WALNUT HUSK FLY MANAGEMENT

Helmut Riedl, S. A. Hoying, Johannes Joos and J. E. DeTar

Monitoring of adult flies: Numerous trapping experiments were carried out during the past season in Contra Costa, Solano and Napa counties to investigate attraction to chemical as well as visual stimuli, effect of within-tree trap placement on catches, trap maintenance, and the relative efficiency of the AM trap through the season. Experiments indicated that response to the Frick trap is primarily due to chemical attraction while attraction to the fluorescent-yellow AM trap is primarily of a visual nature. Adding an ammonium carbonate charge to the AM trap increased trap catches 4 - 5 fold in midseason and about 2 - 3 fold later on (preliminary analysis). Response threshold to ammonium is extremely low. Initial charges ranging from .4 g to 24 g attracted equal numbers of flies. Catches began to decline only after ammonium carbonate charge decomposed below .1 g. Quadrant had no effect on magnitude of catch but catches increased with trap elevation. Traps 1 m outside or below the canopy caught significantly less than traps surrounded by foliage.

Seasonal phenology: These studies were carried out in 2 orchards, one an abandoned planting with high fly densities near Lafayette, the other a commercial orchard (Franquette) with a low density in Solano Co. Flight activity was monitored with AM traps and oviposition was monitored through routine weekly egg searches (see below). The schedules of oviposition relative to flight activity were entirely different in the 2 locations confirming previous findings that onset and extent of egg laying cannot be reliably predicted from trap catches.

Within-and between-tree distribution of egg punctures and damage: Intensive egg sampling was carried out every week in both orchards according to the procedures established during the previous year. A preliminary analysis indicated that there are no ovipositional preferences for a particular tree quadrant. However, at low population density oviposition begins in the lower part of the canopy. As density increases egg punctures are more uniformly distributed throughout the crown region. From this extensive data base (2 years, 2 orchards) a sequential sampling plan will be developed as a management tool. Monitoring of egg laying in conjunction with trapping of adults will be a more reliable system on which to base control decisions than trapping of adults alone.

Egg and larval development under field and controlled laboratory conditions: Field: Duration of larval development was recorded in nuts which were caged after oviposition without removing them from the tree. Laboratory: Egg development was studied under constant temperature conditions (ranging from 50°F to 110°F) with egg masses either removed from the husk (placed on moist filter paper) or left inside the husk tissue. When eggs were kept on moist filter paper significant mortality was noticeable already at 95°F. When left inside the husk tissue eggs were able to survive and hatch at 105°F. The study of larval development at various temperatures was only partially successful because of the rapid deterioration of husk tissue after the nut is removed from the tree. This information will form the basis for a phenological model.