

# NODDING THISTLE RECEPTACLE WEEVIL

*Rhinocyllus conicus*



The Biological Control Of Weeds Book - Te Whakapau Taru: A New Zealand Guide

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## History in New Zealand

Nodding thistle receptacle weevils were first imported by the DSIR in 1972, and released a year later at Nelson, Ashburton and Whakatane. The weevil is native to Europe and western Asia, but the New Zealand population came from Canada where it is a successful biocontrol agent. The weevils established readily in New Zealand, and as a result of efforts to spread them around in the late 1970s and early 1980s, they are now common on most infestations of nodding thistle.

## How would I find/recognise it and what is its lifecycle?

Look for the adult weevils on nodding thistles throughout spring and summer. In the spring the adults emerge from their winter hibernation, and you will find them congregating on rosette plants. The adults are dark brown with lighter speckles, about 6 mm long, and they have the long snout (or rostrum), characteristic of the weevil family. Although the weevils are strong day-time fliers you will not normally see the wings as they are usually kept tucked away.

Once flower buds have appeared on the thistle plants you can look for the eggs, which are generally laid on the undersides of the buds. The eggs are spherical in shape, about 1.5 mm long, and each one is covered in a protective capsule of brown masticated plant tissue to prevent it from drying out. Each female can lay about 200 eggs, and you may see more than 20 eggs on a single flower bud.

White larvae hatch after about a week and burrow into the bud until they reach the receptacle (the part of the flower that supports and nourishes the developing seeds). One receptacle can support at least 25 larvae. The larvae remain there until they are fully fed, about 3–4 weeks. After this time, they construct a hard black cell to pupate in. The weevils pupate for about 2 weeks and then new adults emerge from the flower head. Those that emerge early in the summer may be able to produce another generation straightaway, but the majority must hibernate for the winter in the soil litter before they can breed the following spring. Adults can live as long as 15 months.

You can identify infested flower heads using the following method. Pick mature, dried flower heads,



Adult receptacle weevil



Receptacle weevil eggs on flower head

and carefully pinch the centre of each one between your thumb and forefinger. If the flower head feels hard and lumpy then it is infested, otherwise it will feel smooth and flat. Break the flower head open (this should be easy to do) and you will see that the inside is black. You may also see the pupal cells or new adult weevils. If the flower head is difficult to break open and looks yellow inside, it is infested with the nodding thistle gall fly (see *Nodding thistle gall fly*). You may also find flower heads that are infested by both agents and show some of the characteristics of each.

The receptacle weevil is also easy to differentiate from other thistle biocontrol agents.

See *Nodding thistle crown weevil*, *Green thistle beetle*, and *Californian thistle stem miner*.

### How does it damage nodding thistles?

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The adults make small round holes in the leaves, but this damage is inconsequential. The main damage is caused by the larvae whose feeding prevents the production of healthy seeds.

### Will it attack other plants?

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Although the weevils prefer nodding thistle, they will also attack five other thistles to varying degrees including: plumeless (*Carduus acanthoides*), winged (*Carduus tenuiflorus*), slender-winged (*Carduus pyncephalus*), Californian (*Cirsium arvense*), and Scotch (*Cirsium vulgare*) thistles. The weevil has been reported in the literature to attack variegated thistle (*Silybum marianum*) but this has not been observed here. Other plants are not thought to be at risk.



Receptacle weevil larvae inside flower bud

### How effective is it?

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A study in the 1980s at three sites (Ashburton, Whakatane, and Rotorua) showed that the weevils destroyed most of the seed produced by primary flowers (99%) but were less effective on secondary (72%) and tertiary flowers (64%). The nodding thistle gall fly was subsequently released to try to further reduce seed production of later flowers. Recently a more detailed study showed that in Canterbury the weevil is not well synchronised with nodding thistle and may only reduce overall seed production by around 15%. However, it is likely that the impact of this agent will vary from place to place and from year to year.

### How can I get the most out of it?

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Because the weevils are widely established you do not need to do anything except avoid activities that will interfere with their life cycle. If you must mow your thistles, wait until the first flowers turn brown. This will enable most of the receptacle weevils to mature and prevent the production of late flowers. Avoid mowing in the early flowering stage as this kills the larvae and promotes late flowering. Also avoid overstocking, as hungry animals may eat all the flower buds.

### How do I select a release site?

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