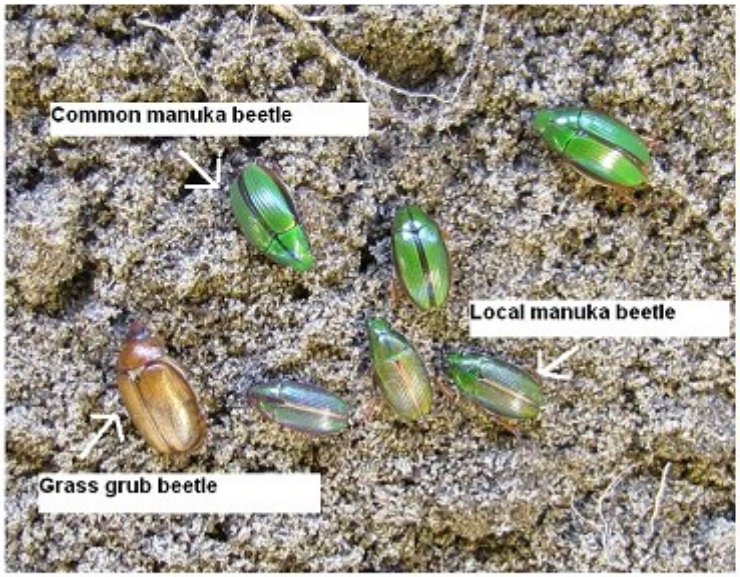
Manuka Beetle Management Brochure

Cape Foulwind 2013

Information booklet

What is manuka beetle?

The small, bright green manuka beetles are native scarab species. The beetles emerge from the soil and feed on manuka bushes in early summer. They fly during the daytime and sometimes form large swarms in hot weather.



Manuka beetles are smaller than the common brown grass grub beetle, and there are two distinct species. The common manuka beetle (*Pyronota festiva*) has a dark longitudinal stripe down its back while the local beetle (*Pyronota setosa*) has a gold stripe.

Sustainable Farming Fund
Ministry of Agriculture and Forestry
Te Manatū Ahuwhenua, Ngāherehere

Landcorp

agresearch

How does the beetle cause damage?

Adult beetles lay eggs in the pasture and these hatch into the damaging larvae. Larvae feed on the roots of grasses and clovers and, if the numbers are high enough, will kill the plants or damage the roots so that plants are pulled out of the ground by grazing stock. Pasture damage will be worsened by birds looking for the larvae in the soil.

Damaging manuka beetle larvae in the soil.

A patch of damage caused by feeding larvae.

Damage patches start to appear in February/March as the larvae grow and consume the roots. Feeding will cease when the larvae have reached their full size but some feeding can continue among smaller larvae until pupation in spring. There is only one generation of the beetle each year. The common manuka beetle will fly in swarms of mixed males and females. These can alight in favourable areas like ridge tops and the resulting larvae can produce large swathes of damage. Females of the local manuka beetle have only limited flight and tend to lay their eggs close to where they emerge. This results in distinct damage patches, which will increase in size from year to year.

WARNING: Grass Grub have been found around the Westport Golf Course. If you find numbers of large grubs on your property get their identity checked (contact information on the back page).

Left: 3rd instar Grass grub larva.
Right: 3rd instar manuka beetle larva
Note: The size difference between the larvae in April.

What can I do about it now?

If you think you have a manuka beetle problem dig some square-sided holes with a standard spade to a depth of 15 cm (about 10 across the paddock) and check for the larvae by sorting through the soil on a flat surface (e.g. old fertiliser bag). This is best done from early March when the larvae can be easily seen and counted. Don't confuse them with porina, which can also be a problem. If you find larvae (grubs) and you are not sure what they are, put them in a container and give them to Landcorp Farming or AgResearch (contact info on the back page).

Scaling of Pasture Damage

Measuring larval densities and estimating larval damage can help farmers make decisions on how to manage this pest.

Manuka beetle larval density can be estimated by taking ten spade samples (15 x 15 x 15 cm) from each paddock, carefully extracting and counting the larvae and calculating the paddock average. Multiplying this number by 45 gives the density/m^2.

Alternatively, paddock damage can be ranked on a 1–5 scale by assessing both the proportion of the paddock with obvious damage patches and the overall vigour of the pasture (See overleaf).

It is recommended that manuka beetle control is applied to pastures with either greater than 300 larvae/m^2 or a damage grading of 3 or above.

Visual damage grading scale for estimation of manuka beetle impact in West Coast dairy pastures.

Larval numbers were significantly related to damage grading. Visual damage occurred at densities greater than 200 larvae/m^2, with severe damage above 500 larvae/m^2. Insecticides should be applied to most paddocks graded 3 and above.

A mean damage grading of 2.7 is equivalent to about 30% of the pasture showing visual damage. This caused both direct pasture loss and pasture composition deterioration over time.

On the Landcorp Cape Foulwind properties, paddocks with a grading of 3 and above are treated with insecticide and paddocks graded 4 and 5 should be prioritised for renewal.

Scale	Description	Example
1	No visible damage.	
2	Some small patches of weak growth and lifting of plants, with patches covering up to 20% of the defined area.	

3	Patches of damage evident, covering 20-40% of the area. Pulling of plants obvious after grazing, with dead plants on the surface.	
4	Damage patches and pulling after grazing widespread (40-60%). Poor pasture performance with little growth in autumn. Weed ingress.	
5	Most of pasture damaged, with weak stressed or dead plants. Strong weed growth.	

Pasture Options

Tall Fescue vs. Perennial ryegrass:

Grass trials were established in spring 2011 and monitored for two years to compare the performance of fescue and ryegrass in soils with high manuka beetle populations.

Key conclusions were:-

- Fescue produced an average of 1.5 tonne more of dry matter per hectare per year than ryegrass.
- The establishment of fescue was slower than ryegrass, and needed careful management and timed grazing.
- Fescue paddocks had an average of 100 larvae less per square metre than the ryegrass paddocks.
- The fescue paddocks showed significantly less visual damage than the ryegrass paddocks.
- It was important to not over-graze the fescue pastures as this reduced the subsequent dry matter production.

Control Options

Insecticide:

The insecticide diazinon used as recommended for grass grub control, has been effective against manuka beetle under the protocol below:

- Apply to closely grazed pasture between February and April when larvae are feeding close to the surface but before damage has become severe.
- Apply by aerial spray or jet-squirt boom, using at least 150 litres water/ hectare and preferably 250 litres water/hectare.
- For best control apply during rain, followed by heavy rain (at least 13mm) or irrigation.
- Always avoid waterways, ponds and bush and leave decent margins between these areas and treated areas to eliminate the risk of spray drift.
- Do not spray in winds over 10km and only spray in rain of 13mm or more, to ensure chemical is washed straight into the soil.
- Pastures should be grazed before treatment to ensure the chemical penetrates the soil and is less likely to stick to the foliage.

Note that the use of diazinon for manuka beetle control would be considered 'off label' usage as diazinon is not registered for use against manuka beetle.

Hoof and tooth:

Heavy stocking during winter when the soil is moist can cause significant reductions in manuka beetle larval numbers through crushing by stock treading. Beetle populations in paddocks intensively strip grazed over winter and in paddocks used as calving platforms have shown very large reductions in larval numbers due to the animal pressure.

Even repeated 'normal' grazing has caused some reduction in numbers but it is possible that, when the pressure is reduced populations will again build up to damaging levels in these paddocks.
Treading damage must be balanced against the benefits of manuka beetle control and it is important to oversow the pastures after trampling to restore the pasture.

Diseases and Natural Control

After major land modification on Cape Foulwind, manuka beetle invaded the new grasslands and flourished without any of their usual biological controls. It took more than 3-4 years for the first natural diseases of manuka beetle to be identified in the Cape Foulwind pastures, but in recent years there has been a steady increase in the number of the natural pathogens.

The insect killing fungus *Beauveria brongniartii,* protozoan and bacterial diseases have started to appear in the field populations. A previously unknown insect disease, caused by the bacterial pathogen, *Rickettsiella pyronotae*, has been identified from manuka beetle larvae and has now spread through beetle populations in the older pastures, and appears to be leading to a decline in beetle populations. Infection produces a whitened, stunted appearance, often with black "pepper spotting" in the larvae.

While *Rickettsiella* is a disease of the larvae, it can be spread to new areas after flights of the adult beetles. Tests are being carried out to see whether the process of spread can be accelerated through movement of soil from an infected area to uninfected paddocks.

Recommendation: In paddocks containing manuka beetle infected with pathogens, avoid deep cultivation as this will delay the build-up of natural biocontrol.

Advanced stage *Rickettsiella pyronotae* infection in a manuka beetle larva.

Manuka beetle larvae infected with *Beauveria brongniartii*.

What can we do about manuka beetle?

- ake sure the identification is correct – don't confuse it with porina or grass grub.
- Take spade samples to define where you have the problem – paddock, soil type or aspect.
- Prepare a treatment map for applying insecticide or stock treading.
- Apply insecticides during periods of wet weather and tread damage patches when the soil is moist.
- Encourage build-up of natural biocontrols by keeping deep cultivation to a minimum.

For further information contact:

PestWebNZ™
Web Address: www.pestweb.co.nz

or

Jessica Dunbar
Landcorp Farming Ltd
Ph: 027 634 5234
Email: dunbarj@landcorp.co.nz

or

Richard Townsend
AgResearch, Lincoln Research Centre
Ph: 03 325 9982
Email: richard.townsend@agresearch.co.nz