

VARIATION IN FUSIFORM RUST STEM GALLS ON FIVE- AND SIX-YEAR-OLD SLASH PINES

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Infection of slash pines (*Pinus elliottii* Engelm. var. *elliottii*) by *Cronartium quercuum* (Berk.) Miyabe ex Shirai f. sp. *fusiforme* produces many identifiable external symptoms as well as internal damage. This study classifies symptoms on galled 5- and 6-year-old slash pine stems. Observations were made in progeny tests near Gulfport, Mississippi; Greenwood, Florida; and Savannah, Georgia. Data and photographs of approximately 20 families and 5 replications per location serve as the basis for this poster.

Galls on apical dominant stems are thin, one-sided, small, typical, or fat. The first three of these five types appear innocuous unless they develop into constricted galls. Some galls cause a loss or reduction of apical dominance and stimulate the production of auxiliary stems. These are stem to branch, branch to stem, double stems, or multiple stems (often termed witches brooms). Trees with auxiliary stems may split in windstorms and generally die 2-5 years following infection. By the fifth growing season 23% of rust-affected trees have formed witches brooms and another 22% have grown auxiliary stems while retaining a dominant main stem. Galls on dominant or abnormal stems can kill affected slash pines by girdling the cambium. Constriction and girdling of pine stems have long been associated with wounding by mechanical means, incompatibility of scion and stock, and infections such as fusiform rust. Stem tissues above the constriction increase to form an elongated upward taper. Constrictions may form in thin, typical or fat galls; the cambium is destroyed within the gall. Incidence of constricted stem galls in the progeny tests was 0 to 27% for control-pollinated families.

These preliminary results indicate that infected progeny from different parents exhibit large variations in external symptoms. Families M-601 and C-115 in the Florida test had similar percentages of infected trees. However, their percentages with branch galls were 80 and 46, respectively. Incidence of witches brooms was 25 and 38%, and mortality was 19 and 54%, respectively. Thus, disease severity was significantly different in these two families. Disease severity is governed by type of stem gall and the age of the tree at time of infection. Thin, one-sided, and small stem galls appear to cause minimal tree distortion unless they become constricted galls. Galls which cause loss of apical dominance ruin the affected trees for forest products.

Knowledge of gall types may have application in selecting for rust resistance in slash pine. A family which forms a high percentage of thin, one-sided or small galls on dominant stems has the greatest chance of survival. Typical and fat stem galls, and especially those showing constriction reduce height growth. Once this occurs, mortality usually follows within one or two growing seasons.

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