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RESEARCH AND DISCOVERY AT THE UNIVERSITY OF VICTORIA

Nutrition secrets of the evergreen forest

By Yvonne Lund and Monique Jacobs

Ever wonder why trees go to all the trouble of growing leaves only to lose them every autumn? As it turns out, all the work they do to grow those leaves doesn't really go to waste.

In summer, when trees are actively growing through the process of photosynthesis, they are also accumulating nutrients such as nitrogen in their leaves. In autumn, before deciduous trees drop their leaves, the trees move the nitrogen back into the trunk and branches, where it's kept until needed to make new growth in the spring.

This process — the transfer of nutrients to different locations in the tree —is called retranslocation; it's part of a fascinating puzzle that affects the way trees grow. "Some people — like me — want to find out exactly how and why trees do this," says tree physiologist Barbara Hawkins of UVic's Centre for Forest Biology.

Evergreen trees, such as conifers, also move nutrients when they lose their leaves or needles. They seem to have developed mechanisms to control when and where nutrients are sent. Nitrogen in older leaves, for example, can be mobilized and used for new growth.

In the case of conifers, however, leaf drop is not restricted to one particular time of year. In fact, it can take years before some varieties of conifers drop their leaves.

Hawkins' current research, funded by the Natural Sciences and Engineering Research Council, focuses on the nutritional characteristics of conifers.

She conducts some of her nutritional trials on conifer seedlings in the university's greenhouse. The tiny trees — up to 700 per study — are fed carefully balanced doses of fertilizers to try to determine the optimum combination of nutrients for each species.

But it's not just trees grown in greenhouses that interest Hawkins and her students. At a large outdoor site near Campbell River, they have been tracking the growth of naturally regenerated amabilis fir seedlings since 1996, measuring their responses to the interactive effects of light, competing vegetation and differing fertilizer treatments.


Hawkins

At intervals, the trees from both inside and outside sites must be harvested and measured to get a true assessment of their growth. When it comes to scientific research, though, measuring the growth of these seedlings is not as easy as leaning them up against a yardstick or plopping them on a scale.

Instead, Hawkins and her assistants must painstakingly dissect the trees, carefully removing and separating branches, leaves, buds and roots, and sorting these components into first-, second- and third-year growth. Then the components are dried in an oven before being weighed, ground up and chemically analyzed. In this way, Hawkins can determine where the trees are storing their nutrients.

The work of Hawkins and her assistants seeks to explain how these processes of nutrient uptake, transport and utilization help conifers survive the nutrient-poor and harsh environment in which many of them have evolved. By helping to unlock the secrets of their growth, her work will aid in the choice of appropriate tree species and populations for reforestation sites across British Columbia.

SHARPEN YOUR KNOWLEDGE

- UVic's Centre for Forest Biology is a graduate program integrated into the departments of biology and biochemistry & microbiology, emphasizing forest regeneration and forest biotechnology. Graduate students in these programs have the opportunity to work closely with federal and provincial research laboratories and industry. More information: **http://web.uvic.ca/~forbiol/**
- Further information on Dr. Barbara Hawkins, her research projects, and recent publications is available at **http://web.uvic.ca/~forbiol/hawkins.html**
- The B.C. Ministry of Forests Web site is a rich source of information on the province's forests, forest policies, and even includes electronic versions of Forest Service recreation maps. **http://www.gov.bc.ca/for/**

ON THE EDGE OF YOUR SEAT

PUBLIC EVENTS AT UVIC

Town Hall Meetings on UVic's Future
The university invites public input on UVic's plans and priorities for the future
March 27, 7:30 p.m.
Langford Municipal Hall, 2805 Carlow Road
Registration/information: 472-5046
March 29, 7:30 p.m.
Victoria City Hall Council Chambers,
1 Centennial Sq.
Registration/information: 472-5048

UVic Community Festival
Join us to celebrate spring with music, words and ideas at this year's community festival.
This year's festival features:
- Concerts by the UVic Chorus & Orchestra and the UVic Big Band, joined by local secondary school musicians
- Readings by noted UVic authors
- President's Distinguished lecture, "Canada's Role on the World Stage," by Dr. Lloyd Axworthy
- Alumni Garden Adventure at the crystal Garden Conservation Centre
- A full day of events celebrating the tenth anniversary of UVic's award-winning Faculty of Business.

For details, see the full-page ad in today's *Times Colonist* or call 721-UVIC.

SPARK

Yvonne Lund and Monique Jacobs wrote this as participants in the SPARK program (Students Promoting Awareness of Research Knowledge), funded jointly by UVic and the Natural Sciences and Engineering Research Council of Canada.

EDGE/WISE What's a phytotron?

It's a high-tech green-house facility, and one being built at UVic this summer will greatly expand the research capabilities of the university's Centre for Forest Biology.

The facility will provide six computerized, climate-controlled greenhouses to run research experiments focusing on forest regeneration processes from seed production through to early stand development.

With the phytotron (pronounced FITE-o-tron), researchers will be able to manipulate a wide range of environmental variables, including light, temperature, carbon dioxide, humidity and ventilation. Two larger rooms will feature a nutrient mixing system, an overhead running boom irrigation system and black-out curtains.

"This phytotron will open up a whole new horizon of research possibilities," says Dr. Barbara Hawkins, whose research in seedling care and forest regeneration will benefit from the use of these advanced growth environments.

Funding for the phytotron is being provided by the Canada Foundation for Innovation, the B.C. Knowledge Development Fund, UVic and the private sector.