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PACHNAEUS ROOT WEEVILS IN PEACH AT GAINESVILLE

W. B. SHERMAN
Horticultural Sciences, University of Florida
Gainesville, FL 32611

R. F. MIZELL
North Florida Research and Education Center
Monticello, FL 32344

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Abstract. **Root Weevils, *Pachnaeus opalus* (Oliver), have caused extensive damage to mature peach trees in the breeding plots at Gainesville. Weevil larvae feed on woody roots, thus weakening the tree. This damage results in short shoot growth, small fruit size, and eventual tree decline. Early symptoms resemble phoney peach disease. Time of weevil emergence at Gainesville is from mid-April to mid-June.**

Peach production in Florida is dependant on having trees with a strong healthy root system to support a commercial life of 10 years or more. Several root weevil species (Woodruff, 1981) are known to be very detrimental to citrus and ornamentals and have recently been shown to be a major impediment to tree health and longevity. Root damage and associated tree decline symptoms were studied, and emergence time of the adult weevils was investigated.

Materials and Methods

The stonefruit breeding program at the University of Florida is located on the main campus in Gainesville. Orchard space is limited and trees are usually replanted within a year or 2 of removal following evaluation. Parts of the orchard have been replanted to peach trees 3 to 5 times since 1965 and peach trees have been grown almost continuously in the orchard for 30 years. Visual tree decline symptoms were first noticed in 1989 in one test block, but symptoms spread throughout the trees of the breeding program by 1992.

The first insect traps were deployed in spring 1993 to monitor time of weevil emergence but were employed too late to trap early emergence. These traps were inverted cone shaped, made of hardware screen, and were the ground type (Bullock and Miller, 1995). Traps were about 3 feet in diameter at the base with an inverted plastic cup secured in place with elastics over the trap funnel at the top. Traps were placed between trees in the row and sealed with soil banked around the bottom periphery about 2 inches deep. Thus the cone traps caught only the weevils that emerged from the soil in the area they covered.

Tedder traps (Tedders and Wood, 1994) were used in 1994 and 1995. The Tedder trap functions as a tree trunk mimic and catches weevils as they emerge over a much greater area than the cone traps. Traps in all 3 years were randomly placed in one or more plots. The traps were monitored every 2 days and adults removed. The number of weevils was recorded and are presented as the percentage per trap per day of the total number of trapped weevils in an experiment for that year. A second set of Tedder traps was employed in 1994 in a separate block, which was a perceived hot spot during the emergence period, and did not record early weevil emergence. No autumn emergence was observed, thus no other trapping periods were monitored.

Results and Discussion

First notice of tree decline was observed in May 1990 in 3-year-old trees. Generally, tree decline symptoms did not occur in young vigorous trees; decline began after trees were 3 years old or when heavy fruit loads stressed the trees. Trees appeared stunted as length of new growth was reduced and appeared to be in the early stages of phony peach disease. Some current growth, mainly water sprouts, remained vigorous on declining trees. Some of these water sprouts exceeded 3 feet in length by mid-July, but only in a sector of each tree with severe reduced terminal growth. In general, trees remained weak in terminal growth. Trees of 'TropicBeauty', an extremely vigorous variety, that were stunted for 2 years, were severely winter pruned in January 1991 to restore scion vigor. Some scion vigor was restored, but the trees did not recover enough through 2 summers of regrowth to produce a commercial crop in 1993.

Soil with root pieces was examined with a screen sieve in February 1991 to confirm fresh scarring and presence of larvae. Trees in one planting that were very weak in spring 1991 were removed in June and the roots were examined; all trees showed extensive root damage from feeding larvae. Roots from 1/4 to 1 inch diameter showed extensive scarring from larval feeding where larvae had made furrows in the phloem

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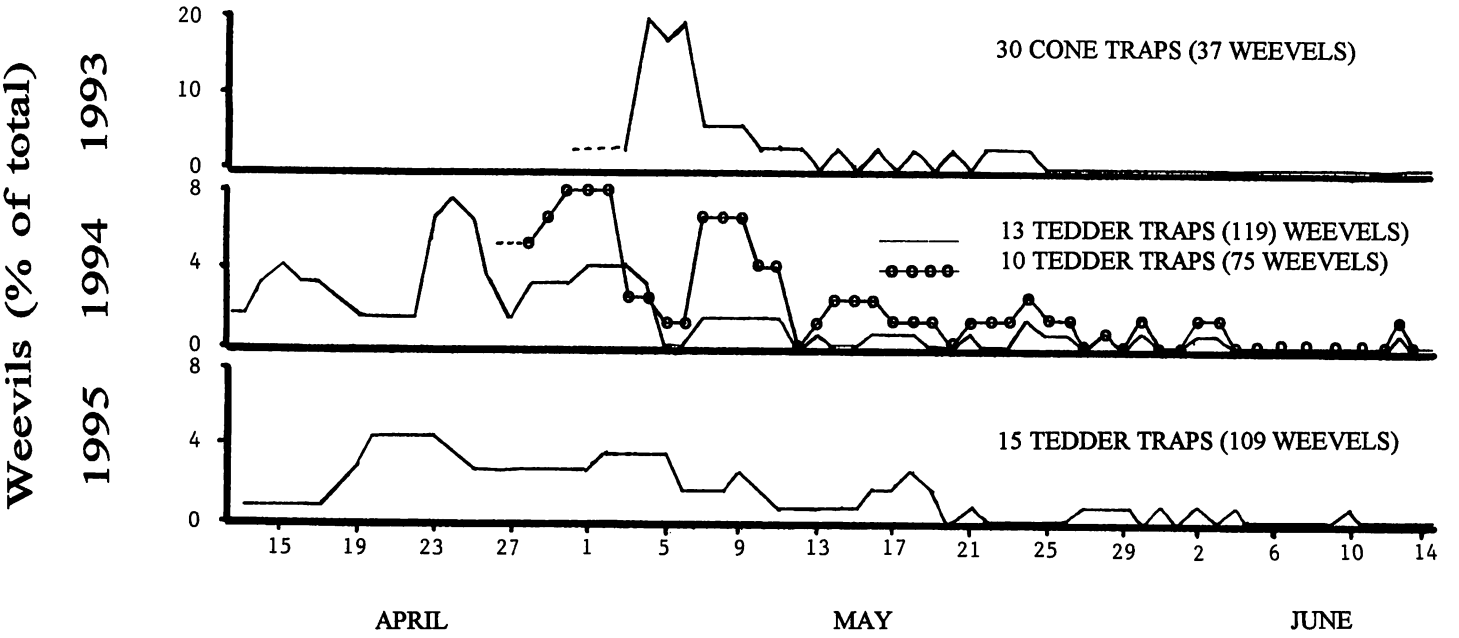

Figure 1. Weevils of *Pachnaeus opalus* caught in April through June 1993 through 1995 at Gainesville.

to the cambium. Furrows were mostly longitudinal along the roots, but occasionally girdled the roots, usually in an erratic spiral that was sometimes 3 to 6 inches long. Many of these roots appeared weak and some were dead, especially smaller roots less than 1/2 inch diameter. Woodruff (1981) states that small roots are often totally consumed.

The 30 cone traps deployed 3 April, 1993 caught 37 weevils, which was similar to the approximate one weevil per trap per year reported by Adair (1994) for *Diaprepes abbreviatus* L. Traps were employed too late to catch early emergence and the last weevil was caught 24 May, even though the traps remained in place through 30 June. Thus, emergence was thought to end in late May. The 13 Tedders traps, employed the first of April through June 1993 caught 119 weevils from 12 April to 15 June. Because no weevils were caught in the 12 days prior to 12 April, it is presumed that no weevil emergence occurred prior to those first caught. The second set of 10 Tedder traps were employed later on 27 April catching 75 weevils between 28 April and 13 June. These 2 sets of Tedder traps caught about 9 and 7.5 weevils per trap, respectively. The lower weevil number per trap in the second experiment was probably due to missing the earliest emergence period, but this was partially recovered in the high initial caught rate during the 2 week period from 28 April to 11 May. Obviously, the Tedder trap was nearly 10 times more efficient in capturing weevils than the cone trap because they trapped individuals from a greater area. Both sets of Tedder Traps caught only 3 weevils after 4 June and none between 13 and 30 June. Thus, last emergence of weevils could have been in late May to early June in 1994.

The 15 Tedder traps employed from 1 April to 30 June, 1995 caught 109 weevils from 18 April through 10 June or about 6 weevils per trap. The 1994 and 1995 data suggest that emergence of *P. opalus* begins at Gainesville in mid-April and mostly ends by late May, after which the Tedder trap caught either an occasional escaping or straggling weevil that emerged into mid-June. No weevils have been found in orchard trees in summer and autumn at Gainesville despite regular weekly visual observations. Emergence in north Florida begins around mid-May and continues into early August (Mizell, unpublished data).

Traps next to trees 3- to 8-years-old appeared to capture more weevils than traps adjacent to 1- or 2-year-old trees. Weevils were also mostly observed in old trees. Weevils were difficult to observe in trees on bright sunny or windy days. They were easily observed by vigorously shaking the trees on calm days, especially in early mornings or on windless, cloudy days. Weevils shaken from the tree feign death, dropping on bare ground or on a canvas where they can be seen and collected.

There is no doubt that peach orchard life is reduced, perhaps by half, in the Gainesville area by *Pachnaeus*. Weevil infestations probably account for reduced orchard life throughout north Florida. Similar tree symptoms have been observed by the authors in peach orchards in Madison and Quincy in the past 5 years, and Woodruff(1981) reports the occurrence of *P. opalus* in Leon, Jefferson, Liberty, and Calhoun counties. No pesticides are approved for ground application to kill grubs. Thus, weevil emergence periods may offer the best time for pesticide control. Biological control with entomopathogenic nematodes (Adair, 1994; Bullock and Miller, 1994; and unpublished trials in peaches at Gainesville by authors) have been erratic or failed to adequately reduce populations.

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