

MUSSER FORESTS SEED IMPROVEMENT PROGRAM

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Our interest in seed orchards and seed production areas was aroused at a Forestry Seminar which Dr. Gerhold invited us to in the winter of 1961. The object of our program is to insure our supply of Scotch Pine seed of the best source for the production of Christmas trees,

We have planted a three-acre clonal seed orchard using 10 clones and spacing the tree on 16 feet centers. They were planted in a basic diagram for 10 clones made by "Langner & Stern". The diagram was repeated four and one-half times and reversed each time to try and get the maximum stratification.

We anticipate grafting enough material to plant another three-acre clonal orchard in the spring of 1965, We have also established two 25-acre seed collecting areas which have been thinned. These collecting areas are in 14- and 15 year-old stands of Scotch which have exceptionally good color, branch angle, and needle retention.

(A series of 15 slides were shown of the selection of superior trees, the grafting of Scotch Pine, and the thinning of the seed collection areas.)

DISCUSSION

LARSSON - Mr. Bedger, have you considered establishing the grafted material on their own rootstocks? Do you think the rootstock of the grafting stock will affect the growth and appearance of the grafted trees in your seed orchards?

BEDGER - I cannot answer this question completely, but we do a lot of grafting of ornamental pines such as Pinus cembra and Pinus sylvestris "Watereri" and also different varieties of spruce, Most of the spruces eventually produce some roots at the point of the union. However, the pines, to the best of my knowledge, do not form any new roots but depend on the root system of the under-stock. A number of Dutch propagators in this country a few years ago switched from Norway spruce to white spruce to graft their Koster blue spruce. At first it did not appear to affect the graft, but later on it was thought that the two may not be compatible in older age.

LARSSON - How do you account for the dwarfing effect of the Mailing stock on common apple varieties?

BEDGER - One reason why I selected this oversexed tree to grow seedlings for understock is because the geneticists tell me that there is a possibility that the understock may influence the seed production of the graft. I am not a geneticist, but I am hopeful that by using seedlings which were grown from this oversexed parent and used as understock, we may be able to produce more seed in our seed orchard.

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²Transcripts of the discussions were sent to each of the participants for editing with the specific request not to change the contents of their remarks,

WELCH - Isn't it true that the Mailing effect of those rootstocks is due to the fact that the rootstock itself is a dwarf; it doesn't grow big, therefore, the tree doesn't grow big.

BEDGER - Again, I cannot answer you, sir. I am not familiar with this technique, Perhaps someone else in the room could.

SCHREINER - Yes, I think I can answer that, the selected Mailing stocks are slow growing. Beakbane and her associates at East Mailing found that they can recognize these dwarfing rootstocks by the ratio of rootbark to diameter of the root, We have also found that in poplars the rootbark percent of nursery stock could be used to select for inherent growth rate; Santamour gave a short summary report on this at the 1960 NEFTIC meeting, But whether or not the rootstock will affect the early fruiting of the tree, to my knowledge, is still an open question. And this actually is not a genetical problem; the physiologist is the man who should answer that question. Do we have any physiologists in the audience?

GERHOLD - I'm not a physiologist, but I would like to comment on the same point
There have been a number of experiments exploring the possibility of the effect of rootstock on the scion with forest trees, and so far as I know, there's very little, if any, effect on many of the characteristics that have been examined.. I don't think this is contradictory to the situation with dwarf apple rootstock;
I think we are just faced with different possibilities, different situations, with respect to this effect of stock on scion.

GABRIEL - We are very much interested in the effect of rootstock on the sugar content in sap in sugar maple, Thus far we haven't been able to prove any-thing one way or the other, and should anyone have any information on the subject we would be glad to hear from them. I believe that back in 1956, there was some work started on the effect of rootstock on the sap sugar of the scion. But I think that in grafting scions of both a low-sugar producing and high-sugar producing tree on the same rootstock, one scion has forced the other into the role of a small lateral through the expression of dominance.

HUNT - I would like to comment on the rootstock effect in the case of Scotch pine and red pine. We found in Syracuse, about 1958, that grafts of red pine done on Scotch pine rootstocks were initially more compatible and demonstrated greater vigor than those done on red pine rootstocks. I believe they are still surviving on the Scotch pine rootstocks. There's a tendency for the Scotch pine rootstock to become weak and flexible after a period of years; however, the initial take is much better, and the vigor of these grafts for the first few years is considerably better than those on red pine rootstocks, It is a characteristic of the Scotch pine as a rootstock to grow very rapidly, unite and support the red pine scion or else push the scion out At times this growth is so vigorous that the scion is completely pushed off the cut face.

STAIRS - I do not believe this practice is to be recommended because we find instances of incompatibility developing later. Mark Hoist, of the Petawawa, Canada Research Station has also reported incompatibility developing in red pine- Scotch pine grafts after several years of normal growth. Thus, while initial success may be good, later on incompatibilities may be a seriously limiting factor,

GERHOLD - One other observation came to my mind with regard to flower production as it might be influenced by grafting., I graft occasionally when I see a need for it, and a few years ago I grafted four branches from a heavy flowering Scotch pine into a tree of another variety; there were no trees flowering at all in

that variety, About three years later this particular tree started flowering, and it was one of the very few trees in that plantation that had any flowers. Now this evidence isn't as good as we'd like because that tree might have flowered anyway without the grafting, but it gives some indication that there might possibly be some effect, In this case,, the grafts were put on side branches rather than on the terminal.

HUNT - Al, do you equate the ADCU labor-hour with a normal labor-hour? That is, can this ADCU voluntary labor be compared with the same man-hour of normal wage-labor that we'd hire on the open market?

ALLISON - I would say that under proper supervision it would be as good as we would get for \$1.10 an hour; it's the same person; it's just who pays him. In other words, a dollar an hour doesn't cost the Division of Forestry any money other than to provide the supervision. An ADCU laborer has to report for work for a predetermined number of hours per month in order to qualify for his monthly check. We are not able to exercise quite the same amount of control, but usually get satisfactory results.

ELIASON - These cost figures are very comparable to that we have obtained in New York, where some 50 acres of young plantations have been converted into seed production areas. In some cases the areas have been worked twice, once in 1959 and then L years later, However, the total cost in labor and supervision has remained near the figure of \$200>00 per acre.

ALLISON - On the white pine area cost summary, two figures are not represented. This area is still probably going to have to have a little more thinning done after we observe what effect the roguing and thinning might have on future snow damage and wind-throw.. We also have some additional work in the removal or chipping of brush and tree tops from this white pine seed production area.

HEIMBURGER - I'd like to ask Mr. Allison a question. The origin of your Virginia pine seed production area is from 800 feet elevation, as far as I understand, and it's planted at 1800 feet. Will that make a difference in Virginia pine? I would think that it would be better to have the origin higher and the production area at lower elevation than the other way around,

ALLISON - The eighteen hundred feet in elevation is farther south than the eight hundred. Virginia pine seems to be very adaptable to its range, both in our Ohio River area and in the upland area, of that section of West Virginia, I don't think you would find any difference there in whether the tree would produce cones or perform the same or not. Clyde Hunt may have some remarks on that, but from our experience it seems to do the same regardless of where it's planted.

DYER - Mr. Allison,, what is the basis for your selecting that particular stand of white pine? Do you have lots of areas that you can go into, or are you desperate in picking certain ones?

ALLISON - Whenever we started to look for a seed production area, we found that they were rather scarce. We want a seed production area, if possible, to be real handy and easily developed, This area happened to be near the road and also near the residence of the headquarters of the Seneca State Forest. This means that we can keep track of it and will also control the land ownership. This was the only area that we felt was suitable on Seneca State Forest. We looked at some other areas on a different, State Forest and picked this one to start on.

WELCH - As a consulting pathologist I was interested in your cost figures where you used a pathologist and a geneticist to examine your area. I noticed that you allowed \$50 a day for the geneticist but allowed nothing for the pathologist, and I was wondering if that pathologist is on relief.

ALLISON - Our pathologist, Dr. True, has already caused me so much trouble in the nursery that I didn't think that he needed to be paid. Also, he wasn't brought in on our request; he was brought in on the request of the geneticist, and, therefore,, I felt he should be paid by the geneticist. I have drawn a fine line based on who makes the request and who pays for it.

GABRIEL - This question is directed to Mr. Allison. Do you have any plans for deciduous species with reference to seed orchards?

ALLISON - Yes, were very much interested in black locust, because black locust is one deciduous tree that is being used in large quantities for strip mine reclamation work. We produce between two to three million each year. Some areas have been direct seeded with black locust as well as planted with it. A few areas have clonal plantings on them, In some of these latter, the clonal propagations look very promising. On most of these severe sites, we're trying to get cover that will hold the spoil bank and also produce some merchantable product later. We are also raising some European black alder for planting on spoil banks that have a low pH. Dr. Cech's program at the University is interested in black cherry and black walnut. In recent years we have not used black cherry in our nursery program and have been shipping stratified black walnut seed instead of seedlings. Yellow poplar, of which we produce about a half a million a year,, has usually been gathered behind veneer operations. Last year our few veneer operations were in stands that didn't have seed, so our seed source was not as desirable as it could have been.

In a veneer operation in our part of the country, loggers go through the woods first and harvest the veneer stock and then the regular loggers follow. This method lets us gather seed from the better-formed., veneer-quality trees. Now with the big demand being for red oak and black walnut, veneer operators weren't interested in cutting yellow poplar last year.

SCHREINER - I have a question for Mr. Allison. As I recall,, many years ago the Soil Conservation Service selected a stand of what they thought was superior native black locust somewhere in the hills of West Virginia. It wasn't called a seed production area in those days, but it was scheduled for seed collection. What has happened to that stand?

ALLISON - Those are in the Harmon area of Randolph County where three areas were selected. They were called the dominant stemmed strain of black locust. They tend to, or supposedly tend to, maintain a dominant stem. Even though they may branch., one stem of that tree will stay ahead of the other ones. They were also considered to be borer resistant in their native location. In the clonal seed production area that we had on the Land Use area in the lower part of the Ohio River area., one of the clones (H.C. 4149) held up and two of them (H.C. 4146 & 4148) fell apart. Wilmer W. Steiner was working on those and he has been in West Virginia just recently reviewing these clonal plantings. I went to the Harmon stands in the fall of 1948 to collect seed from those seed collection areas (I guess that is what you would call them) As I climbed those trees, and I consider myself a fairly decent climber., the higher I got the farther down the ground got. I could see locust seed hanging all over the place but couldn't get any quantity of seed; so we finally "backed off" onto unleased land in the area and picked from smaller trees.

ROLLINS - We have 11 different strains of black locust provided by the Soil Conservation Service that are planted or lined out at the nursery, and maybe one of your strains is there. This last winter exerted quite a selection pressure on these strains. Two or three of them showed up as being more winter hardy than the others. (Following information returned with edited remarks: The clones planted in Maine are: 4191, 4192, 4193, 4194, 8316, 8450, 8452, 8470, 9229, 9230, 9282.)

ALLISON - I know they are planting, I think have planted, nineteen different clonal stock sources in West Virginia. The particular ones that we were dealing with on our Land-Use project were the old hill culture numbers H.C. 4149 which showed up the best, the H.C. 4148 which was probably second, and the H.C. 4146 which is now about twenty feet tall and dead.