Project Plan

Seasonal variation in foliar moisture content of five coniferous and two broad-leaved eastern Canadian tree species

By

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PROJECT PLAN

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Title: Seasonal variation in foliar moisture content of five coniferous and two broad-leaved eastern Canadian tree species.

INTRODUCTION

The purpose of this project is to discover whether there are significant seasonal variations in the foliar moisture content of some forest tree species, and the degree of such variation if present. The results, it is hoped, will shed light on the behaviour of crown fires in different species throughout the fire season.

It is well known that some species support crown fires more readily than others. Foliar moisture content is probably one of several important factors determining a species' tendency to crown; the proportion of inflammable resins, oils and waxes in the leaves, and the crown density in terms of weight of foliage per unit of crown volume must also be important. This project will be concerned only with moisture content and its variation from month to month. Little or no research on this subject has been reported for eastern Canadian species.

THE EXPERIMENT

The species proposed for study are:

1) red pine,
2) white pine,
3) jack pine,
4) white spruce,
5) balsam fir,
6) trembling aspen, and
7) sugar maple

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Within each species, three samples from each of three trees will be taken on each sampling day. The trees will be tagged with permanent markers. For the conifers, medium-sized trees will be chosen in semi-open stands, so that the lower crowns are healthy and within reach. For the broad-leaved species, small groups of saplings will be located, and nine samples taken on each day. Red pine, white pine and white spruce will each be located on two sites of different moisture regimes, the other species on one site only. All sites will be chosen as typical for the species, and the different species near one another wherever practical.

The individual samples will be about 5 grams fresh, placed immediately in sealed containers. Each year's foliage on the conifers will receive equal representation. Moisture contents will be determined by oven-drying at 212°F. for 24 hours, and expressed as per cent moisture based on oven-dry weight. The xylene distillation moisture content method will be used on some duplicate samples, the results to be used also for Project P-601.

Precautions will be taken to reduce to a minimum the effect of variations other than seasonal. Such other possible variations are:

1) from hour to hour throughout the day,

2) from day to day as the weather changes, and

3) from rainfall to rainfall as soil moisture changes.

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Accordingly, sampling will be carried out only between 2:00 and 3:00 P.M. on sunny days with light winds and moderate relative humidity, and between 4 and 8 days after a substantial rain. Initially, samples will be obtained frequently and under a variety of conditions in order to learn roughly the amount of short-term variation possible. Later, sampling will be confined to once a month on days answering the weather prescription. The study will continue for 3 years, barring good reason for a change in plans.

Each year's results will be plotted on a uniform time scale. It is expected that any seasonal variations great enough to matter from the fire behaviour viewpoint will be of obvious statistical significance. A final report should be forthcoming by the end of 1964.