AMERICAN BEECH BARK DISEASE
"The Infection Has Come"

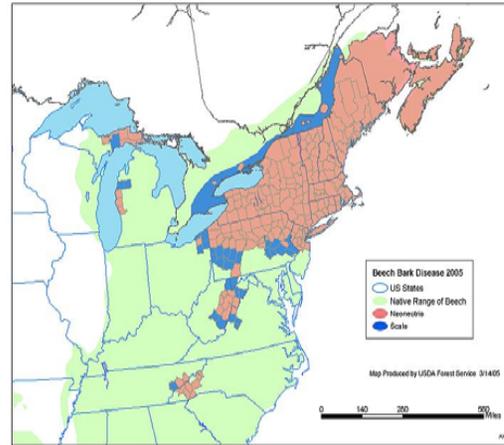Bryan Westerberg

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Abstract

This project is used to determine if Beech Bark disease has spread to the younger smaller diameter Beech trees. With data collection the results can show whether or not this is true. By producing data sets and mapping each area studied, this project should show results that will prove of disprove this fact. Which is whether or not the science community that stated only larger adult beech trees are infected by this disease, and not the younger 0 to 6 inch diameter trees.

Introduction

Beech bark disease is currently impacting American beech in Michigan and eastern North America. It occurs when a tree is infested with a 'scale' insect (beech scale) and then colonized by a nectria fungus. (Deborah McCullough, 2005). The scale insect, readily visible on the trees, was considered the cause of death until 1914, when it was learned, that a fungus, then identified as nectria ditissima tool, infected trees infested by the scale. (William Jones, 2011). Beech scale was accidentally introduced from Europe into Nova Scotia, Canada around 1890. By the 1930's, the scale and an associated Nectia fungus were killing trees in eastern Canada and Maine. (William Jones, 2011). Beech Bark Disease was discovered in Michigan in 2000. (Deborah McCullough, 2005) The scale as immature is blown by the wind and is also moved by birds and people transporting infested firewood. In Wisconsin there are 34 million cubic feet of beech trees that have not yet been harmed, yet beech disease has started in Wisconsin so it's only a matter of time. This disease has involved the interests of the logging industry because the infected trees become less in value. Soon beech trees could disappear because of this disease; because beech trees don't grow in dry climates they aren't found often growing west of Wisconsin. The independent variable is part with the beech bark disease experiment that the researcher is manipulating; this treatment is experimental and\or the treatment variable. The treatment variable being how this vast spreading disease could be documented in the best way possible. The yield to this or rather the cause and effect is the scale insect traveling by wind, wildlife , or human impact. After collecting data off a selected zone of the number of American beech trees and documented whether or not there is any infection on each tree will show the importance of this research. This research will further explain the importance of collecting scientific data. The more data one can collect the more credible the research is. If a researcher had the time and money to collect sampled data from the entire state of Michigan then that data would have more profound information. Though without those resources this research project will be on a 20 acre plot NW ¼ NW ¼ Section 5 Township 46 North Range 4 West in Chippewa County, Michigan.

Beech Bark Disease 2005
- US States
- Native Range of Beech
- Neonectria
- Scale

Map Produced by USDA Forest Service 3/14/05

Methods

The first step was deciding where a high source of Beech Tree population could be found. Using ESRI 2011 Data and Maps, finding an area within Chippewa County was easy. Being a Parks and Recreation major picking location throughout Brimley State Park was simple because class trips to that park were abundant over past years. Examining data sets from United States Data Surveys and studying the scientific data from independent studies its been shown that only adult trees are infected from this Beech Bark Disease. With the tools listed below I would have the chance to disprove this former idea set.

TOOLS USED:
- Nikon Forestry Pro Laser Rangefinder.
- Compact laser rangefinder and height meter.
- User selectable distance, angle, 1, 2 & 3 point height modes.
- Use 3-point height mode for accurate height readings - uses laser to obtain horizontal distance to target, then internal inclinometer to measure angle to base and top of tree.
- Greater height accuracy than Forestry 550 when using 3-point mode.
- Leonard plastic Pocket Tree Caliper.
- ARC GIS 10.2 used for mapping the surrounding area and putting data within.

DATA SOURCES:
- ESRI 2009 North American Digital Imagery.
- ESRI 2011 Data and Maps. Environmental Systems Research Institute.
- Upper Peninsula Tree Habitat Database. April 2012
- Geographic Information Systems Library

Question:

Does the Size of the Beech Trees in Diameter show a significant difference to which could explain when trees are infected and what size does the infection start?
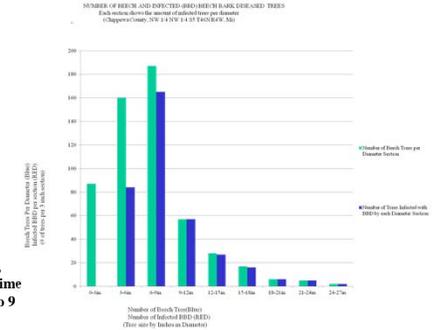
The data results shows that from 0 to 3 inches there is no infection, but as the trees grow the rate of infection spreads to 100% by the time they reach adulthood, even young trees are being infected from 3 to 9 inches which is considered a small tree.

The data shows the impact areas throughout America. Believed to have started in Nova Scotia, Beech Bark Disease has spread along with climate change. Its believed that the changes in climate has shown the greatest impact on the BBD infection areas. The map on the right shows the Infection areas in white and green and the Bright colors show the degree of climate change.

Results
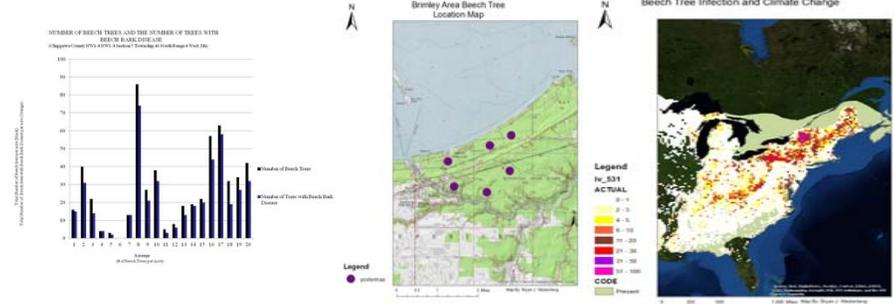
Conclusion

The purpose of this research is to further illustrate the life of the American Beech trees in Chippewa County in the year 2012. The American Beech trees of this area are involved in an epidemic. This epidemic is the cause of an insect which is not native to this area; it came from across seas and now resides in the United States. This insect flows with the wind and hitches rides from whatever it can, such as birds and humans. In 2000 the USDA and the Michigan Department of Natural Resources made the discovery of beech bark disease in Michigan's upper and lower peninsulas which marked the beginning of a major shift in ecology of its northern hardwood forests. According to the information provided in this data set the American Beech trees are starting to have infection sightings from 3 inches and up to full size adulthood.