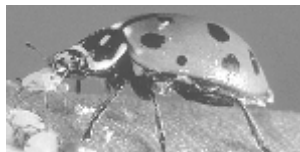


## LADYBUGS

*Hippodamia convergens*

This package contains a minimum of 1,000 ladybugs.



Ladybugs are probably the most universally known beneficial insect. They are found nearly everywhere and are regarded by many gardeners and farmers as a sign of general well being in the insect complex. They are usually most successful at aphid control, but also eat mites, scales, mealybugs and a whole host of other soft-bodied insects. Ladybugs hibernate in the Winter months and also tend to go inactive during the hottest parts of the Summer. They are heavy feeders during the Spring and Fall which coincides with the times of highest aphid populations.

### RELEASE

1. When Ladybugs arrive put the sack in a cool place (refrigerator) until late evening or early morning.
2. Do not release the Ladybugs during the heat of the day or while the sun is shining.
3. Ladybugs should be released when plants have some foliage, which will provide coverage, and some pest insects are present, which will provide food.
4. In order to achieve biological control of insects try to maintain a balance of a few pests for food and enough Ladybugs to keep them in check, being careful not to release too many Ladybugs at one time.
5. Sprinkle or irrigate the area before releasing the Ladybugs so they will have a drink of water after their journey. They can also be watered by sprinkling the sack with water. **DONOTPUTWETBAGSINTOREFRIGERATOR.**
6. Ladybugs should be released a few at a time twice a week during the season when leaves are young, tender and attractive to pest insects.
7. Apply 1 tablespoon on each shrub and a handful on each tree to keep them free from pest damage.
8. For heavy infestation, release all the Ladybugs in the bag at on time.

### STORAGE

Ladybugs may be stored in your refrigerator for up to two weeks. **DO NOT FREEZE.** After application, retie the bag and place in refrigerator until all Ladybugs are used.

### A LITTLE HINT TO KEEP THEM AROUND

Use a 50/50 mixture of Water & Soda (Coke). Put it in a standard spray bottle and spritz the Ladybugs. This will stick their wings together temporarily. This will help them to stay in your garden or greenhouse longer. You can repeat this application every three days.

## AMBLYSEIUS CUCUMERIS



These predators are pear-shaped, pale tan and active mites. They are noticeably smaller and flattened compared to *Phytoseiulus*. They lay smaller eggs which are white whereas the eggs of spider mite predators are tinted with brown. A major advantage of *Amblyseius* is that, unlike *Phytoseiulus*, it can survive the absence of its prey by taking other food, such as spider mite nymphs or pollen. Although the numbers of predators declines after control has been achieved, the proportion of leaves on which *Amblyseius* can be found remains high for some weeks.

### STORAGE

*Amblyseius* should be released as soon as possible. However, if you must store them for a day or two before release, they should NOT be refrigerated. Instead, store them in a cool area at 60° – 70° F.

### RELEASE

*Amblyseius* prefer fairly high relative humidity levels. They should be released at the rate of at least 1 predator per square foot, two weeks after transplanting. Repeat applications every month during periods of warm, dry weather.

The bran material contains eggs, nymphs and adult *Amblyseius*. Sprinkle approximately ¼ teaspoon of the bran material on the top foliage of your plants throughout the area of suspected thrips infestation. The *Amblyseius* will begin searching for thrips eggs and nymphs.

If you have received “sachets”, tear the left corner off the top of the sachet, this will create an exit hole. Hang the sachet in your plants. The *Amblyseius* will continue to exit the “sachet” during the next few weeks.

Other Thrips controls include:

Yellow or Blue Sticky Cards

Beneficial Nematodes

Orius (Minute Pirate Bug)

# PRAYING MANTIS EGGS

*(Tenodera sinensis)*



Praying mantis are beautiful insects with a voracious appetite, and a delight to have in the garden. Being strictly carnivorous, they'll eat almost any insect of a size they can overcome. Waiting in quiet ambush for hours at a time, when an insect comes wandering by they suddenly jump out and attack – always biting the neck first. At rest, they seem to be “praying”, holding their “hands” together.

Each praying mantis egg case will hatch about 100-200 tiny mantises, all at once. In order to hatch they'll need several weeks of warm weather, so they can “sense” that summer (and pest insects for food) has arrived. Attach the egg case to a twig or plant about a foot or two off the ground where there's cover to protect the babies. When hatching, the young crawl from between tiny flaps in the cases and hang from silken threads about 2" below the case. After drying out, the long-legged young disperse into the vegetation leaving no evidence of their appearance. This happens within an hour or two, and it's very difficult to know hatching has occurred unless the elusive, well camouflaged young are found. (The egg case does not change appearance in any way). If you'd like to see when the mantis have hatched, place the egg cases in a paper bag, fold the top and seal shut with a paperclip or clothes pin. Place the bag on a window sill in direct sunlight. Periodically open the bag carefully and when you see tiny mantids running around inside, take them outside and sprinkle them throughout the area. Be patient, sometimes it takes up to eight weeks of warm weather for them to hatch.

Once hatched, praying mantis begin feeding on small insects, such as aphids. Later on, they'll continue advancing up to larger and larger prey. By summer's end, praying mantis can reach several inches in length. In the fall, females produce more eggs, deposited in a frothy secretion that hardens to protect the eggs from predators and severe winter climates. Egg cases may be laid before cold winter finally sets in. This new generation of praying mantis will hatch when warm weather returns, to repeat the process.

# LACEWING EGGS

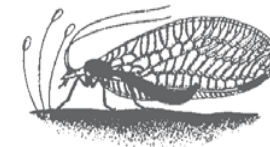
*Chrysoperla carnea*



Lacewing larvae are very active and look like flat alligators, but with large, piercing, laterally opposed tusks. These hollow tusks, or mandibles, are used to pierce prey and suck out body fluids. Lacewing larvae feed on aphids, scales, mealybugs, psyllids, whitefly larvae, mites, small caterpillars and more. Lacewing larvae are cannibalistic and should be separated when hatching begins.

Lacewing pupa is white and shaped like a small pearl. The strands of silk in the pupa are visible to the naked eye. After pupating for approximately two weeks, depending on temperature, the adults emerge and look for mates.

Lacewing adults feed only on pollen and honeydew. Beneficial Insect Food may be necessary to get the adults to reproduce. Eggs are laid on silky stalks to protect the eggs from being eaten by other larvae.



## RELEASE

1. Store at room temperature (70° - 80° F.) until some hatching is observed, usually 1 - 4 days. Newly hatched Lacewing larvae are very small, no bigger than their egg.
2. Distribute throughout the area of plant pests. The eggs should be placed on leaves within the plant canopy where they are shaded from direct sun and protected from overhead water for a few days.

Lacewing larvae are somewhat nocturnal. They prefer to feed for a while, then go find a place to hide and rest. You may find them resting in the curl of a leaf or in the foliage at the bottom of your plants.

# SPIDERMITE PREDATOR

*Phytoseiulus persimilis*



## Contents:

Proper name: *Phytoseiulus persimilis*  
Common name: Predator mite  
Minimum contents: Listed on the bottle  
Packed in vermiculite: no prey included.  
Size & appearance of adult females: red color, approx 0.5 mm long  
Immatures & males are smaller and lighter in color. Eggs are oblong.  
Predators should be active at room temperature.

## Instructions for use:

Release immediately upon arrival by gently sprinkling onto dry foliage. Rotate bottles slowly to mix predators while sprinkling onto crop.

## Storage:

Bottles may be refrigerated for up to one day at 40°F (6°C). Bottles should be stored horizontally.

## Accepted Uses:

*P. persimilis* feeds voraciously on Two-spotted mites & other spidermites (red spider) in the family *Tetranychidae*. Predators must have spidermites to survive & will not feed on pollen or plants. They are not cannibalistic. Best adapted to greenhouse, shadehouse & moderate outdoor environments.

## Rates of Use:

Release rates are dependant on crop, pest levels, and desired speed of control. Releases should be made when pest levels are low. A typical value of 1 predator per sq/ft (10 per sq/m). It is not unusual to wait 6-8 weeks for complete control. In nursery & greenhouse crops, predators are often released every 2-4 weeks.

## Biology: (typical values @ 68-77°F)

sex ratio: 4 females/male  
average eggs laid per day: 2.4  
lifespan: 30-36 days - days from egg to adult: 7.5  
average eggs per female: 54  
population increase = 44 x in generation time of 17 days  
prey consumed per day: 7 adults, 20 immatures or 25 eggs.

# WHITEFLY PARASITES

*(Encarsia formosa)*



1. Open package in area where parasites are to be released as flying adults may be present.
2. Handle parasite cards by the edges to avoid squashing the black parasite pupae.
3. Each black pupae contains a parasite. Hang the strips or individual cards in shaded locations so they are evenly distributed throughout the infested plants. Parasites will emerge from the black pupae over a period of 2 - 7 days and fly to search out whitefly larvae.
4. These parasites will only go after whitefly and are harmless to plants or people. Each female *Encarsia* is capable of laying 50 - 100 eggs into whitefly larvae.
5. Control will be shown by a reduction of whitefly and 15 - 20% of the whitefly larvae turning black within 2 weeks and should be self sustaining once established.
6. Subsequent releases, weekly or bi-weekly, are suggested until control is achieved.
7. The best results are obtained when the following conditions are met:
  - \* temperatures are between 70° - 90°F (21° - 32°C).
  - \* relative humidity is between 50% - 80%.
  - \* parasites are applied at the first sign of whitefly. Use **yellow sticky traps** for monitoring whitefly adults as soon as crop is seeded. (Each adult whitefly caught on a trap may prevent 100 eggs from being laid on your plants). *Encarsia* are NOT attracted to the color yellow.
  - \* not less than one parasite is released per every 2 plants. Introductions should be made for 4 - 10 weeks or until 80% of whitefly larvae are black
8. Do not throw away pruned leaves without checking them for black parasite pupae. Leave these under the plant for a week or so until they have emerged. The small emergence hole can be seen if the leaf is held up to the light.
9. Do not use Diazinon (even as a drench), Ambush, Parathion, or any systemics as these remain toxic to parasites for up to 4 weeks. M-Pede or Safer's Insecticidal Soaps have been shown to be a very effective whitefly insecticide, with low toxicity to *Encarsia* when used in accordance with directions.
10. If you are unfamiliar with *Encarsia*, it is recommended that you place 1 card containing the black parasite pupae in a jar. Cover the mouth of the jar with a cloth. This will allow air to get into the jar, but will prevent the escape of the adult *Encarsia*. Place the jar in a shaded area, where the temperature can be properly maintained. Inspect the jar every day. You will soon see the adult *Encarsia* emerging. They are very tiny. Once you have studied the size and appearance of the adult *Encarsia*, the jar should be opened in the area of infested plants and the card can be placed within a shaded area of your crop. If you do not see any emergence within 10 days, contact your supplier.