Monitoring Ambrosia Beetles in Northern New Jersey Orchards

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Ambrosia beetles have been a longtime ornamental pest in New Jersey. In more recent years they have been noted as an economically damaging orchard pest in this state. The Rutgers Plant Diagnostic lab has confirmed that we have both Granulate Ambrosia Beetle (*Xylosandrus crassiusculus*) and Black Stem Borer (*Xylosandrus germanus*) invading Northern New Jersey orchards. Both species are known to attack many species of young thinly barked deciduous trees that are exhibiting a stress response. These species of Ambrosia Beetle are attracted to ethanol which is released by trees experiencing some type of stress including flood stress, freeze stress, drought stress, etc. Ambrosia beetles are a very small pest, only 2-3 mm in size, which bore into the trunk of their host to reproduce. Some of the initial signs of infestation include a 1-2 mm diameter hole in the lower 2-3ft of the trunk as seen in Figure 1. If the weather has been mild with little wind or rain, you may also notice toothpicks of sawdust pushed out of these holes by the beetle as seen in Figure 2.

Figure 1. Sawdust toothpick caused by ambrosia beetle boring into apple tree trunk.

Once the Ambrosia Beetle has bored into the heartwood of the trunk, they will create a brood gallery and farm the *Ambrosiella* fungus, carried in on their mycangium, which the adult and her larvae will feed on. The combination of boring damage and the *Ambrosiella* fungus blocking the vascular system of the tree will cause symptoms such as wilting and dieback of branches. If the infestation is severe, tree death will eventually occur as seen in Figure 3.

Figure 2. Ambrosia beetle boring holes in apple tree trunk.

During the 2023 season in Northern New Jersey, we noted up to 5% loss of apple trees in flood stressed orchards. In another orchard in the 2024 season, we noted 43.3% loss of topworked apple trees. Understanding how economically damaging this pest can be the Rutgers University North Jersey Tree Fruit IPM program began a monitoring program for this pest which was made possible by funding from the New Jersey State Horticultural Society.

Figure 3. Apple tree killed by ambrosia beetle infestation.

Materials and Methods

A monitoring program was initiated at all 29 farms participating in the North Jersey Tree Fruit IPM Program through Rutgers University. One clear sticky trap (Figure 4) and three wood dowel traps (Figure 5) were placed on 3' stakes at each farm with 20 meter spacing between each trap. All traps were placed along the edge of an orchard block closest to the wood line since this is where this pest overwinters. The clear sticky traps were all placed at farms between 3/28-4/5 and the wood dowel traps were placed once we began capturing ambrosia beetles at each farm. The wood dowel traps were utilized to time attacks of this pest while the clear sticky traps were used to monitor flights. Wood dowel traps were cut from fallen trees or limbs, most were taken from Black Walnut or Dogwood trees which are within the Black Stem Borer and Granulate Ambrosia Beetle's host range. Each wood dowel trap was 2"-4" in diameter and cut at 1.5'-2' long. A ½" hole was drilled down the center of each wood dowel trap and filled with 99.5% ethyl alcohol then corked on a weekly basis. The clear sticky traps were baited with a commercially available Trécé ethanol lure. This lure needs to be replaced every 6 weeks, and the clear sticky traps were replaced as needed. Both types of traps were checked at each location on a weekly basis. Each week data from the clear sticky traps was reported to the growers as number of ambrosia beetles per week while the data from the wood dowel traps was presented as positive or negative for the presence of attacks.

Figure 4. Clear sticky trap with lure. Right: Ambrosia beetle captured on clear sticky trap.

Figure 5. Wood dowel trap. Right: Borer holes indicting an attack

Results

The clear sticky traps captured ambrosia beetles at all 29 farms they were placed at during our monitoring period (4/6/2024 - 5/25/2024). Our first trap capture on the clear sticky traps occurred on 4/8/2024. We also found that the pest attacked the wood dowel traps at each of the 29 farms they were placed at. Our first attack on our wood dowel traps was noted on 4/18/2024. Our highest trap capture in a single week was 529 ambrosia beetles, however, the farm this capture occurred at did not have any evidence of ambrosia beetle attacks this year or in previous years. Our peak trap capture occurred during the week of 4/28-5/4 during the 2024 season as you can see in Figure 6.

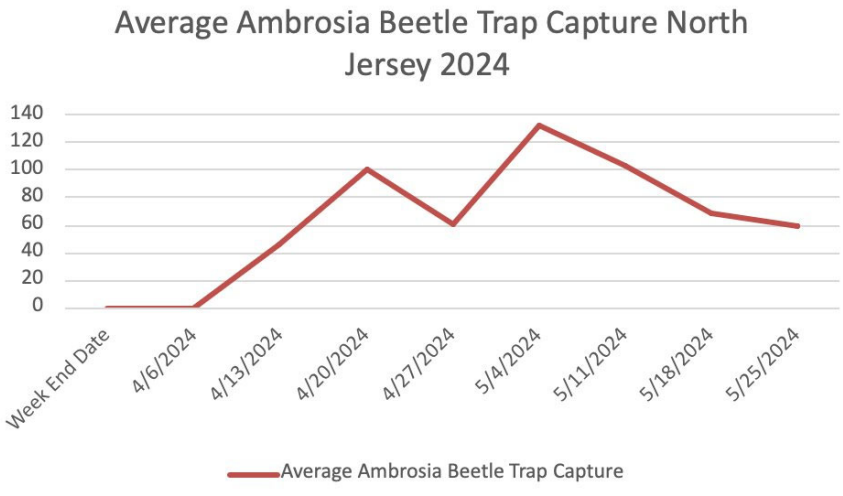

Figure 6. Average Ambrosia beetle trap captures in North Jersey 2020.

Conclusions

Based on this year's monitoring program ambrosia beetles are prevalent throughout North Jersey and are present at most farms where tree fruit is grown. Based on this information, managing stress within your orchard is the best line of defense against this pest since the species present are only known to attack stressed trees. There are very few chemical control options that are effective against this pest since they do not feed on the tree itself. Ambrosia beetles cannot be killed once they have bored into the tree so proper application timing is essential for management. Growers with a history of ambrosia beetle infestation in their orchard utilized the data provided from the wood dowel traps to properly time their insecticide applications. Observationally, the growers who did this have stated they felt they lost fewer trees to this pest this season, but more research needs to be done to confirm these observations. Moving into the 2025 season, we plan to continue our ambrosia beetle monitoring program in North Jersey. In 2024 we only utilized the clear sticky traps to monitor for a 6-week period but in 2025 we will monitor the flight of this pest over the course of the entire growing season. We also plan to utilize a third type of trap at each farm which will be juice bottle traps. This trap will be used to collect ambrosia beetles and bring them to the Rutgers Diagnostic lab to have the species identified. This will give us a better idea of what species are present in North New Jersey orchards so we can have a better understanding of this pest and how to manage it.

Acknowledgements

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