An Entomology Study: Development of Acoustic Model of Wood Boring Insects for Characterization and Detection for U.S. Forestry and Canadian Forestry

The purpose of this research is to build a field-deployable device that is able to make an exact diagnosis of a tree infected with a wood-boring insect. The device was initially developed for the Asian Long Horned Beetle, a species indigenous to China. Currently, the system is being enhanced to include the Cotton Wood Borer, (a species indigenous to the North East United States), and the Brown Spruce Beetle, indigenous to Europe but currently a Canadian problem. The need of this device becomes apparent when one considers the damage that can be done to the hardwood industry if the insect is left unchecked to destroy the hardwood. It is estimated that the damage done by these insects will approach tens of millions of dollars. The method being used to build the device is acoustic detection, which can be compared to eavesdropping. Using a computer-based software called Matlab, several models have been developed which have been combined with confidence estimates to give the user the ability to detect an infested tree. Samples of sounds are being collected from infested trees and analyzed. At this time, three models have been developed for these boring insects that include the Asian Long Horned Beetle and the Cotton Wood Borer. Future work includes enhancements to these models and the inclusion of the Brown Spruce Beetle.

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