NON-TOXIC CONTROL OF WHITEFLIES ON VEGETABLES

By Philip A. Stansly

Whitefly Menace

Soon after its detection in 1986 on poinsettia in west-central Florida greenhouses, "silvery" whitefly became the tomato pest throughout the southern part of the state.

Formally known as sweetpotato whitefly, the new name refers to a silvery response of squash and pumpkin leaves to salivary toxins injected through the sucking mouthparts of the scale-like immatures (nymphs). Silvery whitefly attacks many broad-leaf vegetables (tomato, eggplant, cucumber, cole crops), ornamentals (poinsettia, hibiscus, salvia, Gerber daisy) and agronomic crops (cotton, soybean, peanut). High populations may debilitate plants through sap depletion and sun-screening by sooty mold growing on whitefly honeydew. Moderate populations may cause plant disorders which in addition to squash silverleaf include stem blanching of cole crops and irregular ripening of tomato. Even low populations may be damaging if whitefly-borne plant viruses are present such as tomato yellow leaf curl virus, recently introduced from the Middle East into the Caribbean, tomato mosaic geminivirus (TMoV), indigenous to Florida, squash leaf curl virus seen in the southwest and Mexico, and many others.

Losses and control costs in Florida tomato for whitefly and TMoV combined were estimated at $125 million for the 1990-91 season.

Natural enemies

Although commercial vegetable growers rely primarily on insecticides to control whitefly, biological control may be the unsung hero in their management programs. When fields are cleaned up after spring harvest, whiteflies are forced to make due on weed hosts to survive the summer fallow period. Outside a protective chemical blanket, whiteflies fall easy prey to lacewing larvae, small black ladybugs, tiny parasitic wasps, spiders, and a host of other beneficial predators.

Add the effects of insect-killing molds, driving rains, and poor host plant quality and the result is few survivors to infest the fall crop. The longer the crop-free period the fewer survivors, so growers are urged to clean up fields early and maintain them free of volunteer plants that could serve as sources of whiteflies and virus inoculum during the crop-free period.

Biological Control

So biological control works in weeds, but what about in the crop itself? We followed pest and beneficial insect populations in a 2-year study at an organic vegetable farm in southwest Florida where no synthetic pesticides were used. Although damaging levels of some pests such as spider mites, pepper weevils, and potato aphids were occasionally seen, damaging levels of whitefly or TMoV were not. A pulse of whiteflies migrated into the crop in early fall but later declined, seemingly in response to beneficial insects, especially parasitic

1. Larva of the tiny ladybug, Nephapis oculatus has a voracious appetite, especially for whitefly eggs, but is susceptible to insecticidal soap.
2. Inside this whitefly shell is the pupa of a tiny parasitic wasp, Encarsia pergandii which will emerge to seek new whitefly hosts.
NON-TOXIC CONTROL OF WHITEFLIES ON VEGETABLES

By Philip A. Stansly

Whitefly Menace

Soon after its detection in 1986 on poinsettia in west-central Florida greenhouses, “silverleaf” whitefly became the tomato pest throughout the southern part of the state.

Formally known as sweetpotato whitefly, the new name refers to a silverying response of squash and pumpkin leaves to salivary toxins injected through the sucking mouthparts of the scale-like immatures (nymphs). Silverleaf whitefly attacks many broad-leaf vegetables (tomato, eggplant, cucurbits, cole crops), ornamentals (poinsettia, hibiscus, salvia, Gerber daisy) and agronomic crops (cotton, soybean, peanut). High populations may debilitate plants through sap depletion and sun-screening by sooty mold growing on whitefly honeydew. Moderate populations may cause plant disorders which in addition to squash silverleaf include stem blanching of cole crops and irregular ripening of tomato. Even low populations may be damaging if whitefly-borne plant viruses are present such as tomato yellow leaf curl virus, recently introduced from the Middle East into the Caribbean, tomato mottle geminivirus (TMoV), indigenous to Florida, squash leaf curl virus seen in the southwest and Mexico, and many others.

Losses and control costs in Florida tomato for whitefly and TMoV combined were estimated at $125 million for the 1990-91 season.

Natural enemies

Although commercial vegetable growers rely primarily on insecticides to control whitefly, biological control may be the unsung hero in their management programs. When fields are cleaned up after spring harvest, whiteflies are forced to make due on weed hosts to survive the summer fallow period. Outside a protective chemical blanket, whiteflies fall easy prey to lacewing larvae, small black ladybugs, tiny parasitic wasps, spiders, and a host of other beneficial predators.

Add the effects of insect-killing molds, driving rains, and poor host plant quality and the result is few survivors to infest the fall crop. The longer the crop-free period the fewer survivors, so growers are urged to clean up fields early and maintain them free of volunteer plants that could serve as sources of whiteflies and virus inoculum during the crop-free period.

Biological Control

So biological control works in weeds, but what about in the crop itself? We followed pest and beneficial insect populations in a 2-year study at an organic vegetable farm in southwest Florida where no synthetic pesticides were used. Although damaging levels of some pests such as spider mites, pepper weevils, and potato aphids were occasionally seen, damaging levels of whitefly or TMoV were not. A pulse of whiteflies migrated into the crop in early fall but later declined, seemingly in response to beneficial insects, especially parasitic

1. Larva of the tiny ladybug, Nephoris sp. oculatus has a voracious appetite, especially for whitefly eggs, but is susceptible to insecticidal soap.

2. Inside this whitefly shell is the pupa of a tiny parasitic wasp, Encarsia pergandrella which will emerge to seek new whitefly hosts.