Fusiform Rust and Pitch Canker Resistance in Loblolly Pine Elite Varieties

A. Benowicz[1], R. J. Weir[2] and P. J. Belonger[3]

[1]Manager Product Development, CellFor Corporation, Victoria, BC, [2]Director Product Development, CellFor Corporation, Raleigh, NC, [3]Senior Forest Geneticist, Plum Creek Timber Company, Watkinsville, GA

Loblolly pine elite clonal varieties of Atlantic Coastal Plains (ACP) origin were screened for fusiform rust and pitch canker resistance in tests involving artificial inoculations. The screenings were done by the USDA Resistance Screening Center (RSC) in Asheville, NC over the course of four years. Twenty two related and unrelated varieties were challenged with rust inoculum developed from aeciospores collected in three regions representing large sections of the eastern, central and western distribution range of loblolly pine. The inocula from the three regions were not mixed. Pitch canker resistance screenings involved eleven varieties challenged with mixed inoculum from three southern ACP sources.

RSC rust screening results were compared to field rust infection rates based on age five data from multiple test sites. There were very large differences among the varieties in rust and pitch canker resistance. In the rust screening tests the varieties ranged from more resistant than the resistant checklot to as susceptible as the susceptible checklot. The best varieties had less than 3% infection rates compared to 42% for the resistant checklot. The most susceptible and the most resistant variety came from the same family. The majority of varieties screened for rust resistance showed very little interaction with inoculum source. With very few exceptions, the RSC results were consistent from year to year. Levels of resistance based on field data and RSC data were highly correlated ($r = 0.80$) despite low overall levels of infections in the field. There was no correlation between growth and disease resistance. Two varieties with the highest growth rates were ranked as very resistant for both rust and pitch canker.