



A DENDROECOLOGICAL STUDY OF BALSAM WOOLLY ADELGID DAMAGE IN RELATION TO CLIMATE AND SITE FACTORS IN EASTERN MAINE

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Background



Balsam woolly adelgid (BWA) (*Adelges piceae*), an insect native to Europe, was first identified in Maine in 1908 and spread throughout the lower half of the state by 1950. Isolated patches of infestation occurred as far north as Westmanland in northern Aroostook County. Chronic infestations remained in coastal areas of Maine, while further inland damage became sporadic and widely scattered. Within the last decade damage has increased in interior portions of the state with the worst damage in central Hancock and

Washington Counties. This prompted a cooperative study between the Maine Forest Service and the University of Maine to determine if recent intensification of BWA infestations has initiated reductions in radial growth just within the last decade and if the onset of reduced growth corresponds to distinct weather patterns.

Hypotheses and Study Approach

Hypothesis 1: Reductions in radial growth of BWA-damaged balsam fir have been initiated within the last decade in downeast Maine.

Approach 1: Analysis of tree-ring series

Hypothesis 2: Radial growth reductions in adelgid-damaged balsam fir are associated with distinct weather patterns such as warm winters and/or droughts.

Approach 2: Examination of climate records and timing of growth reductions

Hypothesis 3: Balsam woolly adelgid damage severity varies with soil drainage class and other stand parameters.

Approach 3: Multivariate analysis of relationship between soil drainage class, other stand parameters and severity of BWA symptoms

Example Host and Non-host Cores

Beddington, ME



Presumed BWA caused growth reduction beginning around 2000



Collection

Established circular 0.08 hectare (1/5 acre) study plots in 29 townships.

- Collected site and tree measurements
- Soil drainage class
- Balsam fir
 - Adelgid damage assessment
 - Height, diameter, crown estimates
- Collected and prepared increment cores
- 12 Non-host trees (1 species/plot)
- 12 balsam fir with adelgid caused dieback
- All balsam fir on plot

Analysis

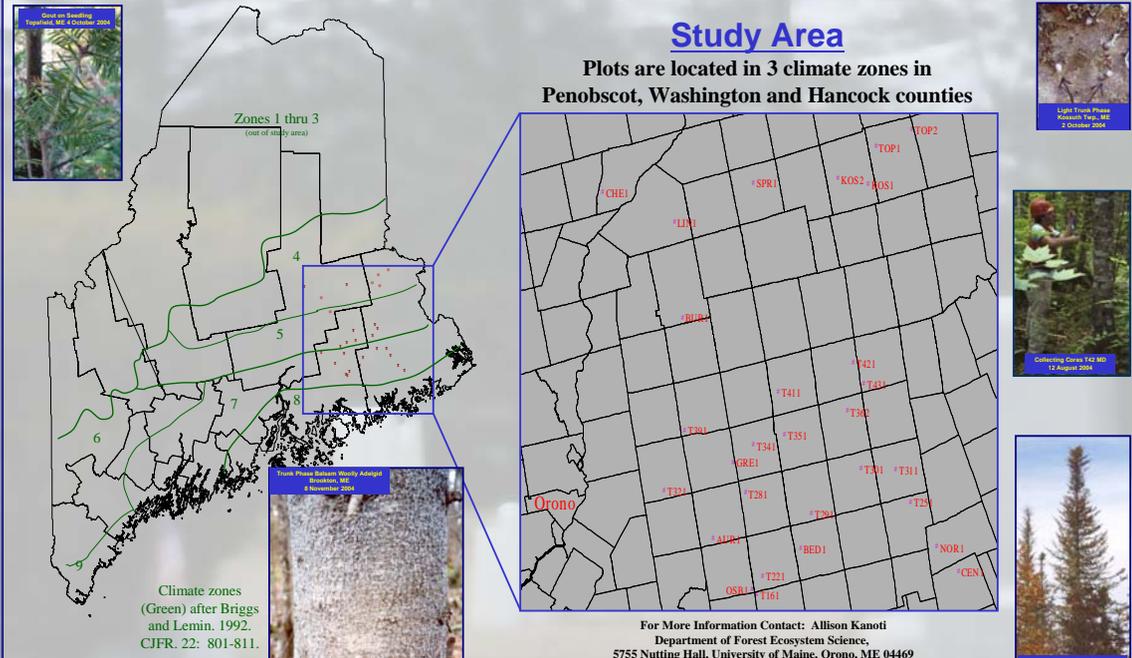
- Develop and compare chronologies from increment cores of host and non-host species
- Identify onset of growth reduction on BWA-damaged trees
- Match start of growth decline with weather records
- Quantify relationships between soil drainage class, other stand parameters and severity of BWA symptoms



Collecting Core T2C 9C
12 August 2004

Study Area

Plots are located in 3 climate zones in Penobscot, Washington and Hancock counties



Light Purple Spruce
Penobscot Twp., ME
3 October 2004



Collecting Core T2C 9C
12 August 2004



Penobscot Twp., ME
3 October 2004

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