

HARDWOOD DISEASES IN PLAINS FOREST TREE NURSERIES

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Hardwood seedling diseases have not been studied so extensively as diseases of conifer seedlings. Early work on nursery diseases in the United States dealt primarily with conifers (Spaulding, 1914; Hartley, 1921), and it was not until the 1930's that juvenile diseases of hardwoods received much attention. At this time the Prairie States Forestry Project and erosion control plantings created an unprecedented demand for hardwood stock, and many new nurseries were established. Several U. S. Department of Agriculture plant pathologists investigated nursery diseases during the period of greatest activity (1935-1942). Much of the work is summarized in a publication entitled "Diseases of Forest Tree Nursery Stock" by Davis, Wright, and Hartley (1942).

Wright of the U. S. Department of Agriculture studied tree disease problems in Plains nurseries from 1935 to 1942. He found that hardwood production was hampered by losses due to damping-off, and that American elm, Siberian elm, desert willow, and black locust were especially susceptible (Wright 1944). Wright noted that damping-off losses were higher if these species were seeded in beds previously cropped with legumes such as sweet clover and alfalfa than if they were seeded in beds previously cropped with cereals such as wheat, oats, and corn. Increase in nitrate nitrogen increased damping-off losses. Plowing under green manure crops less than 1 month before sowing caused heavy losses (Wright 1941). He did not find any correlation between soil pH and damping-off of Siberian elm (Wright 1944). Tests made with seed-protectant chemicals did not reduce post-emergence damping-off. Wright (1957) felt that if sowing time were adjusted so that emergence of seedlings was rapid and if irrigation water were used moderately, damping-off could be reduced.

Observations made in several Plains nurseries in the last few years indicate that damping-off is not now a major threat to production of most hardwoods. Black locust seedlings occasionally fail due to damping-off.

In Canada, damping-off has hampered production of the Siberian pea tree (Caragana arborescens). Cram and Vaartaja (1957) in recent tests found that soil drenches with fungicides such as Tersan or Captan applied at 1-week or 2-week intervals gave satisfactory control in Caragana beds.

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They recommended that the initial drench be at a higher rate than subsequent drenches.

Root rot of young hardwood seedlings were found to be unimportant in the Plains area (Wright 1944). During the thirties, however, root rots were damaging to black locust produced in some southern nurseries. Conifer root rots in forest nurseries are now controlled primarily by soil fumigation, and this method should be equally effective against root rots of hardwood seedlings. It is well known, however, that soil fumigation results in larger conifer stock, and recent trials in an eastern Nebraska nursery indicate that a similar growth response can be expected in hardwoods. Such an increase in growth of some hardwood species would be undesirable, since under usual nursery production methods, seedlings are larger than needed for field planting anyway.

Nematode diseases of conifer seedlings have received considerable study, and can be controlled by soil fumigation. Experience in controlling nematode diseases of hardwood seedlings is limited, but soil fumigation would probably control root-knot nematodes that have been reported as damaging to catalpa, multi-flora rose, and black locust in nurseries. Fumigation would likely control any other nematodes that might be found damaging to hardwood seedlings.

Virus diseases could be a limiting factor in the production of hardwood seedlings, especially if the viruses were seed transmitted; but there is no evidence of serious seed-transmitted viruses of forest tree seedlings in the Plains. Virus diseases could become especially troublesome if they were found in hardwoods that are propagated vegetatively.

Foliage diseases have been a threat to the production of several hardwood species in Plains nurseries. The shot-hole disease (Coccomyces lutescens) of chokecherry has been especially damaging. This disease has only recently been brought under effective control. Inman and Weihing (1959) at the Nebraska Station found that Cyprex provides excellent control. Little has been done to control foliage diseases of hardwoods in nurseries. They deserve more attention since many of them can readily be controlled by newer fungicides.

Stock commonly deteriorates in storage in Plains nurseries. In the central and northern Plains, hardwood seedlings are usually dug in the fall and stored indoors over winter. An especially damaging root rot of Siberian elm occurs in storage. Exposure of roots to freezing temperatures during lifting predisposes plants to this rot (Young 1943) which was found to be associated with the fungus Chalaropsis thielavioides (Lamb et al. 1935). Keeping storage temperatures between 35° and 38°F. and maintaining low humidity reduces losses (Wright 1942). Cottonwood stored over winter in central Plains nurseries also has deteriorated in storage. Solutions to this problem are currently being sought.

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