

# General principles for Good Management Practices



October 2019

## Biopesticides

### What are biopesticides?

Biopesticides are alternatives to conventional synthetic pesticides. They include live microbes (such as bacteria, fungi and viruses) and/or their extracts, crude or purified plant extracts, pheromones and other natural biochemicals. Biopesticides work best when incorporated into an integrated pest management programme utilising a range of control measures. They are different to biostimulants and biofertilisers since they claim pest control activity rather than just promotion of plant growth.

### What regulatory approval is needed for their use?

In New Zealand, the regulatory process for biopesticides is the same as for conventional chemical pesticides. The product must be registered under the ACVM (Agricultural and Veterinary Medicines) Act. They can be categorised as biofungicides, bioinsecticides and bioherbicides.



### How do they work?

Biopesticides can work in a number of different ways. Some products only have one mode of action whilst others have multiple modes of action.

**Attraction/repellency** Produce compounds that disrupt the normal behaviour of insect pests.

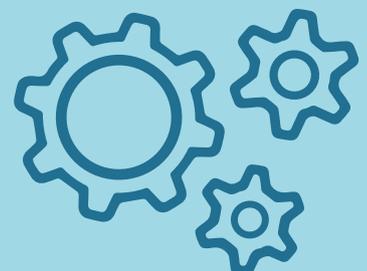
**Competition** Microbes can out-compete plant pathogens for space and other resources and prevent the pathogen from infecting the plant.

**Physical action** Produce compounds that cause cell leakage, desiccation and death in the target pest.

**Parasitism** Microbes can infect/colonise a target pest/pathogen and kill it.

**Toxicity** Microbes/plants can produce a compound that has a direct toxic effect on the target pest.

**Induced resistance** Microbes/plants can produce compounds that stimulate the crop plant's general resistance to pest/pathogen attack.



# How to use biopesticides



**Storage** It is very important to follow the label guidelines, particularly around storage. Products based on living microbes can be affected by extreme heat and cold, so storing at ambient temperature is usually recommended, although some products need to be refrigerated. Some products must be used immediately and cannot be resealed and stored. Biopesticides are subject to the same regulations as chemical pesticides and need to be held in an approved store.



**Environment** Biopesticides can be sensitive to environmental conditions so check labels carefully. Many biopesticides should be applied in the evening to avoid the heat of the day and some benefit from being applied with UV protectants. Most biopesticides are not systemic or rain fast so re-application will be needed if there is a significant rainfall event.



**Application** Most foliar biopesticides are protectants, so it is important to apply them before pest/disease symptoms appear and to make sure that good plant coverage is achieved. Use the specified nozzle to prevent blockages. When using products based on live microbes clean your spray system very well before adding and don't use chlorinated water. Biopesticides may need to be reapplied at 7-10 day intervals.



**Compatibility** Check label recommendations around adjuvant use and tank mixing as live microbes may be affected by other crop protection products.



## Biopesticide benefits

Biopesticides may seem more challenging to use than conventional chemicals, but they provide a number of benefits.

**Low resistance risk** Biopesticides have a low risk of resistance developing because of their multiple modes of action. They can be integrated into IPM systems to extend the life of agrichemicals.

**Residue management** Biopesticides are exempt from MRL residue targets and therefore can be used close to harvest time when other chemicals are not suitable.

**Low environmental impact** Biopesticides often have good compatibility with beneficial insects and are generally regarded as safer for the environment. Many biopesticides have a zero or low re-entry and handling interval.

# Questions to ask when buying biopesticides



## What is the active ingredient?

If it is a crude preparation (plant extract or mix of microbes) ask about the consistency of the product with respect to quality assurance. If it's a single microbe/pure compound ask for specific identifications eg specific strain of a microbe. If you get vague answers – buyer beware.

## How does it work?

Don't accept vague or overly complicated answers. Understanding how the product works is the key to understanding how to use it properly. Cross reference what the company rep tells you with what is on the label.

## What field trial data can you show me?

Reputable companies selling good products will have good trial data to back up their claims. Don't accept pot trial data (poor translation to field efficacy) and be cautious with field data on other crops/pests.

## How should I use the product?

Ask for detailed information on how the product should be used and what other products it is compatible with. Beware of vague answers or claims that it can be used exactly like a chemical.

**If something sounds too good to be true – it will be. Biopesticides are not stand-alone solutions. They work best when incorporated into an integrated pest management programme utilising a range of control measures.**



# A selection of biopesticides registered in New Zealand for use on vegetable/arable crops\*

Product	Active ingredient	Application	Mode of action	Company
<b>Bio-fungicides</b>				
Bacstar™ WDG	<i>Bacillus subtilis</i> var <i>amyloliquefaciens</i> strain D747	<i>Sclerotinia minor</i> /lettuce Downy mildew/onion	Inhibition of pathogen growth	Etec Crop Solutions Ltd
Clarity WP	<i>Bacillus subtilis</i> MB1600	<i>Botrytis</i> on strawberry, onions. Powdery mildew on onions	Protectant	Grochem (AgriNova NZ Ltd)
Sentinel® WP	<i>Trichoderma atroviride</i> LU132	<i>Botrytis</i> on tomatoes	Competitive exclusion	Farmlands, FruitFed Supplies, Horticulture
Tenet® Granules	<i>Trichoderma atroviride</i> LU132	Onion white rot. Fusarium basal rot of onions/garlic	Competitive exclusion	Farmlands, FruitFed Supplies, Horticulture
Triplex SC	<i>Bacillus amyloliquefaciens</i> BS1b	<i>Botrytis</i> on vegetables	Competitive exclusion	BioStart Ltd
<b>Bio-Insecticides</b>				
Biobit DF	<i>Bacillus thuringiensis</i> sub spp <i>kurstaki</i> (H-3a, 3b, HD1)	Leafroller caterpillars and fruitworm on tomatoes, Diamond back moth on vegetable brassicas	Bacterial toxin kills the larvae	Grochem
Bioshield® Granules	<i>Serratia entomophila</i> (626)	NZ grass grub	Toxic to larvae	BioStart NZ Ltd
Delfin WG	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> (3a, 3b, SA 11)	Leafroller caterpillars and fruitworm on tomatoes, Diamond back moth on vegetable brassicas	Bacterial toxin kills the larvae	FruitFed Supplies
Dipel DF	<i>Bacillus thuringiensis</i> sub spp <i>kurstaki</i> (H-3a, 3b, HD1)	Leafroller caterpillars and fruitworm on tomatoes, Diamond back moth on vegetable brassicas	Bacterial toxin kills the larvae	NuFarm Ltd
Hortcare Bactur WDG	<i>Bacillus thuringiensis</i> var <i>kurstaki</i> (3a, 3b, HD263)	Leafroller caterpillars and fruitworm on tomatoes, Diamond back moth on vegetable brassicas	Bacterial toxin kills the larvae	Grosafe Chemicals
Nematop® WP	Parasitic nematode <i>Heterorhabditis bacteriophora</i>	Grass grub	Nematode releases symbiotic bacterium that kills the pest	Bioforce
PyGanic® EC	Pyrethrins	Vegetable pests	Contact action	Key Industries
Xentari® WG	<i>Bacillus thuringiensis</i> sub spp <i>aizawai</i> (1857)	Caterpillars on brassicas	Toxin	Nufarm Ltd

\*For up to date product availability go to [www.novachem.co.nz](http://www.novachem.co.nz)

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