

Grass Grub by Nick Hoskins

Battling the grass grub

Over the past few years, I have encountered patches of poor growth in vineyards stretching from Hawkes Bay down to Central Otago. After considering the usual issues (including water availability, weed competition, plant nutrition, and so on), I started examining the vines' root systems and found high numbers of grass grubs in the affected areas.

The larvae of the common brown beetle, grass grubs are a serious agricultural pest in New Zealand because they attack the roots of most pasture plants. Unfortunately, they also seem to have an insatiable appetite for a grapevine's fibrous root growth.

Grass grubs are easy to find throughout February and March, and you're likely to spot them in most vineyards if you look hard enough (typically, they can be found in the top 150mm of soil). At present, we have no hard and fast data on the numbers required before damage occurs to vines. Nonetheless, common sense tells us that when vines are young, with small root systems near the surface, they are more at risk from this pest.

I was called in to examine vines that had grown well during spring and early summer but had started to lose leaf, with growth eventually stopping in mid-to-late February. This fits with the grass grub lifecycle: eggs are laid in November/December; the first instar (that is, grubs in their first larval stage) appear in December/January; the second instar show up in January/February, and the third instar (the final larval stage) from February/March through to the following spring. During February and March, they feed near the surface.



Grass grubs in their natural habitat – New Zealand pastureland

With their root systems severely compromised, affected vines are unable to store reserves for the following and become progressively

weaker if the root feeding continues in subsequent years.

I had already made some conclusions of my own, but I wanted more information. For that, I went to Richard Townsend, at AgResearch Ltd, based at Lincoln University in Christchurch. He supplied me with some preliminary results from his own investigations into grass grubs and grapevines.

Using 15cm potted vines, Richard introduced 20 third-instar grubs to each pot. After five weeks, the vines were removed and the soil washed from the roots. As the accompanying photograph illustrates, the three vines on the left had a large proportion of their roots eaten. The three on the right were the control group.

Counting grubs

If you suspect that grass grubs may be damaging areas of your vineyard, you'll want to follow Richard's sampling methodology for confirmation:

- Start sampling in late February when the grubs are large and feeding near the surface.
- Using a small spade (150mm x 150mm), take out a square of soil of the same dimension. Place the soil on a sheet of canvas and sift through it, counting the grubs as you go.
- Multiply this count by 44 or, if you are using a standard 200mm x 200mm spade, then multiply by 25. The total gives you an estimate of the number of grubs per square metre.

According to Richard, a "grub count" of more than 100 per square metre is considered economically damaging to pasture. While we still lack precise information on the number of grubs required to damage vine roots, the pots of 101-14 bear out that grubs will indeed feast upon your vines.



Grass-grub damage to roots of the three potted 101-14 vines on the left; a control group of three vines is shown on the right.

Control

While control is more a matter of reducing overall numbers, growers do have several options for keeping these pests at bay. AgResearch has developed a bio-control agent (the bacteria, *Serratia entomopila*) that originally came out in a liquid form known as "Invade." While that is no longer on the market, the agent is still available, from Ballance, in a granule form called "Bioshield." The granules have to be drilled into the pasture or vineyard, according to instructions.

Some growers have reported limited success using "Diazanone," sprayed directly onto the surface. This method requires rain to wash the substance into the soil profile. Diazanone is a

broad-spectrum organophosphate; as such, it may kill off beneficial soil organisms as well.

"Suscon Green" also controls grass grubs and is active for three or more years. It, too, is an organophosphate that must be drilled into soil.

Traditionally, the issue of grass grubs has not been factored into planning for new plantings – yet pre-planting offers a "one-time only" opportunity to reduce the pest. Repeated cultivation from February through to planting in August will significantly reduce the number of grass grubs, thereby helping growers to stop a potential threat before vines are in the ground.

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