Renewal
Assessment Report

Lecanicillium muscarium Ve6

Volume 3MA – B.3 Data on application

January 2018

Rapporteur Member State: The Netherlands
Co-Rapporteur Member State: France

Version history

When	What
January 2018	Initial RAR

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B Summary of the data and information

B.3 Data on application

Note to reader:
Information from the original DAR and/or addenda to the DAR is highlighted grey.

Here the data is presented that were previously evaluated by RMS The Netherlands in the DAR (June 2007) and DAR addenda (June 2009, October 2009), as well as new data and information based on literature searches and studies. Previously submitted information (consolidated from DAR and addenda) is highlighted in grey, and information on the original DAR Points and the respective EU Points is complemented where necessary.

B.3.1 Function

Lecanicillium muscarium strain Ve6 is an insecticide. Lecanicillium muscarium strain Ve6 was formerly known as *Verticillium lecanii*.

B.3.2 Field of use envisaged

Target organisms of *Lecanicillium muscarium* strain Ve6 are whiteflies (*Bemisia tabaci, Trialeurodes vaporariorum*) and thrips (*Frankliniella occidentalis*).

For information about the representative formulation and representative uses, please refer to Volume 3MP – B-3, paragraph B 3.3

B.3.3 Crops or products protected or treated

For information about the representative formulation and representative uses, please refer to Volume 3MP – B-3, paragraph B 3.3

B.3.4 Method of production and quality control

Please refer to Volume 4 (Confidential Volume).

B.3.5 Information on the occurrence or possible occurrence of the development of resistance of the target organism(s)

Resistance of whitefly or thrips against *L. muscarium* strain Ve6 has not been reported since introduction of this strain as microbial insecticide in the 80 s. *Lecanicillium muscarium* strain Ve6 does not have an IRAC mode of action classification.

The EPPO standard on principles of efficacy evaluation for microbial plant protection products PP1/276(1) states that when the mode of action of a micro-organism is based on direct toxicological or infective interaction with a pest, adaptation of the pest is more likely to occur.

The mode of action of *Lecanicillium muscarium* is not based on the presence of toxins in the fungus. Spores of *Lecanicillium muscarium* germinate on the whitefly cuticle, penetrate and affect tissue within 48 hours after infection. Once in the host, *L.muscarium* forms blastospores which spread through the haemolymph of the arthropod host and lead to further infection. After 7-10 days, the insect dies after formation of a great number of hyphal bodies inside the body cavity.
Thrips are probably killed as a result of multiple lesions of the cuticle by enzymatic degradation, as no fungal material was found in the haemolymph of the insect at the time of death.

Taking into account the mode of action, and the absence of reported cases of resistance, for renewal of the active substance there is no concern regarding the development and occurrence of resistance.

New date

Report KMA 3.5/02 - Ambethgar, V. (2009), Potential of entomopathogenic fungi in insecticide resistance Management (IRM): A review
Published report,
Journal of Biopesticides, 2, 177-193

Abstract: Insect pests have remarkable capacity to develop resistance to insecticides. More than 600 species of plant feeding insect pests have developed resistance to insecticides. Management of insecticides resistance offers great promise as a complementary extension of integrated pest management (IPM). Insecticide resistance management (IRM) attempts to prevent or delay the development of resistance. A revival of interest in the use of microbial agents, especially entomopathogenic fungi in combination with sublethal doses of insecticide is increasing in insecticide resistance management. Integration of selected strain entomopathogenic fungi with selective insecticides can improve the control efficiency, besides decrease the amount of insecticides required, minimize the risks of environmental contamination and delay the expression of insecticide resistance in insect pests. Co-application of fungi like *Beauveria bassiana, Metarhizium anisopliae, Nomuraea rileyi, Paecilomyces* spp., *Lecanicillium (=Verticillium) lecanii* and *Hirsutella thompsonii* with suitable sublethal concentration of selective insecticide as two-in-one tank mix have been successfully employed against various insect pests to reduce the selection pressure insecticides and to avoid concurrent resistance risks in target pests. Majority of mechanisms of resistance occur through induction of enzymes especially mono-oxygenases and to some extent the esterases. Entomopathogenic fungi have ability to induce high degree of susceptibility to insecticides in target pests by suppressing enzyme activities and predispose them for fungal infection. This review outlines the current state of knowledge on the development of insecticide resistance in insect pests and discusses strategies

for manipulation of certain important fungal entomopathogens as potential microbial tool in the insecticide resistance management programme for sustainable pest management systems.

B.3.6 Methods to prevent loss of virulence of seed stock of the micro-organism

Verticillium lecanii Ve6 is stored at -85°C and cultured in such a way that the strain is genetically stable, based on literature that describes repeated sub-culturing on different agars and passing through an aphid (Hall, 1980).

New data

No new data is to be submitted under this point.

Previously submitted information is considered to be acceptable to cover current requirements.

B.3.7 References relied on

A literature search was conducted to identify all recent published open peer-reviewed literature on biological properties (Scholze, 2016), see B.2 MA for more details.. .

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company, Report No GLP or GEP status (where relevant) Published or not	Data Protection Claimed* Y/N	Owner **
Annex II Data and Information					
	Scholze, I.	2016	LITERATURE REVIEW ON LECANICILLIUM MUSCARIUM VE6 (19-79): BIOLOGICAL PROPERTIES Koppert, 2191392-MA-02-01 GAB Consulting GmbH, Heidelberg, Germany GLP/GEP: no Published: no	Y	KBS
	Ambethgar, V.	2009	POTENTIAL OF ENTOMOPATHOGENIC FUNGI IN INSECTICIDE RESISTANCE MANAGEMENT (IRM): A REVIEW -, not applicable Journal of Biopesticides, 2, 177-193 GLP/GEP: no Published: yes	N	-

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company, Report No GLP or GEP status (where relevant) Published or not	Data Protection Claimed* Y/N	Owner **
	R.A. Hall	1980	Effect of repeated subculturing on agar and passaging through an insect host on pathogenicity, morphology and growth rate of *Verticillium lecanii* Glasshouse Crops research Institute, Worthing Road, Littlehampton, Sussex, UK. - Journal of invertebrate pathology 36, pp. 216-222. - Published statement	N	-
	Anonymous	2016	MATERIAL SAFETY DATA SHEET - MYCOTAL Koppert, not available Koppert Biological Systems GLP/GEP: no Published: no	N	KBS