Meria Laricis Vuill. (Larch Needlecast)  
Control Trial on Douglas Fir  
In Koksilah Seed Orchards at Duncan, B.C.
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Benomyl and mancozeb were tested as foliar sprays to control a needle
cast complex at Koksilah Seed Orchard. While the results were not
statistically significant, there were indications that benomyl may reduce
the disease when applied at 10-day to 2-week intervals.

Introduction

In the spring of 1984, several Douglas-fir trees (Pseudotsuga
menziesii (Mirb) Franco) at Koksilah Seed Orchard near Duncan, B.C. were
suffering needle loss from an unknown cause. Surveys conducted in May of
that year indicated that 74 out of the 541 trees (14%) in the orchard
were affected. Samples of diseased material were examined by the
Canadian Forestry Service and the causal agent was tentatively identified
as a needle cast complex of Meria laricis Vuill. and Hormonema merioides
Hopkinson. This is the first time that Meria laricis has been found in
Douglas-fir.

In the spring of 1984, infected needles had brick-red tips. The
size of the area affected varied from needle to needle but most had a
distinct dividing line between the green and the dead or dying portions.
The underside of the affected part of the needles commonly had groups of
stomata that appeared moist and in the laboratory, this wet material was
found to contain spores. Needle casting occurred prior to and after
bud-burst and it was primarily (but not only) 1 year old needles that
were shed.

In 1985, the symptoms were less conspicuous. The brick-red color
was less frequent and often the needle color graduated slowly from green
to light-brown. Spores were present as early as late February.

Because of the unexpected flair-up of the disease at this one
orchard and the heavy needle loss on some trees, a trial was initiated in
an attempt to devise some control measures. On larch (Larix occidentalis
Nutt.) the fungicides benomyl and maneb have shown some promise in
controlling Meria laricis (Cooley, 1981), so benomyl and mancozeb, a
chemical related to maneb, were chosen for testing at Koksilah Seed
Orchard on Douglas-fir.
Material and Methods

During the May 1984 survey, 28 trees in the orchard were rated as having a medium to heavy degree of infection (ie. casting common over all or most of the tree). These individuals were selected for the trial because it was presumed that they were at least moderately susceptible to the disease. The trees were grouped so that 10 would receive benomyl (100 g/100 l Benlate®), 10 would receive mancozeb (150 g/100 l Manzate 200R) and 8 would receive no treatment, acting as checks for the 2 tests. All trees in each fungicide group received hydraulic spray applications at 10 day to 2 week intervals until dry summer weather arrived. In order to see if the infection period lasted longer, 5 trees in each group were to continue receiving sprays during cool damp periods throughout the summer. As it turned out, most of the summer was dry and the second group received only 1 additional spray. The spray dates were May 30, June 10, July 9 and July 19 for the additional spray.

In 1985, 2 assessments were made on each tree. On May 23, 6 - 8 twigs were collected from around the midcrown of each tree and the needles were stripped off into a bag. Four 50 needle samples were taken from each bulked sample and the numbers of infected and uninfected needles were counted to determine the percentage of infected needles per tree. Each tree was also rated visually as having no, light, medium or heavy infection in general. The visual ratings for disease levels were converted to a numeric scale as follows: 0 = no infection; 1 = light infection; 2 = light to moderate infection; 3 = moderate infection; 4 = moderate to heavy infection; 5 = heavy infection. Numeric ratings in each treatment group were averaged for graphic presentation.

The data was analyzed using analysis of variance, Duncan's multiple range test and contrasts between specific means for both ranked and unranked data (Winer 1962, Conover, 1980).

Results

Analysis of variance for both ranked and unranked data failed to detect any significant differences between treatments in either trial (Fig. 1). The data is presented together in Fig. 1 for simplicity only. Each fungicide was compared separately to the check. Paired comparisons of the means did indicate a difference between the benomyl trees that received the extra spray (benomyl (+)) and the check trees (P = 0.0478). Duncan's multiple range test also showed a difference between this pair at a 10% confidence level. Neither of the latter techniques indicated any differences in the mancozeb test.

The results of the visual ratings show a graphic pattern very similar to the needle infection data (Fig. 2). Benomyl(+) trees were again rated as having less disease than the check trees. The mancozeb treated trees had ratings similar to the check trees.
Fig. 1  Average percentage of needles infected in various treatment groups at Koksilah Seed Orchard in 1985. Lines in bars represent standard errors. (+) indicates one extra spray.

Fig. 2  Average rating of disease incidence in various treatments at Koksilah Seed Orchard in 1985. (+) indicates one extra spray. Severity of rating disease increases 1-5.
Discussion

There was a large amount of variation both between trees and between needle samples from the same trees. This probably accounts for the lack of precision in determining treatment differences. Just the same, the benomyl(+) trees were rated both qualitatively and quantitatively as having less disease than the check trees indicating that benomyl probably did have some effect on these fungi.

From the data it would appear that this needle cast complex may be able to infect needles well into the summer months. Comparing the 2 benomyl regimes, the one extra spray on July 19 reduced needle infection from 10.4% to 3.1%. While this difference was not significant in itself, it did result in benomyl(+) being much different from the checks.

Further tests would be required before benomyl could be recommended for operational use against this needle cast complex. Treatments applied in a year with heavier infection levels may result in less variation and more distinct results. In the spring of 1986, a similar analysis will be made to assess the results of sprays applied to protect the 1985 foliage.

References Cited


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