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ASIAN AMBROSIA BEETLE POPULATION DYNAMICS IN EAST TEXAS

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Background. The Asian ambrosia beetle has been found in Texas since the mid 1980's. As the name implies, the beetle has Asian origin and possibly came into the U.S. on nursery stock from some Asian country. The adult beetle has a wide host range including many fruit and ornamental trees. The beetle damages trees by boring into the trunk and excavating a brood chamber. In developing these chambers, sawdust and frass is pushed out the tunnel and this material remains intact and protrudes from the trunk and looks as if toothpicks have been stuck into the tree. Eggs of the beetle are laid in this chamber and the larvae feed on a fungi or ambrosia deposited by the adult female.

The number of eggs laid by each female ranges from less than ten to over fifty and is apparently determined by the size and fecundity rate of the female. The number of egg chambers in each tree ranges from one to as many as 50 to 75. The adult beetles usually attack young trees with trunk diameters of less than one-half inch to three inches in diameter. Egg chambers may be located near the soil or up to six feet or higher on the tree. Twigs and branches less than one-half inch in diameter are seldom attacked.

Since its introduction, the beetle has spread rapidly and is now found in all East Texas counties and in many other parts of the state such as Dallas and Houston. It appears to be spreading naturally through migration and by the movement of nursery stock from one location to another.

The attack by the beetles is usually lethal to the tree. Wholesale tree nurseries, where large numbers of small-diameter trees are grown in a small area, are particularly vulnerable to beetle damage. Young trees planted into the landscape or in fruit and nut orchards may be attacked by beetles in the area of the planting or possibly if it is a recently planted tree, the tree may have been infested when it was purchased from the nursery. All East Texas nursery managers are concerned about this problem and are working diligently to do everything possible to grow clean beetle-free trees.

Since this is a recently introduced pest, not much is known about the insect and its activity within the U.S. Entomologists and horticulturists across the Southern U.S. where the insect is found, are attempting to learn more about the insect through studies and experiments. This information is shared with homeowners and nurserymen in an attempt to control the insect in infested trees and to prevent the beetle from attacking trees grown in the landscape or nursery.

Objectives of this study were: 1) to determine if the activity of Asian ambrosia beetle adults can be monitored in a medium-sized wholesale tree/shrub nursery setting using home-made water traps baited with ethyl alcohol , 2) to learn more about the seasonal movement of Asian ambrosia beetles in East Texas, and 3) to determine if Asian ambrosia beetle adults display patterns of peak activity (tree entry).

Adult beetles are known to be attracted to ethyl alcohol. Water traps made from plastic cups and a vial containing the alcohol has been found to be an effective means of capturing the insect. For the past two years, a trapping study has been conducted at a local site to determine the seasonal abundance of the insect. In 1996, this study began on March 20 and continued through November 18. Eight traps were placed among infested trees and monitored weekly for the presence of the beetles. Beetles that were caught were counted, removed from the trap and the number recorded. A similar study using eight traps was conducted at the same site in 1997 beginning on February 11 and ending on November 17. Results were posted on a web site for growers use and information (http://extension-horticulture.tamu.edu/county/smith/industry/aab.html).

Research Findings. The study in 1996 was started on March 20. At this time, beetle activity was noted in some trees in the study area. However, beetles were not caught in traps until April 10 when there was an average of 1.3 beetles/trap in six traps. The delay in capture could be due to the authors unfamiliarity with the trapping methods or, all the beetles had already penetrated plants and were unavailable for capture.

In 1997, traps were deployed on February 5 and the study was terminated on November 17. Prior to trap deployment, the weather was cold with no possibility of beetle activity. The plants where the traps were to be deployed had been covered for protection from the effects of winter with polyethylene plastic covers. The plants were uncovered only a few days prior to trap deployment. Figure 1. Shows the average number of beetles caught per trap for 1997. The first beetles were caught on February 27 with the last beetles caught on October 31. This data shows five peaks of activity; two in March, one in May, one in late May through early June and an extended emergence in July through August. On March 11, 11.6 beetles were caught per trap and on March 25, 11.3 beetles were caught per trap. The peak in early May averaged 7 beetles per catch. The most beetles caught on one date in 1997 was 14.4 beetles per trap on June 3. This was 6.5 beetles less than the 20.9 caught on July 5, 1996.

The most extended peak of activity in 1997 occurred between June 20 and August 19. For the 18 catch dates during this period, the traps averaged 3.2 beetles per trap. The highest catch per trap was 7.5 which occurred on July 29. A total of 1,400 beetles were caught in all traps in 1997.

Application. Trees attacked by Asian ambrosia beetles usually die. Several wholesale tree nurseries have reported annual tree loss in the thousands of dollars, and the cost of replanting orchard trees, including loss of production, can be considerable. Tree nurseries are particularly vulnerable since there are such large concentrations of susceptible-sized trees. Beetles can attack any time during early spring through late summer, and weekly spraying would be cost prohibitive. By monitoring Asian ambrosia beetle activity using water traps, growers can time pesticide applications more precisely to minimize pesticide costs.

In conclusion, in 1996 and 1997, adult Asian ambrosia beetles were active from February through late November when cold weather prevents their activity. There appears to be several activity peaks during the year. Adults are somewhat constant from February through mid August with at least four peaks of activity during this time. The water traps designed for this study are an effective method of monitoring the movement of the beetles and can possibly be used in management systems to time pesticide applications to control this pest.

Figure 1. Mean number of Asian ambrosia beetles caught per trap. Tyler, Tx. 1997