REPORT OF TECHNICAL COMMITTEE VI.

INHERITANCE OF INSECT RESISTANCE

The following statement is in no sense a "Working Plan". It is simply a brief statement of the problem indicating certain objectives which might serve as a basis for developing detailed working plans. A very general statement on "Methods" is given which suggests some possible approaches to the problem. How the results of the work to be undertaken may best be presented and when personnel assignments may be made for specific phases of the project are obviously questions which cannot be answered at this time.

It is hoped that the discussions at this meeting may pave the way for the development of an adequate program of work on this important problem.

Resistance in White Pine to White Pine Weevil Attack

1. The Problem

Investigations of the possible immunity or resistance in white pine to attack by the white pine weevil.

2. Literature

3. Objectives and Scope

(1) To determine if there is any evidence of immunity or resistance to weevil attack in individual eastern white pines in natural stands or plantations.
(2) To determine if there is any evidence of immunity or resistance in exotic species of the white group planted within the natural range of weevil distribution.
(3) Same as for (2) for hybrids of the white pine group.
(4) To ascertain if bark thickness, as suggested by Kriebel, is correlated with weevil attack.
(5) To determine if such factors as soil, growth rate, chemical composition of the tree, etc., are correlated with incidence of weevil attack,

4. Methods

(1) The task of attempting to determine the possible occurrence of resistant or immune eastern white pine individuals is obviously of Herculean proportions. It will require the efforts of a number of agencies in the region. If, however, immune or resistant pines exist and can be found, the effort would certainly be worthwhile. The Division of Forest Insect Research in cooperation with the northeastern states has established some 300 quarter-acre survey plots which will be examined annually to determine incidence of weeviling. In these plots, the trees at the present time are from 2 to 10 feet in height. The New York Conservation Department contemplates the establishment of plots in older plantations to obtain records of degree of weevil attack. The Pennsylvania Department of Forests and Waters plans to examine the older plantations in that State to

obtain records of the incidence of weeviling. Thus, these investigations will involve the examination of a large number of trees.

There exist in New York, in the so-called Tug Hill area, plantation established some 15 to 20 years ago which occur within an area of some 300 square miles where growth rate has been exceptionally good and where weevil attack has been extremely light. In nearby plantations, weeviling is heavy. This area should receive attention particularly in regard to seed source, and to determine if growth rate or soil is correlated with weevil attack.

The staffs of the Maria Moors Cabot Foundation for Botanical Research and the Division of Research of the Pennsylvania Departments of Forests and Waters have established plantations of eastern white pine seedlings taken from various points throughout the natural range of this species. The trees in these plantations should be examined annually to determine the status of weevil attack.

In addition to the specific projects already mentioned, an effort should be made through interested agencies to conduct a search for individual white pines which may be immune or resistant to attack by the white pine weevil.

Biological tests may be applied to determine evidence of immunity or resistance to weevil attack. The tests involve (1) the caging of white pine weevil females on the leaders of suspected immune trees to determine if oviposition and larval development will take place or (2) the release of weevil adults in close proximity to suspected immune trees to determine if such trees are attacked. Although these tests may not be conclusive, they may prove to be of value.

(2) A record should be compiled of the location of all plantations of exotic pines of the white pine group. It would obviously be impossible to catalog all individual exotic pines planted as ornamentals, but every effort should be made to determine the location of groups of such trees or forest plantations. All trees in such plantings should be examined to determine the extent of weeviling.

(3) Same as for (2) for hybrids of the white pine group. Biological tests should be applied to any trees in either (2) or (3) suspected of immunity or resistance.

(4) A special study should be set up to check the validity of Kriebels hypothesis that bark thickness is a factor influencing weevil attack or survival of the weevil on attacked trees.

(5) The work involved in determining if such factors as soil, growth rate, chemical composition of the tree, etc., are influencing weevil attack is obviously a tremendously complicated problem which may involve a long period of time. Work on the reproduction weevil and bark beetle in the West has shown that the quantity and quality of oleoresins in different species and hybrids of pine are related to insect resistance. This may also be true in the case of the white pine weevil. Careful thought should be given to the development of working plans for each facet of this study.

5. Presentation of Expected Results

Annua1 progress reports should be prepared and submitted to the committee. This is a long range project, and it is probable that several years will elapse before conclusive results will be obtained. It is rather academic, therefore, to indicate at this time how the results will finally be presented.

6. Personnel Assignment

It is hoped that this problem maybe developed as a cooperative project with several agencies contributing. Every effort should be made to enlist the help of all individuals and agencies in the region interested in the problem.

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