Research

Research Project: IPM TECHNOLOGIES FOR SUBTROPICAL INSECT PESTS

Location: Subtropical Insects Research

Title: Effects of freezes on survival of Diaphorina citri

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Technical Abstract: Citrus in Florida is occasionally subjected to freezing temperatures. No information was available on the effect of freezing temperatures on mortality of Asian citrus psyllid (Diaphorina citri) in Florida. Studies were therefore initiated to assess mortality rates of D. citri eggs, nymphs and adults exposed to different freeze events varying in minimum temperature ("1.5 to "5.5°C) and duration (1 to 10 hours), all of which could realistically occur in some areas in Florida. Presented here is a research progress report. Freezes in the range of "2.5 to "5.0°C for up to 5 hours resulted in no more than around 40% mortality of eggs. The greatest percentages of egg mortality occurred at the upper range of the temperatures studied ("4.5 to "5.5°C), but only when the freeze duration exceeded around 7 hours. A single trial has been conducted thus far with nymphs exposed to cold. Less than 30% mortality of fifth instar nymphs occurred following exposure to "2.7°C for up to 10 hours. Working with adults from a psyllid colony maintained in a temperature-regulated greenhouse, freezes of "2.3°C for up to 10 hours killed relatively low percentages of adults while freezes at "5.0°C for 4 hr or longer killed 95 to 100% of adults. For both males and females at "5.4°C, there appeared to be a time window of exposure below which only low percentages of adults died, above which large percentages of adults died within a day, and within which relatively large percentages of adults died but slowly over time (apparently because they stopped feeding). The lower threshold for this time-period of exposure appeared to be just below 3 hr and the upper threshold

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Publications
- Publications

Related National Programs
- Crop Protection & Quarantine (304)

Related Projects
- Pathogen-Vector Relations Between Asian Citrus Pysllid and Liberibacter Asiaticus
- Deployment of Pheromone-Based Mating Disruption in Tree and Fruit Crops
- Efficacy of Seasonal Insecticide Programs for Suppressing Hlb in New Citrus Plantings

just above 4 hr for both males and females. Studies with adults from a psyllid colony maintained outdoors during the winter indicated that adult D. citri may acclimate to cold. In one study, 100% mortality of adults from the indoor colony occurred within four days following a 4 hour exposure to "5.4°C; with respect to the outdoor colony, 5 hours of exposure to this temperature was required for 100 percent mortality. Some freeze events particularly in northern areas of Florida might be severe enough to temporarily eradicate the psyllid, with subsequent repopulation by migrating psyllids. In central and north-central Florida where a moderate to hard freeze lasting 5 hours or longer could occur, population levels of D. citri might be greatly reduced but only for a short period of time, as surviving individuals would likely continue to reproduce.

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