THE BLISTER RUST SITUATION IN IDAHO IN 1932

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The Spread of the Rust

It is now twenty-two years since the first introduction of the white pine blister rust into Vancouver, B.C. and about nine years since the first establishment of the rust at widely separated points in the Inland Empire. The first infection on white pine in Idaho can be traced to the year 1923, the infection being discovered five years later. During the period 1928-1930 a number of pine infection centers were found in Idaho and during 1931 a great many more were discovered, bringing the total up to sixty one. A total of 45 new centers were found in 1931. At the rate of increase noted during the seasons of 1928 to 1931 inclusive, it might be safe to predict that 1932 will disclose somewhere near 100 pine infection centers. The rapidity of spread indicated by the above rate of increase of pine infection centers and the rapid development of the rust on the pines within these centers point to an unusually vigorous invasion of the white pine belt in Idaho. At least there are certain areas such as the one on Long Meadow Creek near Elk River, Idaho and a recently discovered one on Fishhook Creek near Avery, Idaho, which show a very large percentage of trees infected and a large number of cankers per tree.

The Division of Blister Rust Control has found by a preliminary scouting of the Fishhook Creek infection area comprising about 100 acres on the St. Joe National Forest that approximately 50 ~~to 75~~ per cent of the 25,000 trees on this area show infection. This amount of infection has developed within a period of 8 years, beginning in 1923, the year of original infection. An analysis

infection on this area indicates that the canker increase has been at the rate of approximately 3,000 cankers of 1926-28 origin for each canker started in 1923. The ratio of canker increase is not so great on the other pine infection areas but the fact must be borne in mind that the 61 centers already located are but a small percentage (perhaps 1 per cent) of the actual number of centers scattered over many miles of rugged territory.

The usual speed at which the rust has worked in the Idaho region during this period is startling, particularly so when we find that some of the years within this period were noted for subnormal precipitation. Another interesting observation made by E. L. Joy and his co-workers indicates that the wild black currant (E. petiolare) is the host of greatest importance in initiating the infection centers and that the other species of Ribes are responsible for a considerable amount of spread from these infection centers. A single aeciospore carried in from a distant point may readily cause infection on the wild black currant. The intensification of the disease on this stream type of Ribes progresses rapidly and infection soon spreads to the nearby trees and from these after three or four years to the upland Ribes. By the time the telial stage of the rust is produced the infection has spread far up the slopes on Ribes other than R. petiolare. It is evident, therefore, that these scattered upland Ribes unquestionably play a prominent part in spreading the infection to a large number of pines over a large area. Given a concentration of heavily infected stream type Ribes with a scattering of upland Ribes on the slopes above and the scene is laid for the rapid and extensive spread of the disease from creek bottom to ridge.

Another interesting observation regarding the spread of the rust in Idaho indicates that the rust is found developing best in areas where moisture conditions appear to be most favorable and where eddies occur in the air currents. With the

exception of the Newman Lake area in eastern Washington, all of the pine infection centers seem to occur in areas which are classified as optimal sites for Western white pine. In the Newman Lake area where white pine is marginal to its best site the influence of a dense growth of trees and shrubs, the presence of swampy areas and a large body of water no doubt have a direct bearing upon the entrance and establishment of the rust. Again, all of the larger pine infection centers appear to be located at or near the juncture of two streams where the air currents form a settling pool or eddy. Here the wind-borne spores may encounter a natural settling basin and at the same time find environmental conditions favorable for germination.

Idaho is not the only center of rust activity, for the disease is spreading rapidly throughout the coastal region of Washington and Oregon and its southern progress is now marked at a point in Oregon within 50 miles of the California border. The finding of the rust in California is but a question of time and following its invasion of that state will come the battle for the protection of the sugar pine stands.

The deductions which may be drawn from a study of rust behavior in Idaho and adjoining areas point to but one conclusion. And that is the urgent need for an acceleration of the control program. In carrying out this program of attack reasonable attention should be given to the removal of the upland species of Ribes in view of their capacity to spread the rust.

In view of the fact that as yet we have no definite data to guide us in determining the ~~percentage~~ amount of Ribes live stem which may safely be left or overlooked on a control area in Idaho, it would be better to aim at a complete removal of the Ribes population, and err on the side of safety rather than on the side of low control cost. The word "aim" is used advisedly, for it is real-

ized that it is not humanly possible to remove every Ribes plant, large and small, from a control area.

Nevertheless, the effort should be made to attempt complete removal until the time when research tells us that we can safely leave a certain ~~percentage~~ amount of Ribes live stem per acre.

Progress Made in Control

Prior to 1928 all control work on the white pine blister rust project was carried out by the Division of Blister Rust Control as part of the experimental local control plan. The first extensive control operation in which a number of agencies cooperated was begun in 1928. In that year Federal, state, and private agencies pooled their available funds and began fighting the rust on a large scale within the more valuable white pine stands.

During 1931 a total of 176,000 acres of timber land were partially or totally protected from the rust through cooperative effort. With a total of 415,000 acres worked over for the removal of Ribes prior to 1931, this brings the total acreage of ~~eradicated~~ worked stream and upland types up to 591,000 acres. On the basis of a ten year period, the time needed for a clean-up of Ribes on the valuable white pine areas comprising three million acres, we are somewhat short of the 300,000 ~~eradicated~~ worked acres per year needed to prevent serious damage to the pines.

Most of the eradication work has been carried out on the Clearwater Timber Protective Association, the Potlatch Timber Protective Association and the Clearwater National Forest areas. A considerable acreage of timberland owned by the state of Idaho has been worked over for the removal of Ribes plants during the past few years and additional acreage will be treated in 1932.

In the Montana region a very intensive control area has been laid out for a radius of a mile around the Forest Service nursery at Haugan where thousands of white pine seedlings are grown each year for use on the plantation areas in the Montana and Idaho forests. Another nursery in which considerable quantities of white pine are grown is the School of Forestry nursery and arboretum at Moscow, Idaho, which has been gone over regularly for the past few years and the nursery as well as a wide protection zone/surrounding it has been freed from Ribes.

During the past two years new methods of attack have evolved from the practical field experience and field investigations and from the research laboratories. Many improvements have been made in the use of crews on an area, in the type of equipment used in the spraying program and in the methods of checking results. New chemicals and concentrations have been tested and a study made of the effect on the Ribes plants of various concentrations of chemicals applied to the roots in the soil. An interesting and promising method for eradicating Ribes on certain stream bottom lands has been proposed by C. H. Johnson, blister rust state leader for Montana. The method involves the use of a bulldozer type of tractor in scraping off and piling up in windrows for subsequent burning, all refuse including brush and Ribes bushes. The area thus cleared is to be sown to suitable forage grasses and maintained for grazing purposes. It is claimed that this method is practicable and within reasonable cost. For wide, flat creek bottoms it should prove useful.

The rapid spread of the rust to pine in Idaho has greatly stimulated interest in studies on the life history of the rust and on the influencing factors. The part which climate and weather play in the spread and development of the blister rust fungus has received some attention, as has also the function of the pycnial stage in its relation to the other stages of the parasite. Some interest has also been shown in the study of one of the parasites of the rust, the purple mold, Tuberculina maxima, which is said to suppress aecial production in certain regions of Europe where blister rust is common.

Thousands of acres of valuable western white pine timber such as these along Skookum Creek above the Honeysuckle Ranger Station, Coeur d'Alene National Forest, merit protection against the white pine blister rust.