ANNUAL REPORT OF THE OFFICER-IN-CHARGE, FOREST BIOLOGY (PATHOLOGY) LABORATORY, CALGARY, ALBERTA, FOR THE FISCAL YEAR ENDED MARCH 31, 1958.

by

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FOREST BIOLOGY LABORATORY

CALGARY, ALBERTA

CANADA

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

FOREST BIOLOGY DIVISION

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CONTENTS

GENERAL REVIEW

Noteworthy developments in the fiscal year ended March 31, 1958, the sixth year of operations of the Forest Biology (Pathology) Laboratory, Calgary, Alberta.

Establishment

No new positions were added to the establishment of the laboratory during the year, rather the year featured a consolidation of personnel resources following the aquisition of six positions the previous year. Dr. V.J. Nordin, formerly Officer-in-Charge of the laboratory, was posted away from Calgary in January to assume the duties of Associate Chief (Pathology), Forest Biology Division, Science Service, Department of Agriculture, Ottawa. His successor, Dr. G.P. Thomas, was transferred to Calgary from the Forest Biology (Pathology) Laboratory, Victoria, British Columbia, effective April 1, 1958. The nature of Dr. Nordin's new duties will assure his continued association with the Calgary laboratory.

Cooperation with the Alberta Department of Lands and Forests

The plan of cooperation outlined in the last previous Annual Report with respect to cull studies was put into operation during the year, namely, the assignment of a graduate forester and supporting field crew by Provincial authorities and the assignment of a Forest Biology Assistant by the laboratory to the cull program. Work during the year involved estimates of rot incidence and cull in aspen and balsam poplar through sampling of about 400 trees in three areas in the Lesser Slave Lake region. Over-all direction for the program was provided by a research officer of the laboratory.

Continued support of the Forestry Training School operated by the Alberta Department of Lands and Forests at Seebe, Alberta, was once again provided by the Laboratory in the form of a six-hour summary of forest disease information pertinent to Alberta forests given by one of the research officers of the laboratory. This form of assistance to Provincial forestry personnel has resulted in an increased awareness on their part of forest diseases and has facilitated the reporting by such persons of disease situations to the laboratory.

New Projects

1. Studies on the Atropellis canker of lodgepole pine. (A revision of the project entitled "Etiological, host-parasite, and ecological investigations of the Atropellis disease of lodgepole pine").

(Project leader: J.C. Hopkins)

This project is designed to complete the verification of the pathogenicity of Atropellis piniphila (Weir) Lohman and Cash in addition to studying the physiological aspects of ascospore germination, to observing ascospore output as it may be affected by climatic considerations, to establishing the rate of canker development, to determining the age of cankers at which apothecial fruiting occurs, and to establishing the histological relations that exist between the pathogen and host tissues.

2. Ecology of branch stub infection in aspen. (A revision of the project entitled "The influence of site on variations in decay of aspen").

(Project leader: D.E. Etheridge)

This project is designed to assess the role of dead branches in rot establishment in living aspen trees. Particular attention is being paid to the types of branches with respect to their size, location, internal and surface moisture conditions, and age. The possible influence of forest site on branch mortality and the persistence of dead branches will also be considered as will the succession of attack by heartrot fungi. The over-all objective of the study will be to provide a basis for a pathological site classification for aspen in northern Alberta.

Research Program

Fungus flora of living lodgepole pine stems and its possible role in decay development.

(Project leader: R.J. Bourchier)

Preliminary emphasis in the larger study of the decay potential of certain of the Fungi Imperfecti in lodgepole pine stems has been placed on the identification and taxonomic description of the more commonly isolated members of this group of fungi from pine. Of the total of about 54 different "imperfects" obtained in culture 19 have received special attention because of their frequent occurrence in lodgepole pine. The taxonomic phase of the study will continue before much detailed work is done on the pathogenicity aspect of the study.

The influence of site on variations in decay of aspen.

(Project leader: D.E. Etheridge)

Examination of aspen from the viewpoint of a possible variation in the extent of heartrot between forest sites showed such variations to occur but that they are much less pronounced than those encountered for other species, notably subalpine spruce. Hence dry sites are more conducive to heartrot of aspen than are moist sites. Tests of the moisture content of aspen heartwood in trees of different sites showed very little variation. On the other hand, the moisture content of aspen heartwood was found to decrease appreciably with increasing height above ground on all sites. Since it would appear that intensive study of the ecology of branch stub infection could provide a means to explain the difference in heartwood decay that exists between sites, work is proceeding to this end.

Etiological, host-parasite, and ecological investigations of the Atropellis disease of lodgepole pine.

(Project leader: J.C. Hopkins)

This study was designed to obtain information relative to infection and subsequent canker development of Atropellis sp. in lodgepole pine. A critical review of the literature, however, revealed an immediate need to clarify the present unsatisfactory taxonomic status of the causal fungus. This is being done. In the meanwhile observations have revealed that tree age, stand density, and stand composition are factors influencing the incidence of the disease. Cultural studies have shown a similarity between the fungus isolated from stained wood and the fungus grown from single ascospores of Atropellis piniphila (Weir) Lohman and Cash. Cultural characteristics of the fungus isolated from wood and physiological studies of it, including temperature-growth relationships and nutrient requirements, have been made (manuscript in preparation). Mycelial inoculations of the fungus made into lodgepole pine indicate a slow rate of growth similar to that of the fungus in culture.

Red stain and decay of lodgepole pine.

(Project leader: V.J. Nordin)

Further information on the distribution of red stain and associated decays in lodgepole pine was obtained in examinations made of 140 trees in the Grand Prairie region of Alberta. More than half of the isolations made from wood in the firm red stain condition proved to be Stereum pini and about one third prov d to be Fomes pini. These data substantiate earlier results obtained in other parts of Alberta.

Decay of slash of lodgepole pine.

(Project leader: V.J. Nordin)

This is a long-term project involving biennial observations of the succession of wood-rotting fungi into lodgepole pine slash of different sizes and resulting from different systems of logging. Spring and fall examinations of tagged material were carried out as part of the continuing program.

Forest Disease Survey

Conduct of the Forest Disease Survey was augmented during the year by the full-time services of a Forest Biology Assistant. The activities of this man, together with those of the Survey-Officer-in-Charge, has enabled the maintenance of a satisfactory level of liason with Forest Biology Rangers of the laboratory. Forest Biology Rangers continue to provide the detection aspect of the survey with re-examinations of disease outbreaks and detailed damage appraisals being carried out by disease survey personnel. A recession of winter injury and needle cast was experienced for lodgepole pine during the year in areas of former high damage. Knowledge of the distribution and intensity of infection by dwarf mistletoe on lodgepole pine was extended in the reporting of the parasite on more than 80% of the trees in some stands near Caroline, south of Rocky Mountain House.

PERSONNEL AND FUNCTIONS

Name and Classification	Period Employed	Functions and Projects
Professional		
Bourchier, R.J. AGR-802SFB-22 R.O. (A) 1.	Educ. leave 30/9/57 - 31/3/58	Forest Disease Survey; Hyphal fusions; Fungus flora of living lodgepole pine.
Etheridge, D.E. AGR-802SFB-21 R.O. (A) 2.	Full time	Decay of subalpine spruce; root and butt rot of subalpine spruce: Influence of moisture and other factors on the activity of heartwood fungi.
Hopkins, J.C. AGR-802SFB-43 R.O. (A) 2.	5/8/57 - 31/3/58	Etiological, host-parasite, and ecological studies of Atropellis sp.
Loman, A.A. AGR-802SFB-36 R.O. (A) 1.	27/5/57 - 31/3/58	Decay of slash of lodgepole pine.
Nordin, V.J. AGR-802SFB-3 A.R.O. 6	1/4/57 - 31/1/58	Officer-in-Charge laboratory, organization, direction, and administration; Red stain of lodgepole pine; Lodgepole pine diseases; Biology of Corticium sp.
Sub-professional		
Bennett, E.M. AGR-802SFB-23 F.B.A. 1.	1/4/57 - 15/12/57	Equipment care and inventory; Assistant on field projects.
Debnam, P.S. AGR-802SFB-24	Full time	Photography for Forest Biology staffs (Pathology and Zoology).
Laut, J.G. AGR-802SFB-47 F.B.A. 1.	15/7/57 - 31/3/58	Assistant on field projects and analysis of data.

PERSONNEL AND FUNCTIONS (Cont'd.)

Name and Classification	Period Employed	Functions and Projects
Lemmon, W.J. AGR-802SFB-23 F.B.A. 1	3/2/58 - 31/3/58	Assistant on field projects and analysis of data.
MacArthur, L.E. AGR-802SFB-49 Asst. Tech. 2.	27/5/57 - 31/3/58	Assistant in laboratory experimental work and general laboratory duties.
McLeod, E.J. AGR-802SFB-4 Tech. 1	Full time	Laboratory experimental work in relation to major laboratory projects.
Serne, H.M. AGR-802SFB-38 Asst. Tech. 1	4/4/57-30/6/57 1/11/57-31/1/58	Herbarium and laboratory duties.
Stevenson, G.R. AGR-802SFB-46 F.B.A. 1	1/5/57 - 31/3/58	Forest Disease Survey; Herbarium duties; Assistant on field projects.
<u>Survey Assistants</u>		
Browett, R.J. AGR-802SFB-31	1/5/57 - 15/9/57	Disease Survey and assistant on field projects.
Hrdlicka, J. AGR-802SFB-32	29/5/57 - 15/9/57	Assistant on field projects.
McDougal, F.W. AGR-802SFB-33	13/5/57 - 15/9/57	Assistant on field projects.
Petryk, M. AGR-802SFB-35	30/4/57 - 15/9/57	Disease Survey and assistant on field projects.
Weir, L.C. AGR-802SFB-34	6/5/57 15/9/57	Disease Survey and Assistant on field projects.

CONFERENCES AND CONSULTATIONS

Conference	Personnel Attending
Canadian Phytopathological Society. Vancouver, B.C., June 18-20, 1957	D.E. Etheridge
American Institute of Biological Sciences. (Mycological Society of America) Berkeley, California, August 26-29, 1957.	R.J. Bourchier
Canadian Institute of Forestry. Toronto, Ontario, October 22-24, 1957.	R.J. Bourchier A.A. Loman
Western Forest Disease Work Conference. Salem, Oregon, December 3-6, 1957.	D.E. Etheridge

REPORTS AND PUBLICATIONS

Interim Mimeographed Reports

1. Etheridge, D.E. 1957. The influence of moisture and other factors on the activity of heartwood fungi in subalpine spruce. Can. Dept. Agr., Forest Biol. Div. Mimeographed. Calgary, Alberta.

2. Nordin, V.J. 1957. Diseases of lodgepole pine in Alberta. Can. Dept. Agr., Forest Biol. Div. Mimeographed. Calgary, Alberta.

Bi-monthly Progress Reports

3. Bourchier, R.J. 1957. "Red belt," Atropellis canker and tree mortality of lodgepole pine in Alberta. Can. Dept. Agr., Forest Biol. Div., Bi-monthly Progress Rept. 13(21:2-3).

4. Etheridge, D.E. and Carmichael, E.J. 1957. New observations on Coryne sarcoides. Can. Dept. Agr., Forest Biol. Div., Bi-monthly Progress Rept. 13(4:3).

5. Etheridge, D.E. 1957. Relationships between site and decay in subalpine spruce. Can. Dept. Agr., Forest Biol. Div., Bi-monthly Progress Rept. 13(5:1-2).

Publications

6. Etheridge, D.E. 1957. Differentiation of white- and brown-rot fungi by an oxidase reaction. Nature, 179(4566):921-922.

7. _____. 1957. Comparative studies of Coryne sarcoides (Jacq.) Tul. and two species of wood-rotting fungi. Can. J. Botany, 35:595-603.

8. _____. 1957. A method for the study of decay resistance in wood under controlled moisture conditions. Can. J. Bot., 35:615-618.

9. _____. 1957. Moisture and temperature relations of heartwood fungi in subalpine spruce. Can. J. Botany, 35:935-944.

Publications (Cont'd.)

10. _____. 1958. The effect of variations in decay of moisture content and rate of growth in subalpine spruce. Can. J. Botany, 36:187-206.

Reports and Publications in Press

11. Etheridge, D.E. Decay losses in subalpine spruce in the Rocky Mountain Forest Reserve in Alberta. Forestry Chronicle.

12. Nordin, V.J. Red stain in lodgepole pine. Forestry Chronicle.

Manuscripts in Preparation

13. Etheridge, D.E. and Paul, G.D. Decay of aspen (Populus tremuloides Michx.) and balsam poplar (Populus balsamifera L.) in the Lesser Slave Lake region of Alberta. Joint report of Can. Dept. Agr., Forest Biol. Div., Calgary, Alberta and Alberta Dept. Lands and Forests, Forests and Wildlife Div., Edmonton, Alberta. Mimeographed.

14. Hopkins, J.C. Morphological and physiological characteristics of the fungus Atropellis piniphila (Weir) Lohman and Cash.

15. Loman, A.A. Red stain and decay in lodgepole pine in the Grand Prairie region of Alberta.