

F I N F O R M A T I O N **O R E S T R Y**

PACIFIC FORESTRY CENTRE

VOL. 15 NO. 2 1988



Pacific Forestry Centre — Victoria



Government
of Canada

Gouvernement
du Canada

Canadian
Forestry
Service

Service
canadien des
forêts

COOPERATIVE EFFORT PREVENTS GYPSY MOTH OUTBREAK IN B.C.

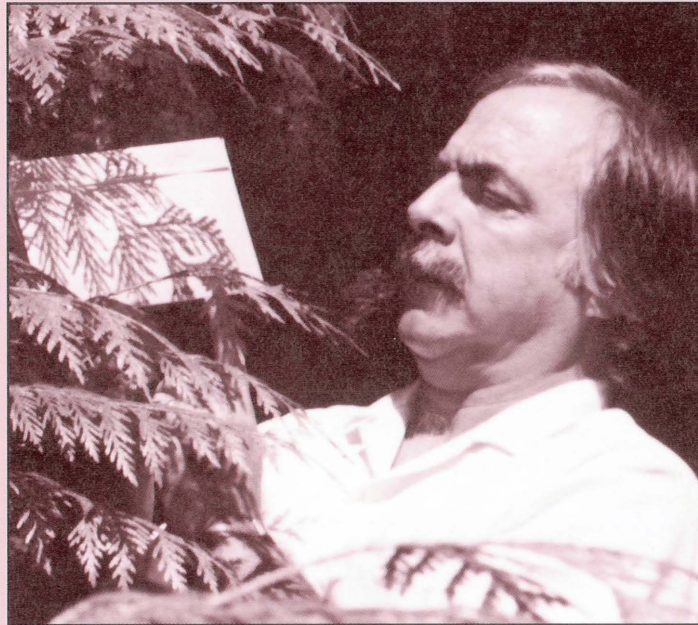
by Wayne Melvin

British Columbia's forests, parks, gardens, and tree lined streets attract millions of visitors every year. Although, it can readily arrive in the same caravans of trailers and campers as the province's other guests, and is equally interested in those same trees and forests, there is one traveller which is unwelcome here — the gypsy moth.

The gypsy moth (*Lymantria dispar*) is responsible for the destruction of forests in other parts of the world, and for many years has posed a threat to British Columbia's trees and forests. So far, however, it has been prevented from making its home in the province, and the Pacific Forestry Centre and other cooperating government agencies and private companies are working together to ensure the gypsy moth does not become established in British Columbia in the future.

The lead agency working on the gypsy moth problem in B.C. is the Plant Health Division of Agriculture Canada. They are assisted in this work by staff of the Canadian Forestry Service and British Columbia Forest Service. To date, the main efforts of this cooperative project have been the establishment of a network of traps to detect the arrival of moths in the province and the prompt treatment of infestations.

The gypsy moth in its caterpillar stage is a voracious feeder and can consume a square foot of leaves every day and, although, it prefers deciduous trees it can also feed on nearby conifers. While most insects have a restricted diet preferring only a few plant species for their food, the gypsy moth has a wide host range which includes more than 500 different trees and



Chief Forest Insect and Disease Survey Ranger, Colin Wood inspects a pheromone trap in Goldstream Provincial Park for gypsy moths. The destructive insects can enter British Columbia aboard campers and trailers arriving from infested areas.

shrubs. A gypsy moth infestation can, therefore, be a serious threat to a wide variety of forest, shade, fruit and ornamental trees. In fact, this forest pest has become a major problem in other parts of Canada, the United States, Europe and Asia.

"It is a pest that is not welcome here," asserts pathologist **Dr. Allan Van Sickle**, head of Forest Insect and Disease Survey (FIDS) at the Pacific Forestry Centre. "Our initial concern in British Columbia is to prevent the spread of the moth in urban centres, however, if it becomes established in British Columbia it could seriously jeopardize exports of lumber and other forest products." As Dr. Van Sickle explains, the main concern for foresters is the potential need for having to certify B.C. wood and wood products exports as being free of gypsy moth eggs, caterpil-

lars and adult moths, a proposition that could prove to be very expensive to the forest industry.

How it got here

Curtailing the expansion of the gypsy moth's territory has become the task of forestry organizations throughout the world. A native of Europe, the moth was introduced to North America by a naturalist attempting to cross the species with silk worms. Because gypsy moths have no natural predators here, the naturalist's attempt at breeding a commercially valuable insect led to the destruction of many trees and forests, not only in his own state of Massachusetts, but throughout the eastern United States and eventually in Canada as well.

The gypsy moth was first spotted in southern Quebec in 1925 and has since spread throughout the southwestern part of that province and the eastern part of Ontario. In British Columbia the first infestation occurred in the Kitsilano area of Vancouver in 1978 when the moths were imported into the province on an egg mass attached to a canoe. This was not the first occurrence in British Columbia, however. In 1911 a provincial inspector discovered a single egg mass on nursery stock that had arrived from Europe. Fortunately, the egg mass, which can easily contain upwards of 500 eggs, was detected before an outbreak could occur.

While the Kitsilano infestation of 1978 was safely eradicated it did serve as a further warning to forestry officials, who have been monitoring the occurrences of the moths in B.C. for the past fourteen years, that an outbreak in B.C. could occur at any time. Recent outbreaks in Washington and Oregon

states have reinforced their concern as have minor outbreaks on Vancouver Island and elsewhere in British Columbia.

Monitoring and trapping

Gypsy moth traps are placed in areas where moths hitching a ride into British Columbia are most likely to be found. These sites are usually located in highly visited areas such as campgrounds and urban centers, but even remote wilderness sites are monitored. The traps use pheromones, which are chemical scents that operate as powerful sex attractants, to lure male gypsy moths towards them often from a considerable distance away. Upon scenting the tiny strip of pheromone treated paper, the male moths fly towards it expecting to find a female to mate with. They then enter the small cardboard carton which contains the pheromone strip and become ensnared by glue coating the inside. Foresters regularly check the traps to determine if there are any moths captured within them.

As Dr. Van Sickle explains, the traps

are not generally used as a treatment procedure, but rather as a method of detecting the moths while they are still in small enough numbers to be easily controlled. For, once entrenched, the problem of eradicating the moth becomes considerably more difficult. Aerial spraying with pesticides has been used to kill the larvae in the past, but, with the growing concern about the effects of chemicals on the environment, there has been a switch to biological agents. One treatment method now being effectively used is to spray the pest with naturally occurring bacteria, such as *Bacillus thuringiensis*, that are selective killers of defoliators such as the gypsy moth.

Although, the male gypsy moth is a strong day time flyer, the female's large body size prevents her from becoming airborne. This leaves the most common method of entry into B.C. being in the form of egg masses which are attached by the females to objects such as packing crates, lawn furniture, and holiday trailers. Inter-provincial travelers such as moving companies, the military and vacationers can thereby unwittingly transport the pest from an affected area to an unaffected region literally overnight.

Public awareness needed

According to Dr. Van Sickle, the best line of defence is early detection and for this public education is the key. "Little can be done," he says, "without the public awareness of the potential for serious damage to B.C. trees and forests by the accidental introduction of gypsy moths into the province." Charged with the responsibility of educating both residents of and visitors to British Columbia about the problem is the Gypsy Moth Committee of the British Columbia Plant Protection Advisory Council.

Along with advising moving companies, military officials and realtors how to detect the tell-tale egg masses, the Committee has also developed a poster to be distributed to the public at large. The poster, Dr. Van Sickle says, will not only educate the public about gypsy moths, but will also help enlist their aid in keeping British Columbia free of this pest.

GIS'89 "A Wider Perspective"

Speakers and exhibitors from Canada, the U.S.A., Scandinavia and from countries throughout the Pacific Rim will be gathering in British Columbia March 7-10, 1989. The event, GIS'89, "A Wider Perspective", is booked into Vancouver's spectacular Trade and Convention Centre and is being billed as the "premier event of the 1989 season."

The show will focus on new applications of Geographic Information Systems (GIS) technology in the forestry and natural resource sectors, with an emphasis on GIS as a tool for decision makers. Workshops, a symposium and a trade show will all feature the latest developments in GIS technology.

Among the topics covered in the symposium will be: Introduction to GIS concepts; Future trends in GIS; Microcomputer-based GIS; The Scandinavian Experi-

ence: A Case History; Applied GIS Technology in Developing Countries; Data Conversion: Alternative Sources and Methods; Organizational Issues in Implementing a GIS; Integrating Satellite Imagery and Map Data.

GIS'89 is being sponsored by the Canadian Forestry Service under the Canada-British Columbia Forestry Resource Development Agreement (FRDA).

For more information contact:

GIS'89, Attn. Bardolf Paul
Suite 1550, 401 West Georgia St.
Vancouver, B.C.
CANADA
V6B 5A1

SCIENTIST SWATS WEEVILS

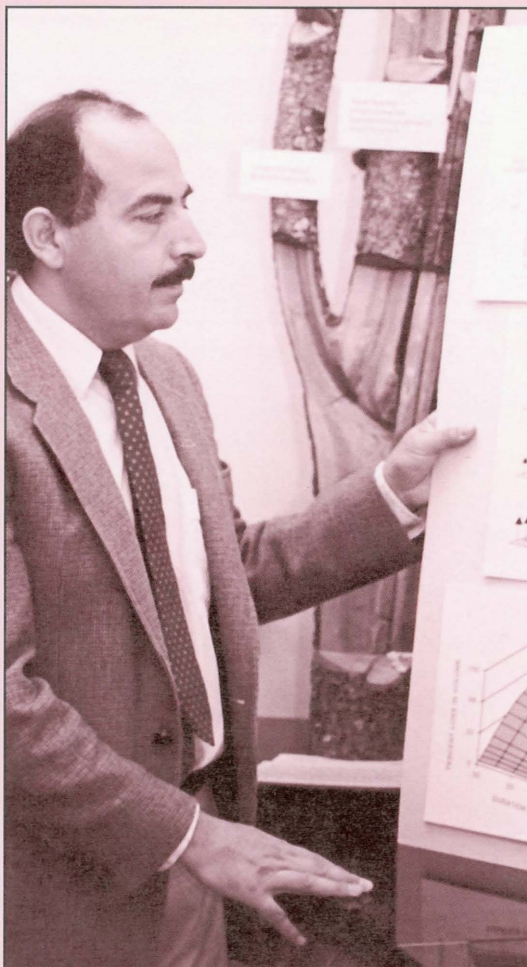
by Wayne Melvin

Spruce trees repeatedly attacked by spruce weevils (*Pissodes strobi*) can be deformed, stunted, suppressed and eventually killed by competing vegetation. Since the damage occurs when trees are young it is difficult to determine the consequences of a current attack on the future yield of a stand.

According to **Dr. Rene Alfaro**, a specialist in insect damage with the Pacific Forestry Centre, "the cost to the forest industry is severe enough to curtail planting of spruce in some areas of British Columbia and to undertake control action in others."

To help combat the problem Dr. Alfaro has enlisted the aid of the Centre's powerful VAX/VMS computer. With the collaboration of computer programmer **Mark Rozen-daal**, a summer student from the University of Victoria, Dr. Alfaro developed a computer program designed to study and simulate the effects of the spruce weevil on productivity of a Sitka spruce plantation. The program, aptly dubbed SWAT, (Spruce Weevil Attack Trials) determines the consequences of weevil attacks and predicts how this damage will ultimately affect lumber quality. The program is the result of 10 years of research by Dr. Alfaro.

Spruce weevils are a common pest of Sitka spruce, white spruce and Engelmann spruce in British Columbia, as well as other parts of Canada and the United States. The adult insects fly to terminal leaders in spruce trees and lay their eggs. The larvae then mine under the bark of the leader causing its destruction. After an attack, trees develop stem defects at the point of injury which substantially reduce the usefulness of the tree. Weevil infestations can be seen throughout the Sitka spruce forests of the lower mainland



Dr. Rene Alfaro, specialist in insect damage at the Pacific Forestry Centre, enlists the aid of the Centre's powerful computers to combat spruce weevils (*Pissodes strobi*).

and Vancouver Island as well as in the Prince Rupert region and in spruces of the British Columbia interior. The attacked trees can be easily identified by their crooked or forked stems.

To assess spruce weevil damage to a forest, and to determine the amount of merchantable timber still left, Dr. Alfaro's SWAT program calculates the reduction in height growth of the trees. Also, using probability equations, the program estimates the number of attacks that will develop into defects (scars, crooks, forks). SWAT then forecasts the

number of logs of various dimensions that might be obtained from a plantation. Foresters using this program will be able to decide on the optimum harvest time for an infested spruce stand and the amount of wastage that can be expected from it. In fact, they can estimate the effects of an infestation as much as fifty or sixty years from now.

"SWAT is a very useful tool in the battle against the spruce weevil because it allows sound pest management," says Dr. Alfaro. "However, we also wanted a program that could be used for technology transfer and for field demonstrations of weevil damage." To accomplish this goal Dr. Alfaro again enlisted the help of students. This time his SWAT team consisted of computer technology students **Don Gourlay, Judith van den Broek** and **Pat Gleeson** from Camosun College. The challenge Dr. Alfaro presented them was to transfer the program from the large main-frame computer at the Pacific Forestry Centre to a single floppy disc that could be run on a portable computer anywhere it is needed. Work on their portable version continues.

The SWAT program is currently calibrated only for the Nitinat Lake region of Vancouver Island, however, as Dr. Alfaro states: "Calibration for other regions is certainly possible." Meanwhile, he is already designing other applications for the program.

Plans include the development of an economic module that will allow foresters to calculate the financial return from spruce plantations suffering from different levels of damage.

The overall significance of SWAT is that it allows foresters to apply control only when an economic loss is forecast, thus fulfilling the main premise of integrated pest management (IPM). According to Dr. Alfaro, "the financial impact of the SWAT program for the forest industry in British Columbia can be very substantial."

NEW APPOINTMENTS

Dr. R.C. Bob Dobbs, A/Director General, Canadian Forestry Service, Pacific & Yukon Region, is pleased to announce the following new appointments to the staff of the Pacific Forestry Centre.

Abul K.M. Ekramoddoullah has joined the Forest Protection program to work on the white pine blister rust project. He will be analyzing the protein and polypeptide profiles of resistant and susceptible pines with a view to identifying the unique proteins in resistant pines. The isolation and characterization of these unique proteins is expected to pave the way for the genetic engineering of the resistant pines.

Prior to joining PFC, Dr. Ekramoddoullah was a member of the department of Immunology and the Medical Research Council group for allergy research at the University of Manitoba. He lead a project relating to the physio and immunochemical characterizations of grass pollen proteins - the

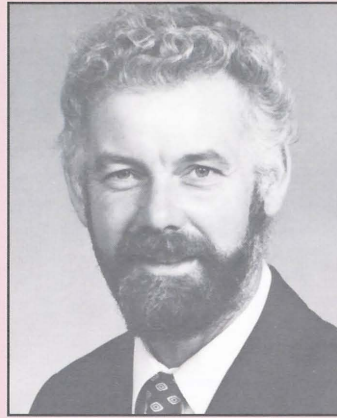


Abul K. M. Ekramoddoullah

causative agent of hay fever. He made a major contribution to the field of pollen allergy.

Doug Pollard has returned to join PFC as Project Leader of the Growth and Biology program - Douglas-fir ecosystems (Shawnigan Lake project). His own research will concentrate on the physiology of tree growth on canopy development and biomass distribution in response to fertilization and thinning.

In 1982 Dr. Pollard was assigned to Policy and Planning, CFS headquarters,



Doug Pollard

where he undertook policy development and analysis of issues relating to research, environment and conservation. During this period, he conducted an in-depth review of climate change and its implications for forestry, and was part of the team responsible for preparing the national Forest Sector Strategy for Canada. From 1967 to 1982, Dr. Pollard's research focussed on the physiological basis of yield in various tree species at Petawawa National Forestry Institute and at PFC.

South Moresby Forest Replacement Fund Established

A \$24 million Forest Replacement Fund - part of the South Moresby National Park agreement - was recently put in place when Federal Forests Minister Gerald Merrithew and B.C. Forests Minister Dave Parker each contributed \$12 million on behalf of their governments.

The money will be used for forest management over the next eight years in parts of the Queen Charlotte Islands outside the park boundaries and on British Columbia's coast to increase the growth potential of the forest resource.

The increased growth is expected to offset the loss of productive forest land resulting from the creation of the park. The fund, which will be used to rehabilitate sites, fertilize and space stands and for forest research, will be administered by federal and provincial representatives.



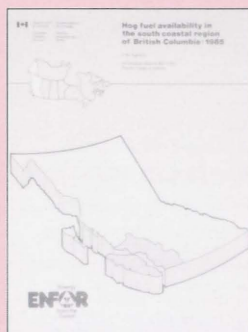
Assistant Deputy Minister Appointed

Thomas E. Lee has been appointed Assistant Deputy Minister, Forestry Operations, Canadian Forestry Service. Mr. Lee was formerly Assistant Deputy Minister of Timber and Land Marketing with the British Columbia Ministry of Forests and Lands.

In his former position Mr. Lee was responsible for the sale and disposition of all lands and forest resources of the province, acted as Chairman for the Forest Research Review Committee and also served as a provincial representative on the Board of Directors of Forintek.

He assumed his new position June 1, 1988.

PUBLICATIONS



Hog fuel availability in the south coastal region of British Columbia: 1985

P.W. Appleby

This ENFOR study updates work funded by the British Columbia Wood Waste Energy Coordinating Committee in 1977 (Reid, Collins and Associates 1978), which investigated hog fuel availability in the south coastal region of B.C.

BC-X-297

The spruce beetle *Dendroctonus rufipennis* (Kirby): An annotated bibliography 1885-1987

D.A. Linton and L. Safranyik

The bibliography has been restricted to published reports and some theses, most of which are readily available.

BC-X-298

Forest tree seed certification in Canada under OECD scheme and ISTA rules: 1981-1985 summary report

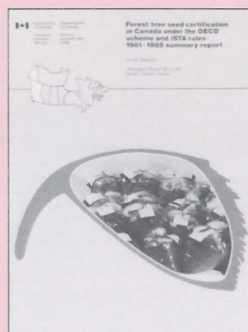
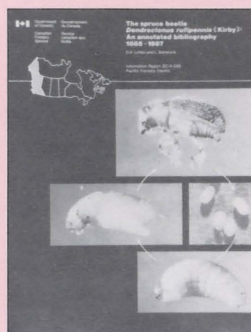
D.G.W. Edwards

A summary of forest tree seed certification under these two programs.

BC-X-299

Reports and publications 1987

A listing of all published reports and papers by the staff of the Canadian



Forestry Service, Pacific & Yukon Region (Pacific Forestry Centre).

BC-X-300

Impacts of forest harvesting on physical properties of soils with reference to increased biomass recovery - a review

J.T. Standish, P.R. Commandeur and R.B. Smith

Literature dealing with physical soil impacts of forest harvesting and the subsequent effects on tree growth, particularly material published since 1970, is summarized, and the relevance of research results to increased biomass harvesting in B.C. assessed.

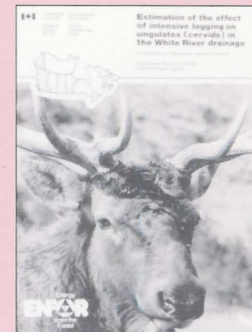
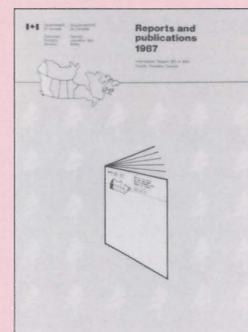
BC-X-301

Control of *Armillaria* and *Phellinus* root diseases: 20-year results from the Skimikin stump removal experiment

D.J. Morrison, G.W. Wallis and L.C. Weir

The Skimikin experiment, which combined inoculum removal with a species trial, is the oldest of its type in western N. America. This report describes the history of the experiment, tree mortality and growth, current maintenance and management of the experiment and discusses implications of the results for management of diseased sites.

BC-X-302



Estimation of the effect of intensive logging on ungulates (cervids) in the White River drainage

G. Schuerholz, P. McNamee and M.R.C. Massie

A generalized ungulate population module was developed to estimate sustainable populations of elk, moose and deer before and after salvage logging of beetle-damaged Lodgepole pine in the White River area of the E. Kootenays. The results show that salvage logging in the area will significantly enhance winter ranges for elk, deer and moose.

BC-X-303

Forest Insect and Disease Conditions in Canada 1986

This is the sixth in a series of national annual reports of the Forest Insect and Disease Survey and contains data and information on pests considered to be most significant in terms of their present or potential economic, sociological or environmental impact.

Canada's Forests 1987

A leaflet providing statistics on such categories as area classification; wood volumes and maturity class; primary forest production; forest industries; exports; world forestry data, etc.

Can Western White Pine Be Saved?

by Wayne Melvin

Priced for its beauty by furniture makers and interior decorators, western white pine is one of British Columbia's most valuable tree species. Tragically, this species has been decimated by a disease accidentally introduced to the province from Asia more than seventy-five years ago.

Foresters, who have been combating the disease in B.C. since its first outbreak in the province, report that, despite their numerous attempts at control, white pine blister rust (*Cronartium ribicola*) has destroyed entire stands of western white pine throughout British Columbia and the northwestern United States. The fungus is introduced to a pine tree through its needles then attacks the inner bark of its branches where cankers develop. These cankers result in the killing of branches, and, once the trunk is girdled, death to the entire tree occurs. Disease weakened trees are also subject to further damage by bark beetles and other insects, slugs, mammals, and secondary fungi. The problem is still considered so severe that some forest industry interest groups are pessimistic about the possibilities of saving the species.

However, in spite of the severity of the problem, some forest management officials and forest companies believe that western white pine can be saved. One reason for optimism is that since 1950 the species has been naturally developing strains of disease resistant trees. Furthermore, various government agencies and private companies have been cooperating to improve the chances of survival for western white pine.

Last May the Western Pine Management Symposium was held in Nakusp, British Columbia. Jointly sponsored by the Canadian Forestry Service, the British Columbia Ministry of Forests, and Westar Timber, the forum brought together 150 foresters, managers and

researchers from both Canada and the United States. Presentations were made by white pine experts from the Canadian and British Columbia Forest Services, the National Research Council, the U.S. Forest Service and Potlatch Corporation.

Dr. Richard Hunt, a plant disease specialist, was one of the seven delegates from the Pacific Forestry Centre in attendance at the conference. He was particularly impressed with some of the reports from American researchers speaking in Nakusp who have been successful in developing rust resistant white pine. He says, "We are very optimistic that the Americans have developed resistant trees, and we are now in the process of selecting resistant pines from our own stands."

Kelly Finck, a forester and plantation pest specialist with the Pacific Forestry Centre, acts as project assistant for the FRDA contract which funds one of the demonstration areas visited by delegates. The site is used to monitor the effects of trimming, spacing, and canker excising on the spread of the

White pine blister rust has destroyed entire stands of western white pine

white pine rust. Although, he says the experimental results cannot be fully evaluated yet, he shares Dr. Hunt's optimism about the future of western white pine.

"The conference was extremely worthwhile," Finck says, I am very enthusiastic about some of the research that was reported there. For one thing, if we can finally solve the white pine problem then we not only save that species, but we may have found a solution to one of the province's other major tree disease problems as well. Western white pine shows resistance to *Phellinus Weirii* root rot and could be planted in areas where that disease is now a problem."

MIXEDWOOD SYMPOSIUM

The tremendous potential for forestry investment in northeastern British Columbia is the reason for an upcoming conference in Fort St. John. "Managing Change in Western Boreal Forests" will be the theme of the second annual Northern Mixedwood Symposium scheduled for June, 1989. The three day event is being sponsored by the Canadian Forestry Service under the Canada-British Columbia Forest Resource Development Agreement.

Speakers from Europe, the U.S.A. and Canada will discuss the latest harvesting techniques, forest utilization and silviculture in the

mixedwood and hardwood stands of boreal and sub-boreal forests. The 200 participants, expected to attend the symposium at the Northern Lights College, will also be able to participate in post-conference tours of local stands of mixedwood and hardwood stands to view first-hand the strong, forestry investment potential of the Fort St. John area.

For more information contact:
Walter Matosevic
Canadian Forestry Service
514-550 Victoria St.
Prince George, B.C.
V2L 2K1
(604) 561-5350

World's Forest Scientists Met in B.C.

Forest scientists from fourteen countries around the world convened a conference in British Columbia last August. Delegates to the convention, hosted by the Canadian Forestry Service, examined the problem of forest diseases which cause damage and mortality throughout the world's forests, and are responsible for hundreds of millions of dollars in timber losses every year. The scientists came from across Canada and the United States, as well as Australia and Japan, and other forest dependent countries throughout Europe, Africa and Asia.

The 1988 conference of the International Union of Forest Research Organizations (IUFRO), Working Party on Root and Butt Rots met in Vernon from August 9-12 and Victoria from August 14-16. Having two venues permitted delegates to observe and discuss both interior and coastal root disease problems.

The ninety delegates to the conference were scientists and other forest disease specialists who study and advise on the biology, recognition and control of root diseases in commercial forests, rubber and palm tree plantations and other crops. The fungi responsible for root and butt rot diseases occur worldwide, and researchers are hoping that by sharing information and treatment techniques they can substantially reduce the wastage caused by these diseases.

In British Columbia tree root diseases are a major concern for forestry officials, scientists and forest companies, particularly in stands of high value species such as Douglas-fir. According to a Canadian Forestry Service estimate, the four most common root diseases account for a total loss of more than 3 million cubic metres of marketable timber in the province — enough wood to build 140,000 homes. This damage is mostly due to reduced productivity of infected sites, and is especially serious in young, second-growth forests.

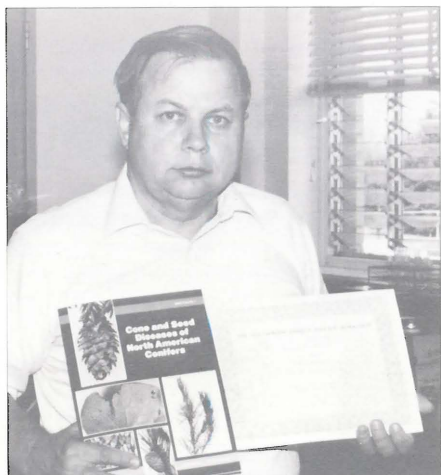
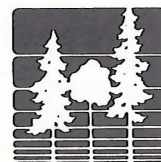
Forest managers are studying methods of earlier detection, as well as treatment programs that include removal of diseased roots and stumps, and thinning of stands. The most promising field is the planting of disease resistant trees, or the selection of them during thinning operations.

Previous IUFRO conferences have been held in Australia, West Germany, the southeastern United States, Denmark and Britain. The conference program in British Columbia included presentations of more than seventy scientific research papers on all aspects of root diseases.

The next meeting will be held in Sweden in 1993, and will be chaired by **Dr. Duncan Morrison**, of the Pacific Forestry Centre, who was newly elected chairman of the group.



The Pacific Forestry Centre recently played host to Dr. Alexander S. Isaev, the newly appointed Chairman, USSR State Forest Committee. The visit to the Centre was an extension to his trip to Vancouver where he attended the XVIII International Congress of Entomology. Shown, from left to right is, back row: Dr. Les Safranyik, Senior Research Scientist; Dr. Jack Sutherland, Senior Research Scientist; front row: Dr. Isaev; Nadia Larionova, Interpreter, USSR; and Dr. Bob Dobbs, Acting Director-General of the Centre.



Dr. Jack Sutherland senior research scientist with the Pacific Forestry Centre, was recently presented a certificate for the Outstanding Forest Pathology Paper by the Southwide Forest Disease Work Conference, an organization which honors authors of outstanding papers in research and extension categories. The prestigious award was presented to Dr. Sutherland and co-writer Dr. Thomas Miller for their publication "Cone and Seed Diseases of North America."

Information FORESTRY

Published by

PACIFIC FORESTRY CENTRE
CANADIAN FORESTRY SERVICE
506 WEST BURNSIDE ROAD
VICTORIA, B.C. V8Z 1M5
388 - 0600 Loc. 610

Editor : Elaine Teske
Design : John Wiens

Canada