

Clover Root Weevil

Clover root weevil (CRW) was first identified in the Waikato in 1996 and is now found throughout the North Island, and has the potential to eventually inhabit the South Island. Feeding exclusively on clover, CRW is now one of New Zealand's most serious pasture pests, with an estimated cost to New Zealand farmers in excess of \$300 million dollars in lost productivity and profitability annually. Larvae feed on clover roots and nodules, reducing the nitrogen fixing capability of the clover, and subsequent clover production and survival. New Zealand's farmers rely on pasture as a cheap, high quality feed source, to maintain a competitive advantage.

To minimise losses in production farmers in CRW infested regions are relying on higher applications of nitrogen fertiliser to compensate for reduced nitrogen fixation and forage quality. In order to minimise the damage caused by CRW it is necessary to recognise the insect and understand the damage it does to clover, above and below the ground.

What Clover Root Weevil looks like and where to find it?

CRW's are 4-5mm long, brown to grey and feed on clover leaves causing C-shaped notches. Adult weevils (figure 1) are most abundant in spring and autumn; they live on the soil surface, and feed on clover leaves. CRW prefer the leaves of white clover, but will feed on leaves of other clovers. Since clover is bred for defoliation the adult feeding alone will not kill clover plants, but defoliation is a good indicator that CRW are present. The larvae are the most damaging stage, and live in the soil, typically in the top 5cm. The larvae are present throughout the year, but are most abundant from late autumn to early spring. Larger larvae feed on the stolons and roots of clover reducing production, persistence and sustainability. Smaller larvae damage the clover nodules, affecting the plants ability to fix nitrogen. Larvae are creamy-white (figure 2) and range from 1-6mm long and have a brown head.



Figure 1
Adult CRW and notching damage to leaf.



Figure 2
CRW larvae.

Control Strategies

Cultivation is preferred when renewing pastures damaged by CRW, in order to kill the insects prior to drilling. Insecticides may be useful when sowing clover in pasture for protecting seedlings, but after that insecticides are not economic and less effective. Do not attempt to re-establish clover into CRW infested pastures by over-sowing clover seed, as weevils prefer clover seedlings.

Traditionally ryegrass/clover pastures have been sown with 18-20 kg/ha of ryegrass seed and 3-4kg/ha clover respectively. For stronger clover pastures consider mixes of 12-15kg/ha ryegrass and 4-6kg/ha clover. Another option is to use alternative pasture species such as tall fescue, red clover and chicory. The advantage of using these species is better drought tolerance, persistence, improved summer production and quality compared to perennial ryegrass. Tall fescue is a more clover friendly grass, which has grass grub tolerance and higher summer quality. Red clover is deep rooting which provides it with better drought tolerance, and it has more summer and autumn production than white clover. Red clover offers farmers short-term tolerance to CRW.

Spring

From October onwards, adult CRW's start to emerge in greater numbers and during this period they lay large quantities of eggs into the pasture. Notching damage on the clover leaves caused by the CRW is more obvious during Spring. It is important that pastures do not become rank, as this shields the clover from the light, reducing its ability to grow.

Applying nitrogen fertiliser can offset nitrogen lost from the soil-pasture system due to CRW. (When clover loses it's nodules it also loses its ability to fix nitrogen). Clover, along with other components of pasture requires nitrogen for growth. This requirement can be met through application of nitrogen fertiliser. Applying a little and often nitrogen fertiliser is a recommended strategy to maintaining clover in the sward.

Due to nematode and CRW attack, establishing clover in spring will effectively offer no return.

Summer

During summer weevil egg laying and both egg and larval survival are dependant on summer rainfall. During dry summers CRW populations do not build up as the heat and dry conditions reduce egg laying, and decimate eggs and young larvae. Low CRW populations as a result of a dry summer can result in clover resurgence. In contrast wetter summers when the soil moisture levels are maintained, CRW survival is good and can have a negative impact on clover growth and survival the following autumn. It is important to keep sufficient cover on pastures in summer to protect the clover stolons from direct sunlight.

Autumn

CRW larval populations initially decline in autumn as they pupate and new adults emerge. Following CRW emergence, egg laying rapidly increases and larval populations begin to rise. (Grass growth accelerates in the autumn months). Care is required with grazing to ensure that the clover is not out competed. Following a moist summer CRW larval populations will potentially be very high, and therefore clover plants will be under stress. To minimise the stress on clover it is important to avoid over grazing pasture, but at the same time ensure that the clover is not out competed during accelerated grass growth. With regards to establishment, if sowing clovers into a CRW infested pasture it is likely that the CRW adults will need to be controlled to ensure good clover establishment. Lorsban 750 WG insecticide is registered for this purpose.

Winter:

CRW numbers decline during winter and larval populations rise. Clover levels and summer survival of the weevil will dictate clover root weevil population levels. Numbers will be high if the previous summer was moist and clover levels good. To minimise damage to clover, pugging should be avoided at all costs.

Summary

- Clover Root Weevil is now one of New Zealand's most serious pasture pests.
- Larvae are the most damaging and are present throughout the year, but are most abundant from late autumn to early spring.
- When clover loses its nodules it loses its ability to fix nitrogen.
- Clover also needs nitrogen for its own growth.
- Clover nitrogen requirements can be supplemented with bagged nitrogen, with a little and often approach.



Adult clover root weevil



Clover root weevil damage



Grasslands Kopu II is a unique high stolon density large leaved white clover. Due to its high stolon density, Grasslands Kopu II has shown better persistence than other large leaved white clovers and has the highest tolerance to clover root weevil in the large leaf class.

