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Background

The emerald ash borer (EAB) is an invasive insect species that is native to parts of Asia. The beetle was first detected in Canada in 2002, in Windsor, Ontario. However, data from tree ring analysis showed that the beetle could have been present since the 1990s. Currently, the emerald ash borer has been detected in southwestern Canada, Ottawa, some parts of eastern Ontario and in both Sault Ste. Marie and Manitoulin Island. It has also been detected in parts of Quebec and in 21 states in the United States. The closest area to Muskoka that EAB has been detected in is the Ramara county near Orillia. The Cooperative Emerald Ash Borer Project has published a map that displays the [known North American distribution](#).

Emerald ash borers attack a number of different tree species, focusing mainly on native ash species. Five species of native ash, green, white, black, pumpkin, and blue ash, have all been attacked. However, the blue ash has proven to be slightly resistant to the species. EAB is a very hardy parasite, able to withstand temperature of -30°C through the production of antifreeze compounds. Additionally, from surveys in Michigan, very few native parasitoids are making transition to the EAB, though some have been discovered in China and Canada that may have an impact on EAB populations. Woodpeckers are the only native animals that feed on the EAB.

The main cause of damage to ash trees is due to the feeding of the larvae. The larvae feed on the inner parts of the bark and impact the nutrient transportation system of the ash tree. The destruction of this nutrient transport system causes the tree to die through a process called girdling. Girdling is a process where a ring of bark is entirely removed from the tree, preventing nutrients to be carried to or from the roots.

The removal of ash trees can have significant effects on the ecosystem of both forests and rivers. Loss of these trees causes erosion in the stream habitats they were part of. This adds more soil to the stream as well as changes the water temperature due to an increase in solar exposure. Loss of ash trees can also impact any populations of animals that depend on the ash tree for food or habitat.

Project Description

The EAB project was launched to understand the health of our forest ecosystems and detect whether any emerald ash borers had made their way into the Muskoka region. The project initially started with a single trap being put up in 2015. The following year, 20 traps were put up in the Bracebridge area and no EAB were found at the end of the study. This year's project was undertaken in partnership with both the Town of Bracebridge and the Town of Gravenhurst, which allowed the scope to be increased from previous years. 24 traps were set in total, throughout the Gravenhurst and Bracebridge areas. BioForest Technologies generously donated the 24 traps used in the project.

The 24 ash tree sites were selected based upon a number of factors. Priority was given to trees growing in open areas, or with canopies that were accessible for trap placement. Additionally, areas where high traffic was to be expected were selected, so that any EAB moving on infected products would have the highest chance of being spotted.

The green prism traps were baited with a pheromone and a green leaf volatile lure to draw the adult EAB beetles to the trap. They were placed in the low to mid canopy of the tree to increase the chances that any EABs would contact the trap. The outside of the trap is quite sticky, trapping any beetles that fly toward the scent. Once the beetles make contact with the trap, they get stuck to the outside and cannot escape.

Results

The traps were checked and removed on September 20th and 21st. When the trap was removed, a member from Bioforest Technologies looked over the trap to check for the presence of Emerald Ash Borer. Due to inclement weather conditions in the summer, two of the traps were not recovered and thus, data was unable to be collected in those two locations.

Of the traps surveyed, 12 specimens that were possibly EAB were discovered. A sample was sent to the Agricultural and Food Lab at the University of Guelph to verify whether or not they were EAB. Additionally, 5 samples were sent to the Great Lakes Forestry Centre in Sault Ste Marie for testing. The Great Lakes Forestry Centre confirmed that the five species sent to them were definitively not EAB. The sample that was sent to the University of Guelph couldn't be definitively proven to be EAB.

Project Successes

This project was designed as an early detection program for the presence of EAB. It was successful at determining the spread of EAB within the Bracebridge and Gravenhurst area. Additionally, it served as a way to raise public awareness of EAB, as well as increasing EAB presence in the media. A demonstration was held in June of this year, which covered the potential effects of EAB and what steps could be taken to deal with the problem. While putting up and removing the traps, many members of the public were interested in the project and wanted to learn more about the dangers of EAB. Additionally, many of the participants with traps on their property remarked about the interest of the neighbours and other people in the area. This public outreach is incredibly beneficial for further projects dealing with EAB, as it engages the public and creates more awareness of the potential problems of EAB.

The partnership between both the Muskoka Conservancy and the Towns of Bracebridge and Gravenhurst is incredibly valuable and we hope to have continued opportunities to work together. As our project's scope was larger this year, we were able to test a larger area, as well as an area closer to the current confirmed sightings of EAB. This allows us more time to prepare if EAB is found to be present and prepare a proper treatment plan if deemed necessary.

Recommendations

If this project were continued in future years, expansion of the area in which traps are placed would be an incredibly valuable way to increase the spread and success of this project. As EAB has been spotted in areas as close as Orillia, an early detection project allows us to increase our understanding of EAB activity in the area. Getting other municipalities and towns on board with the project is another important way to protect Muskoka, as it increases the scope of the project. Another valuable municipality to have on board would be the Township of Muskoka Lakes. It is vital to expand the scope of the project, as the Muskoka region must be prepared for the possibility of EAB spreading to the area. Early detection of EAB allows the affected areas the maximum amount of time to establish a plan for the protection of the area.

Another recommendation for the project would be to have a section of the study be focused on cataloguing the current state of the tree and checking for visible changes throughout the summer. This would allow us to identify trees that could be susceptible or already affected by emerald ash borer. Signs to look for would be epicormic shoots, bark cracking, yellowing of leaves, woodpecker damage, or canopy decline.

Acknowledgements

We would like to thank both the Town of Bracebridge and the Town of Gravenhurst for their support for this project. Their partnership is what allows us to continue this project and continue to monitor the movements of EAB in the Muskoka area.

We would also like to thank Bioforest Technologies and their staff for the donation of time and resources to make this project a success. Their skills and knowledge in this area were very important in making this project successful.

Finally, we'd like to thank all the Muskoka Conservancy volunteers and members who helped with the project or allowed us to place a trap on their property.

Figure 1: Map of 2017 EAB trap sites

