

Berry Industry lends a hand to help researchers address an invasive prickly problem

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- Invasive European blackberries cost Australian farmers over \$103 million per year in lost production and control costs.
- A natural enemy of blackberries in western Europe is being investigated as a biological control agent against weedy blackberries in Australia.
- Before a biological control agent can be released, it must undergo a rigorous assessment process to show that the risk associated with its release into the Australian environment is very low or negligible.

Invasive European blackberries are a scourge to our natural environment, forestry and grazing industries, costing Australian farmers over \$103 million per year in lost production and control costs.

Through a new biological control project, researchers from Agriculture Victoria (AgVic) have reached out to the berry industry for their help. The project will investigate whether a cane-boring sawfly (*Phylloecus faunus*), a natural enemy of blackberries in western Europe, will make a suitable biological control agent against weedy blackberries in Australia.

But before it can be released, it must undergo a rigorous assessment process to show that the risk associated with its release into the Australian environment is very low or negligible. This will be done through a series of experiments known as “host specificity testing”, designed to predict the sawfly’s host range.

During these tests, the sawfly will be exposed to native and economically important plant species that are closely related to the predominant weedy species, *Rubus anglocandicans* to see if it is able to feed and live on desired plant species.

How is the berry industry helping to assess the risk of a new biocontrol agent?

With hundreds of commercial *Rubus* cultivars grown in Australia, it goes without saying that it is not feasible to include each and every one in the host specificity testing. Therefore, AgVic scientists reached out to key berry industry representatives for help in determining which cultivars should be included on the host specificity test plant list.

Through an on-line meeting, AgVic scientists guided participants through a “cultivar selection tool”¹ to identify important criteria that could be used to prioritise the cultivar list, including a range of biological and economic attributes (Table 1).

These criteria have been applied to assess blackberry cultivars and will soon be used to assess raspberry cultivars. The draft test list will be published on Department of Agriculture, Water and the Environment’s website in September for industry and public comment (www.agriculture.gov.au/biosecurity/risk-analysis/biological-control-agents/host_test_lists).

Table 1: Key criteria

Criteria	Sub-criteria	Description
Biological	Exposure to risk	Does the cultivar’s range overlap with the predicted range of the agent and co-occurs with the target weed? Is the agent likely to spread to areas where the cultivar grows through natural dispersal or an identified pathway? Is the cultivar grown in a habitat suitable for the agent?
	Growth habits	Is the growth form or phenology of the cultivar suitable for the agent to maintain a viable population on?
	Genetics	What information is known about the genetic makeup of the cultivars and can they be grouped according to their parentage or breeding lines? For host specificity testing it is ideal to select cultivars that represent the genetic diversity present within Australia.
Economics	Commercial Importance	Which cultivars are important based on area under cultivation, market share or segment, export value, cultural or heritage significance, or amenity value?

What do we already know about the sawfly from past studies?

In its native range, the cane-boring sawfly larvae tunnel through blackberry primocanes (first-year canes), leading to cane collapse and dieback, and reducing daughter plant production.

Preliminary host-specificity tests carried out in the late 1970s revealed that sawfly larvae were able to feed on several cultivated brambleberries and some garden rose varieties, but no attack was recorded on raspberry or four Australian native species². Despite the attack on non-target plants under laboratory conditions, the sawfly is not known to attack these species in its native range in Europe³.

This suggests that the results from early host testing may have been influenced by laboratory conditions, masking the real host preferences of the sawfly; a phenomenon not uncommon in laboratory-based experiments.

More recently, field surveys were conducted in Portugal, France and Italy using DNA barcoding to identify larval samples collected from the canes of blackberry and other closely related species. The study confirmed our suspicion that the sawfly has a more restricted host range than what previous laboratory studies had found. A video of this research can be seen here: <https://youtu.be/BfQEZW60nC8>



Female blackberry cane-boring sawfly, *Phylloecus faunus*.
Photo credit: Vincent Lesieur, CSIRO

What are the next steps?

Currently, the sawfly is being reared at the CSIRO European laboratories in France and will be imported into the AgriBio quarantine facilities in Melbourne later this year, where the host specificity testing studies will be conducted.

Key phases of the project involving the host specificity testing of the cane-boring sawfly, *Phyllocolpa faunus* in Australia

Stages involved in assessing the risk of a *NEW* biocontrol agent for blackberry

Develop a host specificity test plan list

Source & grow plant species to be used in testing against the sawfly

At CSIRO's European laboratory, develop a sawfly colony ready for shipment to Australia

Conduct host specificity testing in AgriBio's quarantine insectary

CONSULT WITH BERRY INDUSTRY STAKEHOLDERS

- **NATIVE RUBUS**
- **COMMERCIAL CULTIVARS**

IMPORTATION OF SAWFLIES INTO QUARANTINE

RISK ASSESSMENT



Blackberry cane-boring sawfly



Native raspberry, *Rubus parvifolius*



AgriBio's quarantine facility

Stay tuned for further articles as we keep you updated as the project progresses.

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References

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- 2 Bruzese, E., 1982. The host specificity of *Hartigia albomaculatus* (Hym.: Cephidae) and its potential effectiveness in the biological control of European blackberry. *BioControl* 27, 335-342.
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