

2022

# Biological Controls Product Guide



*Rooted in your community.*

**TerraLink**

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If a pest is not listed here, please let us know. We may be able to help. For more information, please contact our IPM specialist Rachel Hagel (rachel.hagel@tlhort.com) or call 1-800-661-4559.

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## About Us

TerraLink is British Columbia’s leading manufacturer and distributor of fertilizer, seed and crop protection products. We strive to improve farm productivity by offering superior fertilizers and other crop input technologies with unparalleled agronomic support. The strategically located blending and packaging facility at Abbotsford along with store locations at Delta and Calgary enable us to efficiently service Western Canada.

TerraLink’s proprietary products are marketed with leading brand names and the company maintains a long-standing reputation and history within its market. TerraLink operates as a convenient, one-stop outlet for growers of forage, fruit, vegetable, turf, ornamental, and greenhouse crops.

TerraLink Horticulture offers a wide variety of biological pest controls. We purchase biological control agents produced by some of the largest, most respected and innovative insectaries world-wide, such as BioBee and e-nema®.

## Our Featured Partner

CABI is an international, inter-governmental, not-for-profit organization that improves people’s lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. The CABI BioProtection Portal is an online tool that helps growers and agricultural advisors to identify, source and correctly apply biocontrol and biopesticide products against pests in their crops. The portal is free to use and can be accessed



## BioProtection Portal

on multiple devices, thereby putting this valuable information at the fingertips of anyone who needs it. Information is sourced directly from national governments’ list of registered pesticides and from partner biocontrol manufacturers. We are proud to back the CABI BioProtection Portal as it supports the use of eco-friendly products and connects growers with local resources and experts.



Visit [bioprotectionportal.com](http://bioprotectionportal.com) to learn more.

## Why Use Biological Controls?



Use of chemical insecticides kills those insects that are susceptible, but over time those that survive have less competition, reproduce, and following generations are made up of more chemical-tolerant individuals. This is why chemical control of pests such as thrips and whitefly has become increasingly difficult. Additionally, chemical insecticides can negatively impact populations of native insect predators and pollinators.

Unlike chemical pest controls, which usually work within hours or a few days, biological control takes a bit more planning and timing as it consists of living organisms. It can take 2 – 4 weeks for the biological controls to become established. But once the natural and insectary-reared insects become established in the infested area(s), nothing more is required other

than a weekly inspection of the infested areas to assess the biological / pest populations. The occasional supplemental release should be considered to enhance the biocontrol population.

Introducing and establishing populations of biocontrol agents early helps prevent the pest populations from establishing in the crop, which in turn limits the scope of their damage to the crop. Don’t wait to react to the problem once the damage is done - act proactively and produce more premium products without worrying about residues, re-entry intervals, or pre-harvest intervals.

### Specific advantages TerraLink offers:

- Preventative schedules can be built for each crop
- Control options that won’t interfere with native predators or pollinators
- Direct shipping on selected products
- Supportive options for predators and pollinators:
  - ◊ Artemia for *A. swirskii*, *N. cucumeris*, *Orius* – can be used to support predators and produce “Biocontrol ready” propagation plants
  - ◊ Crop Boost increases the number and foraging time of bees working in the crop
- Monitoring and trap options that can be tailored to attract target pests
- Options that prey upon the pests directly, or lure the pests to alternative locations where they are trapped

### TerraLink supplies biological controls for the following:

In agriculture, greenhouses and ornamental nurseries:

- Aphids
- Mites
- Thrips
- Caterpillars
- Whitefly
- Mealybug
- Scale
- Leafminer
- Flies
- Fungus gnats

In turf and landscape:

- Grub
- Leatherjacket
- Weevil
- Ants





## APHIDS

Aphids are a common plant-feeding pest, notorious for their rapid reproduction rates. In addition to feeding damage and virus transmission, they also secrete honeydew which fouls leaves and fruit, decreasing marketable yield. Common species include green peach aphid (*Myzus persicae*), cotton/melon aphid (*Aphis gossypii*), tobacco aphid (*M. p. nicotianae*), cannabis aphid (*Phorodon cannabis*), potato aphid (*Macrosiphum euphorbiae*), foxglove aphid (*Aulacorthum solani*), and pea aphid (*Acyrtosiphon pisum*).



### *Aphidoletes aphidimyza*



*Aphidoletes aphidimyza* is a predatory midge that feeds on over 70 species of aphids. It is only the larval stage that predate the aphids, so it is recommended that they are introduced early in order to give time for this stage to develop. They can multiply quickly and are recommended for heavy infestations.

Predator Name	SKU	Quantity per package
Bio Aphidoletes	6603406	Bottle of 1000 pupae

### *Aphidius colemani*



*Aphidius colemani* is a parasitic wasp that controls over 40 aphid species including the green peach aphid (*Myzus persicae*), the cotton aphid (*Aphis gossypii*), and the tobacco aphid (*M. p. nicotianae*). *Aphidius* inserts an egg into the body of its host aphid, and as the wasp pupates, the aphid gradually turns into a hardened mummy, usually golden-brown in colour. The adult *Aphidius* female is able to lay up to 200 eggs during a lifetime of just a couple days. They are strong fliers, and are even able to locate individual aphids, making them a great preventative option, but please note that intensive crop de-leafing will hamper the establishment of the *Aphidius* population, since mummies are attached to the leaf.

Predator Name	SKU	Quantity per package
Bio Aphidius	6603405	Container of 500 parasitized aphid mummies
	6603415	Container of 1000 parasitized mummies

### *Aphidius ervi*



*Aphidius ervi* is a parasitic wasp of large aphid species, such as potato aphid (*Macrosiphum euphorbiae*), foxglove aphid (*Aulacorthum solani*), cannabis aphid (*Phorodon cannabis*), and pea aphid (*Acyrtosiphon pisum*). Parasitized aphids turn golden-brown in colour. As a strong flier, *Aphidius ervi* is recommended for preventative introductions, but please note that intensive crop de-leafing will hamper the establishment of the *Aphidius* population, since mummies are attached to the leaf.

Predator Name	SKU	Quantity per package
Bio Ervi	6604595	Bottle of 250 parasitized aphid mummies
	6604596	Bottle of 1000 parasitized aphid mummies

### *Aphidius matricariae*



*Aphidius matricariae* is a parasitic wasp used to control many species of aphids, especially the cannabis aphid (*Phorodon cannabis*), the green peach aphid (*Myzus persicae*), and the tobacco peach aphid (*M. p. nicotianae*). Compared to other *Aphidius sp.*, *matricariae* are better adapted to low temperatures, and parasitize aphids at greater numbers and more quickly. Their mummies are grey/brown, and their ability to locate small populations make for an excellent preventative option.

Predator Name	SKU	Quantity per package
Bio Aphidius matricariae	6603395	Bottle of 250 parasitized aphid mummies
	pls inquire	Bottle of 500 parasitized aphid mummies
	6603425	Bottle of 1000 parasitized aphid mummies
	pls inquire	Bottle of 5000 parasitized aphid mummies

### *Chrysoberla carnea*



Lacewing larvae are voracious predators of many aphid species, and are recommended for heavy infestations. They have relatively large temperature and humidity ranges, so they are well-suited to environments with large climatic variance. *Chrysoberla* may also provide some control of secondary prey: whiteflies, thrips, mites, moth eggs, and leafhopper eggs.

Predator Name	SKU	Quantity per package
Bio Lacewing	6606245	5000 <i>Chrysoberla carnea</i> eggs on 20 cards
Bio Green Lacewing	6605175	Bottle of 500 <i>Chrysoberla carnea</i> larvae
	6605180	Bottle of 1000 <i>Chrysoberla carnea</i> larvae

### Aphid Banker Plant



The potted wheat plant (*Triticum aestivum*) comes infested with the cherry oat aphid (*Rhopalosiphum padi*), a monocot aphid that will not target dicot plants. Early introduction of this system allows for preventative population establishment of aphid predators and parasitoids, eliminating any delay between detecting aphids in the crop and implementing the control. This is a huge advantage given the rapid reproductive rate of aphids. As beneficial insect populations increase, they will spread through the crop in search of more aphids. As long as aphids are present in the banker plant it will provide the habitat and prey for predators and parasitoids, so occasionally new banker plants may need to be introduced to maintain a preventative level of control throughout the growing season.

Predator Name	SKU	Quantity per package
Bio Barley Plant	6608000	1 barley banker plant infested with monocot aphids

**MITES**

There are many species of mites that cause damage in crops. Most common are the two-spotted spider mites (*Tetranychus urticae*), broad mites (*Polyphagotarsonemus latus*), cyclamen mites (*Phytonemus pallidus*), russet mites (*Aceria anthocoptes*), red spider mites (*Tetranychus cinnabarinus*), and strawberry spider mite (*Tetranychus turkestanii* Ugarov & Nicolski). In addition to the feeding damage that results from mite infestations, spider mites also produce webs that impact the aesthetic value of ornamental crops.



**Amblyseius andersoni**



*Amblyseius andersoni* is a predatory mite that targets many species of mites, including two-spotted spider mite (*Tetranychus urticae*), European red mite (*Panonychus ulmi*), broad mite (*Polyphagotarsonemus latus*), cyclamen mite (*Phytonemus pallidus*), and russet mites (*Aceria anthocoptes*). They will also feed on western flower thrips (*Frankliniella occidentalis*), and pollen. They can be introduced into the crop as a preventative control if there are blooming flowers as an available food source, and are often used in tomatoes due to their ability to navigate through the trichomes.

Predator Name	SKU	Quantity per package
Bio Andersoni	6603250	Box of 250 sachets of 250 mites each (62,500 total)
	6603245	1L bottle of 50,000 mites
	pls inquire	5L bag of 125,000 mites

**Neoseiulus californicus**



The predatory mite *Neoseiulus californicus* is used to control a variety of other mites. These include two-spotted spider mites (*Tetranychus urticae*), broad mites (*Polyphagotarsonemus latus*), cyclamen mites (*Phytonemus pallidus*), russet mites (*Aceria anthocoptes*), and some species of gall mites (*Eriophyidae*). Pollen can be used to help establish or support *N. californicus*. There are indications the *N. californicus* may perform better in lower humidity than other predatory mites.

Predator Name	SKU	Quantity per package
Bio Californicus	6603015	1L bottle of 25,000 mites
	6603018	4 oz vial of 2,000 mites
	6603023	250 sachets of 250 mites each (25,000 total)
	6603021	500 sachets of 250 mites each (125,000 total)
	6600260	Bottle of 5000 mites
	6603022	Bottle of 50,000 mites

**Neoseiulus fallacis**



*Neoseiulus fallacis* is a predatory mite used to suppress pest mites such as two-spotted spider mites, spruce spider mites, European red mites, cyclamen mites, strawberry mites and broad mites in many crops, and can easily establish in outdoor crops. This mite has excellent dispersal abilities, is active between 9°C and 32°C, and can survive when pest populations drop to low levels.

Predator Name	SKU	Quantity per package
Bio Fallacis	6604610	Container of 1250 mites (all stages) on bean leaves
	6604615	Container of 2500 mites (all stages) on bean leaves
	6604600	Bottle of 500 mites on vermiculite
	6604605	Bottle of 1000 mites on vermiculite

**Phytoseiulus persimilis**



*Phytoseiulus persimilis* is a predatory mite used to control web-spinning spider mites such as two-spotted spider mite (*Tetranychus urticae*), red/carmine spider mite (*Tetranychus cinnabarinus*), and strawberry spider mite (*Tetranychus turkestanii* Ugarov & Nicolski). It develops twice as fast as its prey and is considered an outstanding efficient natural predator. It is able to suppress mite infestations quickly and thoroughly, and effective at spreading through plant contact in many crops.

Predator Name	SKU	Quantity per package
Bio Persimilis	6600005	Bottle of 2000 adult mites (plus all stages)
	6600015	Bottle of 4000 adult mites (plus all stages)
	6600025	Bottle of 10,000 adult mites (plus all stages)
	6600035	Container of 100,000 adults mites plus all stages (no carrier)
Bio Persi+ Speed	6600045	250 sachets of 100 mites
	pls inquire	500 sachets of 100 mites
Bio Persi+ Classic	6600050	250 sachets of 300 mites
	6600040	500 sachets of 300 mites



**Stethorus punctillum**



Known as the spider mite destroyer, this beetle is a strong flier and very tolerant of both high temperatures and low humidity. Larvae and adults predate all stages of several mite species, including two-spotted spider mite, spruce spider mite, southern red mite and European spider mite.

Predator Name	SKU	Quantity per package
Bio Stethorus	6606770	Bottle of 100 beetles



## THRIPS

Thrips are a common crop pest that have proven difficult to control through chemical means due to their rapid development of pesticide resistance. Western flower thrips (*Frankliniella occidentalis*) and tobacco thrips (*Thrips tabaci*) are the most prolific, and their damage appears as silver/grey spots or streaks. When they feed on flowers, the flower or fruit will exhibit deformations or discoloration as a result. Beyond this damage, thrips can vector viruses such as tomato spotted wilt virus, causing even greater losses throughout the crop.



### *Amblyseius swirskii*



*Amblyseius swirskii* is a predatory mite and efficient predator of young stages of thrips, including western flower thrips (*Frankliniella occidentalis*). *Swirskii* will also feed on the eggs and young nymphs of whiteflies (*Bemisia tabaci* and *Trialetodes vaporariprum*), and secondary targets include two-spotted spider mites (*Tetranychus urticae*), red spider mites (*Tetranychus cinnabarinus*), russet mites (*Aceria anthocoptes*), cyclamen mites (*Phytonemus pallidus*), and broad mites (*Polyphagotarsonemus latus*). In the absence of prey, it can survive on pollen, nectar from flowers, and Artemia. It does not hibernate and functions effectively, even on short days, if temperatures allow.

Predator Name	SKU	Quantity per package
Bio Swirskii	6606725	250 sachets of 250 mites (62,500 total)
	6606700	Box of 500 sachets of 250 mites each (125,000 total)
	6606705	Container of 25,000 mites
	6606710	Container of 50,000 mites
	6606720	4 L bag of 200,000 mites
	6606725	250 sachets of 250 mites (62,500 total)
	pls inquire	Container of 50,000 mites mixed with Artemia

### *Dalotia coriaria*



Also known as *Atheta* and the rove beetle, *Dalotia coriaria* is a fast moving, soil-dwelling predatory beetle known for its aggressive feeding behavior. This beetle spends most of its time in the substrate but can also fly. They have a wide range of feeding options, and in addition to thrips, they also predate shore flies, fungus gnats, and many other soil-dwelling insects. They can rapidly colonize an environment, and are an excellent preventative option for controlling many pests.

Predator Name	SKU	Quantity per package
Bio Atheta	6603705	1000 beetles
	6603710	3000 mixed stages, breeding system

### *Neoseiulus cucumeris*



*Neoseiulus cucumeris* is a predatory mite that feeds on the larval stage of thrips, especially western flower thrips (*Frankliniella occidentalis*). They also feed on mites, such as two-spotted spider mites (*Tetranychus urticae*), broad mites (*Polyphagotarsonemus latus*), russet mites (*Aceria anthocoptes*), cyclamen mites (*Phytonemus pallidus*), and can survive on pollen or Artemia, making them an excellent preventative biocontrol agent.

Predator Name	SKU	Quantity per package
Bio Cucumeris	6603800	Box of 250 sachets of 1000 mites each (250,000 total)
	6603825	Box of 500 sachets of 1000 mites each (500,000 total)
	6603805	500mL bottle of 25,000 mites
	6603810	1L bottle of 50,000 mites
	6603815	1L bottle of 100,000 mites
	6603820	5L bag of 500,000 mites
	pls inquire	5L bag of 250,000 mites

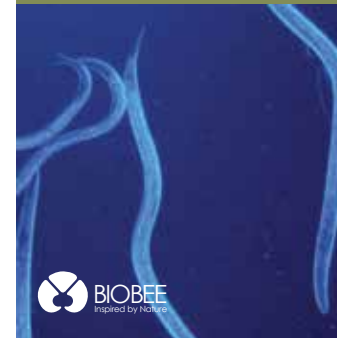
### *Orius insidiosus*



Commonly known as the Minute Pirate Bug, *Orius insidiosus* is a generalist predator that can be used in a wide variety of crops. They are primarily used to control the adult and nymph stages of various thrips species, but they also predate aphids, whiteflies, mites, and lepidopteran eggs. Orius are highly mobile and can feed on pollen, making them an excellent biocontrol option to release preventatively if blooming flowers or Artemia are available to support population establishment.

Predator Name	SKU	Quantity per package
Bio Orius	6606250	90 mL bottle of 500 Orius
	6606255	250 mL bottle of 1000 Orius
	6606260	250 mL bottle of 2000 Orius

### *Steinernema feltiae*



*Steinernema feltiae* is a species of insect-pathogenic nematode used to control thrips pupae in the soil, or thrips larvae through foliar application. The nematodes carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. The insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host. It only takes 2-3 infective juveniles to kill the insect, and if conditions are favourable, they will persist in the soil and continue to control the pest throughout the season.

Predator Name	SKU	Quantity per package
Bio SF	6606740	50 million
	6606735	250 million
	6606730	500 million
Bio SF Pearl	pls inquire	200 slow release capsules



## WHITEFLIES

Whitefly species like the greenhouse whitefly (*Trialeurodes vaporariorum*), and tobacco/silverleaf/sweet potato whitefly (*Bemisia tabaci*) are very common greenhouse pests. The tobacco whitefly is especially difficult to control using chemicals, since they rapidly develop pesticide tolerance. In addition to transmitting viruses, whiteflies also produce honeydew from feeding on plants, which fouls leaves and fruit, decreasing marketable yield and encouraging fungal growth.



### *Amblyseius swirskii*



*Amblyseius swirskii* is a predatory mite that feeds on the eggs and young nymphs of whiteflies (*Bemisia tabaci* and *Trialeurodes vaporariprum*), thrips, and some mite species. It is possible to release these predators preventatively since, even in the absence of prey, they can survive on pollen, nectar from flowers, and Artemia. A single egg, or egg cluster of 2-6 eggs, are laid on the underside of leaf, and eggs change their color depending on the prey the mite is feeding upon. They do not hibernate and function effectively, even on short days, if temperatures allow.

Predator Name	SKU	Quantity per package
Bio Swirskii	6606725	250 sachets of 250 mites (62,500 total)
	6606700	Box of 500 sachets of 250 mites each (125,000 total)
	6606705	Container of 25,000 mites
	6606710	Container of 50,000 mites
	6606720	4 L bag of 200,000 mites
	6606725	250 sachets of 250 mites (62,500 total)
	pls inquire	Container of 50,000 mites mixed with Artemia

### *Delphastus catalina*



*Delphastus catalinae* is a predatory beetle that targets many species of whitefly, including tobacco/silverleaf/sweet potato whitefly (*Bemisia tabaci*) and greenhouse whitefly (*Trialeurodes vaporariprum*). *Delphastus* are very successful in controlling whitefly hotspots in a variety of crops.

Predator Name	SKU	Quantity per package
Bio Delphastus	pls inquire	Bottle of 1000 beetles

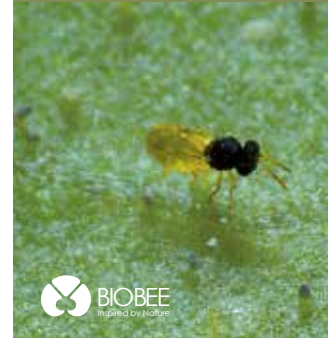
### *Dicyphus hesperus*



*Dicyphus* is a predatory bug and generalist that is primarily used to control whiteflies, but can also feed on mites, thrips, and moth eggs. It should be noted that *Dicyphus* are omnivorous, and require plants to complete their lifecycle. If pest populations are low they may feed on plants to the point of damage, or target other beneficial insects. It is recommended for hot spot management, and that supplementary food such as *Artemia* be provided.

Predator Name	SKU	Quantity per package
Bio Dicyphus	pls inquire	Bottle of 250 Dicyphus
	pls inquire	Bottle of 500 Dicyphus

### *Encarsia Formosa*



*Encarsia formosa* is a parasitic wasp that can be used in many crops to control the greenhouse whitefly (*Trialeurodes vaporariprum*). It is easy to assess the progress of whitefly control, as parasitized whiteflies turn black in about 10 days. *Encarsia* may provide a limited control of other whitefly species, but it is recommended to combine *Encarsia* with *Eretmocerus eremicus* for maximum flexibility.

Predator Name	SKU	Quantity per package
Bio Encarsia	6604465	Bottle of 5000 parasitized whitefly mummies
	6604470	Box of 250 cards of 60 parasitized whitefly each
Bio Encarsia Eretmocerus	6604475	250 cards of 60 mixed Encarsia and Eretmocerus each

### *Eretmocerus eremicus*



*Eretmocerus eremicus* is a parasitic wasp that can be used in many crops to control both the tobacco/silverleaf/sweet potato whitefly (*Bemisia tabaci*) and the greenhouse whitefly (*Trialeurodes vaporarium*). For the most effective control, it is recommended to introduce *Eretmocerus* while whitefly populations are low, or combine them with a whitefly predator for hotspot management.

Predator Name	SKU	Quantity per package
Bio Eretmocerus	pls inquire	50mL bottle of 3000 parasitized whitefly mummies
	pls inquire	50mL bottle of 5000 parasitized whitefly mummies
	pls inquire	90mL bottle of 15,000 parasitized whitefly mummies
	pls inquire	Box of 15,000 parasitized whitefly mummies on cards

### *Orius insidiosus*



Commonly known as the Minute Pirate Bug, *Orius insidiosus* is a generalist predator that can be used in a wide variety of crops. In addition to the adult and nymph stages of thrips, they also predate whiteflies, aphids, mites, and lepidopteran eggs. *Orius* are highly mobile and can feed on pollen, making them an excellent biocontrol option to release preventatively if blooming flowers or *Artemia* are available to support population establishment.

Predator Name	SKU	Quantity per package
Bio Orius	6606250	90 mL bottle of 500 Orius
	6606255	250 mL bottle of 1000 Orius
	6606260	250 mL bottle of 2000 Orius



## FUNGUS GNATS & SHORE FLIES

Sciarid flies, also known as fungus gnats, include *Lycoriella spp.*, *Sciara spp.*, *Bradysia spp.*, and Mycetophilidae family. Adults are often visible in association with moist growing media, and their larvae can damage roots and stunt plant growth, particularly in seedlings and young plants. Their feeding can result in susceptibility to various plant diseases (including *Pythium*, *Fusarium*, and *Phytophthora*), as well as significant root damage and even plant death. Shore flies, which include *Scatella spp.* and *Ephydriidae spp.*, don't feed on the plants directly, but their rapid reproduction can cause a nuisance due to swarming, and their waste decreases the aesthetic value of crops.



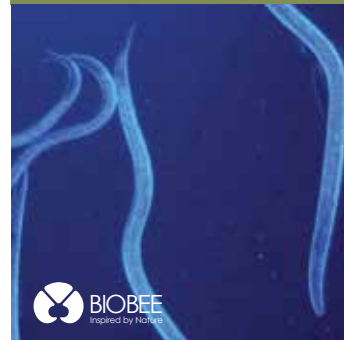
### *Dalotia coriaria*



Formerly known as *Atheta*, *Dalotia coriaria* is a fast moving, soil-dwelling predatory beetle known for its aggressive feeding behavior. This beetle spends most of its time in the substrate but they can also fly. They have a wide range of feeding options, and in addition to shore flies and fungus gnats, they will also feed on thrips, and many other soil-dwelling insects. They can rapidly colonize an environment, and are an excellent preventative option for controlling many pests.

Predator Name	SKU	Quantity per package
Bio Atheta	6603705	1000 beetles
	6603710	3000 mixed stages, breeding system

### *Steinernema feltiae*



*Steinernema feltiae* is a species of insect-pathogenic nematode used to control fungus gnats, shore flies, leafminers, and thrips. The nematodes carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. The insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host. It only takes 2-3 infective juveniles to kill the insect, and if conditions are favourable, they will persist in the soil and continue to control the pest throughout the season.

Predator Name	50 million	250 million	500 million
Bio SF	6606740	6606735	6606730

Predator Name	SKU	Quantity
Bio Pearl	pls inquire	200 slow release capsules

### *Stratiolaelaps scimitus*



*Stratiolaelaps scimitus* (formerly *Hypoaspis miles*) is a soil-dwelling mite capable of the prevention, control, and management of sciarid flies, shore flies, and many soil pests, including the soil-dwelling stage of various thrips. Both the adults and larvae are voracious predators, and they are good at spreading through the crop, even potted crops. They eat and reproduce in both soil and soilless media.

Predator Name	SKU	Quantity per package
Bio Stratiolaelaps	6606745	Bottle of 10,000 mites
	6606750	Bottle of 25,000 mites
	6606755	Bottle of 50,000 mites
	6606760	5L bag of 125,000 mites
	6606765	5L bag of 250,000 mites

## CATERPILLARS

Caterpillars are the larval stage of Lepidoteran insects. This large group includes the codling moth (*Cydia pomonella*), cranberry girdler (*Chrysoteuchia topiaria*), pepper moth (*Duponchelia fovealis*), leatherjacket/crane fly (*Tipula spp.*), and cutworms (*Agrotis spp.*). While the adults are often harmless, caterpillars are voracious plant feeders, and as such are considered among the most serious agricultural pests.



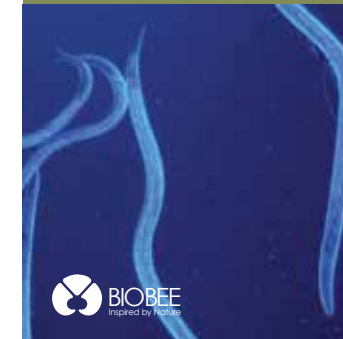
### *Steinernema carpocapsae*



The larval stage of the cranberry girdler (*Chrysoteuchia topiaria*), cutworm (*Agrotis spp.*), pepper moth (*Duponchelia fovealis*), leatherjacket (*Tipula paludosa*), banana moth (*Opogona sacchari*), chestnut moth (*Cydia splendana*), leopard moth (*Zeuzera pyrina*), and palm moth (*Paysandisia archon*) are controlled using this nematode. The nematodes carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. It only takes 2-3 nematodes to kill the host, the insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host.

Predator Name	50 million	250 million	500 million
Bio SC	6606585	6606590	6606595

### *Steinernema feltiae*



The larval stage of the codling moth (*Cydia pomonella*), cutworm (*Agrotis spp.*), leatherjacket (*Tipula oleracea*), apple clearwing moth (*Synanthemon myopaeformisi*), oriental fruit moth (*Grapholita molesta*), plum fruit moth (*Grapholita funebrana*), and oak processionary moth (*Thaumetopoea processionea*) are controlled using this nematode. The nematodes carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. It only takes 2-3 nematodes to kill the host, the insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host.

Predator Name	50 million	250 million	500 million
Bio SF	6606740	6606735	6606730

### *Trichogramma sp.*



*Trichogramma* are parasitic wasps that lay their eggs in the eggs of *Lepidopteran* species. They can be used in a wide variety of crops, and since they prevent the emergence of caterpillars, they provide the maximum efficiency for damage prevention. Tricho-gard is used to target pests of cruciferous crops such as Leek moth (*Acrolepiopsis assectella*), Cabbage moth (*Plutella xylostella*), Cabbage looper (*Trichoplusia ni*) and Cabbage white (*Artogeia rapae*). Tricho-fruit is for fruit trees, and targets Codling moth (*Cydia pomonella*), obliquebanded leafroller (*Choristoneura roseceana*), Leafroller (*Platynota sp.*) and other *Lepidopteran*s. Tricho-mix is a mix of 3 species that are used for unidentified caterpillars in vegetable, ornamental, herbs, and cannabis crops.

Predator Name	SKU	Quantity per package
Bio Tricho-gard	6606800	Card of 4000 pupae
Bio Tricho-fruit	pls inquire	Card of 8000 pupae
Bio Tricho-mix	pls inquire	Card of 4000 pupae

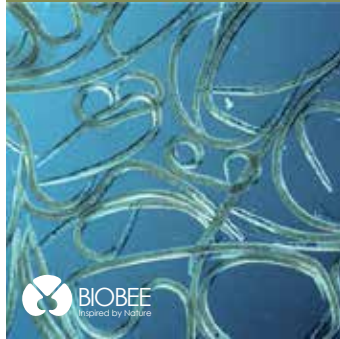


## WEEVILS & BEETLES

The larval stage of both weevils and beetles are known as grubs. These grubs can cause extensive damage to crops and turf directly through root feeding damage, or indirectly by being an attractive food source for birds and animals that will tear up the lawn to reach them. In some cases, the adults will also feed on plants. The most common beetle grubs are those of the European chafer beetle (*Rhizotrogus majalis*), Japanese beetle (*Popilla japonica*), the May-June beetle (*Phyllophaga fusca*), and the black turfgrass ataenius (*Ataenius spretulus*). Common weevil grubs include black vine weevil (*Otiorhynchus salcatus*), cranberry root weevil (*Anthonmus musculus*), and strawberry root weevil (*Otiorhynchus ovatus*). The best biological control option for all these species is to use nematodes.



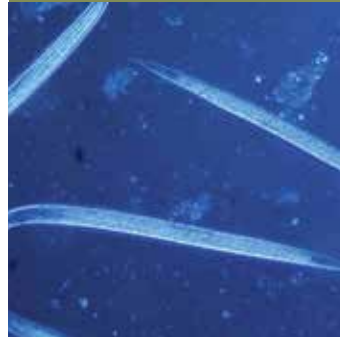
### *Heterorhabditis bacteriophora*



These nematodes can be used to control black vine weevil larvae (*Otiorhynchus salcatus*), and cranberry root weevil adults (*Anthonmus musculus*), as well as several varieties of chafer beetle (European, garden, welsh, and summer). They carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. The insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host. It only takes 2-3 infective juveniles to kill the insect, and if conditions are favourable, they will persist in the soil and continue to control the pest throughout the season.

Predator Name	50 million	250 million	500 million
Bio HB	6605014	6605013	6605012

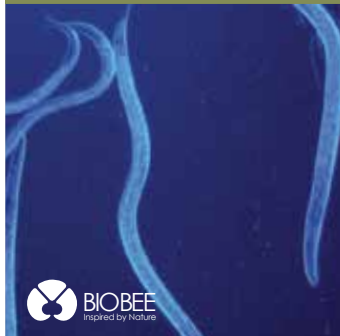
### *Steinernema carpocapsae*



These nematodes can be used to control the red palm weevil (*Rhynchophorus fer rugineus*), and the adult black vine weevil (*Otiorhynchus salcatus*). They carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. The insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host. It only takes 2-3 infective juveniles to kill the insect, and if conditions are favourable, they will persist in the soil and continue to control the pest throughout the season.

Predator Name	50 million	250 million	500 million
Bio SC	6606585	6606590	6606595

### *Steinernema feltiae*



These nematodes can be used to control the asparagus beetle (*Crioceris spp.*). They carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. The insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host. It only takes 2-3 infective juveniles to kill the insect, and if conditions are favourable, they will persist in the soil and continue to control the pest throughout the season. They are also used in combination with another nematode species to control the strawberry root weevil (*Otiorhynchus ovatus*), and *Melolontha* chafer.

Predator Name	50 million	250 million	500 million
Bio SF	6606740	6606735	6606730

## LEAFMINERS

Leafminer flies (*Liriomyza spp.*) can cause extensive damage to plant leaves, decreasing photosynthetic area, plant vigour and yield, and reducing the aesthetic appeal. The larvae feed on the inside of the leaf, creating the characteristic “mines”, and adult females pierce the plant during feeding.



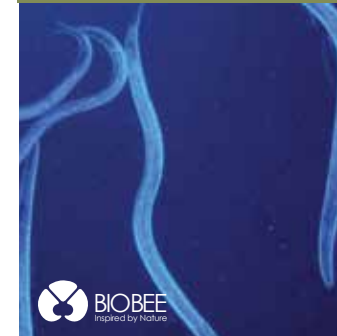
### *Diglyphus isaea*



*Diglyphus isaea* is parasitic wasp that controls leafminers (*Liriomyza spp.*) in many crops. Female wasps can lay over 60 fertile eggs in their lifetime. The adult female wasp sucks the liquids from its prey, killing them and using the protein for her egg development. She will paralyze leafminers and lay her eggs nearby, and when the eggs hatch the young larvae feed on them as well.

Predator Name	SKU	Quantity per package
Bio Diglyphus	6604621	Container of 500 wasps

### *Steinernema feltiae*



*Steinernema feltiae* is a species of insect-pathogenic nematode used to control leafminers, fungus gnats, shore flies, and thrips. The nematodes carry symbiotic bacteria, which is harmless to humans, and once they enter their host the bacteria quickly kill the insect allowing the nematodes to feed and reproduce in their new habitat. It only takes 2-3 nematodes to kill the host, the insect dies within three days, and 2-3 weeks later up to 300,000 new nematodes may emerge from one infested host.

Predator Name	50 million	250 million	500 million
Bio SF	6606740	6606735	6606730



## MEALYBUGS

Mealybugs have waxy threads on their body that protect them from pesticides, making them very difficult to control chemically. Common species include the citrus mealybug (*Planococcus citri*), the grape mealybug (*Pseudococcus maritimus*), the vine mealybug (*Planococcus ficus*) and the cypress mealybug (*Planococcus vovae*). In addition to feeding damage, they also excrete honeydew, which fouls leaves and fruit, decreasing marketable yield and encouraging fungal growth.



### *Cryptolaemus montrouzieri*



Commonly known as the Mealybug Destroyer, *Cryptolaemus montrouzieri* beetles predate many species of mealybug, including citrus mealybugs (*Planococcus citri*), long-tailed mealybugs (*Pseudococcus longispinus*), and pink hibiscus mealybugs (*Maconellicoccus hirsute*). They will also attack several species of soft scales, including hemispherical scale (*Saissetia coffeae*) and its relatives. Additional prey includes members of the following insect families: Aleyrodidae, Aphididae, Coccoidea, Psyllidae, Noctuidae, etc. Both adults and larvae predate mealybugs, and the larval stage bears a strong resemblance to their target. Adults are more mobile, so are most effective in preventative application or tall crops, while larvae are better for hot spot treatment.

Predator Name	SKU	Quantity per package
Bio Cryptolaemus	6604020	Container of 500 adults

## BARN & HOUSE FLIES

The housefly (*Musca domestica*) is the most common fly species found in houses and barns. One female fly can lay upwards of 900 eggs in a month. If you have 1000 flies laying 900 eggs, you'll have close to a million flies within a month, and it keeps going! Several studies have shown negative economic impacts on agricultural operations including lower meat, milk and egg production that are directly attributed to fly related stress on the livestock. As well, biting flies can transmit blood borne diseases and pathogens.



### Parasitic Wasps



Fly parasitoids act as effective biological control agents of many of these species by killing the fly before it can emerge as an adult. One type of fly parasitoid wasps associated with livestock production commonly found in North America belong to the genera *Muscidifurax*. The genus *Muscidifurax* is represented by three species: *Muscidifurax zaraptor*, *Muscidifurax raptorellus*, and *Spalangia cameroni*.

Predator Name	SKU	Quantity per package
Fly Parasites	6604810	Package of 7,500 parasitized pupae
	6604820	Package of 15,000 parasitized pupae
	6604860	Package of 25,000 parasitized pupae
	6604870	Package of 100,000 parasitized pupae
	6604880	Package of 250,000 parasitized pupae

## Looking for certified organic crop inputs?

Under the BioFert brand, TerraLink's offers a full range of crop nutrition products that are suitable for certified organic crops. Our BioFert manufacturing facility in Chilliwack produces a full range of liquid and granular fertilizers and amendments that are subject to the same stringent quality control processes than our conventional TerraLink products. TerraLink also carries a wide range of certified organic crop protection products. For more information, please request a copy of our Organic Product Listing, or visit our organic website at [www.biofert.ca](http://www.biofert.ca).



**OTHER ITEMS**

**Predatory Insect Food**



*Artemia* cysts are a supplementary food source that help with the establishment of biocontrol agents in the crop. Research shows they are especially helpful in supporting *A. swirskii*, *N. cucumeris*, and *Orius*, and that they maintain their integrity longer than *Ephestia* eggs or pollen under greenhouse conditions. The addition of a readily available food source helps beneficial insect populations establish more quickly and successfully. Bio ArtFeed has a shelf life of at least 3 years in the fridge, and can tolerate being taken in and out of cold storage. It remains viable for up to 10 weeks after application. Due to the hygroscopic nature of the product, it holds well to the plant surface and there is little risk of it being washed off by irrigation.

Predator Name	SKU	Quantity per package
Artemia Feed	6603011	1 kg bag of Artemia feed
	6603009	200 g shaker of Artemia feed
	6603013	100 m roll of Artemia feed tape

**Distribution**

Product Name	SKU	Quantity per package
Distribution boxes (D-Boxes)	6603008	Box of 25 D-Boxes
Distribution boxes (Dibox)	6603005	Case of 400 D-Boxes

**Lures**

Product Name	SKU	Quantity per package
Thripnok lure (thrips)	6600255	1

**Flying Pests**



Sticky trap rolls are used for mass trapping of flying pests, while sticky cards are used for monitoring or small scale trapping. Yellow is attractive to many insects, while blue is used to target thrips. White cards are attractive to blueberry midges and brown marmorated stink bugs, and red sticky cards attract pests that are drawn to ripe fruit, such as Spotted wing drosophila.

Predator Name	SKU	Quantity per package
Yellow Sticky Cards - Impact (10 x 25 cm)	6600220	10 yellow sticky cards - wet glue
Yellow Sticky Cards - Impact (10 x 25 cm)	6600221	1 case of 1000 yellow sticky cards - wet glue
Yellow Sticky Cards - Impact (20 x 25 cm)	6600222	10 yellow sticky cards - wet glue
Blue Sticky Cards - Impact (10 x 25 cm)	6600230	10 blue sticky cards - wet glue
White Sticky Cards - Impact (10 x 25 cm)	6600240	10 white sticky cards - wet glue
Red Sticky Cards - Impact (10 x 25 cm)	6600250	10 red sticky cards - wet glue
Optiroll Yellow (30 cm x 100 m)	6600300	1 yellow sticky trap roll



## **How to order Biological Controls (Beneficials) from TerraLink:**

TerraLink orders beneficials every Tuesday morning for delivery the following week. Order cut-off time is 4:30 pm Monday.

Fly parasite orders are placed every other Thursday for delivery the following Wednesday.

**Submit your order to the TerraLink order desk (sales@tlhort.com or 1-800-661-4559).**

For assistance on how to choose the solutions right for you, please contact Rachel Hagel, our IPM specialist (rachel.hagel@tlhort.com).

### **TerraLink Horticulture Inc.**

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Abbotsford, BC, V2S 7M1  
Toll Free: 1-800-661-4559  
Phone: 604-864-9044  
Fax: 604-864-8418  
[www.tlhort.com](http://www.tlhort.com)

Updated May 24, 2022

*Rooted in your community.*

**TerraLink**