HARDWOOD NURSERY DISEASES

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It is significant that until now hardwood diseases did not rate a separate part on the Nurserymen's Conference Program. They do now because of increased emphasis on artificial regeneration of southern hardwoods. Nurserymen now must know, more than ever before, the diseases that limit production of the top quality hardwood seedlings that consumers are demanding.

If the Stennis Forestry Incentives Bill becomes law, our present State nurseries will have to double their production to meet demands for seedlings. Nurseries will be forced to use all available land to meet production requirements with no fallowing of plots. The best techniques available for disease control will be required.

The nursery disease picture is not bleak. Diseases that limit production or excessively raise costs can be controlled. This conclusion was emphatically demonstrated at one nursery where the size of sweetgum stock was decreasing each year. The supervisor decided to fumigate with methyl bromide, but left one-third of one bed untreated. The results were spectacular. Seedlings from the untreated bed were one-third the size of those from the treated bed and were unmerchantable at the end of the season. The cost for labor in weeding the untreated area was more than the cost of the fumigation.

Most root rots can be controlled through fumigation. Methyl bromide gas applied under a tarp consistently gives good results. Its biggest disadvantage is the need for a plastic cover. Best results are obtained if the chemical is applied when the soil temperature is SO° to 80°F., when soil moisture is adequate for good seed germination, and when the soil is plowed to a depth of 12 to 18 inches. If these conditions are not met, you can expect inferior results.

The same requirements must be met when methyl bromide or chloropicrin formulations are applied through a chisel. Vorlex, which can be applied without a tarp, consistently controls nematodes and root rot but not weeds. Moisture is not a critical factor with vorlex. The chemical may be biologically active for 6 weeks if a good water seal is maintained to prevent it from being lost to the atmosphere. Planting can be done 1 week after the chemical is applied, but the soil must first be disced or plowed. A lettuce seed test, as described by the manufacturer, should be done before planting to insure that the chemical has dissipated.

Damping-off is still a big problem in tree nurseries. How big? No one really knows, but it certainly eliminates at least 25 percent of all seeds planted. Many nurserymen plant an extra 20 to 30 percent of viable seeds per bed to obtain the desired stand. The increase compensates for seeds that do not germinate, seeds that germinate but are killed before they emerge, and seedlings that emerge but are killed within 14 days. Pythium species including P. sylvaticum, P. ultimum, P. debaryanum and P. irregulare, cause the most damage. Most Pythium spp. grow best at about 28°C. and do not grow at temperatures above 37°C. In the same temperature range-Fusarium solani and F. oxysporum are common and can also cause damping-off. We are presently working with Pythium spp. and Fusarium spp. to determine pathogenicity on and pine seedlings of various species. The objective is to develop a seed protection technique that will reduce or eliminate the loss from damping-off. Several systemic chemicals show promise in preliminary tests.

The most serious disease problem in cottonwood nurseries is canker-causing fungi. At present Septoria musiva, which usually does not cause a girdling canker, appears to provide the infection court for other organisms not possessing the ability to penetrate non-wounded stems. Cytospora chrysosperma, Phomopsis macrospora, and especially Fusarium solani are associated with cankers that possibly were originally made by Septoria.

Septoria also causes the most serious leaf disease on cottonwood. This fungus causes only minor defoliation in open stands, but it could cause serious losses in nurseries or in plantations where plants are closely spaced. Leaf infections supply inocula for stem infections, which result in a high percentage of cull in nursery stock. Stoneville clones 81 and 74 show resistance to this disease.

Cottonwood rust, Melampsora medusae, is not presently a serious problem in the South but may become one in the future. Western larch is the only alternate host of this rust Dr. Toole could find. He tested many conifer species, but found that only larch produced aecia that would infect cottonwood. Clones 81 and 74 also show resistance to this rust. Rust can be controlled with one application of cupric oxide or benomyl.

Black end rot of cottonwood cuttings is another disease under investigation. The causal organism is believed to be Alternaria tenius. This fungus causes a problem in the propagation beds on unrooted cuttings. The best control at present is to keep leaves dry for 24 hours.

Leaf spots on hardwoods may be caused by many fungi, including some in the genera Cylindrocladium, Septoria, or Cercospora. Cylindrocladium can cause serious damage to leaves, stems, and roots on yellow poplar and black walnut. Pathogenicity studies show the fungus can also cause leaf spots on sweetgum, dogwood, sycamore, and oaks. Most leaf spots are not serious problems and can be chemically controlled.

Nursery diseases can be controlled economically if nurserymen utilize the latest techniques available. Any disease or abnormal growth of seedlings should be investigated and reported immediately to State or Federal pathologists. In most cases, effective controls can be implemented after symptoms appear on a few plants. Control of diseases usually comes from protection of uninfected stems and leaves with chemicals, rather than from eradication.