

## NURSERY SOIL MANAGEMENT 1/

Jack T. May, University of Georgia  
Athens, Georgia  
(Panel Moderator)

I would like to reminisce a little. The first commercial tree nursery in the South was established in Bogalusa, Louisiana, about 1919. For the next 10 years they operated a nursery that moved from one site to another site. The nursery produced from 1 to 3 million seedlings per year, which is not a large measure by today's standards. But, they did produce good seedlings by moving to another area when they wore the soil out in one particular spot. In the middle of the 1920's after the Clark McNary Act was passed, most of the states began to establish state nurseries. Again, these were relatively small, until about 1933. At that time, the Civilian Conservation Program started and both the Forest Service and the Soil Conservation Service began to establish nurseries. These were relatively large as compared to the earlier nurseries.

The first-year production at the Stuart Nursery was around 12 million seedlings. Then in approximately 3 years, production jumped to about 42 million seedlings. Our early techniques were somewhat crude compared to some of the practices today and some of the things that we've learned later; as LeRoy mentioned earlier in his remarks this morning.

When we first started, as far as soils were concerned, we picked the poorest site we could get for a nursery and operated it somewhat like the farming operations in the area. In looking over the early reports of the Stuart Nursery, I found that the fertilizer treatment was 200 pounds of 6-10-7 per acre for the cover crop and nothing was added to the seedling crop. By today's standards, that's relatively low. The standard cover crops were primarily cowpeas, crotalaria, etc. Attempts were made to increase organic matter by adding sugar cane, tobacco leaves, or anything that might be available. Also, there was some attempt in the early days to use compost, which was a basic method used to maintain organic level in the soil. The general soil treatments were aluminum sulfate, sulfuric acid, and formaldehyde.

The major soil problems were primarily damping-off and white grubs. Root rot first began to show up about 1936-37. At that time no one knew anything about nematodes; in fact, very little about root diseases. Pathologists employed by the Forest Service would visit a nursery that was having problems; but about the only thing they could say was that there was some type of nutrient deficiency or there was no chemical available for control of the problem.

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1/ Panel presentation. Papers of panel participants are included.

The first nurserymen's conference of this type was held in August 1937 at the Ashe Nursery. I would like to read just a few remarks regarding soil management that were made at the conference. This has to do with soil amendmets . . . . "fertilizer--not generally used; standard fertilizers cannot be recommended because of varying soil conditions. Each nursery must work out its own fertilizer requirements and study them carefully. Fertilizer shouldn't be added to the compost. Better no fertilizer than a wrong fertilizer." A lot of nurserymen took this comment literally and decided that no fertilization was better than fertilization. Therefore, there was no heavy fertilization program at any of the nurseries.

Also, as root rot began to spread, a rather extensive study was initiated. Root rot was first discovered at the Ashe Nursery in 1937. A team of one to three men began working on root rot about 1946. But I don't think that they actually had classified it even at the end of the third year--they were just trying to get it under control.

Chemicals tried then were methyl bromide, EDB, DD, and some others. EDB gave fairly effective control then and has been used continuously since. One of the men suggested that root rot was primarily a phosphate deficiency and recommended an application of 3,000 pounds of P<sub>0</sub> per acre each year, which is a rather heavy application to use by today's standards.

Soil tests, as known today, were unheard of. I don't think that any nursery had the soil tested prior to 1947-48. It wasn't until about 1952 that we began to get into soil testing for forest tree nurseries. Most of the Agricultural Experiment Stations did not run a soil testing lab then and it was somewhat difficult to get a really good soil analysis. After tests became available in 1952-53, most nurseries had complete analyses made within the next 5 to 6 years.

In 1952-53, some of you might remember, Dr. Pein from Germany visited the United States. His family had been in the commercial forest tree nursery business for over 150 years in Germany and had operated nurseries on the same site for the entire period. We mentioned this morning the number of seedlings produced in the South and the United States. West Germany produces over 2 billion seedlings per year in their planting program, which was more than the entire United States production during the peak of the Soil Bank period. Dr. Pein wrote a report on his visit to the United States. He compared nursery practices and general cultural operations in his Country with those in use here. At that particular time, one of the things which he strongly suggested was the use of compost for organic material, particularly cow manure. Then, in one of his publications, the importance was pointed out again. He said, "I suggest it might pay American nurseries to keep cattle in order to

get the necessary manure for maintaining soil fertility." That procedure has been used in his Country's nurseries for a long time.

Beginning about 1964, we have had some comprehensive papers on the management of nursery soils. Some of you are relatively new in the nursery business. But some of you have been nurserymen for a long time and know that the papers have pretty well covered a lot of the subject matter that we will deal with today.

Today we probably have the best qualified panel on soil problems that we've ever had at any nurserymen's meeting. I'm not going to give you a complete bibliography of the men who are on the panel, but I will tell you that they are all very capable scientists and are specialists in their field. I'm going to introduce the men in the order which they will appear. They will take about 10-15 minutes to discuss certain phases of nursery management and then we'll open the floor to questions. This is supposed to be a participation-type meeting and we'd like for you to address your question to the Chair, or one of the panelists; and we will see if we can come up with some answers on any problems that you might have that deal with soil management. We may have more than one answer--we may have two or three different opinions--but that usually happens when three or four people who are knowledgeable in the same field get together.

Dr. Bengtson is with the Tennessee Valley Authority at Muscle Shoals, Alabama. He is primarily a physiologist and has a very strong background in fertilizer and fertilizer application.

Dr. Davey is Professor of Forest Soils at North Carolina State University and is probably one of the most outstanding young soils men in the South today, especially in the area of microbiology.

Dr. Rowan has been associated with these meetings in the past and is with the U. S. Forest Service. He is a pathologist primarily and is also a very good physiologist.