FUMIGATION OF FOREST NURSERIES IN THE SOUTHEAST FOR CONTROL OF WEEDS AND ROOT ROT

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During the past few years, increased numbers of forest nurseries have been found to be infected with root rot. The lower part of the seedling root system decays and swelling occurs in the live tissue just above the decayed area. Work is still under way to determine the cause of this disease. It can, however, be controlled by soil fumigation. In severe cases, control of the disease alone justifies the cost of fumigation. In other areas, nurserymen fumigate because of the additional benefit from the control of weeds, particularly nut grass.

The most effective fumigant is methyl bromide. This material applied at 300 pounds per acre under plastic covers will completely eliminate root rot, nut grass, and most other weeds during the first growing season. It is important that the soil be disked thoroughly and that its moisture content be suitable for planting seed. If the soil temperature is above 60° F., 24 hours exposure to the chemical, with the covers on, is necessary. If the soil temperature is between 50° and 60 , a 48-hour exposure is necessary. Soil cannot be successfully fur-gated at temperatures below 50°. It is safe to plant 24 hours after the covers have been removed.

Cost of fumigant is about $210 per acre. In addition, cost of plastic covers varies with the number used atone time. A crew of 4 to 6 men using 25 covers of 900 square feet each can fumigate about one-half acre per day. Labor costs increase the expense of fumigation to approximately $400 per acre. Tree growth has been outstanding on areas that have been fumigated, so some growers believe the additional expense of approximately 40c per thousand seedlings is justified.

Because of the high cost and excessive labor involved in fumigating with methyl bromide, a search has been made for a cheaper substitute. The most promising material yet tried is Vapam.21 This material used at 60 gallons per acre will completely control nut grass and give commercial control of root rot. Its cost is $180 per acre. The greatest advantage in using Vapam is the ease of application. It can be pumped into the irrigation system slowly so that it takes 20 to

1 / The author is employed under a cooperative agreement with the Georgia Forestry Commission.

2 / Vapam is now marketed by Stauffer Chemical Company and E. I du Pont de Nemours Company.

30 minutes to apply the chemical. For control, this must be followed immediately with at least one-half inch of water to seal it. Failures with this chemical have been traced to an improper seal. Vapam decomposes rapidly and evaporates as soon as it is diluted. If it has been properly sealed, it will remain in the soil for several days. Vapam will control root rot and nut grass after being sealed in the soil for 24 hours, but disking and planting should be delayed for 2 weeks to avoid any possible toxic effects to the new seedlings. Treated soil should be thoroughly disked when beds are prepared. A more complete control can be obtained by increasing the dosage to 120 gallons per acre, but in early tests it seems doubtful that the extra expense is justified.

Tests on the use of Vapam are still in progress and further refinements can be expected. This preliminary information is released because of the tremendous interest in the use of Vapam evidenced by requests from nurserymen throughout the area. It would be wise to experiment with the material on limited acreage before undertaking large-scale fumigation.

Another material which has been used in forest nurseries for several years is ethylene dibromide. This chemical controls nematodes only and has no important effect on fungi or weeds. A formulation of 85 percent ethylene dibromide by volume when used at 10 gallons per acre costs in the neighborhood of $40. It is injected into the soil 6 to 8 inches deep by a special apparatus. Soil should be prepared in the same manner as for other fumigants. It is necessary to wait two weeks after treatment before planting. Although some nurseries have obtained control of root rot by this means, there are many areas where it fails to produce the desired effect. This suggests that nematodes are a factor but not the only factor involved in the root-rot complex.