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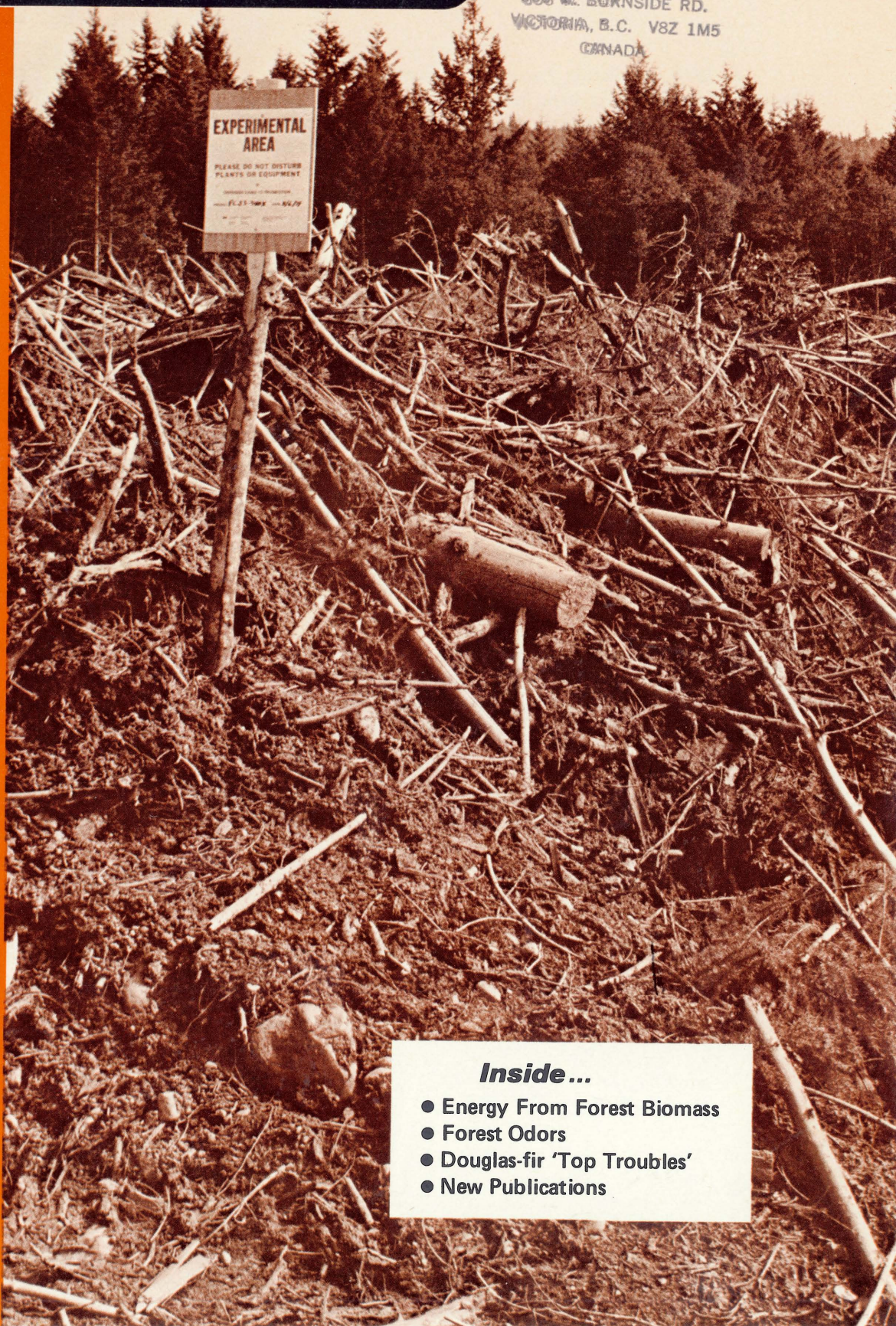
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Canadian Forestry Service,
Pacific Forest Research Centre,
506 West Burnside Road,
Victoria, B.C.,
V8Z 1M5.

Vol. 6 No. 2
Summer 1979

Inside...

- Energy From Forest Biomass
- Forest Odors
- Douglas-fir 'Top Troubles'
- New Publications

Is Energy from Forest Biomass Feasible?

In 1978, the Pacific Forest Research Centre let a contract to Paul H. Jones and Associates of Vancouver to determine the availability of forest biomass on Vancouver Island, and the feasibility of using this material to generate electricity. The results of this study, which was completed in March, 1979, indicate a substantial amount of material available for energy generation.

The consultant estimated that 195 million cubic feet (5.53 millions m^3) of material is available on an annual basis on Vancouver Island. This is composed of 92% logging residues, five % red alder and three % pre-

commercial thinning.

Four sites: Port McNeill, Campbell River, Lake Cowichan, and Port Alberni were identified as potential sites for biomass generators on the basis of cost, land availability and possible tie-ins with the B.C. Hydro transmission grid. Installations built at these sites would have a total capacity of 756×10^6 kilojoules (210 MW). The four plants listed above would use 45% of the available biomass, and have a fuel cost of 20 mills per kwh (28 cents per kilojoule). This cost compares favorably with the fuel costs of coal. The report of this study is forthcoming as Report BC-X-197, and is available from the Pacific Forest Research Centre.

FUTURE STUDIES

As a result of this study, PFRC has let two further contracts. The first of these is to Forestal International Ltd., Vancouver, for \$184,939 for the testing and modification of machinery to make transportation of biomass to a utilization site more economical. The machines will reduce the varying sized pieces of logging slash to a more uniform size, which should be more economical to handle, transport and store.

The second contract, to T. McDaniels Research, Vancouver, for \$62,000, will analyze the socio-economic effects of forest biomass energy use on the forest resource, industry and government.





Deodorant Protection In the Forest

Anyone who has walked the outdoors has smelled the various characteristic odors of the forests.

Insects living in the forests have a highly developed sense of smell, one that discriminates among the different components within the complex mixture permeating the air. The insects respond to these odors in order to find their mates, living quarters and food. They also produce odors (pheromones) themselves that cause similar responses to ensure the success of vital biological functions such as reproduction and survival.

In the complex mixture of odors are those that elicit an attractive response and those that repel. The latter usually act in a protective

capacity, regulating attack density and warding off enemies. In comparison to attractants, those that repel are not as specific.

In daily life, we are constantly aware of products that purportedly create attractive responses (perfumes); others that conceal unpleasant odors (deodorants, air refreshers) or that produce an avoiding reaction (mosquito repellents). Similar tactics are used in forest pest management.

ODORS THAT PROTECT

The main objective of our current research is to find a product that protects felled logs and living trees from insect attack, one that is not

harmful to the environment and which leaves the insects the option to go where their activity has no significant economic impact. Extractives of sulphate pulp waste are being tested in the field to try to camouflage odors that normally attract the flying beetle population and to create a repellent atmosphere around the logs to discourage insects from landing and entering the bark.

Results so far indicate that the beetles avoid the treated logs and that attacks are considerably delayed and reduced.

We hope, in the near future, to achieve an effective control capability, particularly by combining the use of repellents with a population reduction scheme, using synthetic pheromones. ●



NEW PUBLICATIONS

FOREST INSECT AND DISEASE CONDITIONS

A series of forest insect and disease conditions throughout the province are catalogued.

BC-X-190
Vancouver F.R.

BC-X-191
Nelson F.R.

BC-X-192
Kamloops F.R.

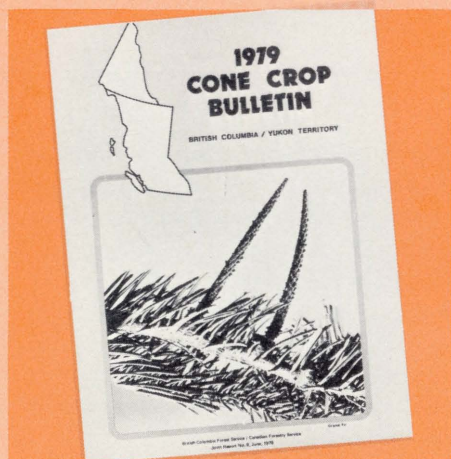
BC-X-193
Prince George F.R.

BC-X-194
Prince Rupert F.R.

BC-X-195
Cariboo F.R.

BC-X-196
Yukon Territory

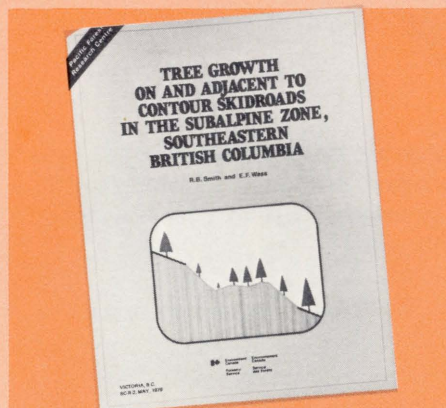
Copies of these publications may be obtained by filling out the enclosed card and returning it to the Information Office, Pacific Forest Research Centre, 506 West Burnside Rd., Victoria, B.C. V8Z 1M5.



1979 CONE CROP BULLETIN

This bulletin is intended to be a comprehensive record of the past cone crops and should provide a base for studies of cone crop periodicity so that through understanding of the reproductive process, reasonably accurate and timely predictions of cone crops could be made.

CFS/BCFS Joint Report No. 9

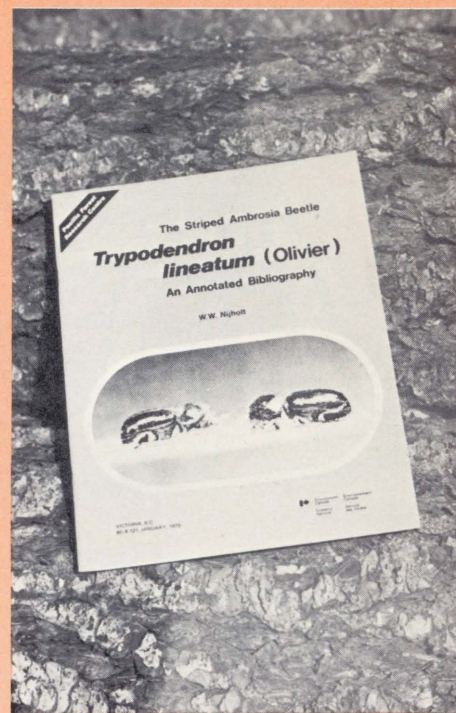


TREE GROWTH ON AND ADJACENT TO CONTOUR SKIDROADS IN THE SUBALPINE ZONE, SOUTHEASTERN BRITISH COLUMBIA

R.B. Smith and E.F. Wass

An examination of natural regeneration of Engelmann spruce and subalpine fir in steep clearcuts established on, above and below contour skidroads in southeastern British Columbia.

BC-R-2

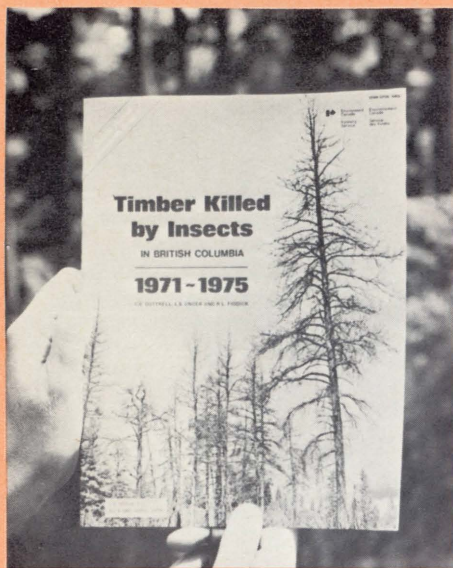


THE STRIPED AMBROSIA BEETLE *TRYPODENDRON LINEATUM* (OLIVIER) An Annotated Bibliography

W.W. Nijholt

This bibliography contains 208 references, and an author and subject index. Its purpose is to provide a comprehensive background for the study of the striped ambrosia beetle, as well as easy access to information of practical use to those in forestry practices.

BC-X-121

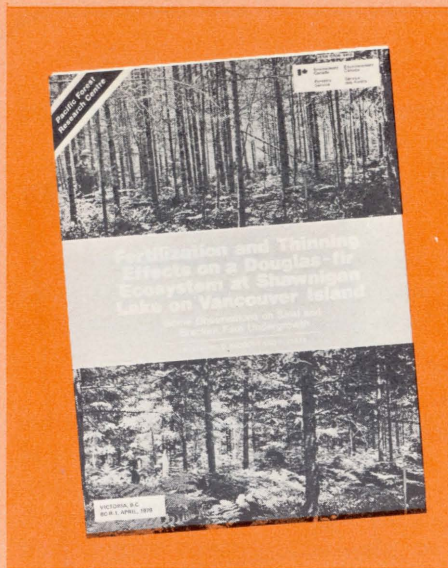


TIMBER KILLED BY INSECTS IN BRITISH COLUMBIA, 1971- 1975

C.B. Cottrell, L.S. Unger and
R.L. Fiddick

During 1971-75, bark beetles continued as the major cause of tree mortality in British Columbia. An enlightening account of the damage caused by defoliating insects in B.C.

BC-X-189

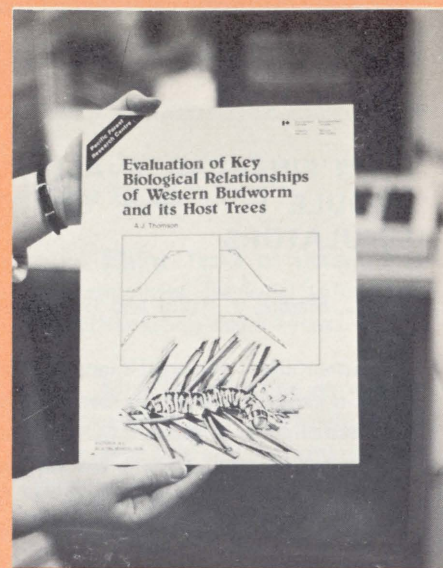


FERTILIZATION AND THINNING EFFECTS ON A DOUGLAS-FIR ECOSYSTEM AT SHAWNIGAN LAKE ON VANCOUVER ISLAND

W. Stanek, D. Beddows and D. State

The results of this study are interesting in that they indicate the important role undergrowth could play in the ecology of a forest community.

BC-R-1



EVALUATION OF KEY BIOLOGICAL RELATIONSHIPS OF WESTERN BUDWORM AND ITS HOST TREES

A.J. Thomson

Factors influencing the population dynamics of the western budworm, *Choristoneura occidentalis*, are reviewed, and the mathematical functional form of important relationships and linkage of the relationships in a simulation model are described.

BC-X-186

Pest Leaflets



WESTERN CEDAR BORER

R.W. Duncan

A brief history, including damage, detection and control, of this common wood borer.

FPL 66

BLACK STAIN ROOT DISEASE IN BRITISH COLUMBIA

Richard S. Hunt and Duncan J. Morrison

Black stain root disease, first reported in British Columbia in 1976, has since been cited in many areas in southern B.C., on the Coast and in the Interior. A brief report on what to look for and how to control this fungus.

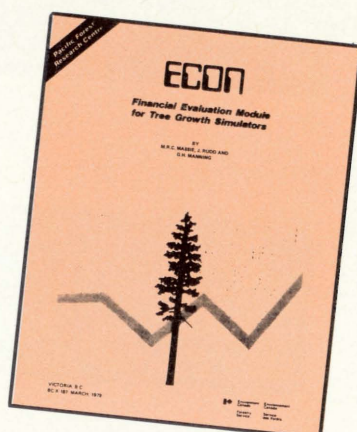
FPL 67

Economics

ECON FINANCIAL EVALUATION MODULE FOR TREE GROWTH SIMULATORS

M.R.C. Massie, J. Rudd and G.H. Manning

Implementation of forest management regimes is generally based on favorable financial feasibility evaluation. ECON is a routine which can be used to test the physical outputs of tree growth simulation for financial feasibility, and uses a technique closely related to the "forestry fund" approach.



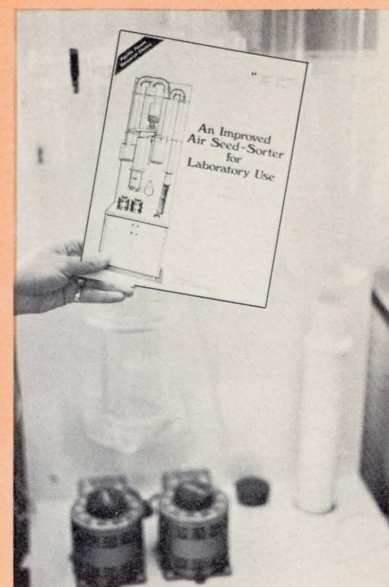
BC-X-187

ENERGY FROM FOREST BIOMASS ON VANCOUVER ISLAND

Paul H. Jones & Associates Limited,
Vancouver, B.C.

A study was performed on Vancouver Island to determine the availability and cost of forest biomass for energy production. See article entitled "Is Energy from Forest Biomass Feasible?" on page 2 for more details on this report.

BC-X-197

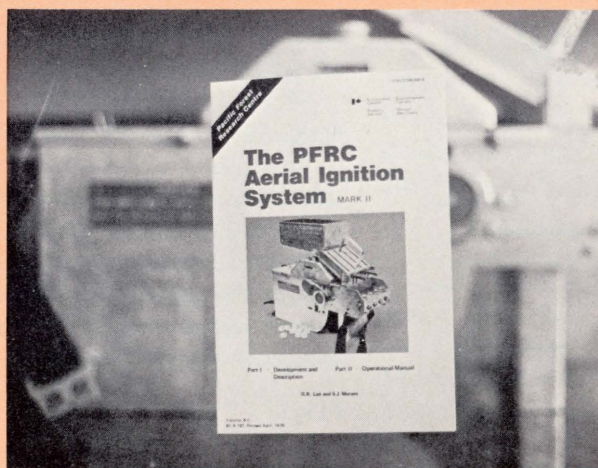


AN IMPROVED AIR SEED- SORTER FOR LABORA- TORY USE

D.G.W. Edwards

This report highlights the operation and construction of a compact aspirator-type cleaner and sorter for conifer seeds. It also provides an indication of how an earlier device has been modified and offers suggestions for further improvements.

BC-X-188



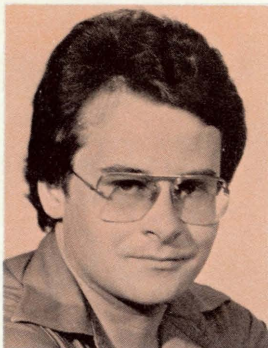
THE PFRC AERIAL IGNITION SYSTEM - MARK II

G.R. Lait and S.J. Muraro
(27-page illustrated booklet)

A potassium permanganate-ethylene glycol incendiary device developed in Australia has been modified for use in an ignition system appropriate to Canadian use. This publication provides background information and a description for the incendiary device and dispenser as well as details on installation and operational procedures.

BC-X-167 (Revised)

Dr. T.G. (Terry) Honer, R.P.F., A/Director, Pacific Forest Research Centre is pleased to announce the following two recent appointments to PFRC:



Alex
Gardner



Elaine
Teske

Alex Gardner

Alex Gardner, a 25-year-old native of Port Hope, Ontario, has been appointed forestry officer to the PFRC.

In his new position, he will assist the Yukon Lands and Forest Service in reforestation and with the technical details of forest crop production. He will also undertake responsibilities for the container reforestation program in the Prince George region.

Mr. Gardner is an honors B.Sc. (Forestry) graduate of Lakehead University, Thunder Bay, Ontario. He was formerly employed with the Canadian Forestry Service at Prince Albert, Sask.

New Appointments

Elaine Teske

Elaine Teske of Ottawa has been appointed Regional Information Officer replacing Tegid Jones.

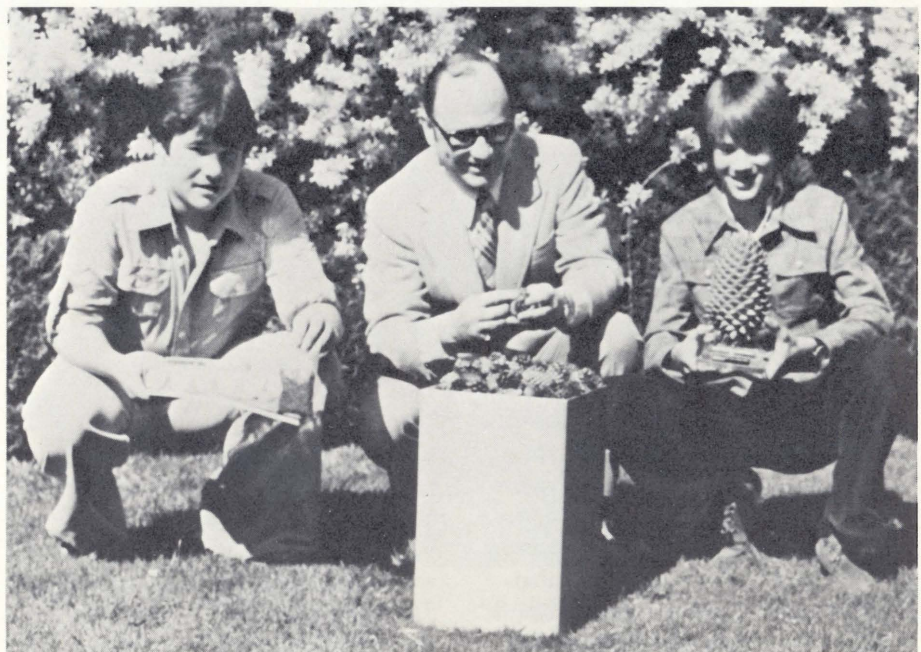
Mrs. Teske will be responsible for developing and implementing the public relations and information program for PFRC, which includes media relations, writing, editing and publishing public information documents, as well as maintaining liaison with the general public, industry and other government agencies.

Mrs. Teske is a Bachelor of Journalism graduate from Carleton University and was an Information Officer with the federal department of Fisheries and Oceans prior to coming to PFRC. ●

..and the winners are..

Winners of the "Count the Seeds" and "Count the Cones" contests, held during the recent PFRC Open House, were 14-year-old Robin Carey (It) and 12-year-old Roy Spanier, shown with Acting Director, Dr. T.G. Honer, who presented the prizes.

A large plastic bag containing 18,857 evergreen seeds -- officially counted electronically -- and a box containing 745 seed cones were displayed.



Robin, a student at Colquitz Junior Secondary, guessed 18,750 seeds and Roy, a student at Lakehill School,

estimated 750 cones, winning for them a Coulter pine cone mounted on a stand and a display of 18 native seeds. ●

'Top-Troubles' in Young Douglas-fir Plantations

Left - Dieback on young Douglas-fir

Below - Typical annual canker with pycnidial fruiting bodies.



The increased frequency of "top-troubles" in young Douglas-fir plantations is probably a reflection of the somewhat artificial conditions created in "man-made" forests.

Dieback is rarely caused primarily by a pathogenic fungus, although there is usually one or more species of fungi associated with this type of disease. It is usually when site characteristics combine with environmental factors (weather) to produce weakening or predisposition in young trees that the pathogenic fungi are able to gain entry to the tissues and produce dieback. The symptoms of dieback may begin without fungus involvement, but the affected tissues are often quickly colonized and killed by fungi.



Several well recognized weather conditions may bring on dieback in young trees, such as summer drought, winter drying and late spring frosts. These factors have been well-documented and frequently correlated with site factors in disease, but outbreaks of dieback do occur in which the basic causal factor has not, with certainty, been determined.

A check of all climatic factors may reveal no unusual overt conditions; site characteristics may not appear different from nearby areas that are unaffected.

UNKNOWN SPECIES

The pathogenicity of numerous recognized microfungi that occur in these outbreaks has been assessed. Almost yearly, however, there are species appearing that are completely unknown as to range, ecology and virulence. Fortunately, we have no introduced bark fungi running rampant on Douglas-fir; all appear to be "native" species which normally function in natural thinning and branch pruning, and become troublesome only in the stressed trees.

Research is continuing into both the environmental and biotic unknowns in this die-back complex. By continued observation and recording of the details of dieback occurrence, a better understanding of the interplay of the factors will come. Although direct control measures are seldom indicated in these outbreaks, the application of new knowledge at a management level will help to reduce losses to top-killing diseases. ●