

BioShield® Grass Grub

Product information sheet



What is BioShield® Grass Grub?

BioStart **BioShield® Grass Grub** is a biological agent for the control of New Zealand grass grub (*Costelytra zealandica*) which causes pasture damage.

BioShield® Grass Grub is available in an easy-flow granule format which contains the active bacteria, (*Serratia entomophila*), a soil bacterium that occurs naturally in New Zealand and causes amber disease in the New Zealand grass grub.

- It does not affect humans, animals or any other insects
- Registered pursuant of the ACVM Act 1997 No.P7112.

Use **BioShield® Grass Grub** to prevent a build-up of grass grub numbers. **BioShield® Grass Grub** starts a disease cycle in grass grub larvae that leads to a population decline thereby reducing the pasture damage caused by the larvae.

How it works

BioShield® Grass Grub is eaten by grass grubs:

Once **BioShield® Grass Grub** granule is drilled below the soil surface, under the right conditions the bacteria *Serratia entomophila* is dispersed into the soil. There, the bacteria is ingested by the grass grub larvae which take in soil while they are feeding on plants and roots.

Grass grubs develop amber disease:

Once inside the grass grub gut, the bacteria multiply and cause an illness known as amber disease. This causes the grass grub to stop feeding within 2-3 days and they starve.

The infection is recycled:

Death of the infected, non-feeding grass grub larvae may take 1-2 months to occur. When infected grass grub die, the bacteria in their gut are released and enter the soil where they can be ingested by other grass grubs.

This way a cycle of infection is set up and long term control of the grass grub is achieved.



What to expect

- It takes around six weeks to see the initial effects of **BioShield® Grass Grub**
- After six weeks, around 10-20 percent of the grass grubs should show signs of amber disease
- One year later, the grub population should be about half what it was at the time of application
- Dead grubs will not be visible—they quickly disappear by natural decay processes
- **BioShield® Grass Grub** provides around 3-5 years' protection, depending on environmental conditions



Before: Healthy grass grub larvae have a black colouring due to soil in their digestive tract.



After: Grubs that are infected by amber disease do not have soil in their digestive tract, because they have stopped feeding. Instead, they take on an amber colouring, hence the name of the disease.

Directions for use

Timing	Application Rate	Comment
<p>February to mid-April</p> <p>When late 2nd – mid-3rd instar grass grub larvae are actively feeding and the population density is between 100 and 300 larvae/m².</p>	<p>Apply 10-30mm below the soil surface (the larvae feeding zone).</p> <p>Granule: Drill 30 kg/ha using a direct seed drill.</p>	<p>Apply BioShield® Grass Grub granule once the soil has been opened then cover with soil.</p> <p>BioShield® Grass Grub can be applied separate to or in conjunction with seed.</p>

What formats are available?

BioShield® Grass Grub is available in an easy-flow granule format.

- **15 kg bag** (treats 0.5 ha) contains a minimum of 1×10^9 cfu/g *Serratia entomophila* strain 626 in a granule form.

Correct usage

BioShield® Grass Grub is effective and easy to use however as it is a biological control agent its effectiveness depends upon correct usage.

DO NOT apply BioShield® Grass Grub if the following conditions are present:

- Soil temperature is below 10°C
- Soil moisture is below 15%
- Grass grub larvae have developed past the mid-3rd instar stage of development (after April)

Timing/soil moisture note: In areas where soils remain moist during the summer, e.g. North Island dairy pastures, applications can be made earlier against the early 2nd instar larvae. In dry east coast regions of both the North and South Islands, **BioShield® Grass Grub** should only be applied to irrigated pastures or where moisture can be maintained throughout the top 50mm of the soil profile through natural rainfall.

Assessing grass grub larvae populations

Dig 10 spade squares to a depth of 10-15 cm from throughout the paddock and hand sift through the soil to collect grass grub larvae. A 20 cm spade with 4 larvae $\sim 100/\text{m}^2$. A 15 cm spade with 2 larvae $\sim 100/\text{m}^2$. Note in February larvae are small and hard to find.

Use **BioShield® Grass Grub** to prevent populations of grass grub growing above 300 larvae/m². Under 100 larvae/m² no control is required. Above 300 larvae/m² chemical control methods are recommended with a **BioShield® Grass Grub** treatment 1 to 2 years later.

Storage

Use in the season of purchase. Exposure to sunlight or warm temperatures will reduce viability. Keep out of reach of children.

Granules: Store in a cool place below 20°C out of direct sunlight.



Maximising effectiveness after application

DO NOT USE;

- Alternative grass grub control practices such as heavy rolling or insecticide treatments as this will reduce the effectiveness of **BioShield® Grass Grub**.
- Cultivation following treatment as it is likely to reduce the effectiveness of **BioShield® Grass Grub**.
- Mob stocking of the treated paddock within the first six weeks after application of **BioShield® Grass Grub** to ensure the *Serratia entomophila* become established in the grass grub population, so setting up the long-term cycle of control.

Withholding period: Nil **Compatibility:** Call BioStart 0800 116 229 for a compatibility list.