

DARWIN'S BARBERRY SEED WEEVIL

Berberidicola exaratus

The history of Darwin's barberry seed weevils in New Zealand

The Darwin's barberry seed weevil is native to central and southern Chile. It was first imported from Chile by Landcare Research into containment to complete safety testing in 2012. Permission to release this weevil was granted by the EPA late in 2012, but releases did not begin until 2015 due to rearing and disease issues, and are expected to continue in the near future. This weevil has not been used as a biocontrol agent anywhere in the world before.

How would I find Darwin's barberry seed weevils?

During the warmer months look for adults which may be seen feeding on the underside of leaves, or resting in the leaf or spine axils - they cling tenaciously on to these if disturbed. Adults are blackish in colour with a slight pubescence, and are only about 3-4 mm long. Females are usually slightly larger than males. You may also notice adult feeding damage which often appears as a series of small craters on the underside of leaves along the leaf margin or mid rib, and puncture holes in developing and mature fruit. The best way to find adults will likely be by tapping barberry plants over a piece of white cardboard or material and looking to see if you have dislodged any.

Females lay a single white egg within a feeding hole made in a young developing fruit. Eggs



hatch after about a week into pale larvae which feed inside the fruit and either damage or consume the developing seeds. Shrivelled fruit may indicate that larvae are present inside. Each larva completes its development inside a single fruit, and then drops to the litter below to pupate, leaving an exit hole in the fruit.

Development from an egg to an adult can occur in as little as 6 weeks at warm temperatures. The adults are long-lived and so the females can lay eggs over many weeks to cover the whole fruiting period.

The only other weevil on Darwin's barberry that you are likely to confuse with the seed weevil is another biocontrol agent which may also be released here. The Darwin's barberry flower weevil is a similar size but lighter in colour, and attacks the flowers not the fruits.

See *Darwin's barberry flower weevil*.

How do Darwin's barberry seed weevils damage Darwin's barberry?

The adults damage the foliage by making holes that are often punched right through the leaf, and make punctures in the fruits. However, the main damage is caused by larvae feeding inside the fruits reducing the number of viable seeds formed.



Will Darwin's barberry seed weevils attack other plants?

The seed weevil is highly host-specific. As well as Darwin's barberry it is likely to attack barberry (*Berberis glaucocarpa*), and it is possible that some other very closely-related ornamental species (such as *B. thunbergii*) may be attacked to a lesser degree. It is highly unlikely that any species other than *Berberis* will be attacked.

How effective are Darwin's barberry seed weevils?

It is too soon to know what impact the seed weevil will have here, but laboratory studies and field observations in Chile have shown that they can be extremely damaging to Darwin's barberry. Few parasitoids, that are likely to attack the weevil, are believed to occur in New Zealand. The seed weevil's impact should complement damage caused by the flower



Damaged fruit with feeding and oviposition holes

weevil to reduce the spread of Darwin's barberry. A monitoring programme to measure the effectiveness of the two weevils will be established.

How can I get the most out of Darwin's barberry seed weevils?

If the weevil establishes at initial release sites it would be worth helping to establish them in all areas where they are needed. The adults can fly and will disperse over time, but helping to shift them about will speed up the process.

How do I choose a release site?

Read *Guidelines for selecting release sites for biocontrol agents*.

How do I collect Darwin's barberry seed weevils for release?

In the spring beat Darwin's barberry plants, especially the flowers, with a stick over a beating tray (or a large piece of white material or cardboard) and collect any weevils that have been dislodged with a pooter attached to a compressor. You should aim to shift at least 100 weevils to each new site. Put the weevils into a suitable container and then simply tip the contents out over Darwin's barberry bushes at the new site.

How do I manage the release sites?

Avoid any activities that will interfere with the beetles, such as herbicide application. If you need to undertake control measures then avoid the release site.

For further information contact:

Lindsay Smith
Landcare Research
PO Box 69040
Lincoln 7640
NEW ZEALAND
Email: smithl@landcareresearch.co.nz
Ph (03) 321 9805
Fax (03) 321 9998