PITCH CANKER IN FOREST TREE NURSERIES

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Pitch canker has been recognized for many years as a disease affecting numerous species of southern pines with the principle damage occurring as shoot dieback in intermediate-age and mature slash pine plantations. During recent years this canker-causing fungus has damaged younger slash pine plantations as well. In 1976-77, the pitch canker fungus, Fusarium moniliforme var. subglutinans (FMS), was first reported causing severe shoot dieback symptoms in several southern pine seed orchards, and in 1978 it was determined that this same fungus was also damaging cones and seed of loblolly and slash pines.

In 1979, FMS was identified as the cause of late-season mortality in several southern pine nurseries in Florida. Observations made during the first half of the 1980 growing season have shown that FMS is also responsible for losses occurring early in the growing season. While the known distribution of the disease is presently restricted to nurseries in Florida, it is likely that the actual disease range encompasses a larger geographical area. To date, the seedling host range includes only slash and loblolly pines, with notable losses occurring only in slash pine, the species principally addressed in the remainder of this abstract.

Early in the growing season FMS can infect the lower stem at the groundline (root-collar), the upper portion of the tap root, the cotyledons, or the upper stem above the cotyledonary node. These infections result in a variety of symptom types including foliage discoloration and death of erect seedlings, foliage discoloration and seedling collapse (similar to classic damping-off symptoms), stem cankers, and top dieback. Throughout the remainder of the season, on seedlings with succulent tissues, wilt of the foliage and upper stem occurs following the development of lower stem, root-collar, or tap root infections. Seedlings with less succulent tissues gradually discolor and die. Later in the season as seedlings become larger, discrete, resin-soaked cankers can be detected principally occurring at the groundline or on the upper tap root. Occasionally, resin is exuded through the bark and into the soil in the area of the infected tissues.

The disease occurs as single- and multiple-tree infection centers scattered throughout the nursery. Seedlings of several different symptom types and stages can be found within infection centers that occasionally can encompass several dozen seedlings. The pathogen sporulates on diseased seedlings and this inoculum may be responsible for disease spread and intensification within the nursery. FMS also occurs abundantly in the soil near diseased seedlings.

In 1979, a single-point, late-season assessment of pitch canker-caused mortality was conducted in six nurseries in Florida. Seedling mortality

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(by seed source) ranged from 0 to ~9 seedlings per thousand (S/M). Within individual nurseries, the mean mortality level (per seed bed) ranged from .2 to 3.1 S/M with an overall mean of .9 S/M. These estimates of pitch canker-related loss are conservative in that they do not reflect losses that occurred earlier in the growing season nor do they include infected seedlings that had not expressed foliar symptoms at the time of assessment. While the within-nursery losses experienced to date have generally been low, the destructive potential of this disease may be better illustrated by the 15-25% mortality that has occurred in certain seed sources during the first half of the 1980 growing season.

Further losses may result from the outplanting of seedlings with incipient infections or from the inadvertent inoculation of healthy seedlings during the lifting, handling and outplanting procedures. Studies underway at the present time indicate that pitch canker-related mortality can account for a substantial proportion of the post-plant mortality of properly planted seedlings.

Control practices are not available at the present time, however substantial research is now underway to identify the source(s) of the pathogen, to determine the epidemiology of the disease, to better assess pitch canker-related losses, and to develop effective preventative and/or theraputic controls.