A PRACTICAL LOOK AT CHRISTMAS TREE
IMPROVEMENT IN PENNSYLVANIA

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ABSTRACT.--In 1961 the collection of plant materials
for the establishment of a 10 clone 500 tree seed
orchard was established. After 17 years the results
are still questionable.

IN THE SPRING OF 1961 Fred Musser, Jr. and myself came
to Penn State for a nursery conference and went to a forestry
seminar. We heard Dr. Bruce Zobel talk about the establish-
ment of seed orchards for the improvement of southern pines.
We discussed this among ourselves for a while and decided
if southern pine wood qualities and volume can be improved,
why can't we improve Christmas trees with a clonal seed
orchard.

Our major species is Scotch pine (Pinus sylvestris)
so that is where we thought our effort should be placed.
In the winter of 1961-62 we asked Dr. Henry Gerhold for
some professional advice not only in setting up a program,
but also in the selection of superior trees.

At that time we had a Dutch propagator who was a great
advocate of winter grafting. So in September we potted
about 600, 2-1 scotch pine transplants to be used for under-
stock. In February of 1962, we cut 60 scions from each of
10 trees that we had selected as our superior trees. The
grafting was done on the potted understock in the greenhouse.
We had about 80 percent take and in early June the grafts
were planted out in the transplant beds. The following year
we grafted some more of each clone so that we were sure to
have a minimum of 50 grafts of each of the 10 clones.

In the spring of 196+ the orchard was planted, placing
the grafts on 16 foot centers. The pattern used was de-
veloped by Langer & Stern for a 10 clone orchard. However,
having 500 plants, we repeated it 5 times. The planting
was about 95 percent successful, with only a few of the
poorer grafts dying that were planted in the last 2 rows.

We had great hopes for this orchard. The first few years we mowed it and fertilized each plant with chicken manure. Each year we watched it grow and after a few years some pistilate flowers appeared, but no staminate flowers. Five years, then 10 years; and still not a single staminate flower on any of these trees. Occasionally, however, there were quite a few pistilate flowers. Now finally in 1978, two clones produced a rather large amount of pollen. From past history, what we can expect from this orchard is rather uncertain.

In 1971 we bagged a number of the pistilate flowers and pollinated them with a mixture of pollen from the parent trees. Basically being a commercial nursery and Christmas tree operation, our main objective is to make a profit and keep the overall operation going. So in 1973-74 when the cones should have been collected, they were overlooked and lost. Also, one year we collected a few cones from each clone for test growing and had them drying in the green-house instead of the seed dryer. Well the mice got to them first and we lost them.

I am, however, more hopeful that this winter we can collect the cones since there is a fair amount in the orchard. Also, next year I intend to make a special effort since I know some of the pollen came from the orchard.

Another reason for our lack of interest in the Scotch pine orchard is the increase of disease and insect problems in the last 10 years. Before that we had few, if any, in-sect or disease problems in the pine plantation. Also, the Scotch pine appears to be short lived in our area. At about 25-30 years the stands begin to break up and are over run by hardwoods.

In our efforts to select desirable parents, we did find one clone which is a really superior tree. The selec-tion is what we call tree #1. The outstanding traits of this tree are its blue color, 3 and 4 year needle retention upright branch angle, and its ability to form a central leader after grafting. We have tried numerous ways to root this tree, but our only success has been with grafting. We have about 2000 of these grafts planted in field rows, hoping that some day a more simple method of propagation will be found.