SEED ORCHARD MANAGEMENT

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Seed orchard management or maintenance can very loosely fall into five areas of work:

1. Land preparation and maintenance.
2. Insect and disease control.
3. Flower stimulation--fertilizer, irrigation, etc.
4. Harvesting and testing.
5. Records.

LAND PREPARATION AND MAINTENANCE

Proper land preparation prior to orchard establishment is most important. The time, money, and effort expended at the beginning will make orchard management less expensive in the future. The land should be cleared, raked, and smoothed so that all radical topography is eliminated and foreign objects removed. If necessary, subsoiling should be done at this time. This type of preparation will certainly help reduce work time and labor costs in the future.

Grass and weeds are controlled in our orchard by mowing with a 7-foot 807 bush hog. In normal years, four or five mowings are necessary. Mowing gets most of the weeds and grass, but leaves a small area around each tree that must be hand-cut with a swing blade or chemically treated. For the past few years, we have been using Paraquat C.L. One part Paraquat and 900 parts water with Triton 1957B surfactant, used as a spray, gives us very nice control. Care must be exercised to keep this material off the foliage of young trees.

The mower that we are now using is quite good for today's needs, but we expect that a reel- or flail-type mower will be needed in the future to increase the effectiveness of the seed harvester.

INSECTS

Insect control is probably the most critical job in management. To lose control is to invite disaster in seed production. In the past we have been using a hydraulic spray to wet, or wash down, the trees. Chemicals used in this spray were DDT, Malathion, BHC, and Triton. Spraying usually started about the first week in April and continued on an every two weeks schedule until the second week in September. Sprays were alternated between DDT and Malathion plus BHC. Any area that had over one-half of an inch of rain, within 24 hours after spraying, was resprayed. This rather severe routine gave us excellent protection at a relatively low cost.

This year, due to pressures being brought for the banning of DDT and other insecticides, we have started using Thimet 600 liquid for insect control. Our decision to use liquid Thimet was based on lower cost, ease and safety in handling, and ease of application. Our spray pumps, tanks, and motors were easily converted to low pressure top-of-ground applicators. The present price of Thimet 600 per gallon is 513.44. One gallon liquid is equivalent to 60 pounds of granular Thimet 100, which now would cost 16.50.

One and one-half gallons liquid Thimet to 100 gallons of water is our standard mixture. In our older orchards where the trees are above 25 feet tall, our application rate is 120 gallons per acre or about 1 gallon per tree. For tree heights, our applications are as follow:

25 feet and up	1 gallon
15-24 feet	3 quarts
10-14 feet	2 quarts
5-9 feet	1 quart
2-4 feet	1 pint
below 2 feet	1/2-pint

Older orchards receive full coverage while small trees receive individual treatments. To date, we have good control of tip moth, but there is some small amount of cone damage.

In order to check the effectiveness of our liquid treatment, we have two separate acres set aside on which we made applications, at 100 pounds per acre, of Thimet 10G. Control is good in these areas. An untreated check area that we have is being rather severely attacked by tip moth.

Safety in this area of work is a must. We require our men, when working with insecticides or systemics, to wear a full rubber suit and a Pulmosan chemical filter mask. They must bathe or shower and wash down their protective suits before leaving work.

DISEASES

Fusiform rust is about the only disease that gives us much trouble. In years past, we had to cut out the infected area in. order to save the tree, but now we use sodium arsenate to kill the affected area. For best results, we paint the gall surface with a solution of sodium arsenate after the tree has become dormant. This chemical will kill the diseased part of the tree but will not harm healthy tissue. Tests have shown that a 5 percent solution will give about 90 percent control. As trees start to heal, some re-infection may occur on the cambial roll but this can easily be treated and controlled.

IRRIGATION AND FERTILIZATION

Seven years ago we started a test in our orchard to find out what effect water and fertilizer had on flower production. The test area was divided as follows:

--Water only
--Water and fertilizer
--Fertilizer only
--No treatment

Within each treatment area, four individuals of six clones were selected so that all test trees were of the same age of establishment.

Eight irrometers stationed in areas one and two help us determine when to irrigate. When necessary, we usually irrigate for about 3 hours, putting down about an inch of water. More water than this is usually wasted in runoff.

In two of the areas we have three applications of fertilizer each year. In March, we put down 500 pounds per acre of 10-10-10; in June, 300 pounds per acre of A.N.L.; and in November, 500 pounds per acre of 10-10-10.

The results of this test have been most gratifying. Flower production in the water-fertilizer area is four times greater than in the check. Fertilizer only is three times the check, and water only treatment is double the check. Fertilizing all orchards is now a standard practice and irrigating is done in severe dry times.

HARVESTING

Because of the rather short time between seed ripening and cone opening, seed orchard people quite often find themselves in a position of being short of time, labor, and temper. Cone harvesting is still a hand operation in which we have to pull, push, knock, or cut each cone from the tree. In our harvesting, one man usually works from the tree while a second works from a reinforced ladder mounted on a tractor front end loader. A third man works on the ground collecting and bagging the cones as they are dropped. With our present work force and expanding production, we cannot continue this method of collection. The seed harvester or some other mechanical means of collecting cones or seed will soon be a must.

All open-pollinated seed are extracted and stored at Claridge State Nursery at Goldsboro, North Carolina.

TESTING

The management of controlled crosses for progeny testing, from collection of pollen through pollen processing and storage, to flower bagging, pollination, and harvesting is one of the most tedious and time consuming jobs connected with a seed orchard. These crosses must be located, tagged, and followed closely until outplanted. Control crosses are extracted and stored at North Carolina State University, Raleigh, North Carolina.

RECORDS

No small task, in seed orchard work, is the keeping of records on every tree. The first record of any tree contains the company name, tree number, date of graft, grafter, row number, and hill number. This same information is printed on a stainless steel tag and nailed to the tree. Additional information is added to the record when inarches or scion materials are taken from a tree or any significant event occurs. Without good records, future selections would be difficult and information such as incompatibility, grafting ease, and location would be impossible,