

INSTRUCTIONS FOR RELEASE OF WHITEFLY PARASITES (*Encarsia formosa Nile Delta*)

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.

Whitefly

(*Trialeurodes vaporariorum* / *Bemisia agentifolii* / *Bemisia tabaci* Bio-B)

There are numerous different plant species known to be host plants for whitefly. Among the greenhouse host plants are cucumber, egg plant, tomatoes and many ornamentals. Examples of the latter would be Azalea, Calceolaria, Fuchsia, poinsettia and Verbena.

The Whitefly females lay their eggs on the undersides of young apical leaves, often in circles on hairless hosts. At 70° - 75°F., the eggs hatch after 8 days. The newly hatched larvae ('crawlers' - 1st instar) move for a few hours and then settle. After inserting their mouthparts into leaf tissue, they lose their functional legs and remain static throughout the remainder of their development. After the third moult, the larvae become flattened and then begin to thicken. As the pupa develops, the red eyes of the developing adult become visible.

The adults emerge through a slit in the dorsum of the pupa. The females begin laying eggs 1 - 2 days after emergence. Unmated females lay haploid eggs which produce males. Mated females produce both diploid (female producing) eggs and haploid eggs.

Duration of life cycle of Whitefly and *Encarsia formosa* (Nile Delta) from egg to adult (in days) at different temperatures:

Species	64°F	70°F	75°F
Whitefly	37-42	25-30	22-25
<i>E.formosa</i> (ND)	29-39	25-35	16-24

The parasite *Encarsia formosa* Nile Delta (EFND) is attracted to its host by a volatile compound emanating from the Whitefly honeydew which can be detected over several feet. It usually lands to search for hosts only on whitefly infested plants and seldom on uninfested plants. The adult feeds on whitefly honeydew that the whitefly larvae will naturally excrete.

EFND can distinguish between unparasitized and parasitized hosts, the latter being avoided for oviposition (egg laying) unless parasite density is high. Oviposition can only take place in the latter stages of larval development where their eggs will be provided an adequate food supply for complete development.

Very little difference occurs in egg laying by the female EFND at temperatures between 70°F. and 90°F. The average female will parasitize (lay eggs) into 50 - 100 Whitefly larvae. The best egg laying occurs between these temperatures, with relative humidity levels between 50% - 80% and when light levels are adequate.

The duration of the EFND life cycle depends on the temperature. When half the development of the EFND is completed within the Whitefly larvae, the Whitefly larvae turns black (like the tiny black dots on these cards). The next generation of EF finally emerges through a hole in the dorsum of the 'black pupae'.

