In Delaware Nursery

Root Rot in Seedlings Triggered by Wet Weather and Poor Drainage

John M. Schwalm

Sussex County Service Forester Delaware Department of Agriculture

The Forestry Section of the Delaware Department of Agriculture operates a 12-acre tree nursery in Ellendale, Delaware which plants 3 to 4 acres of 1-and2-year old seedlings yearly.

The spring of 1972 was marked by a higher monthly rainfall than in the past. This recess of water, plus a hardpan in the nursery beds, helped to produce Fusarium roseum - root rot fungus-in the 1-and 2-year old seedlings yearly.

Soil samples were taken at different locations and sent to the University of Delaware College of "Agricultural Sciences. Plant Pathology Department, for verification of the fungus. Additional soil samples were also -sent to Rutgers (in New Jersey) to determine if there were any parasitic nematodes present. This test proved negative.

In certain areas of the nursery, water remained standing in the beds and rows for days. Soil profile disclosed that a sand hardpan was present 16 inches to 18 inches below the soil surface.

Since most of the seedlings had germinated to a height of 1 inch to 2 inches by late spring, loss of 2-year stock of white pine, Douglas-fir, and Norway spruce was 25 percent to 30 percent and 10 percent to 15 percent in 1-year stock of loblolly pine. Mechanical methods were recommenced for use in alleviating the excess condition. A row subsoiler was used between the rows and along the perimeter at a depth of 24 inches. This reduced the surface water by breaking the hardpan.

Irrigation was also kept to a minimum. All irrigation was done in the early morning and discontinued after 12 noon to allow the nursery beds to dry out before evening.

Spray equipment movement over the beds was reduced to a minimum by spraying .three rows at a time. In future seasons, five rows will be sprayed at one time, thus reducing soil packing of the paths.

In the fall, the new planting beds were treated with Vapam soil fumigant at a rate of 80 gallons per acre. The fungicide was applied through spraying equipment, then sealed in the soil by irrigation. Additional soil samples were then tested 45 days after treatment and laboratory analysis revealed that *Fusarium roseum* was no longer present.

Additional mechanical precautions were also taken by sub-soiling the entire nursery to a depth of 24 percent at 6 x 6 foot intervals.

The *Fusarium roseum* root rot problem is very common in nurseries subject to unfavorable wet weather conditions and poor drainage. The use of good irrigation practices, sub-soiling, raised beds, and soil fumigants will help to overcome this problem.