



Organic Insect Controls in the Home Vegetable Garden

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Organic Products and Predators

Product [†]	Insects Controlled	Remarks
Azadirachtin	Beetles, Aphids, Caterpillars, Others	Various Trade names
<i>Bacillus thuringiensis</i>	Most caterpillars, loopers, hornworms, bagworms	This product, also known as <i>Bt</i> , is sold under many trade names.
<i>Beauveria bassiana</i>	Beetles, Aphids, Others	Various Trade names
Foil, M-One, M-Track, Novodor	Colorado potato beetle	Two strains of <i>Bt</i> will control potato beetles: <i>Bacillus thuringiensis</i> ssp. <i>san diego</i> is genetically engineered and therefore is not allowed in certified organic production. On the other hand, <i>B. thuringiensis</i> ssp. <i>tenebrionis</i> , a form of <i>Bt</i> that is not genetically engineered, can be used by organic producers.
Hot Pepper Wax	Aphids, mites, thrips	See label for precautions.
Insecticidal soap	Works well on soft bodied insects, in particular aphids, mites, mealybugs	This product is sold under many trade names and is a fatty acid soap.
Kaolin clay	Beetles, Aphids, Caterpillars, Others	Various Trade names
Neem	Broad spectrum	See label for precautions.
Pyrethrin	Broad spectrum; works on a wide variety of insects	Usually sold mixed with other botanical insecticides such as rotenone.
Pyrethrum/Diatomaceous Earth	Whiteflies, fireants	See label for precautions.
Spinosad	Caterpillars, beetles	See label for precautions.

[†] Botanical insecticides are derived from various plant parts and are commonly used in organic control situations. It is important to read the label and follow all precautions regarding protective clothing, mixing, and labeled plants. Just because they are derived from plants doesn't mean that safety can be disregarded. Biological control is in two major forms. Microbial, which is a formulation containing a microorganism such as *Bacillus thuringiensis*, or the other form, which involves the release of predatory insects or mites, such as lady beetles. Use caution with insecticides when a release of predators is planned.

Working with Beneficial Insects and Mites

Many species of beneficial insects and mites can be purchased although many occur naturally. Beneficial insects are target specific, and require gardener knowledge of existing pests. Timing of release is an important factor, and if pests are not present, neighboring gardens may benefit more than your garden. In general, these insects have specific requirements for long-term survival, and may need to be released anew each season.

Assassin bug - Reduviidae - The assassin bug feeds mainly on aphids, caterpillars, Colorado potato beetles, Japanese beetles, leafhoppers, and Mexican bean beetles. Naturally occurring also.

Bean Beetle Parasite (*Pediobius foveolatus*) for Mexican bean Beetle. These wasps are shipped to you inside their host—Mexican bean beetle larvae. Once the adults emerge, the females deposit their eggs in the larvae of the Mexican bean beetle. Release rate: timing is critical; release one unit (6 mummies/unit, 20-25 wasps/mummy=120-150 wasps/unit) for every 400 sq ft of beans or 100 units/A when the bean beetle larvae are present. These wasps do not overwinter. See: <https://pubs.ext.vt.edu/ENTO/ENTO-170/ENTO-170-PDF.pdf>

Damsel bug - Nabidae - The damsel bug feeds on aphids, leafhoppers, mites, and caterpillars.

Big-eyed bug - Gocoridae - Big-eyed bugs feed on aphids, caterpillar eggs and larvae, immature bugs, leafhoppers, and spider mites.

Predacious stink bug - Pentatomidae - Predacious stink bugs feed on Colorado potato beetles and various caterpillar larvae. Most commonly sold is the Spined Soldier Bug but it occurs naturally as well.

Syrphid fly larvae - *Syrphidae* - Fly larvae of this species feed on aphids and mealybugs.

Lady beetles - *Hippodamia convergens* - Naturally occurring lady beetles feeds mainly on aphids and other soft-bodied insects, such as mealybugs and spider mites. *Hippodamia convergens* is commonly sold for use in gardens but is not recommended because they leave the garden area soon after release.

Green lacewing larvae - *Chrysoperla* sp. - Lacewing larvae, known as aphid lions, feed on insect eggs, aphids, spider mites, thrips, leafhopper nymphs, and small caterpillar larvae. Adult lacewings are not predacious.

Predatory mites - *Phytoseiulus persimilis* and several other species feed on many mite pests, including the two-spotted spider mite. Release at the rate of 2/square foot.

Predatory Nematodes: For wood boring and ground dwelling insects. These nematods will see host insects and not harm plants or humans.

Trichogramma wasp - *Trichogrammatidae* - This tiny wasp attacks eggs of more than 200 pest species, including cutworms, corn borers, corn earworms, armyworms, codling moths, and cabbage moths. Release time is critical for their effectiveness since they only attack pest eggs.

Encarsia wasp - *Encyrtidae* - The greenhouse whitefly is parasitized by this wasp in third and fourth larval instars when Encarsia lay their eggs inside the whitefly pupa.

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