



Eco-Bb[®]

Reg. No. L8469, Act 36 of 1947



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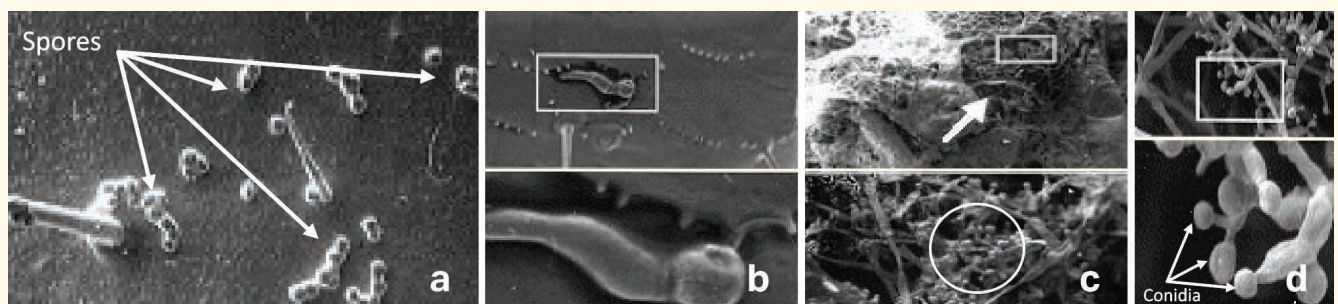
A wettable powder micro-granule formulation of the fungus *Beauveria bassiana* strain R444. Eco-Bb® is a bioinsecticide for the suppression of various insect pests on crops as specified.

Why use Eco-Bb®?

Features	Benefits
Ability to reduce various life cycle stages of the target organism.	Eco-Bb® is effective against the egg, larvae/nymph, pupa and adult stages, depending on the pest. Therefore, the opportunity to reduce or impact on the target population is excellent. Inclusion in an integrated pest management (IPM) strategy will result in a more effective program overall.
Broad-spectrum efficacy.	Eco-Bb® has the ability to suppress and manage a wide range of target insect pests.
Unique mode of action.	Mode of action of <i>B. bassiana</i> is different from chemical insecticides, making Eco-Bb® ideal to use in IPM and resistance management programs.
Superior wettable powder. Micro-granule oil formulation.	Spores are encapsulated in a 'dry oil' formulation, which protects the spores from UV damage and desiccation.
Robust strain R444.	The strain was isolated from soil in Clanwilliam, South Africa and is adapted to hot, dry, semi-desert conditions.
Non-toxic, completely natural and has no withholding period.	Eco-Bb® is suitable for organic and conventional agriculture and can be applied during the harvesting period.

How does Eco-Bb® work?

The active ingredient in Eco-Bb® is spores of the fungus *Beauveria bassiana*, an entomopathogen, which occurs naturally in soils throughout the world. Once the spores come into contact with the cuticle (skin) of the target organism, they germinate; secreting enzymes which specifically weaken the insect cuticle (**a and b**). The fungus invades the host directly and once inside the target organism, the fungus continues to grow, feeding on the internal organs (**c**). When the target organism dies, the fungus takes over the cadaver and, in favourable conditions, grows back out through the body wall, sporulating on the surface. The dead organism is then enveloped in a mat of white conidia (**d**).



The scanning electron micrographs above illustrate the mode of action of *Beauveria bassiana*. (Alcides Moino *et al*, External development of the entomopathogenic fungi *Beauveria bassiana* and *Metarhizium anisopliae* in the subterranean termite *Heterotermes tenuis*, *Scientia Agricola*, v.59, n.2, p.267-273, 2002).

Trial 1 - Apples

Cultivar: Sundowns apple | **Location:** Elgin, Western Cape

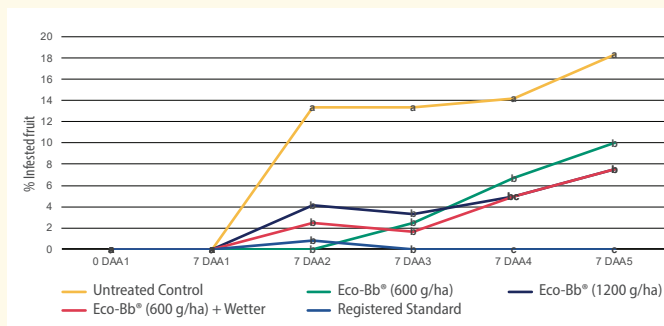
Applications: Weekly applications from fruit size up to 10 mm, fruit fall after flowering (BBCH 71) as a full-cover spray, but not to run off with a mistblower in 1200 L water per hectare.

Registered Standard: Dimethoate.

Evaluations: At onset of applications and every 7 days after each application.

Pest severity: Mealybug infestation of apples in the Untreated Control plots increased from no infestations to 18.3% infested fruit during the trial.

Summary: The corrected level of effectiveness of Eco-Bb® at 600 and 1200 g/ha indicated a reduced severity of mealybug on apples by between 45.5 to 100% without a wetter, and between 54.5 to 87.5% with the addition of a wetter compared with the Untreated Control when applied every 7 days. The efficacy of Eco-Bb® in combination with a wetter did not differ statistically significantly from the treatments without the wetter at any of the evaluation dates.



Efficacy of Eco-Bb® applied at 600 g and 1.2 kg/ha, Eco-Bb® at 600 g with a wetter (Break-Thru® at 250 ml/ha) compared with an Untreated Control and Registered Standard against mealybug on apple expressed as the percentage infested fruit.

Trial 2 - Citrus

Cultivar: Palmer navel oranges | **Location:** Citrusdal, Western Cape

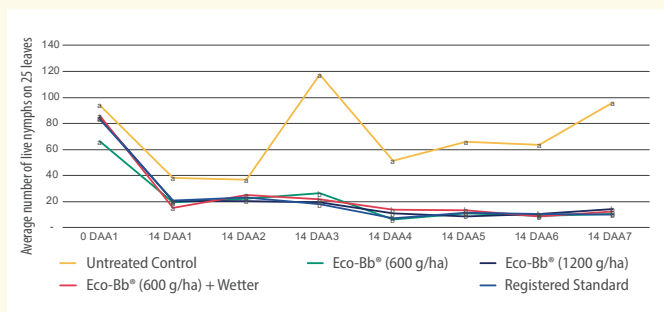
Applications: Applications every 2 weeks from fruit about 70% of final size (BBCH 77) as a full-cover spray, but not to run off with a mistblower in 6000 L water per hectare.

Registered Standard: *Beauveria bassiana*.

Evaluations: At onset of applications and every 14 days after each application.

Pest severity: Woolly whitefly nymph infestation of citrus leaves in the Untreated Control plots ranged between 37 to 118 nymphs on 25 leaves during the trial, with a spike of 118 nymphs at 7 days after application 3.

Summary: The corrected level of effectiveness of Eco-Bb® at 600 and 1200 g/ha indicated a reduced severity of woolly whitefly nymphs on citrus leaves of between 39.86 to 89.06% without a wetter, and between 31.76 to 87.24% with the addition of a wetter compared with the Untreated Control when applied every 14 days. The efficacy of Eco-Bb® in combination with a wetter did not differ statistically significantly from the treatments without the wetter at any of the evaluation dates.



Efficacy of Eco-Bb® applied at 600 g and 1.2 kg/ha, Eco-Bb® at 600 g with a wetter (Charge at 250 ml/ha) compared with an Untreated Control and Registered Standard against woolly whitefly on citrus expressed as the average number of live nymphs on 25 leaves per plot.

Trial 3 - Strawberry

Cultivar: Primoris strawberry | **Location:** Paarl, Western Cape

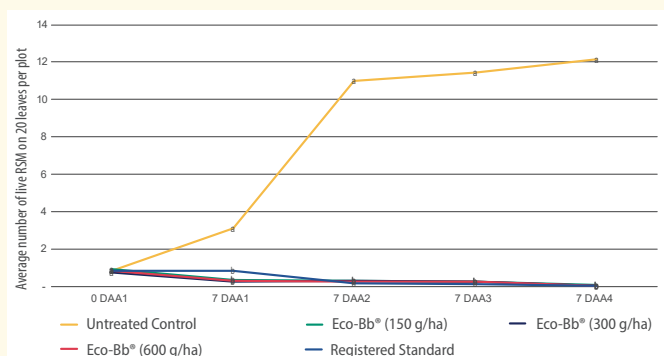
Applications: Weekly applications from first detection as a full-cover spray, but not to run off in 550 L water per hectare.

Registered Standard: Abamectin.

Evaluations: At onset of applications and every 7 days after each application.

Pest severity: Red spidermite infestation of strawberry leaves in the Untreated Control plots increased from 0.8 at the beginning of the trial to 12.1 mites per 20 leaves at the end of the trial.

Summary: The corrected level of effectiveness of Eco-Bb® at 150, 300 and 600 g/ha against red spidermites on strawberry leaves ranged between 90.2 to 98.4% compared with the Untreated Control when applied every 7 days. None of the Eco-Bb® rates differed statistically significantly from the Registered Standard at any of the evaluation dates.



Efficacy of Eco-Bb® applied at 150, 300 and 600 g compared with an Untreated Control and Registered Standard against red spidermite expressed as the number of red spidermites per 20 leaves.



Eco-Bb® Formulation

Eco-Bb® is formulated by combining *Beauveria bassiana* spores, oil and other carrier substances. Once mixed, each oil droplet contains multiple *Beauveria bassiana* spores. When the spores germinate, they produce enzymes to degrade and penetrate the insect's cuticle. The advantage of the oil formulation is that when an oil droplet lands on the target pest, multiple spores are able to produce more enzymes than just one spore. This enhances the virulence of the product towards the pest.

Registered uses:

Crop/Disease	Dosage	Remarks
Whitefly - Beans, tomatoes, cucumbers, brinjals. Red spider mite - Beans, tomatoes, cucumbers, brinjals, strawberries, Cape gooseberries. Leafminer (<i>Liriomyza species</i>) - Potatoes.	300 - 600 g/ha is recommended depending on spray volume, crop, growth stage and pest severity.	Apply as a full cover spray every 7 - 14 days depending on the severity of the pest. Apply at early stage of infestation for best results.
False codling moth Table grapes & pomegranates.	600 - 1000 g/ha depending on size of tree and degree of infestation.	Apply as a full cover spray, contact with pest is desired for maximum effect. Apply when moth activity peaks or eggs or larvae are first noted. Repeat application every 10 - 14 days or use in an IPM program. The higher rate is preferred on large trees, high spray volume application or when pest severity is high.
Woolly whitefly Citrus.	600 - 1000 g/ha depending on size of tree and degree of infestation.	Apply as a full cover spray, contact with pest is desired for maximum effect. The higher rate is preferred on large trees, high spray volume application or when pest severity is high. Apply at an early stage of infestation to optimize efficacy. Ensure coverage of lower leaf surface. Repeat application every 7 - 14 days if necessary.
Mealybug Pome fruit (apples, pears), citrus, grapes.	600 - 1000 g/ha depending on size of tree or vine and degree of infestation.	Apply as a full cover spray from when the pest is first noticed. Ensure coverage of lower leaf surface - contact with pest is desired for maximum effect. Repeat application every 7 - 14 days. A minimum of three applications is recommended. In severe cases repeat application until the pest is no longer present or use in an IPM programme. The higher rate is preferred on large trees, for high spray volume application or when pest severity is high.
Red spider mite Stone fruit (peaches, plums, nectarines, cherries).	600 - 1000 g/ha depending on size of tree and degree of infestation.	Apply as a full cover spray, contact with pest is desired for maximum effect. Apply at an early stage of infestation to optimize efficacy. Repeat application every 7 - 14 days or use in an IPM program. A minimum of three applications is recommended. The higher rate is preferred on large trees, high spray volume application or when pest severity is high.
Sucking bug complex (<i>Pseudotheraptus wayi</i> , <i>Penthimiola bella</i> , <i>Nezara viridula</i> , <i>Coenomorpha nervosa</i> , <i>Atelocera raptoria</i> , <i>Anolcus campestris</i> , <i>Farnya</i> sp, <i>Anoplocnemis</i> sp, <i>Taylorilygus</i> sp, and <i>Bathycoelia</i> sp). Avocado.	300 - 1000 g/ha depending on size of tree and degree of infestation.	Apply as a full cover spray, contact with pest is desired for maximum efficacy. The higher rate is preferred for large trees, high spray volume application or when pest severity is high. Apply at an early stage of infestation to optimize efficacy. Repeat application every 10 - 14 days.

Available in: 40 g, 300 g, 1 kg, 5 kg

Attested by:

Manufactured by:



Andermatt
Madumbi

Healthy Food and Healthy Environment, for all



Product suitable for use in Organic Farming in accordance with: Regulations (EU) No 2018/848 and 2021/1165 and the NOP Regulation. **Controlled by ECOCERT SAS**



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