

BROOM SEED BEETLE

Bruchidius villosus

The history of broom seed beetles in New Zealand

Broom seed beetles are native to Europe, and they were first imported from England by the DSIR in 1985. The beetles were mass-reared and released throughout New Zealand in the early to mid-1990s. Broom seed beetles are now becoming widespread and common at sites in both the North and South Islands.

How would I find broom seed beetles?

You are most likely to find broom seed beetles during the warmer months of the year. In the spring the adult beetles congregate on broom and other flowers to feed on the pollen. You may be able to see the small (2–4 mm long) black beetles inside the flowers, or you may need to dislodge some by tapping broom flowers over a piece of white cardboard or material. You may find it easiest to see the beetles when they are concentrated on the first- or last-flowering broom plants.



Beetle eggs



Broom seed beetle

Female broom seed beetles lay their eggs on newly formed green pods. The eggs are just visible to the naked eye as shiny spots, smaller than the size of a pinhead, and they are often laid close to the edge of the pod. Once the larvae have hatched you may find the empty egg cases easier to see, as they take on a whiter appearance. Each tiny newly hatched larva burrows through the pod wall and into a soft green seed. If you open up a green pod in early summer then you may be able to see infested seeds — they have a distinctive bulge and/or show discoloration. The larvae feed inside the developing seeds and once fully grown, they pupate for a short period. After the beetles have completed pupation they chew their way out of the seed. Usually they emerge before the pod has burst open but sometimes they do not emerge until the seeds have been thrown to the ground.

If you open up some intact ripe pods then there is a good chance that you will see the new adults and hollowed out seeds inside.



BROOM

You may also see a tiny wasp-like parasite (*Pteromalus sp.*) that sometimes attacks broom seed beetle larvae (and gorse seed weevil larvae), although to date parasitism levels seem to be low. If you notice tiny holes in pod walls, they are made by the parasite — the broom seed beetles are unable to chew their way out.

If you find a single creamy-white caterpillar inside a pod this is the gorse pod moth (See *Gorse pod moth*), or if the caterpillar has finished feeding the pod may be empty with an exit hole.

The broom seed beetle is easy to differentiate from other broom biocontrol agents.

See *Broom leaf beetle*, *Broom psyllid*, *Broom twig miner*.

Look out for new adult broom seed beetles feeding on pollen in the autumn to build up their reserves. The beetles hibernate during the winter and emerge to breed in the spring. There is only one generation a year, and the adults can live for about 1 year.

How do broom seed beetles damage broom?

The adults feed on the pollen of many flower species, but this is not harmful to these plants. Damage is done by the larval stage. Each larva feeds on and destroys one broom seed.

Will broom seed beetles attack other plants?

Broom seed beetles will only damage seeds of Scotch broom (*Cytisus scoparius*) and tree lucerne (*Cytisus proliferus*). Other species of broom are not attacked.

How effective are broom seed beetles?

The overall effectiveness of the broom seed beetle in New Zealand is not yet known. However, some limited studies have shown that the beetle is capable of destroying up to 90% of seed at some sites, which is promising.



How can I get the most out of broom seed beetles?

Broom seed beetles are becoming common and widespread. However, if they are not yet present in your area you can accelerate dispersal by shifting some from an established site.

How do I choose a release site?

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

How do I collect beetles for release?

Read *Guidelines for collecting, relocating, and releasing insect biocontrol agents*.

You can either harvest beetles in the spring or infested pods in late summer.

Spring Method - Go to the site when between one-third and one-half of the bushes are flowering, as experience has shown that beetles are easiest to find at this time. As a general rule this amount of flowering will occur in October, but check as the timing will vary from site to site, and even from year to year. Choose some broom plants that have new flowers on them. Beat these flowers with a stick over a beating tray (or a large piece of white material or cardboard) for 5–10 seconds, and then collect any beetles that have been dislodged with a pooter attached to a compressor. Repeat until you have at least 500

beetles. If it takes you longer than an hour to collect this many beetles, then you should leave the site undisturbed for at least another year. It is also possible to collect beetles directly from plants using a garden-leaf vacuum, but we have found this method to be more time consuming.

Others have successfully collected beetles by simply putting bags over flowering branches and shaking them to dislodge the beetles.

Autumn Method - Keep an eye on how the pods are maturing at the site over the summer. It is important to leave the pods on the plant until they are mature and blackish-brown in colour. If you cut the pods too early, then the beetles may not be able to complete development and may die. However, if you leave it too late, then the pods will burst open and the beetles will escape. Be aware that a spell of hot weather can quickly cause pods to ripen. As a general rule you will need to shift the pods in January, but the timing will vary from site to site, and even from year to year.

You need secateurs or loppers, some sacks or a small tarpaulin, and a large vehicle to transport the infested broom material. Before you begin, open a few ripe pods and make sure that they are infested with the beetles. Now, cut off branches with ripe pods, and either put them into sacks or wrap them up in the tarpaulin. Be careful that broom seed cannot escape so that you do not inadvertently spread the weed around the countryside. Ideally you want to shift at least 1000 beetles to each site, so conservatively you will need to shift several thousand pods (10–20 branches) to each new site. Transport your infested pods as quickly as possible to the new site – do not leave them lying about in the sun. At the new site wedge the infested pods into the bushes growing there.



Collecting beetles

Once the pods burst open, the beetles will then be able to find their host plant quickly, and there is less danger of the pods going mouldy or getting blown away.

How do I manage the release sites?

Avoid activities that will interfere with the broom seed beetle's life cycle, e.g., avoid applying other broom control measures when pods, and therefore immobile beetle life stages, are present on plants - at other times of the year the adult beetles will be able to shift to undamaged broom. If you are undertaking control measures over a large area, then leave a few bushes nearby to act as a broom seed beetle reservoir. It is best to avoid herbicides if possible, but if they must be used it is possible to minimise harm.

See *Broom agents & herbicides*.

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