PROBLEMS AND PRACTICES IN NURSERY WEED CONTROL

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In preparation for this paper, about all I could think of was problems; however, much progress has been made in nursery weed control since the first conference, which was held at the Ashe Nursery in 1937. It was there we observed the operation of the cultivator used by Jack May and his associates.

The weed seed problem in Tennessee stems from several sources. We try to control the weeds in the nursery by mowing. However, the big problem comes from the seed that are washed in during the early, heavy spring rains. Many seed are blown in from adjacent areas. Some are brought in through the irrigation water, which is of necessity pumped from a pond. Another source of infestation from weed seed is our burlap seedbed cover. This will be eliminated soon, as we plan to use a hydro-mulcher.

Hand-weeding is, of course, a necessity to some extent. Here, again, we face problems because it is virtually impossible in our section to pick up extra labor during peak seasons. Once you let the laborers go, it is generally almost impossible to get them back. We are now competing with other demands for labor. However, there are some signs on the horizon; and hopefully, the supply of labor may improve to some extent. How much, we do not know.

The last growing season was a very peculiar one in that our weeding cost skyrocketed, and yet our production went down from what we anticipated. Our weeding cost was the highest in history ($1.06 per thousand seedlings). I am told by some of the other states' personnel that their cost has ranged from $0.70 to $1.10 per thousand. This seems like an awfully high price to pay for weed control.

Our interest in chemical herbicides first started in the late 1950's when we heard of the chemical, Mylone--sometimes referred to as Barber's Pre-Plant. Actually, we received very little result from this, probably due to our own lack of knowledge. A few years later the problem of root rot developed on yellow poplar and we were advised to treat with methyl bromide. This provided excellent results; however, the problems involved in making the applications were tremendous. As a result of this, we went to Vorlex applied by injectors, with application rates of from 20 to 40 gallons per acre. We have had good control of fungi, but rather limited success with weed and grass control.

We have had excellent results from our mineral spirits (Gulf refers to it as Gulf Weed Killer) this season. It seems that weather conditions have been just about ideal.

We have made some tests with Treflan, and it has given good control of grass. However, at the rate of 3 pints per acre, it caused stunting in shortleaf pine.

One of our biggest problems to date is the control of weeds and grasses in 2-0 white pine. Perhaps some of you would have a suggestion that would help us with this problem.

Communication with some of the nursery people around the South revealed some interesting experiments with chemical weed control and, no doubt, some of you will wish to discuss the results with individuals concerned.

Paul Adams from Arkansas reports that last year he experimented with spraying 5 acres of seedlings with Planavin, or Treflan, at the rate of 1 pint per acre. He felt this worked so successfully that this season he has recently treated the entire nursery. As I understand it, this was done the last week in June and the first week of July. Paul tells me that he has also put in some tests with gelled methyl bromide and zytox. I suggest you contact him for an evaluation of these chemicals.

Paul also told me that they have developed a rotary hoe, which worked very well. I believe he has a slide of this machine if you are interested in seeing it sometime during the meeting.

Larry Staley of South Carolina tells me that they treat with methyl bromide every 2 years and get excellent control of weeds and grasses along with nutgrass and root rots. Also, he has been using Treflan and mineral spirits at the rate of 25 to 30 gallons per acre in the late stages of seedling growth. He is quite pleased with the use of atrazine on fallow areas to keep weeds from seeding. Atrazine is also used under the water lines.

He further suggested that we give some consideration to the use of prometryne, sprayed in late-May and June. He says this has shown very good results on some species.

W. D. McNeel of the Mississippi Forestry Commission has written a most interesting letter and, no doubt, he has opened some doors. He writes, "For years we have depended on mineral spirits and hand-weeding. We use Stoddard solvent containing about 11 percent aromatic components, starting with 10 to 12 gallons per acre and increasing to 25 gallons per acre. Weeds that have a natural resistance to solvents are removed by hand."

He also states, "In 1957, we treated about one-half of our production acres with Vapam. The result was very poor. Since then our use of chemicals has been limited to small areas, using methyl bromide, Eptam, and Treflan. Last year Dr. Ted Filer put in a study

at Mt. Olive and Winona Nurseries. This study included Vorlex, Eptam, Busan 72, and bromide (gel type), and combinations of these chemicals. The result of the study is not available for release from the Mississippi Forestry Commission; however, Dr. Filer might release it to interested persons." McNeel indicated that, in his opinion, the Vorlex-Eptam combination gave the best weed control. Eptam alone gave the next best. The bromide and Busan did not give good control.

McNeel indicated that because of the increased problem of weed control and the increase in labor cost, it was decided this year to step up the chemical weed control programs. Thus, they used Eptam, Treflan, and a small amount of methyl bromide on both pine and hardwoods. Study plots were established in pine at Mt. Olive, using Eptam and methyl bromide. A grass and weed count was made on May 13, 1970. No weeding or spraying with mineral spirits was done on these plots. Results of the count. follow:

	Methyl bromide (400 lbs./A)	Eptam (3 qts./A)	Check
Nutgrass	0	5	111
Crabgrass	2	4	136
Weeds	1	5	102
Other grass	12		10
Total	15	22	454

After this count was made, the weeds were removed. The reason for removing the weeds was to determine how long they will obtain results from these chemicals. Another count -will be made on July 15, 1970. The methyl bromide was applied by hand applications (under cover) at the rate of 400 pounds per acre. The Eptam was sprayed on the top of the soil with a Handie sprayer, at the rate of 3 quarts per acre and then disked into the soil and watered.

McNeel also applied Treflan to newly established cottonwood cuttings or seedling production area. While Treflan is not doing too well in controlling weeds in the seedling beds, it is giving good control in the cottonwood. The rate of application was from 1 to 2 quarts per acre, depending on the soil type.

At. Mt. Olive, McNeel sprayed nutgrass in the middles of old established cottonwood with Paraquat and DSMA (disodium methyl arsenate), using 1 pint per acre. Both of these looked promising; however, they did not have enough for the job and decided to try mineral spirits. It did the best job.

This year the Mississippi Forestry Commission applied Vorlex to 4 acres at Winona Nursery and 45 **acres at** Waynesboro Nursery. The rate of application was 25 to 28 gallons per acre. Vorlex was applied for control of soil-borne diseases, but they did obtain some weed control. The seedlings in the treated areas are better than the seedlings in the checks.

Jack Rhody of Kentucky writes that his problem at Kentucky Dam Nursery stems from years of wild, untended, and uncut growth which has left him with a tremendous build up of weed seed. He has a large variety of both annuals and perennials, which he considers a major problem. Jack feels that due to the use of fumigants and pre-emergents, it is not quite the problem it once was.

Grasses constitute the biggest problem, especially large crab-grass, crowfoot grass, foxtail, and broadleaf signal grass. Among the perennials is Johnson grass and Bermuda grass.

Weeds, other than grasses, include common yellow woodsorrel, common purslane, curlydock knotweed, and yellow nutsedge. These are the most troublesome.

A number of control methods have been tried over the years but the following seems to have provided the most effective control:

"In our nursery practice we follow the procedure of 2 years in seedbeds and 1 year in cover crop. The cover crop being soybeans. Last year on our cover crop we used Vernam (Stauffer) at the rate of 3 pints in 50 gallons of water per acre. This year (1970) we used 2 quarts of Lasso (Monsanto) in 50 gallons of water per acre. Both chemicals were applied with a tractor-mounted drum-type sprayer. Both seemed equally effective especially on the grasses. Of the two, Lasso is easier to apply since it does not have to be incorporated and costs about S1 less on a per acre basis."

"Vorlex (Morton) is injected into all the seedbed area that has produced a cover crop during the previous summer. This is done by early-November. A John Blue injector is used and the fumigant is placed from 5 to 6 inches deep. The soil is then packed with a roller and cultipacker to help prevent fumigant loss. Two weeks later the soil is turned to place the treated soil on top."

"All seedbeds not in cover crop the previous year are injected with Vapam at the rate of 98 gallons per acre (around the middle of April). Injector depth is about 3 inches. The beds are then rolled and water sealed. One week to 10 days later the soil surface is scratched with a spring tooth harrow to let any vaporing fumigant., gas escape. Seeding begins 11 to 14 days after injection."

"Straw is used as a mulch on our seedbeds. This straw is treated with methyl bromide at the rate of 1 pound per 9 bales of straw. The bales are broken open and covered with polyethylene before treatment. Treatment results in a substantial reduction in germination of any wheat or weed seed that may be in the straw."

"Mineral spirits are applied at the rate of 12 to 25 gallons per acre once or twice weekly. We find that spraying before the seed caps come off, or after secondary needles appear, results in too much damage to the seedling. White pine is especially susceptible and we cannot exceed 15 gallons per acre."

I want to thank the individuals who helped in the preparation of this information.

The question comes to my mind -- just what information do we need to improve weed control and reduce costs. We have so many different and varying conditions that it seems to me we need the services from someone especially trained to test many of these ideas under varying conditions and evaluate and dissimate his findings.