



Eco-Bb[®] (L8469)

Reg. No. L8469, Act No. 36 of 1947

Biomangement



Andermatt
Madumbi



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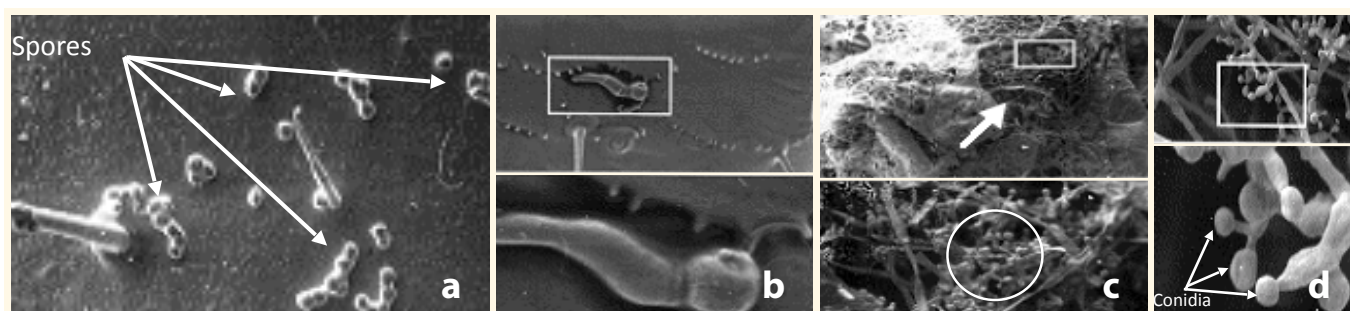
A wettable powder micro-granule formulation of the fungus *Beauveria bassiana*, strain R444. *Eco-Bb[®]* is a bio-insecticide for the suppression of various insect pests on crops as specified.

Why use *Eco-Bb[®]*?

Features	Benefits
Ability to reduce any of the life cycle stages of the target organism	<i>Eco-Bb[®]</i> is effective against the egg, larvae/nymph, pupa and adult stage. 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	<i>Eco-Bb[®]</i> 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 <i>Eco-Bb[®]</i> 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	<i>Eco-Bb[®]</i> 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&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 (a fruiting body containing spores) (**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).

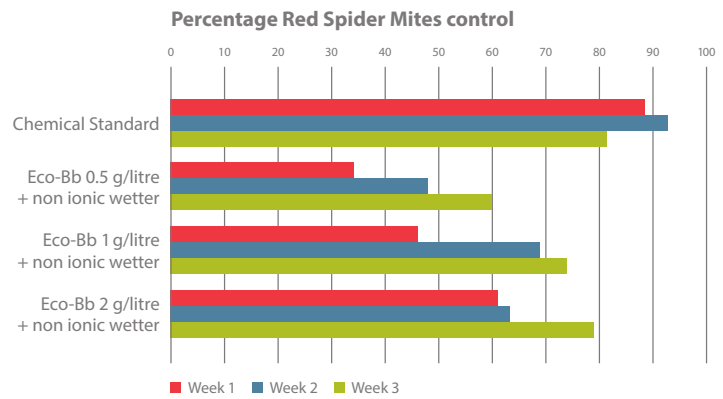
Trial data:

Efficacy of *Eco-Bb*® against Red Spider Mites on tomatoes (Pietermaritzburg, KZN)



Infestation of Red Spider Mites.

Figures right: The graph shows the percentage Red Spider Mite suppression at different *Eco-Bb*® dose rates compared with a standard chemical pesticide. A non-ionic wetter was added to the *Eco-Bb*® applications. Note the accumulative efficacy with the highest level of control being achieved after 3 weeks of weekly applications.

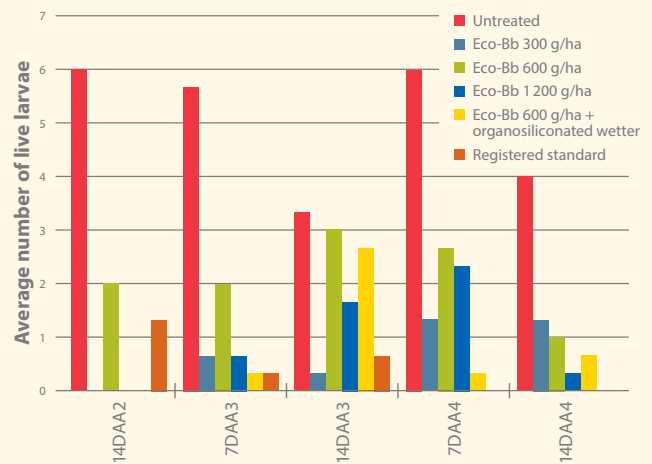


Efficacy of *Eco-Bb*® against False Codling Moth (*Thaumatotibia leucotreta*) on citrus



Infestation of False Codling Moth (*Thaumatotibia leucotreta*) on citrus (Turkey cultivar, Hoedspruit, Limpopo).

Figures right: The graph compares the number of living larvae after biweekly applications of *Eco-Bb*® (300 g, 600 g and 1200 g/ha), *Eco-Bb*® (600 g/ha) plus a wetter and a chemical standard (Methoxyfenozide) as per recommendation. A total of 5 applications were made. *Eco-Bb*® provided significant reduction of FCM compared to the untreated. Adding an organosiliconated wetter improved efficacy at the 600 g/ha dose rate.

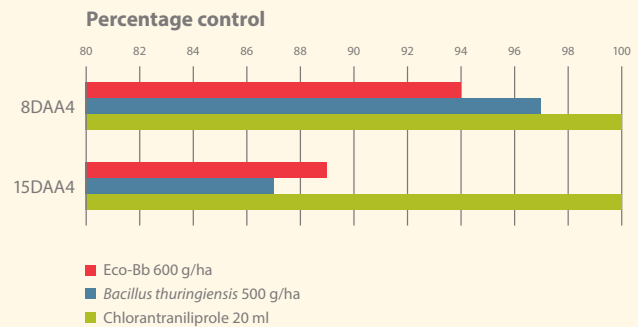


Efficacy of *Eco-Bb*® against Tomato leafminer (*Tuta absoluta*) on tomatoes



Infestation of Tomato leafminer (*Tuta absoluta*) on tomatoes (Star 9086).

Figures right: The graph compares the percentage suppression of tomato leafminer (Cultivar Star 9086) after weekly applications of *Eco-Bb*® (600 g/ha), a biological standard (*Bacillus thuringiensis*) and a chemical standard (Chlorantraniliprole). *Eco-Bb*® provided significant reduction of the *Tuta absoluta* population (94% eight days after the fourth application)

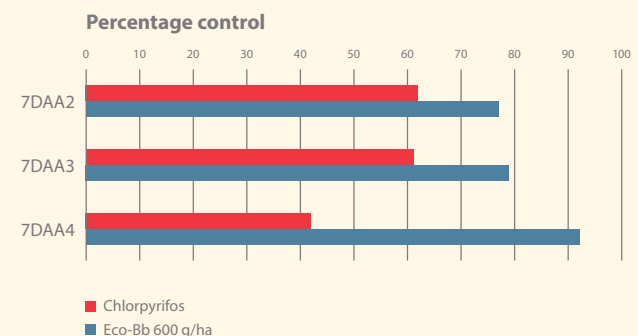


Efficacy of *Eco-Bb*® against Mealybug on citrus



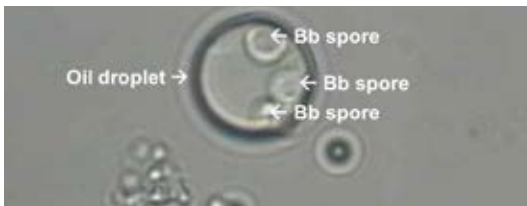
Initial infestation of mealybug (*Planococcus citri*) on Star Ruby citrus (Hoedspruit, Limpopo).

Figures right: The graph compares percentage suppression of Mealybug on citrus after weekly applications of *Eco-Bb*® (600 g/ha) and a chemical standard (Chlorpyrifos) as per recommendation. Both treatments were evaluated weekly and 4 applications were made.



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.



The image to the left shows the presence of multiple *Beauveria bassiana* spores contained within 1 oil droplet.

Registered uses:

Pest	Crop type	Dosage	Remarks
Whitefly	Beans, tomatoes, cucumbers, brinjal	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.
<i>Tuta absoluta</i>	Tomatoes		
Leafminer (<i>Liriomyza spp.</i>)	Potatoes		
Red Spider Mites	Beans, tomatoes, cucumbers, brinjal	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 programme. 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.
Red Spider Mites	Stone fruit (peaches, plums, nectarines, cherries)		
Woolly Whitefly	Citrus		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.
False codling moth	Avocados; litchis; citrus; stone fruit (apricots, cherries (sweet and sour), nectarines, peaches, plums and prunes); tree nuts (almonds, cashews, hazelnuts, macadamia nuts, pecans, pistachio nuts, walnuts, coconut, Brazil nuts and pine nuts), table grapes, pomegranates		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 programme. The higher rate is preferred on large trees, high spray volume application or when pest severity is high.
Mealybug	Pome fruit (apples, pears); citrus; grapes		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.

Available in: 40 g, 300 g, 1 kg

Eco-Bb® contains *Beauveria bassiana*. Reg. No. L8469, Act No. 36 of 1947. Plant Health Products (Pty) Ltd, PO Box 207, Nottingham Road, 3280. Reg. No. 2003/007987/07.

Certified by:
(as Bb-Protec)



Inspected by ECOCERT SA F-32600
Product suitable for use in organic agriculture complying to the annexes of the (EC) regulation n° 834/2007 and 889/2008

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