

CONTROL OF DAMPING-OFF
AT BOSCOBEL STATE NURSERY IN WISCONSIN

Kenneth F. Derr

Game Manager, Boscobel State Nursery, Boscobel, Wisconsin

At the Boscobel State Nursery, started in 1951, our original conifer seeding was kept at a minimum, as we anticipated poor growth until the nursery area could be inoculated with the important root-producing mycorrhizal fungi. The seed was fall sown, without seed treatment. The species were of white and Norway pine and white and Norway spruce. The spring germination of all species was fair; however, early damping-off soon took its toll of better than 50 percent of the germinated seedlings. Those that came through were then attacked by late damping-off, in June and early July. So few plants were left by late summer that it did not pay to maintain the area.

The following year, in cooperation with the University of Wisconsin, tests were made in attempts to control damping-off. Two damping-off fungi were isolated. Early damping-off, caused by a species of Pythium, attacks during the cool and damp weather of early spring; late damping-off, caused by a species of Rhizoctonia, attacks seedlings during hot and dry weather, usually during late June and early July. Symptoms of damping-off are as follows: Early damping-off-Slight lesions appear on the stem at the ground line; the roots turn brown to black; and the plants fall over but usually remain green for several days. Late damping-off-The stems become straw colored; the roots are white when first attacked but later turn brown and die; the stems turn brown but remain standing; and the needles turn brown but do not fall off.

The second year's seeding schedule consisted of several tests of seed pelleting and check plots. DuPont Arasan 50 percent (Tetramethylthiuram disulfide), the organic seed disinfectant and protectant, used with methyl cellulose as a sticker, was used to pellet the fall-sown conifer seed. Proportions of 1 pound of Arasan to 2 pounds of seed, as well as 1 to 4, and 1 to 8, were used. The tests proved that the 1 to 4 trial showed maximum control with the least amount of fungicide.

The sticker held the Arasan on the seed coat throughout the winter, and there was still evidence of some of the Arasan on the seed after the seed coat was forced from the small seedling and had fallen to the ground. While this seed coat remained on the small emerged plant, rain and overhead irrigation washed a small amount of the Arasan material from the seed coat down the stem and on the ground around the plant, resulting

in control for damping-off.

As an insurance measure to control this early damping-off, a spray of Tersan 75 percent (the form of the Tetramethylthiuram disulfide chemical that goes into solution) was applied to the seed beds during mid April, about 2 to 3 weeks prior to germination. This early Tersan spray also controlled some of the early weeds for 4 to 6 weeks.

A second application of the Tersan spray was made after emergence of the seedlings, and this spray controlled late damping-off. Occasionally it was necessary to apply a third spray of Tersan to control late damping-off. No ill effects have been noticed as a result of using this seed treatment or spray material.

The Tersan is used at the rate of 1/2 gram of the 75 percent powder per square foot of seedbed area. We used approximately 3 pounds of Tersan to 12 gallons of water to spray a 42-inch wide row 550 feet long. A Silver Prince Myers sprayer was used for this operation, with three fan-shaped spray nozzles on the end of a boom adjusted to have minimum of lap. It covered the bed and half of each path. The screens in each nozzle were removed to prevent plugging of the material in the nozzle ends.

As already mentioned, our soil lacked the mycorrhizal fungi so important in the nursery for growing good healthy seedlings. Inoculation of the Boscobel nursery soils has been carried on primarily by the use of 2-year-old seedling stock from the Griffith nursery transplanted here and distributed as 2-2 stock and by spreading over our nursery area, soil and cull waste obtained from the Griffith State Nursery culling and sorting shed during the shipping season. Forest leaf mold was also used but was difficult to obtain in the great amounts needed. Seedling growth of conifers on these inoculated areas showed more color, growth, and disease resistance than the seedlings grown on the previously seeded areas not inoculated.

These same tests were run with about the same amount of success at the Griffith State Nursery.