

2000 NYS IPM GRANTS PROGRAM FINAL REPORT

TITLE: Evaluation of Pheromone Disruption in Combination with Insecticide Applications for Control of Peachtree Borers in Peaches – **Year 1**

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ABSTRACT

The effectiveness of three different treatments were compared in the control of infestations and damage by peachtree borer and lesser peachtree borer in commercial peach orchards: (1) pheromone disruption dispensers combined with directed trunk insecticide applications; (2) pheromone disruption dispensers only; (3) directed trunk insecticide applications only. Pheromone dispensers were placed in large blocks (2–3 acres) of peaches on two farms in Wayne Co., and insecticide treatments were applied to single-tree plots in each block. These insecticide sprays were also applied to comparable trees in another planting at each farm not containing the pheromone dispensers. The effectiveness of the different treatments was evaluated by comparing adult male trap catches in pheromone traps in each block, and excavating around the trunks to search for borers and damage in the fall. Pheromone trap catches of both borer species were completely suppressed by the pheromone dispensers in the disrupted plots. Fall trunk inspection revealed no damage attributable to peachtree borer infestation in either the test trees or the untreated checks. In spring 2001, adult emergence of both species will be assessed by enclosing infested cankers with sleeve cages before adult flight begins, and bark surfaces will be examined for empty pupal cases (exuviae). Results will be used to assess the advisability of using pheromone mating disruption as a borer management strategy in commercial peach orchards.

In New York, there are two species of sesiid (clearwing) moths that attack peaches — the peachtree borer (PTB), *Synanthedon exitiosa*, and the lesser peachtree borer (LPTB), *Synanthedon pictipes*. The adult borers are striking clear-winged moths with yellow and steel-blue body markings. The adults of these insects have from one to four yellow-orange stripes across the abdomen, depending upon species and sex. The PTB enters the tree near soil level and does not require the presence of wounds or breaks in the bark for entry, but the LPTB nearly always enters the tree at a pruning scar, canker, mechanical injury, or winter-injured area. Both species pass the winter as borers inside the tree, and in the spring emerge as moths that lay eggs on or in the trunk during the summer. In New York, the LPTB moth emerges first, in late May, and the PTB doesn't show up until mid-June; both stay active (laying eggs) through August. When the borer stages hatch, the PTB tends to crawl down the tree to soil level and burrow in there, but the LPTB will move to the nearest injured area, which may be on the lower trunk or just as easily up in the scaffold limbs. LPTB completes its development in one year, but some PTB larvae take two years to develop, so any control measure a grower would elect will require repeating for at least 2–3 years.

Injury is caused by larval feeding on the cambium and inner bark of the trunk close to the soil level (PTB) or on the upper trunk and lower scaffold branches (LPTB). Occasionally, larger roots are also attacked by PTB. Areas attacked often have masses of gum, mixed with frass, exuding from the bark. All ages of trees are injured. Young trees are at times completely girdled

and subsequently die. Older trees are often so severely injured that their vitality is lowered and they are rendered especially susceptible to attack by other insects or by diseases. Although both species may be found in infested trees, younger plantings and those not afflicted by extensive cankers or other bark splits are attacked primarily by PTB. Control is difficult, owing to the concealed habit of the larvae, and most growers must rely on one to several coarse insecticide sprays of the trunks and lower scaffold branches to deter egg laying and kill newly established larvae. Because this is a labor-intensive measure that often fails to completely control these pests, many growers choose not to elect treatment, or else do an incomplete job, with the intention of getting what they can out of a planting until infestations combine with other peach production factors to warrant tree removal. This approach has been common in the recent past, during which there has been little demand for New York stone fruits outside of local farmstand markets. However, with a recent increase in the planting of new peach varieties and short-range distribution to other markets, there is now more interest in examining currently available pheromone disruption tools for the control of these perennial pests.

This research involves trials testing the efficacy of pheromone disruption with and without directed trunk sprays, and here we report our findings after the first of what is intended to be at least a 2-year period, in order to establish reliable guidelines for the use of mating disruption against these pests in commercial New York plantings.

OBJECTIVES:

1. To compare the effectiveness of different treatments (pheromone disruption, directed trunk insecticide sprays, and pheromone/insecticide in combination) in controlling infestations and reducing trunk damage to peach trees by two species of clearwing borers during successive growing seasons.
2. To evaluate the relationship of trap catch in pheromone-disrupted peach orchards and the level of tree infestations by peachtree borers over a period of 2–3 years.

PROCEDURES:

1. This will be a multi-year trial in commercial orchards having serious annual problems with borers. Because we are targeting both lesser peachtree borer and peachtree borer, we selected orchards infected with cankers (necessary for LPTB). Trials were conducted at two locations in Wayne Co., Furber (Sodus, NY) and Herman (Williamson, NY). In each location, we compared mating disruption versus no pheromone treatment in two separate orchards, each approximately 2.5 acres in size. We further selected a small group of trees in each of these orchards for treatment with insecticide using directed trunk sprays, so the following treatments were evaluated:

- 1 - Pheromone disrupted+trunk spray
- 2 - Pheromone disrupted, no trunk spray
- 3 - Non-disrupted+trunk spray
- 4 - Non-disrupted, no trunk spray

On 31 May, Shin-Etsu Isomate-L ties containing a 30:70 blend of (Z,Z):(E,Z)-3,13-octadecadienyl acetate were placed in the test blocks at a rate of approximately 200/acre (1/tree).

This blend is formulated to be appropriate for disruption of both borers in situations where LPTB is the predominant species, such as we believed to be the case at these sites. On this same date, three wing-style (Pherocon) traps baited with pheromone lures (Scentry) for each species were hung in the interior of each disrupted and non-disrupted block; traps were checked twice per week from 2 June through 29 August.

Insecticide treatments consisted of directed trunk sprays of Asana (4.0 oz/100 gal) applied three times during the season: 2 June, 6–7 July, and 20 September (postharvest), using a Nifty Pul-Tank handgun sprayer operating at a pump pressure of 150 psi. Applications of approximately 1.25 gal per tree were made to single-tree plots, and replicated 10 times per block.

In the fall, from 13–27 October, trees were examined for PTB larvae and larval damage. The bases of the trunks on all the sprayed trees, plus an equal number of unsprayed trees in each block, were excavated around their entire circumference to a depth of 6 inches. The proportion of the trunk circumference was noted having exudations of gum containing frass, in addition to any PTB larvae found in the excavation.

RESULTS:

The pheromone dispensers completely suppressed trap catches of both PTB and LPTB at both sites for the entire season, as there were no moths caught in any of the traps, compared with relatively heavy flights noted in the non-disrupted comparison blocks (Fig. 1). Therefore, it may be concluded that this pheromone treatment was highly successful in disrupting the chemical communication of males and females in these two species. The PTB pheromone traps did regularly catch small numbers of a related species, determined to be lilac/ash borer, *Podosesia syringae*, which is not an economic pest of stone fruits.

The tree trunk inspections turned up no evidence of any PTB larvae or gum exudations resulting from infestations, in both the treated and untreated trees, so it must be concluded that the incidence of this species in these blocks is relatively low, despite the fact that some adults were caught in the non-disrupted plots. Because a proportion of the borers and their galleries evident at the end of 2000 would not have been affected by this season's treatments, this evaluation was to serve as more of a baseline assessment of the populations in these orchards. In the spring of 2001, screen cages will be used to enclose cankers found on scaffold branches prior to first emergence of LPTB and PTB adults, and maintained until all flight activity has ceased in the fall. Moths emerging into the cages will be identified and counted weekly. After a second year of the pheromone and insecticide treatments, the bases of trunks will again be excavated in the fall of 2001 (using different trees) to examine for the presence of PTB larvae, and upper surfaces will be caged the following spring for moth emergence.

After two seasons of these trials, there should be sufficient evidence to determine whether pheromone disruption alone is able to provide adequate protection from infestation in commercial plantings, or whether a combined insecticide+pheromone approach is advisable.

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- Portions of this project that are ready for implementation.

Because the pheromone dispensers and chemical pesticide treatments evaluated in this trial were done using commercially labelled products, these approaches are already available for use by commercial peach growers immediately.

- Portions of the project that are in need of commercial-level testing before full implementation can take place.

We would like to have the results of the full study available to us before attempting to give recommendations on the best approach to use under representative growing conditions in the region.

- Portions of the project require more research.

A more accurate evaluation of treatment efficacy will be possible after the adult emergence aspect of this project is completed, and if the entire group of treatments can be continued for a second consecutive season.

- The potential reductions in pesticide use will result from implementation of the research. If the pheromone-only option appears to be as effective in borer control as using pesticide sprays, pesticide use for this particular pest could be reduced to zero.

- Estimates of what the cost of implementation might be.

This would depend on the market price of the Isomate-L pheromone ties (estimated to be ~\$25/acre), plus the time and labor required to make a single application per season.

- How increased grower profitability might result from implementation.

The ultimate aim of this work is to improvement the management of an important pest whose actions can eventually cut short the productive life of a peach planting. If any of the treatments being evaluated are shown to be more effective than those currently practiced, this would obviously add to the grower's overall profitability in producing this crop.

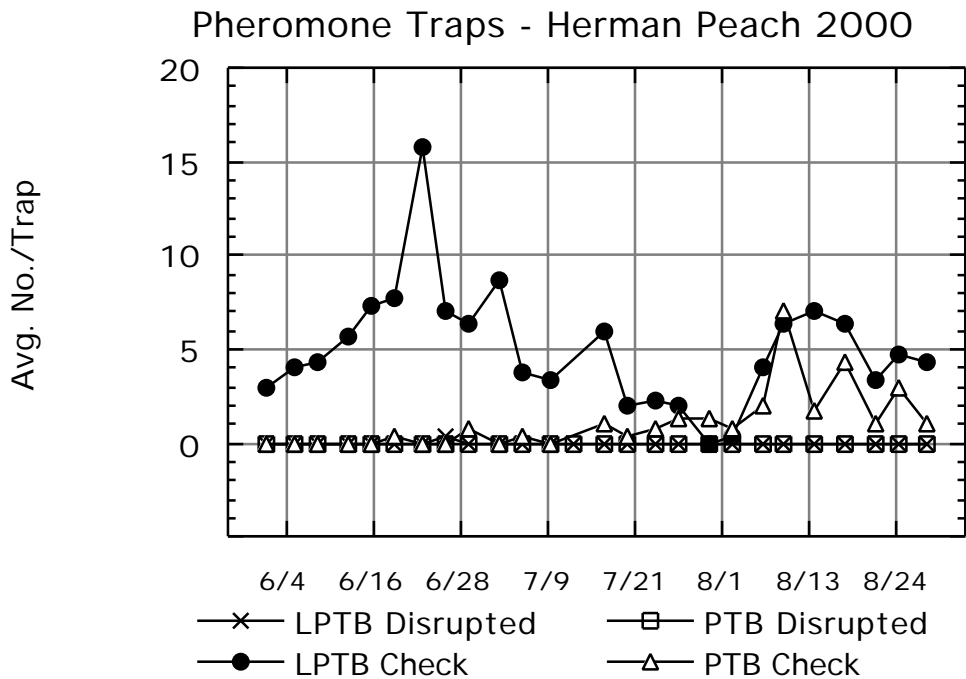
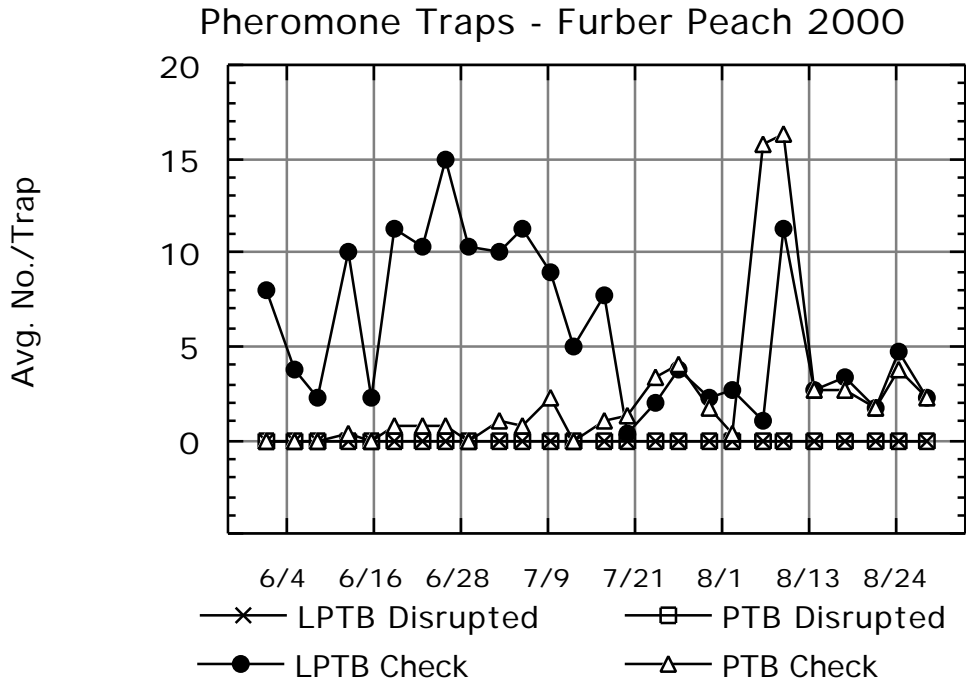


Fig. 1. Pheromone trap catches of lesser peachtree borer (LPTB) and peachtree borer (PTB) moths in pheromone-disrupted and non-disrupted peach plantings in Wayne Co., 2000.