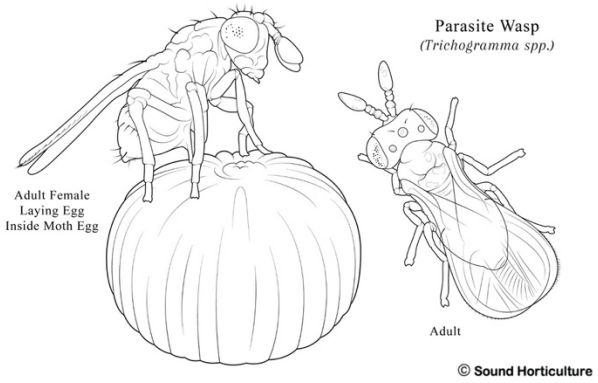
Trichogramma spp.

Moth Egg Parasite

DESCRIPTION:

Trichogramma is a minute parasitic wasp that attacks the eggs of over 150 species of moths, including cabbage looper, codling moth, oriental fruit moth, twig borers and fruitworms.

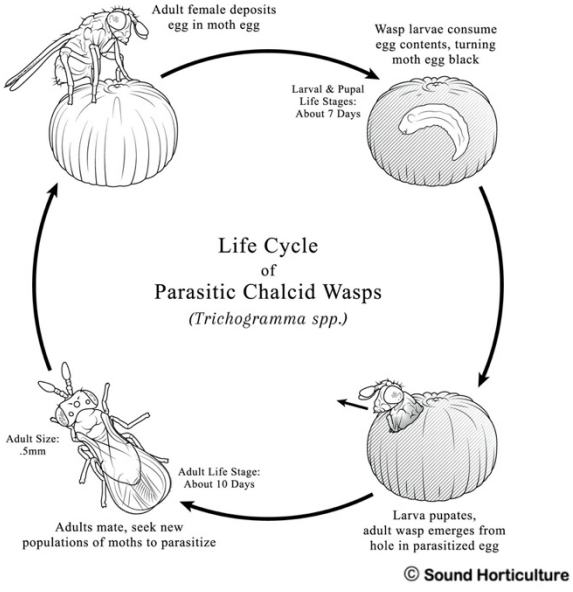
Adults are less than 1/25 inch (1 mm) long. Larvae develop entirely inside the eggs of moths, which darken when they are parasitized.



TARGET PEST:

Several species of moths.

Trichogramma spp.



LIFE CYCLE:

A complete life cycle takes 14 days at 70°F (21°C). Sex ratio in the population is about equal (50% females). Mated females lay 60-70 eggs in moth eggs over a period of 1-2 weeks. Most *Trichogramma* eggs are laid within 1-2 days of mating. Larvae take 10 days to develop within the moth egg, which turns brown or black as the larvae pupate. Adults begin to emerge within 2-3 days at 68-81ºF (20-27ºC) and over 60% relative humidity. They chew a small hole in the moth egg to emerge. Males emerge slightly earlier and await female emergence for mating. Adults can feed on nectar, honeydew, and pollen.

Total life span may be 7-75 days depending upon temperature, relative humidity and species of moth parasitized. There may be 30 or more generations per season.

USE IN BIOLOGICAL CONTROL:

Several different species of *Trichogramma* are used in North American crops. For greenhouse crops use *T. pretiosum;* in orchards and field crops use *T. minutum* in the east and *T. platneri* in the west. New species such as *T. sibericum* are being used in greenhouse trials.

Optimum conditions are moderate temperatures of 68-81ºF (20-27ºC) and relative humidity 60%. Moth species that lay eggs in clusters are more easily controlled using *Trichogramma* than those that lay eggs singly.

For more information, Please contact ***Sound Horticulture***
info@soundhorticulture.com 360.656.6680 www.soundhorticulture.com

PRODUCT INFORMATION:

Trichogramma is shipped as parasitized moth eggs fixed to cardboard sheets. Each sheet holds about 125,000 *Trichogramma*. The sheets are perforated into 30 small squares, each with 4,000-5,000 *Trichogramma*. Carefully tear the sheets along the perforations and either distribute them immediately throughout the crop or hold them in containers with food until the adults begin to emerge (described below).

Incubation Method

This method significantly improves the rates of emergence, and provides an area for the *Trichogramma* to mate before release.

- Enclose each square of cardboard in a small vial or paper cup along with a small piece of cotton moistened with dilute honey or fruit juice.
- Hold for 2-10 days at 76-78ºF (24-25ºC) and when the *Trichogramma* begin to emerge, place the vials throughout the crop.

Parasitized eggs may be held for short periods at 50-60ºF (10-15ºC) if necessary to delay their emergence.

INTRODUCTION RATES:

General Introduction Rates

2 *Trichogramma*/ft^2, (22/m^2) weekly, until caterpillar populations are controlled; or 22,000 wasps per 10,000 ft^2 (1000 m^2) per week.

Use in Greenhouses

Introduction rates for greenhouses should be considered experimental.

In greenhouse tomatoes, monthly releases of 350,000-380,000 *Trichogramma*/acre (875,000-950,000 *Trichogramma*/hectare) gave 80% control of cabbage loopers after three months.

All release should be made weekly at the first sign of moths, ensuring the *Trichogramma* are distributed evenly throughout the greenhouses. Continue regular weekly releases for at least 4 weeks or until control is achieved.

- Greenhouse tomatoes – 2 *Trichogramma*/ft^2, (22/m^2) weekly
- Greenhouse sweet peppers — 1-10 *Trichogramma*/10 ft^2 (m^2), weekly

Use in Outdoor Crops

Regularly releasing *Trichogramma* ensures that mated females are always present to attack moth eggs. Releases should start as soon as moths are first detected (either seen flying or trapped in pheromone lure traps).

- Field crops – 100,000-300,000/acre (250,000-750,000/hectare) over three weeks or evenly spread out over the egg-laying period of the target pest
- Codling moth in orchards – 50,000-100,000/acre (125,000-250,000/hectare) spread over three weeks, as soon as moths are detected in traps
- Home gardens – 12,000/week for each of 3 weeks.

In orchards, place some *Trichogramma* at the base of each infested tree. Releasing a percentage of the *Trichogramma* upwind may encourage their natural spread through the orchard.

Trichogramma can be released in large numbers using an aircraft fitted with special Venturi tubes. Release in early morning or late afternoon, particularly where the plant canopy does not cover the ground.

USING CHEMICALS:

Because *Trichogramma* are weak flyers, they must be well distributed throughout the crop. Use *Bacillus thuringiensis (*i.e., Dipel®, Javelin WG®, and XenTari DF®*)* to control caterpillars until *Trichogramma* is well established.

Pesticide compatibility has not been evaluated for *Trichogramma*. It is likely that the same recommendations would apply as for *Encarsia formosa,* in which case *Trichogramma* would be extremely sensitive to insecticide residues. Plastic covering or flooring used in greenhouses may harbor residues at levels that are harmful to this parasite for over 6 months. For effects of pesticides on *Trichogramma*, contact Sound Horticulture for information.

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