

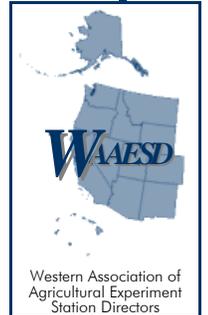
Hatch Multistate Research and Extension 2005 IMPACT REPORT

Documenting
the Impact of
Multi-state
Research and
Extension



W-1187

Interactions among Bark Beetles, Pathogens, and Conifers in North American Forests



Issue

Bark beetles and pathogens interact to cause extensive losses in the forests of North America. Regional management challenges occur because of the ongoing interactions between bark beetles, pathogens and host trees. Changes in global climate conditions (both temperature and precipitation) alter the distributions of both the tree hosts and the insect/pathogen species.

Actions

Collaborative research and extension efforts are examining the role of biotic and abiotic factors in predisposing trees to bark beetle attack and subsequent mortality. The knowledge generated is being integrated and applied to management of forest ecosystems as influenced by emerging issues such as invasive species, global climate change, changing land use patterns and multiple and conflicting societal demands.

Improved sampling and better understanding of tree sensitivity to mortality –causing agents is allowing us to better time and target control remedies resulting in lower and more effective and environmentally benign remedies. For example, characterizing the flight window of the banded elm bark beetle, an exotic insect pest of important landscape and forest trees, is allowing managers to evaluate the relative importance of several different vectors of the Dutch elm disease pathogen.



Blister rust predictive risk models are being utilized by the US Forest Service in their management planning for National Forests in the Central Rockies.

We have determined that external application of methyl jasmonate, a natural product involved in plant response to enemies, increases tree defenses against bark beetle attack and colonization and may have application in tree protection.



Multi-state Project W-1187

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Who is Responsible?

Researchers and Extension faculty at the following State Land Grant Universities and the USDA/FS are involved in this project: CA-B, CO, FL, ID, IA, KY, OH, UT, WI, USDA/FS, CO.

Contact Information

Contact Names and Email addresses for state/federal scientists participating in this project may be viewed at:

http://lgu.umd.edu/lgu_v2/pages/appendixE.cfm?trackID=6336

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We have identified root feeding insects and pathogens as major predisposing factors to attack of red pine by bark beetles in the Midwest. We have identified tree responses that can contribute to resistance against some of these agents in red pine and in Austrian pine. The Wisconsin Department of Natural Resources (WI DNR) is implementing a large scale trial for controlling red pine decline based on our characterization of how this syndrome proceeds.

We have determined that prescribed burning increases tree mortality and the abundance of tree-killing beetles.

We have quantified the efficiency of 4 beetle species in carrying the exotic pitch canker pathogen, which may help to predict the range expansion of pitch canker.

We continue to train undergraduate and graduate students and postdocs, and place them in academia, the public sector (e.g. US Forest Service, State Departments of Natural Resources), and the private sector (e.g. private arboreta). This will guarantee continuous replacement of existing personnel at a time of critical, increased national demand for individuals trained in the identification and management of exotic pathogens and pests threatening our terrestrial ecosystems.



Multi-state research activities are funded by Hatch Act base funding to Land Grant University Agricultural Experiment Stations by the USDA, Cooperative State Research, Education and Extension Service. The W-1187 committee is administered through the Western Association of Agricultural Experiment Station Directors.