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RESEARCH COLLOQUIUM SERIES

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FRIDAY

April 4, 2008

3:30 - 4:30

LECTURE THEATRE

7-150

LIGHT REFRESHMENTS SERVED AT 3:20 PM

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Discovering How Pines Combat Diseases

Pines use both constitutive and inducible defenses against pathogen attack that mediate resistance to disease. Austrian pine (*Pinus nigra*) is typically attacked by fungal pathogens *Diplodia pinea* and *D. scrobiculata*, and is an ideal model system for the study of local and systemic inducible chemical defenses in a conifer. *D. pinea* is a common tip blight pathogen of Austrian pine that, on occasion causes stem cankers. *D. scrobiculata* is a closely related but less aggressive pathogen.

Groups of Austrian pines were exposed to three different fertility regimes were treated by either infecting the trees with *D. pinea*, mock-infecting the trees, defoliating the trees with an insect folivore (*Neodiprion sertifer*), or leaving the trees uninfected. As a measure of systemic resistance, half of the trees were challenge-inoculated with *D. pinea* two weeks after the initial treatment was applied. In two experimental replicates, prior fungal infection lead to systemic induced resistance to the second challenge inoculation. The response was characterized by increased phenolic levels. Insect defoliation increased resistance to the fungal pathogen in one of the trials. Fertility treatments did not affect resistance and only moderately affected defense compound production. A second experiment was conducted to determine the role of terpenes in effective defense responses to pathogens. It revealed that terpenes play important roles in limiting disease progression only once a pathogen is firmly established. A third study that focused on the chemical signal that pines utilize to propagate systemic resistance responses following pathogen infection showed that the signal might be a phenolic compound.

Dothistroma septosporum in a fungal pathogen that is moving into new areas of British Columbia and which threatens lodgepole pine (*Pinus contorta*). Research into this association at UNBC will involve development of a lodgepole pine/ *D. septosporum* model pathosystem for examination of factors that influence the formation of an effective defense response against pathogens. In particular, the impact of water, nutrient, or light availability on host susceptibility will be explored. Such climatic factors will be emphasized because climate change may have an impact on the success of this pathogen in lodgepole pine-dominated forests.