



Accidental introductions of biological control agents are increasing in Europe: how to react?



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EPPO/SMARTER/IOBC/IBMA/CABI workshop, Budapest

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Classical biological control - *deliberate* introductions

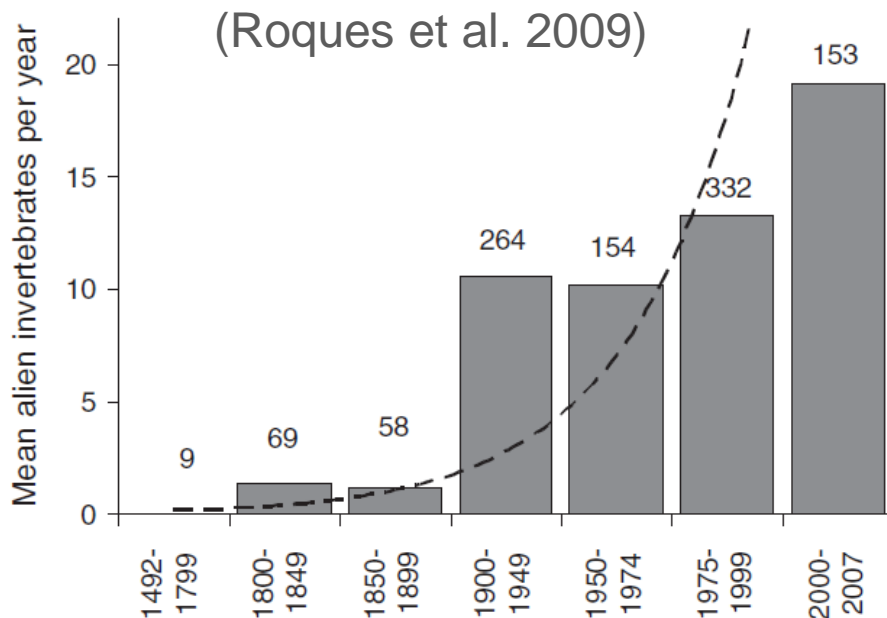
Procedure in classical BC of weeds:

- Literature study and field surveys to identify natural enemy complex of the target weed
- Pre-selection of biological control candidates
- Host specificity assessment
- Impact studies
- Submission of petition for field release to national authorities (may include PRAs)
- Approval/rejection by national authorities
- Mass rearing and field release
- Monitoring



Un-authorized introductions of invertebrates in Europe

- Accidental introductions of invertebrates are common
- Accidental introductions of herbivores associated with invasive plant species are increasing



Macrosaccus robiniiella



Un-authorized introductions of biological control agents in Europe

Accidentally introduced organisms are called 'accidentally introduced biological control agents' when:

- they were proposed for release / have been released for classical BC elsewhere because of narrow host-range and expected impacts on the target weed

Benefits and risks of these organisms have not been assessed for Europe!

Projects assessing the use of accidental introductions for classical BC

Target weed	Agents	Country where recorded	Year of first rec.	Research team
<i>Azolla filiculoides</i>	<i>Stenopelmus rufinanus</i>	Western Europe	approx. 1920s	CABI, (Generalitat Valenciana)
<i>Opuntia ficus-indica</i>	<i>Dactylopius opuntiae</i>	Spain	2007	Generalitat Valenciana
<i>Ambrosia artemisiifolia</i>	<i>Epiblema strenuana</i>	Israel	2008	Ministry of Agriculture, Israel
	<i>Tarachidia candefacta</i>	Bulgaria, Serbia	2009	BBCA, Italy/University of Belgrade, Serbia
	<i>Aceria</i> sp.	Serbia	2011	University of Belgrade/BBCA, Italy
	<i>Ophraella communa</i>	Italy/Switzerland	2013	SMARTER Task Force

Biological control of Opuntia



Dactylopius opuntiae
– Vicente delToro

Dactylopius opuntiae

- *Dactylopius opuntiae* successful biological control agent against *Opuntia* in South Africa
- *D. opuntiae* accidentally introduced into southern/central Spain; translocation experiment in the Espadan Natural Park, Northern Spain
- 6 months after translocation, establishment and impact observed
- Contact: Vincente delToro, Generalitat Valenciana, Conselleria de Territori i Habitatge, Valencia

Biological control of *Azolla*



Stenopelmus rufinasus
– Rob Reeder, CABI

Stenopelmus rufinasus

- *Azolla* biological control research undertaken in South Africa – extensive host range testing
- Weevil, *Stenopelmus rufinasus* found to be an *Azolla* specialist and released in 1997
- Hugely successful biological control agent
- Benefit-cost ratio of *Azolla* biocontrol programme in South Africa 15:1 by 2010

Excellent example of Classical BC

Biological control of *Azolla*



Stenopelmus rufinasus
– Corin Pratt, CABI

Stenopelmus rufinasus

- Native to southern and western USA
- First identified in Britain in 1921
Defra: '**Ordinarily Resident**'



- Mass rearing for inundative BC



30/07/2008

Biological control of Ambrosia



Epiblema strenuana
– Tuvia Yaacoby, Israel

Epiblema strenuana

- Native to North and Central America
- Accidentally introduced in Israel in 2008, found on two *Ambrosia* spp.
- Several generations per year; generation time at 25° C 1 month
- Extensive host range testing; host-range restricted to Heliantheae, attack of sunflower under field conditions unclear
- Deliberately introduced in Australia and China; mass-rearing in China, successful BC

Biological control of Ambrosia



Ophraella communa
– Peter Toth, Slovakia

Ophraella communa

- Native to North and Central America – extensive host range testing
- Several generations per year; generation time at 25° C 1 month
- Host-range restricted to Heliantheae, attack of sunflower under field conditions unclear
- Accidentally introduced in Japan and China; mass-rearing in China, successful BC
- First records in Europe in 2013

Ophraella communa in Europe



How to respond to accidental introductions of exotic CBC agents?

- No regulation of classical BC of weeds at European level
- No official advisory body that provides guidance in risk (-benefit) analysis of (accidentally introduced) exotic BCAs
- Active movements of exotic organisms prohibited in several European countries



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COST Action SMARTER

Ophraella Task Force

Members:

- 2 agronomists
- 3 entomologists
- 3 biological control specialists
- 3 ecologists
- 2 health experts
- 1 aerobiologist
- 1 economist





Ophraella Task Force

assessing impact = risk + benefits

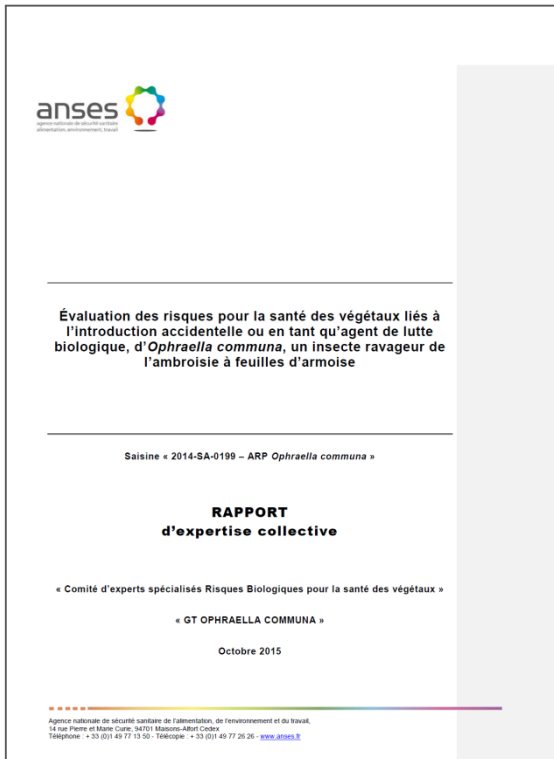
- Host specificity (under open-field conditions)
- Distribution/spread of *O. communa*
- Biology/behaviour of *O. communa*
- Impact of *O. communa* on ragweed population dynamics
- Impact on seed and pollen production
- Use data to parameterize pollen forecast model European-wide
- Benefits for crop yield
- Reduction in medical costs in areas with *O. communa*

Pot. negative impacts

Pot. positive impacts



Groupe de travail *Ophraella communa* en France



- The French Agency for Food, Environmental and Occupational Health & Safety has put together an expert group to conduct a PRA
- A follow-up mandate was given to the group by the French Ministry of Health to assess the potential benefits of establishment of *O. communa* in France

How to respond to accidental introduction of exotic CBC agents?

- Inform European and national authorities (and the public) about the establishment of BCAs and the associated potential risks and benefits
- Create task force with experts from different disciplines; seek contacts with European authorities (e.g. DG SANTE) and organizations (e.g. EPPO)
- Discuss knowledge gaps regarding the risks and benefits of using accidentally introduced organisms for biological control
- Coordinate research on non-target risks and impact of the BCA and brief European and national authorities
- Monitor the further spread, impact and non-target effects of the accidentally introduced BCA

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... and you for your attention