NEW METHOD ACCURATELY IDENTIFIES PITCH CANKER RESISTANCE IN SLASH PINE AT THE RESISTANCE SCREENING CENTER

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Progeny tests for assessing disease resistance in the field are relatively expensive to establish, must be maintained for several years, and depend on the vicissitudes of infection biology for accurate results. Further, successful disease resistance ranking may interfere with accurate assessments of other attributes important in breeding programs, such as tree growth and form. Greenhouse methods used in the past provided results more quickly and cheaper than field tests, but close control of inoculum exposure was difficult to achieve.

A new greenhouse method was used to evaluate the pitch canker resistance of open-pollinated slash pine families representing a range in relative resistance as determined by field tests. Four-month-old seedlings of 25 families plus a susceptible check family were inoculated by severing the stem just below the bud and spraying the cut surface with a water suspension of Fusarium suhglutinans conidia. Seedling responses were evaluated 5, 6 and 7 months after inoculation. Highly significant family differences were observed on all three reading dates, but the best family separation occurred 7 months after inoculation, when family mean infection exceeding a response standard ranged from 2 to 89 percent (mean 48 percent). The susceptible check was always correctly ranked. Field and greenhouse resistance class rankings were nearly identical, and standardized performance scores were highly correlated ($r^2 = .71$). Moreover, greenhouse performance scores for 13 families screened in earlier developmental tests (conducted 18 months prior with different inocula) and again in this test were highly correlated ($r^2 = .84$), demonstrating the repeatability of this method. This is despite the fact that many families were from different seed collections and even different seed orchards, and probably had different pollen parents. Operational greenhouse screening of slash pine families for pitch canker resistance can be completed in 6 months from seed sowing at the Resistance Screening Center for the same cost as fusiform rust resistance screening ($100 per seedlot). This method may be useful in establishing specialized breeding orchards for reforestation of pitch canker-prone field sites, in guiding breeding decisions in second generation orchards, and in research applications.