

ASSOCIATION OF RHABDOCLINE NEEDLE BLIGHT AND EPICORMIC BRANCHING IN DOUGLAS-FIR

Ronald M. Lanner¹ and James A. Bryan¹

ABSTRACT.— In northern Utah, Douglas-firs (*Pseudotsuga menziesii* [Mirb.] Franco) with symptoms of *Rhabdocline* needle blight had a significantly higher frequency of epicormic branching than did healthy trees. It is not known whether *Rhabdocline* infection stimulates epicormy, or whether the proliferation of epicormics increases resistance to the disease.

Rhabdocline needle blight is a leaf disease of Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco) caused by the ascomycete *Rhabdocline pseudotsugae* Syd. (Hepting 1971). Infection sometimes results in defoliation serious enough to cause death, even in relatively vigorous trees up to 100 years old (Davidson and Prentice 1967).

Douglas-fir, especially in the Rocky Mountains, is subject to the formation of epicormic branches that arise from dormant buds borne at the base of primary branches. The occurrence of epicormics appears to be a normal consequence of branch decline not requiring pest attack for its expression (Bryan and Lanner 1981), but the added stress of *Rhabdocline* defoliation may increase the frequency of epicormics in infected trees. The purpose of the observations reported here was to determine whether trees infected by *Rhabdocline* differ from healthy trees in their frequency of epicormic branches.

METHODS

These observations accompanied a detailed morphological study of epicormics that has been reported elsewhere (Bryan and Lanner 1981). Pole-sized Douglas-firs were selected at intervals along trails in Logan Canyon, Cache National Forest, Utah. *Rhabdocline*-infected trees were identified by the sparseness of their crowns, which had lost many of the needles predating those of the current year (N. Van Alfen, pers. comm.). These trees were found mainly in dense, pure stands on north-facing slopes between 1524 and 1860

m elevation, and often near streams. Uninfected trees in those stands were chosen randomly for comparison. Trees were examined in the summer, when needles infected in the previous year had already fallen (Davidson and Prentice 1967). Epicormic frequency was determined by examining the 10 uppermost dead primary branches below the base of the live crowns, and recording the number of those branches with associated epicormics. The Z-test (Dixon and Massey 1969) was used to test the hypothesis that the mean number of epicormics was equal for healthy and diseased trees. The hypothesis that the frequency distributions were equal was tested with the Kolmogorov-Smirnov two-sample test (Conover 1971).

RESULTS

Trees with *Rhabdocline* symptoms had an average of 4.8 (of 10) branches with epicormics in the lower crown, but similar healthy trees averaged only 3.0 such branches (Table 1). The Z-value of 2.23 was significant at the 99 percent level. The frequency distribution of trees with n number of epicormics also differed significantly ($\alpha = .05$) between healthy and diseased trees (Table 2).

DISCUSSION

It is apparent that *Rhabdocline*-infected trees exhibit a higher frequency of epicormics than do healthy trees. Our data do not indicate whether this is because repeated or periodic defoliations stimulate epicormic

¹Department of Forestry and Outdoor Recreation, Utah State University, Logan, Utah 84322. This study was funded under the McIntire-Stennis program and is published by permission of the Utah Agricultural Experiment Station as journal paper 2688.



Lanner, Ronald M and Bryan, James A. 1981. "ASSOCIATION OF RHABDOCLINE NEEDLE BLIGHT AND EPICORMIC BRANCHING IN DOUGLAS-FIR." *The Great Basin naturalist* 41, 476-477.

View This Item Online: <https://www.biodiversitylibrary.org/item/35808>

Permalink: <https://www.biodiversitylibrary.org/partpdf/247973>

Holding Institution

Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Sponsored by

Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Brigham Young University

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.