

DISEASES AND FUMIGATION

S. J. Rowan, U. S. Forest Service
Athens, Georgia

The soil in each forest tree nursery throughout the world differs in one important aspect. The size of particles essentially accounts for most soil characteristics. Sandy soil contains large particles and clay soil contains small particles. The amount of clay, silt, and sand, or the amount of small, medium, and large particles in a soil is used to separate soil types. Since no one has developed an economical way to change soil particle size, such as a particle grinder, I suggest that we disregard soil management and direct our attention to the space between soil particles where the water and nutrients that promote growth and fungi, bacteria, insects, and nematodes that reduce growth exist.

If we can keep this space filled with enough water and plant nutrients and keep all harmful organisms out, we have come a long way toward proper space management (or is it soil management?).

Diseases which affect nursery stock can be controlled by fumigation and fungicidal sprays. Most of you know that such control is expensive and sometimes a little something goes wrong, seedlings start dying, and you start pulling your hair out. Some of you have called me to come by to look at your dying trees, and I have told you such things as damping-off, root rot, nematodes, corn stalk borer, or something. I probably gave you a recommendation to help. Most of you have probably reasoned by now that a dead seedling cannot be brought to life again and by the time I've been, gathered samples, isolated and identified the pathogen, and told you the cause and remedy, more seedlings are dead and often the seedlings have overcome the problem themselves.

It seems that the best advice I can offer is to practice a management program that will not only produce seedlings of a proper size but one that will produce healthy seedlings. Studies have shown that nitrogen will increase growth of seedlings, damping-off, black root rot, and fusiform rust. Sunscald can also be increased with a little extra nitrogen. Is it reasonable to fumigate and spray to control these diseases and then fertilize to increase them?

Nitrogen applied in June, July, and August should meet the requirements for producing plantable seedlings and reduce rust and damping-off. It makes as much sense to provide a balanced diet for seedlings as it does for a growing child. We worry about N, P, and K, and very seldom think of iron, magnesium, sulfur, calcium, or molybdenum. Chlorosis has been shown due to a deficiency of iron and some nurseries have used iron. Sulfur has been applied to lower soil pH and calcium has been applied to increase the soil pH.

My point is simply that a given amount of minor and major nutrients are required by a tree seedling for a balanced diet. A seedling provided such a diet should be most able to withstand diseases and survive outplanting.