



BioShield Grass Grub Liquid: Grass Grub Control in Vineyards

What is BioShield® Grass Grub Liquid?

BioStart **BioShield® Grass Grub Liquid** is a biopesticide containing a naturally occurring NZ soil bacterium for the control of New Zealand grass grub. This product prevents the build-up of grass grub larvae numbers thereby reducing the grapevine and pasture damage caused by the larvae.

BioShield® Grass Grub Liquid is ACVM Registered (P4409) and Certified for use in organic vineyards (BioGro #4436). BioShield® Grass Grub Liquid does not affect humans, animals or any other insects.

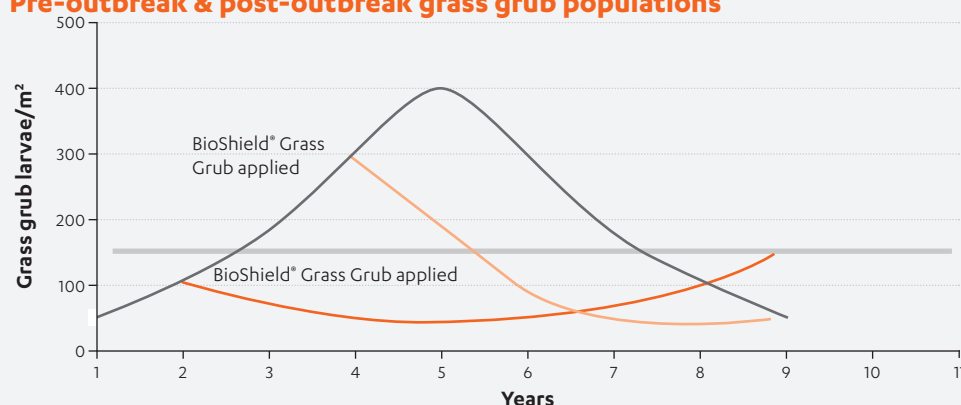
How it works

BioShield® Grass Grub Liquid is applied to the soil surface and watered in so that the bacteria (*Serratia entomophila*) disperses into the soil. The bacteria are ingested by the grass grub (*Costelytra zealandica*) larvae as they feed.

The bacteria multiply in the grass grub gut causing amber disease. Within 2–3 days the grass grub stops feeding and starves.

When the grass grub die, the bacteria in their gut are released into the soil where they can be ingested by other grass grub larvae. This way a cycle of infection is set up for long-term control of grass grub.

Simulated effect of adding BioShield® Grass Grub: Pre-outbreak & post-outbreak grass grub populations



- Normal population curve if grass grub not treated
- Population curve if **BioShield® Grass Grub** used when grub numbers are relatively low (pre-outbreak)
- Population curve if grass grub problem treated with **BioShield® Grass Grub** (post-outbreak)

This information was developed in consultation with AgResearch.












Vineyard Sampling

To identify blocks most at risk of grass grub damage you should sample the vineyard. Ideally sampling is conducted in the previous season, as in February larvae are small and hard to find.

Dig 10 or more spade squares (20 cm x 20 cm) to a depth of 10–15 cm from evenly throughout the vineyard, and hand-sift through the soil to collect grass grub larvae.

If a 20 cm width spade is used, an average of four larvae per spade square is approximately 100/m². If a smaller 15 cm width spade is used, 100/m² is represented by about 2 larvae per spade square.

Quick reference guide

New Zealand grass grub		Manuka beetle	Tasmanian grass grub	Porina	Black beetle
					
Healthy second-instar grass grub larva	Diseased second-instar grass grub larva	Manuka beetle larva	Tasmanian grass grub larva	Porina larva	Black beetle larva
					
Grass grub beetle		Manuka beetle	Tasmanian beetle	Porina moth	Black beetle

For more information visit: www.pestweb.co.nz

Vineyard Programme

Timing

Apply in early March to late April, this is when late second to mid third-instar grass grub larvae are actively feeding on grapevine roots and the population density is between 100 and 300 larvae per m².

Application Rate

Apply 1 L/ha **BioShield Grass Grub Liquid** in a minimum of 1,000 L of water to the weed spray strip under vines. Irrigate in after application. Recommended to co-apply with 2 L/ha **BioStart Digester** or **BioStart Organic Digester**.

Recommended



New Zealand grass grub life cycle

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Adult					BioShield® Grass Grub treatment period							
Egg												
	Larvae 1st instar		Larvae 2nd instar			Larvae 3rd instar						
										Pupa		
											Adult	
												Egg

Correct Usage

As a biological control agent the effectiveness of BioShield® Grass Grub Liquid depends on the following correct usage:

- Only apply BioShield® Grass Grub Liquid if the following conditions are present:
 - » Soil temperature is above 10° C
 - » Soil moisture is above 15%
 - » Grass grub larvae have not developed past the mid-third instar stage (before end April).
- In dry regions only apply product when moisture can be maintained in the top 50 mm of the soil by rainfall or irrigation. In areas where soils retain moisture in summer applications can be made earlier.

Pack Sizes

BioShield® Grass Grub Liquid is available as 5 L can that treats 5 ha of vineyards. It contains ~4 x 10¹⁰ cfu/mL *Serratia entomophila* strain 626 in a suspension concentrate.

Storage

- Use product in the season of purchase
- Exposure to sunlight or warm temperatures reduces viability
- Keep out of each of children
- Store at 4–8°C at all times.

Restrictions

Do not use other grass grub control practices such as insecticide as this will reduce Bioshield's effectiveness.