

DEVELOPMENT OF BLISTER RUST CONTROL IN THE INLAND EMPIRE

By

Stephen N. Wyckoff, Senior Pathologist
Bureau of Plant Industry
U. S. Department of Agriculture.

The advent of white pine blister rust into western North America has brought forward a new and difficult problem in forest protection. This problem had been met and solved in the northeastern states but entirely new conditions of terrain, weather and host plants have been faced in the West. The problem primarily centers about the protection of two great bodies of susceptible timber and reproduction, the western white pine in the Inland Empire region and sugar pine in southern Oregon and California. Because of the part played in the life history of white pine blister rust by Ribes the presence of the disease in any region means that white pines and Ribes cannot both continue to exist in close proximity. The association of these two types of host plants in the presence of the disease almost invariably means the virtual effacement of white pine. Since white pine is the valuable host plant the problem of protection centers about the removal of Ribes from the proximity of white pine.

White pine blister rust was introduced into western North America in 1910 and was discovered in 1921. In 1923 a program of delay, experimentation and control was instituted. The delay and experimental phases of this program have now been under way for eight years. The present spread of the rust into the white pine stands of the Inland Empire has necessitated the beginning of practical control measures. The present is therefore a most opportune time to determine the progress which has been made in experimental and investigative work. Where do we stand in our knowledge of the rust and the development of control methods?

In order to give such an accounting on an intelligent basis, the general

situation and the past experimental work must be briefly reviewed. By a white pine type survey made by the Forest Service in District 1, and by reconnaissance surveys and experimental Ribes eradication by the Office of Blister Rust Control, certain general facts have been realized as forming the basis for a control program.

(1) The Inland Empire region contains about 3,000,000 acres of white pine type which is considered suitable for protection.

(2) Because of the occurrence of large numbers of highly susceptible Ribes in moist locations the narrow belt of bottom land along streams, termed "stream type", represents the most immediate danger of establishment and rapid intensification of the rust. The first and immediate objective of a control program is necessarily the eradication of Ribes from this stream type on a general scale.

(3) Because of the occurrence of numerous Ribes in close association with young trees, Ribes eradication in reproduction stands is necessarily the second objective of such a program.

(4) Because of the occurrence of relatively few Ribes and because of the length of time necessary for the rust to kill large trees, most of the mature timber destined to be cut within 20 to 25 years will be sufficiently protected by the stream type eradication program.

These general considerations will to a very large extent determine the form and scale of a successful program of control and any such program which does not take them into account will either fail because its objectives are not obtained or will be economically unsound because of excessive costs. What progress has been made in the development of control methods suitable to such a program? These can also be briefly enumerated.

(1) Hand pulling methods of Ribes eradication for reproduction and mature timber stands are well developed. The cost of such operations will vary with several uncontrollable factors between 75¢ and \$3.00 per acre.

(2) It is recognized that hand pulling in those parts of the stream type where bushes are most numerous is not feasible because of low effectiveness and excessive cost. To meet this situation the Office of Blister Rust Control has undertaken extensive experimentation upon chemical eradication. It is now recognized that this method is necessary to secure the requisite result at a practical cost. By means of combined hand and chemical eradication in the stream type, each method being used where suitable, it is estimated that this type of eradication can be done for \$10.00 to \$15.00 per acre on the area actually worked. It is further recognized that the stream type will constitute from 5 to 10% of the forested area, thus making the prorated cost of such work vary from 50¢ to \$1.50 per acre for the entire area to which this type of general protection is given.

(3) We are now able to successfully eradicate Ribes petiolare by chemical means. R. lacustre and Grossularia inermis possess greater resistance to chemicals. We are as yet unable to successfully eradicate these species by chemical means, and investigative work is centering upon this problem.

(4) Practical field methods of applying toxic chemicals to Ribes in the stream type are now developed but further refinements and reductions in cost are probable. Further improvements in methods and equipment will result in the decrease of cost of stream type eradication.

In light of the conditions necessarily faced in the control program and the progress thus far made in meeting these conditions, what remains of experimental and investigative work which must be done before the entire program can be undertaken?

(1) As a most important and in fact vitally necessary condition ultimate success of the stream type eradication program a chemical compound must be found which will kill all three species of Ribes occurring in the stream type.

(2) Equipment for and methods of application of chemical eradication must be developed to the highest possible point.

(3) We must carefully study and check over for many years areas upon which eradication has been practiced, to determine the rate and amount of Ribes re-establishment. It is assumed that re-eradication will be necessary in many places. How soon must it be done? What is the relation of per cent of efficiency of first eradication to the length of period before a second eradication is necessary? What is the relation of the cost of first eradication to the cost of the second eradication? The solution of such points is vital to the final success of the control program but can only come by constant experimentation.

(4) The possibility of forest management leading to sustained yield is now occupying the attention of foresters and lumbermen in this region. As the depletion of virgin timber stands more nearly approaches, this subject will become increasingly important. In the last analysis, forest management is an artificial governing of forest conditions to induce a desired type and rate of forest growth. What will be the effect of such control of conditions upon Ribes establishment and growth? To know this we should have concrete expression of these conditions and the degree to which they are altered by forest management. Has not the forester a responsibility here? Is it not incumbent upon him as the logical and proper investigator of forest conditions to determine and weigh the facts concerned in forest growth and to inform us in what way and to what extent they will be altered by forest management? And is it not our responsibility when the forester has given us this information to

determine the effect of the control and alterations of these factors on Ribes growth?

(5) The action of the rust itself must be studied on the native hosts and under the natural conditions of the Inland Empire. The Office of Forest Pathology is doing splendid work in its study of the rust in British Columbia. But the opportunity is just coming to observe it under the conditions in which we must fight it. Such studies must necessarily be carried on for long periods so as to cover a wide range of seasonal weather variation.

You will no doubt agree with me that the points which I have briefly mentioned constitute a wide and necessary field of investigation. This field must be carefully explored before the blister rust control program can be effectively completed. At this moment with the rust present in the Inland Empire the temptation is very great to devote all of our available energies to actual control operations, thus sacrificing the investigative work vitally necessary to the ultimate success of that very control program. Our final success or failure will be measured by our foresight in carrying to completion the study of the factors influencing our work and of the methods of getting the work done.

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