

Progress Report on Goichman Family Endowment Research 2010

Title: Field testing of a newly developed pheromone for trapping and management of longhorn Prionus borers in NY apple trees

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Background

Relatively few insects feed on tree roots. However, some are able to slowly weaken and eventually kill a tree that was once healthy. The Prionus borer is the grub or larval stage of a large longhorned beetle called the broadnecked root borer (*Prionus laticollis*), which is among the largest of the North American beetles; the adult can be over 1.5 inches in length, and the fully grown borer can reach 3.5 inches. During the past few years, these borers have been found in the root sections of Red Delicious apple trees near Northport, Long Island; several trees in the orchard were attacked and as many as 3–4 borers were found in each tree. Injury manifests itself as a gradual decline, and tree death results from young larvae feeding on root bark and older larvae tunneling into the roots. Management of Prionus is labor-intensive and expensive because no pesticides are registered for controlling established infestations, and there are no effective biological or host plant resistance alternatives. The only means of prevention is through trunk-applied applications of chlorpyrifos, a broad-spectrum insecticide that is under increasing regulatory scrutiny and destined not to be available over the long term. Recently, researchers in the western US identified the sex pheromone of a closely related species, *P. californicus*, as a first step in the possible development of non-insecticidal methods of monitoring and managing this important class of pests.

Methods

In 2010, we set out field-trapping trials to assess the effectiveness of this pheromone in detecting the distribution and seasonal activity of this species in NY apple systems. Pitfall traps baited with Prionus pheromone were set out at a known orchard site in Northport, Long Island, NY, where this species was detected in the past, to assess its ability to a) attract adult males of broadnecked Prionus; b) document the timing of their emergence and flight period in eastern NY. The traps, constructed of a plastic funnel inserted into the lid of a 2-qt plastic jar, were buried with the funnel opening flush with ground level. Four traps were placed at various spots in and alongside the orchard on June 22; by the next day, 4 adults had already been trapped. Traps continued to be checked approximately twice weekly through July. To gather information on the general distribution and occurrence of this species in other non-orchard habitat in the state, two additional traps were placed in a mixed pine and hardwood forest outside of Geneva on June 28, and checked every 2-3 days until the first week of August. In all cases, beetles captured were collected and preserved for identification.

Results

The pheromone traps proved to be very effective in attracting adult Prionus males from the general area in each of the locations surveyed. An average of up to 4-5 beetles per trap was collected on each sampling date for approximately 4 weeks in each location (Fig. 1), with peak captures occurring within the first two weeks of each respective population's appearance; all

specimens were identified as *Prionus laticollis*, the broadnecked root borer. Two related species, *P. imbricornis* and *P. pocularis*, have also been reported taken in traps baited with this pheromone, but these appear not to occur in our region. Most of the adult male activity appears to be restricted to the month of July in NY, although occurrence in 2010 was probably a bit earlier than normal, owing to the advanced and warm season.

Projected Impacts:

We anticipate that this pheromone could find useful application in monitoring the distribution and abundance of broadnecked *Prionus*, improving the efficiency of preventive insecticide treatments, and it ultimately might also be exploited for control of the insect via pheromone-based mating disruption, mass trapping, or attract-and-kill strategies. Hope to expand these field trapping trials in succeeding years, including in other sites not necessarily in proximity to apple growing regions. We would like to investigate the specific situations in which these beetles end up becoming a pest to apple trees, and the ability to reliably capture them is an important first step in this process. It is not yet certain that we will be able to procure additional pheromone for such trials, until such time as a private company may choose to commercialize the lures for sale to the agricultural industry.

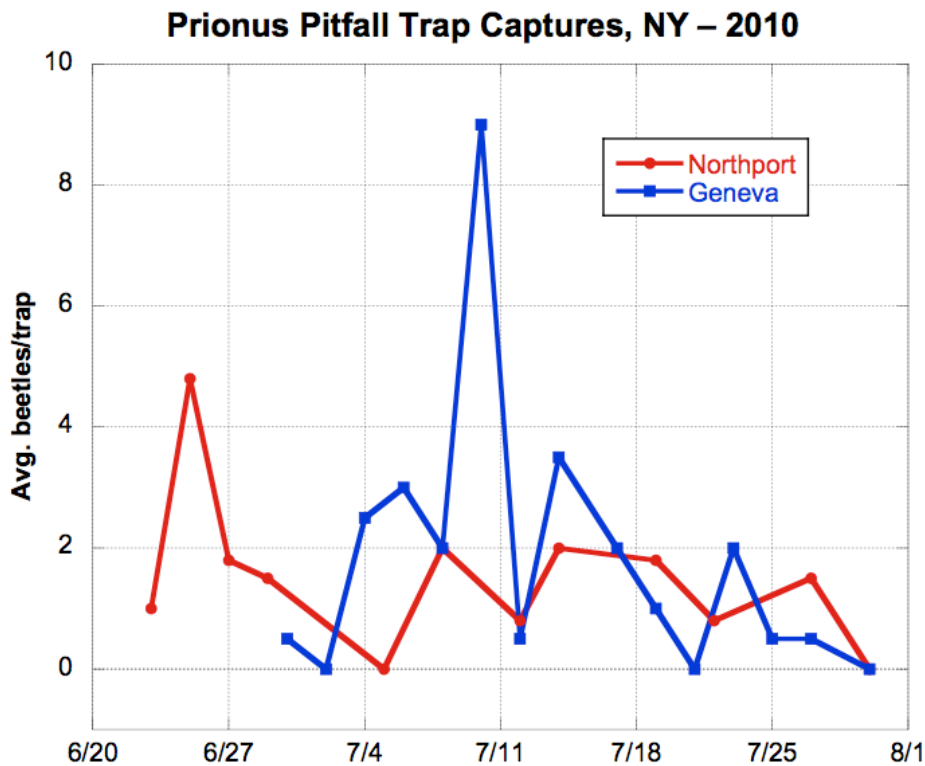


Fig. 1. Average captures of *Prionus laticollis* adults in pheromone-baited pitfall traps placed in orchard (Northport) or mixed woods (Geneva) settings, 2010.