

## Pitch Canker of Slash Pine Seedlings: A New Disease in Forest Tree Nurseries

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### ABSTRACT

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Pitch canker, caused by *Fusarium moniliforme* var. *subglutinans*, is reported for the first time as a cause of mortality among first-year slash pine seedlings in forest tree nurseries. Infected seedlings showed a variety of symptoms; the most diagnostic was a resin-soaked lesion on the lower stem.

Additional key words: *Pinus elliottii* var. *elliottii*

Since it was first described in 1946 (4), pitch canker of southern pines has been generally regarded as a disease affecting trees of intermediate age or older. In recent years, serious damage has resulted from pitch canker in pulp-sized slash pine (*Pinus elliottii* Engelm. var. *elliottii*) plantations and seed orchards in Florida (8) and in loblolly pine (*Pinus taeda* L.) seed orchards elsewhere in the South (3). In plantation and seed orchard trees, pitch canker infections typically cause stem deformation and reduce growth rates (8,9). Although pitch canker can result in high mortality levels in severely infected plantations (2), it is not generally considered lethal to slash pine (8,9).

In 1978, Miller and Bramlett (6) reported that the pitch canker pathogen, *Fusarium moniliforme* Sheld. var. *subglutinans* Wollenw. and Reink., is associated with damage to strobili, cones, and seed of slash and loblolly pines in seed orchards. We report for the first time *F. moniliforme* var. *subglutinans* as a cause of mortality among first-year slash pine seedlings in forest tree nurseries.

### MATERIALS AND METHODS

In August 1979, scattered seedling mortality was observed in slash pine seedbeds in a forest tree nursery in northern Florida. Occasional dead and dying seedlings were readily detected in six other nurseries in the state. Symptomatic seedlings were collected from each nursery, and isolations were made onto either acidified potato-dextrose agar (3.3 ml of 50% lactic acid/L) or Nash and Snyder's *Fusarium*-

selective medium (7). All tissue transfers were surface-sterilized by dipping in 95% ethanol and flaming. Pathogenicity of suspect isolates was evaluated by inoculating 18-mo-old slash pine seedlings (1).

### RESULTS AND DISCUSSION

**Symptoms.** Diseased seedlings were detected in situ by one or more of the following symptoms: 1) off-color, yellow green needles; 2) wilting of foliage and the succulent portion of the leader, with a resultant drooping of the growing tip; 3) brightly colored, red brown discoloration of the foliage. Some seedlings had flattened or depressed areas on the lower stem. Small aggregates of soil were often found adhering to the

lower stems of diseased seedlings where resin had exuded through the bark at the cankered site. Small salmon-pink sporodochia and diffuse powdery growths ("blooms") were observed on the bark of the stem and root collar of many symptomatic seedlings.

Dissection of diseased seedlings consistently revealed pitch-soaked lesions typical of pitch canker infections on older stems and branches (4). Lesions occurred predominantly at or near the soil line but were also found in the region of the cotyledonary node (Fig. 1). In most advanced-stage lesions, resin impregnated the entire cross section of the xylem.

**Isolations, pathogen identity, and pathogenicity.** *F. moniliforme* var. *subglutinans* was recovered from symptomatic stem tissues of seedlings in all seven nurseries, with 77% of 84 seedlings examined yielding the pathogen. Isolates were culturally identical to those routinely obtained from pitch cankers on older slash pines. Each of 39 isolates tested for pathogenicity produced responses typical of pitch canker infection. Water-inoculated controls were asymptomatic.

Examination of the fungal "blooms"

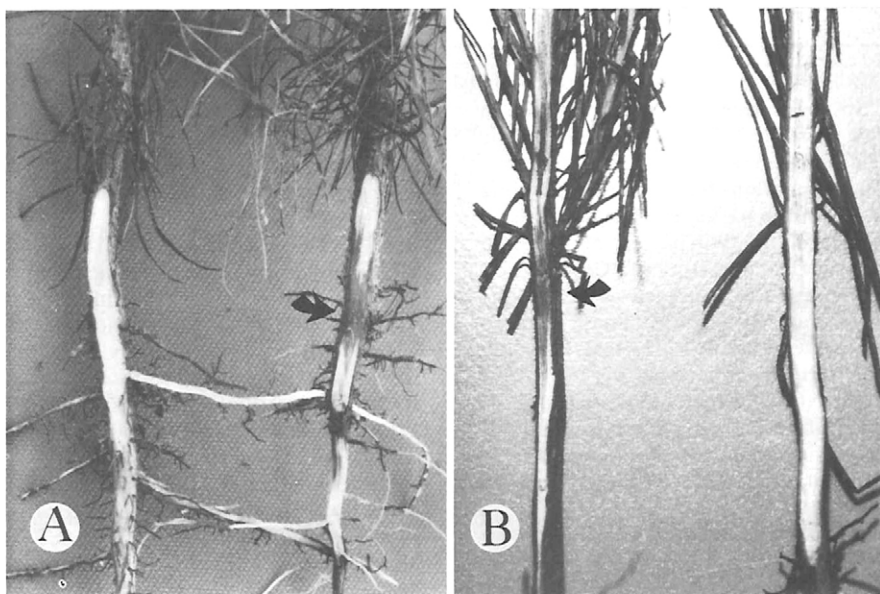


Fig. 1. Resin-soaked lesions (arrows) caused by *Fusarium moniliforme* var. *subglutinans* at the root collar area (A) and the cotyledonary node (B) of first-year, nursery-grown slash pine seedlings. Healthy seedlings are shown for comparison.

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revealed not only the commonly observed macroconidia but also microconidia and polyphialides typical of *F. moniliforme* var. *subglutinans* (5). Sporodochia were characteristic of those found on symptomatic branches of older trees (1). Cultures derived from naturally produced conidia were identical to those obtained from symptomatic tissues and readily induced typical pitch canker symptoms in inoculated seedlings.

**Distribution within seedbed.** Diseased seedlings were usually scattered throughout nursery seedbeds, but small clusters of infected seedlings were not uncommon. The pattern of these clusters—one or more dead seedlings often accompanied by one or more seedlings showing incipient wilting or foliage discoloration—suggested localized (secondary) spread. Conidia produced on infected seedlings are a

potentially significant inoculum source for localized spread within nursery seedbeds.

Symptoms, signs, and pathogenicity tests have confirmed the natural occurrence of pitch canker in forest tree nurseries. The source of primary infection, the severity and consequences of the disease, and control measures are being investigated.

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