coordinator been identified?

- Yes
 No

2.4. Any other relevant information on topic organisation and management

None.

^a First member is project coordinator. A minimum of two partners are necessary for each proposal. Add lines as needed.

^b Please indicate the preferred mechanism (e.g. real pot RP; virtual pot VP; non-competitive NC), or several mechanisms if there is flexibility.

^c Optional, as this amount can still change in the next phase. In-kind contribution should also be indicated in this column.