
Observations of Delphastus pusillus in a Greenhouse Tomato Crop 95-05

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Introduction

The silverleaf whitefly, Bemisia tabaci, has become a serious pest of greenhouse tomatoes in Florida since about 1990. A whitefly predator Delphastus pusillus, a coccinellid beetle, is known to feed on silverleaf whitefly (Hoelmer et. al., 1993 and Hoelmer et. al., 1994). The objective of this study was to determine if Delphastus pusillus could be used as a biological control agent in greenhouse tomatoes.

Tomato (cultivar `Trust') was seeded on August 24, 1994 and transplanted into perlite bags on September 22. The tomato crop was managed as a typical hydroponic tomato crop in terms of irrigation, fertilizer, pruning, pollination, and leaning and lowering. A total of 288 tomato plants were growing in the greenhouse (22 x 60 ft) located at the Suwannee Valley Research and Education Center near Live Oak, FL.

Papaya plants from the Central Florida Research and Education Center near Apopka, FL were introduced into the greenhouse on October 7. A total of 16 single plants in two gallon pots were introduced. The papaya plants were heavily infested with papaya whitefly (Trialeurodes variabilis). The papaya plants also had several beneficial insect populations including: at least two parasitic wasps, Encarsia transvena and a second Encarsia species; a fungus, Paecilomyces fumosoroseus; and the beetle predator, Delphastus pusillus (Osborne et. al., 1991). The papaya plants were used as a bank of beneficial insects for the tomato and papaya pests. The papaya whitefly does not use tomato as a host.

Initially the papaya plants were placed within the rows of tomato plants at the center and on the ends of each row. The papaya whitefly honeydew secretions were significant, and as a result, sooty mold became very common on the tomato plants immediately adjacent to the papaya plants. The sooty mold became so prevalent by mid-November the tomato plants adjacent to the papaya plants were entirely covered with sooty mold. The tomato plants had very low silverleaf whitefly populations at that time so essentially all of the sooty mold was a result of honeydew from the papaya whitefly on the papaya plants. On December 6, the papaya plants were moved from within the tomato rows to the perimeter of the greenhouse area. Plants were placed next

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to the evaporative cooling pad and in each corner of the greenhouse. A total of seven papaya plants were present in this final arrangement. When the papaya plants were moved to the greenhouse perimeter, nine extra plants were taken out of the greenhouse due to lack of space. Prior to the extra plants being taken out of the greenhouse, all Delphastus adults were collected from those plants and released in the tomato crop. Also papaya leaves with high populations of Delphastus immature stages were taken off of the papaya plants and placed at the base of the tomato plants. An estimated 50 papaya leaves were placed in the tomato crop.

During the period of October 7 to December 28 several Delphastus pusillus adults were always present on the papaya plants. A typical Delphastus population on a papaya plant during the month of December was 5-10 adults and 50-100 immatures per papaya plant (5 ft high plants).

Weekly monitoring of pest populations on tomato leaves and yellow sticky cards (3" x 5") was conducted. Delphastus adults were often found on the yellow sticky cards placed 6 ft high, just above the tomato crop canopy. Typically one adult per card per week was found. Weekly inspections of 10 tomato leaflets from the lower plant canopy were made. All pest and beneficial populations were recorded weekly. From October 7 to December 28 there were no Delphastus of any stage ever detected on the tomato leaf samples. On December 28 a drop cloth sampling was conducted in the greenhouse to attempt to detect Delphastus adults. The drop cloth was three feet long and placed under one row of tomato plants in five different locations in the greenhouse. The entire tomato plant canopy was vigorously shaken to disturb any Delphastus adults which would result in the adults falling onto the white drop cloth. There were no Delphastus adults detected at any of the five drop cloth sampling locations. The drop cloth was placed under a papaya plant to verify Delphastus adults would drop onto the cloth when disturbed. A total of 10 adult Delphastus dropped onto the cloth. No immature Delphastus dropped to the cloth even though several were on the papaya plant.

By late December, populations of silverleaf whitefly increased in the tomato crop to severe pest levels. Average counts of silverleaf whitefly immatures on December 28 were 48 per tomato leaflet and 150 adults per yellow sticky card per week. Sufficient food (whitefly) for Delphastus was present in the tomato crop, yet Delphastus was undetected.

On December 29, a floor sweeping was made of one entire walkway within the tomato crop area only. The collected debris from the floor was sorted in search for Delphastus adults. A total of six live and seven dead adults were found in the floor sweeping.

The only pesticide applied to the tomato crop was Dipel 2X on October 4, November 11, and December 9. These applications were targeted at southern armyworm (Prodenia eridania).

In summary, Delphastus pusillus was able to establish a high population on the papaya plants, but was unable to establish a population in the greenhouse tomato crop. Based on this trial, it would appear Delphastus may not be a suitable predator for silverleaf whitefly in greenhouse tomatoes.

Literature Cited

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