A SEED ORCHARD COOPERATIVE PROJECT IN NEW YORK

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Introduction

The establishment of seed orchards can be considered an important step towards the production of better seed. By better seed is meant seed of specific quality with regard to the objectives for which it will be used. In seed orchards the harvest of seed is considerably facilitated and the amount needed can be much better controlled than is possible in natural stands or in plantations, The term "seed-orchard" can be defined as follows:

A "seed-orchard", "seed-garden", or "seed-source garden" is a certain type of plantation established by vegetatively or sexually produced stock which is laid out in a specific pattern to provide easily harvested seed of specific quality, suitable for specific purposes, in the amount required. This definition is broad enough to include the production of genetically superior seed and it also includes the production of seed that is only a representative average of a given stand or ecotype, or has some desired characteristic for purposes other than for timber production.

An important prerequisite for the establishment of a seed orchard is that a planting program exists in the area where seed orchards are to be established. Such a situation exists in the South where there is a high demand for planting stocks New York State is in a similar position because in its state owned nurseries it produces annually 40 million seedlings of various tree species for reforestation and similar purposes.

Seed Needs of New York State

The present and future seed needs of New York State are shown in Table 1.

Our rough estimates for the total acreage of seed orchards needed to produce the annual seed needs of New York State are given in Table 2. This is based upon the seed bearing capacity of various species considered on an acre basis, The total number of grafts is also presented in Table 2. The figures given are partially based upon data from European sources of *Pinus sylvestris* and *Picea abies.*

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Table 1.--Present and future seed needs in New York

Species	Present annual seedling production		Annual seed requirement
	Millions	Percent	Pounds
Pinus strobus	4.0	10	1,000
Pinus sylvestris	6.0	15	375
Pinus resinosa	4.8	12	600
Picea glauca	12.0	30	375
Picea abies	8.0	20	1,000
Larix ssp.	4.0	10	1,000
Misc. species[1]	1.2	3	300
Total	40.0	100	4,650

[1] Pinus nigra, Abies balsamea, Pseudotsuga menziesii, Robinia pseudoacacia, etc.

Table 2.--Overall estimates of acres of seed orchards needed and the number of grafts required

Species	Annual seed production	Seed orchard area required[1]	Grafted trees required[2]
	Lbs./acre	Acres	Number
Pinus strobus	20	50	3,500 - 5,000
Pinus sylvestris	20	19	1,330 - 1,900
Pinus resinosa	5	120	8,400 - 12,000
Picea glauca	25	15	1,050 - 1,500
Picea abies	20	50	3,500 - 5,000
Larix ssp.	10	100	7,000 - 10,000
Misc. species[1]	20	15	1,050 - 1,500
Total		369	25,830 - 36,900

[1] These figures are based upon 70-100 grafts per acre. This gives a spacing range from 15 to 20 feet.

[2] To meet the annual seed requirements given in Table 1.

It is obvious that certain of the figures presented in Table 2 are questionable. This is particularly true under the heading "Grafted trees required". The figures however demonstrate very clearly the following:

1. The establishment of seed orchards is a long-range program. A considerable time will elapse before the total or even a considerable part of future seed needs can be met from orchards.

2. The search for and selection of a sufficient number of ortets of the qualities required are other important considerations and require time as well as the cooperation of foresters and landowners all over the State

3. Convenient areas for the location of the orchards must be found meeting requirements in regard to isolation, site qualities, etc.

Selection and Grafting Program

Beginning last fall, several discussions; concerning a cooperative program for seed orchards were carried on between members of the New York State Conservation Department, Bureau of Nurseries, and the College of Forestry., Department of Silviculture. By the end of March, 1960, general approval had been given by the administration of both institutions. It was agreed to start out with the selection of ortets and their vegetative propagation by means of grafting. The following species were to be used in the program: Pinus strobes, Pinus sylvestris, Picea glauca, Larix decidua and Larix leptolepis.

Selection criteria classes used in the tree improvement work at State University College of Forestry at Syracuse University were used for the seed orchard program,, These classes are as follows:

Class A. Trees of maximum diameter and height.
Class B. Trees of good stem and wood quality.
Class C. Trees resistant to diseases and/or insect damage.
Class D. Trees showing a combination of A, B and C or two of these characteristics.
Class E. Trees suitable for special purposes such as Christmas tree production, interspecific hybridization, etc.

General requirements for tree class A and B are straightness, length of branch-free bole, freedom from diseases, etc. For class E, for example in the case of Christmas tree products, needle color in winter, crown development, and similar characteristics are the criteria.

Of the selections made to date, the Pinus strobus selections are inter-ecotypic because of the distances between the ortets involved. Our selections are distributed all over the Adirondack mountains. To assure good and early flowering of this species the trees selected are mostly very old. All of them are located in natural stands and all but 10 percent in areas which have never been logged.

The selections in Pinus sylvestris with one exception were made in and around Boonville, New York. Here the strain represented exhibits a dark green winter coloration and tapering crown forms. All Pinus sylvestris ortets are of plantation origin.

Picea glauca, which occurs sporadically in the Adirondack Mountains, is known for its high and early seed production, and also for its branchiness. Well formed specimens with long bluish needle color were selected (class E) and only in one instance was an A class tree found. Of the Picea glauca selections three appear to be of plantation origin, the rest are growing in natural stands.

Two Larix decidua trees and two Larix leptolepis trees have been selected and put into the A group because of their obvious dominance in the plantations where they are growing.

Table 3 presents data on the selections which have been made. Scions were collected from the tall trees by using a .30-06 rifle with telescope. The smaller trees were climbed and the scion material cut off as high as possible.

Table 3.--Data on trees selected for seed orchard project

Species and clone	Age class	Total height	D.b.h.	Clear bole-length	Increment	Selection class
	Years	Feet	Inches	Feet	Rings/inch	
Pinus strobus						
Wanakena 1	200-250	136	57.0	75	25	A
Wanakena 2	200-250	120	42.0	60	20	A
Paul Smith	100-120	116	28.0	50	8	A
Saranac Lake	200-250	132	44.0	50	15	A
Blue Mt. Lake	150-180	135	42.0	65	16	A
Inlet	200-250	128	38.0	52	8	A
Raquette Lake	200-250	128	43.0	51	15	A
Huntington 4	100-150	105	33.0	45	7	A
Huntington 5	200-250	92[1]	47.0	51	12	A
Pack Forest 1	130	128	34.0	74	14	A
Pack Forest 3	130	118	22.5	55	20	A + B
Pack Forest 11	200-250	138	44.0	68	16	A
Pinus sylvestris						
Boonville 1	56	48	14.5	10	8	E
Boonville 2	56	50	15.0	10	8	E
Boonville 3	65	61	12.8	13	10	E
Boonville 4	55	58	13.0	10	10	E
Boonville 5	40	54	12.8	6	12	E
Boonville 6	40	54	9.6	6	13	E
Fernow Plantation 1	58	59	10.5	15	15	E + A
Picea glauca						
Huntington 1	150-180	95	18.4	55	10	A
Huntington 2	22	25	1.7	--	7	E
Indian Lake 1	80	35	20.0	--	5	E
Indian Lake 2	32	40	11.5	--	5	E
Indian Lake 3	43	45	13.0	--	10	E
Indian Lake 4	17	26	5.2	--	4	E
Indian Lake 5	32	36	13.3	--	5	E
Pack Forest 1	25	32	6.2	--	5	E[2]
Pack Forest 2	15	18	2.5	--	5	E[2]
Pack Forest 3	15	16	2.5	--	12	E[2]
Larix decidua						
Cooxrox Forest 27	19	40	7.7	16	5	A
Cooxrox Forest 28	19	45	8.2	16	5	A
Larix leptolepis						
Cooxrox Forest 63	24	50	13.0	20	4	A
Burlington, Vt. 1	25	51	10.7	6	3	A

1 Top out; hurricane damage

2 Plantation origin

Grafting was done on rootstocks, most of these were potted in fall, 1959. It is recognized that this is certainly a poor practice, however, potted seedlings growing at least one year in pots were, for the most part, not available at the time of grafting. The side graft method was used for all four species. The grafting job was done mostly in a field greenhouse at Pack Demonstration Forest, and to a smaller extent in Syracuse. Some grafts were made in the field at Pack Forest. In the latter case the scions were grafted onto rootstocks planted in rows in 1957. The scions were placed onto the center section of the stock on the north-facing side and protected with polyethylene bags. These bags were covered by aluminum foil in such a way that the east, south, and west sides of the polyethylene bags were protected against excess heat. The north side of the grafts were kept open to let some light through the polyethylene. The bags were taken off after two months and scions were considered to be alive if they had developed a new, healthy shoot.

Table 4a and 4b present the overall grafting results, i.e. species and species name, number of grafts done at Syracuse Greenhouse, at Pack Forest Field Greenhouse, and in the field at Pack Forest.

A few general statements may be made on the grafting results:

1. Pinus strobus has proven to be a species which can be grafted quite successfully in the greenhouse, as well as in the field. The field-take (65.2 percent) is good when it is considered that some of the grafts were made by very inexperienced students. Grafting done by trained staff as was done with clones, Huntington 4 and Pack Forest 11, produced takes of 80 to 90 percent'. The bagging technique used has proven to be suitable for this species. Out of a total of 976 grafts, 812 were alive by the end of July.

2. The overall take of the Picea glauca grafts was 59.9% which must be considered fair to poor. These results are largely clue to the fact that a few scions of certain clones had already broken dormancy when collected, Furthermore some of the fall potted rootstocks died after a very rapid flushing. Even so the total take was 118 grafts out of 197.

3. What has been said about Picea glauca is also true to a certain degree for Pinus sylvestris where, however, long scion storage (close to a month) caused an additional reduction in the success.

4. Larix, considered an easily grafted species, has been propagated at Syracuse in the greenhouse. Out of a total of 56 grafts 48 were alive and in good growth by the end of July.

5. In total, 1439 grafts were made under this seed orchard program, of which 1032 were alive by the end of July. In the case of those clones where the take did not result in the number of grafts wanted, these will be re-propagated before the end of 1960, i.e. during the latter part of November and during December. It is hoped that approximately 1400 living grafts will be available for 1961, these to be turned over to the New York State Conservation Department.

Table 4a.--Grafting results - Pinus strobus and Pinus sylvestris

Species and clone	Syracuse Greenhouse			Pack Forest Greenhouse			Pack Forest Field			Total Grafts		
	Grafts made	Grafts alive on 7/31		Grafts made	Grafts alive on 7/31		Grafts made	Grafts alive on 7/31		Grafts made	Grafts alive on 7/31	
	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Pinus strobus												
Wanakena 1				50	45	90.0	29	20	68.9	79	65	82.3
Wanakena 2				50	49	98.0	30	19	63.3	80	68	85.0
Paul Smith				50	46	92.0	29	24	82.7	79	70	88.6
Saranac Lake				55	54	98.2	30	11	36.7	85	65	76.5
Blue Mt. Lake				50	47	94.0	30	10	33.3	80	57	71.3
East Inlet				50	41	82.0	28	17	60.7	78	58	74.4
Raquette Lake				57	56	98.2	33	13	39.4	90	69	76.7
Huntington 4				50	50	100.0	30	24	80.0	80	74	92.5
Huntington 5				55	53	96.4	30	20	66.7	85	73	85.9
Pack Forest 1				50	46	92.0	30	20	66.7	80	66	82.5
Pack Forest 3				50	44	88.0	30	29	96.7	80	73	91.3
Pack Forest 11	21	20	95.1	50	47	94.0	30	27	90.0	80	74	92.5
Total	21	20	95.1	617	578	93.7	359	234	65.2	976	812	83.2
Pinus sylvestris												
Boonville 1	30	27	90.0	25	7	28.0				55	34	61.8
Boonville 2				30	17	56.7				30	17	56.7
Boonville 3				35	1	2.9				35	1	2.9
Boonville 4				30	7	23.3				30	7	23.3
Boonville 5				31	1	3.2				31	1	3.2
Boonville 6				30	1	3.3				30	1	3.3
Fernow Plantation 1				30	20	66.7				30	20	66.7
Total	30	27	90.0	211	54	25.6				241	81	33.6

Table 4b.--Grafting results - Picea glauca, Larix decidua, Larix leptolepis

Species and clone	Syracuse Greenhouse: Grafts made	Syracuse Greenhouse: Grafts alive on 7/31		Pack Forest Greenhouse: Grafts made	Pack Forest Greenhouse: Grafts alive on 7/31	
	Number	Number	Percent	Number	Number	Percent
Picea glauca						
Huntington 1				12	7	58.3
Huntington 2				20	16	80.0
Indian Lake 1				20	13	65.0
Indian Lake 2				15	8	53.3
Indian Lake 3				20	14	70.0
Indian Lake 4				20	13	65.0
Indian Lake 5				20	18	90.0
Pack Forest 1				25	5	20.0
Pack Forest 2				25	12	48.0
Pack Forest 3				20	12	60.0
Total				197	118	59.9
Larix decidua						
Cooxrox 27	13	10	76.9			
Cooxrox 28	15	14	93.3			
Total	28	24	85.7			
Larix leptolepis						
Cooxrox 6-B	18	17	94.4			
Burlington, Vt. 1	10	7	70.0			
Total	28	24	85.7			

Establishment of Seed Orchards and Plans for the Future

Outplanting of grafts will be done by the Conservation Department in areas where the surrounding tree species are different from the species in the orchards. Pinus strobus, Picea glauca, and Pinus sylvestris will be placed in orchards which might be called "regular seed orchard, wind pollinated type". The clones will be set out according to a special design to assure good cross-pollination, and will, be planted accordingly to provide possible cross-combinations between neighboring clones in approximately the same frequency. All the field grafts of Pinus strobus done at Pack Forest will remain there for clonal and offspring testing. The Larix grafts will be used for the production of inter-specific hybrid seed and will be planted on fences in a so-called "vineyard type" seed orchard.[1]

Since, except for Larix, the number of clones used so far is too small to assure good cross-pollination new ortets have to be found and will be propagated vegetatively. Some pre-selections have been made in the last few weeks. Twenty-five hundred rootstocks of various tree species have been potted and grafting will start around February, 1961, and be completed by the middle of Maya For 1962 a similar program is under consideration.

It is to be expected that all the clones will not live up to expectations. Offspring and clonal tests will enable us in the future to eliminate unsuitable clones in the orchards. By then, we hope, the orchards will be in good seed production and will help to meet the seed needs of New York State.

[1] See "Seed Orchard Classifications." Journal of Forestry, 58(5), May, 1960.

DISCUSSION

FORD. At Beltsville we have about 250 hybrid poplars in clonal tests planted since 1919, most of them on poor poplar sites. Some of the clones were doing very well until about three years ago, but in the last three years many clones have become severely cankered. I would like to ask Dr. Giordano how many clones they have found in Italy that seem to be free from canker?

GIORDANO. We have no canker problem in Italy.

BUCKINGHAM. I have noticed that some Norway spruce have this second flush while others from the same seed source do not. In the last six years that I have been watching these particular trees, two trees have never shown any second flush while the others show it in varying degrees. Is that normal?

FARRAR. I couldn't quite say whether it was normal or not because one would expect the same trees to show a second flush year after year. That's what I did not find.

BUCKINGHAM. They're showing the same but in varying amounts. I've noticed three trees within 5 feet of one another. One of them will start to grow earlier. That tree has just one flush and no more, The other trees start growth about a week later as I recall and they will have a second flush. One of them has always seemed to put on more growth than the other tree. There is no reason that I can see, on the surface, for this variation.

FARRAR. Well, I observed something like that and I assumed that it was an in herited characteristic so I was looking for that sort of difference between the seedlings. Some would produce one flush one year and the next year they would produce two and, of course, the opposite happened, too. Now we know as they grow older there is less tendency toward this second flush.

BUCKINGHAM. In our seedbed in the nursery we have noticed a quite vigorous second flush. Often it hasn't been as noticeable.

FARRAR. It's related to fertility, too. Usually the trees are growing in fer tile places that produce this second flush. If the soil fertility is low or where the water condition is poor they wont produce a second flush even though they have the other characteristics to produce it.

SANTANOUR. I'd like to add just a few observations that we made on the eastern white pine provenance test that were conducting. In a New Jersey nursery we had 22 sources of eastern white pine ranging from Georgia to Quebec and during the last growing season we checked on these at weekly intervals to determine the duration of the height-growth period. The maximum difference, the difference between the Georgia seedlot and the Quebec seedlot was only a matter of two weeks in active shoot extension. Of course, the other provenances were somewhere in between this. All active terminal height growth up to the base of the terminal bud had been completed before the longest day of the year, suggesting that photoperiod, at least at that latitude, seemed to have no effect on increased growthperiod of the Georgia-seedlots. On this matter of second flushes, we didn't get what might be called a real second flush in the eastern white pine. We did get a rather pronounced extension of the stem. It looked like a long terminal bud. There were 35 trees that produced

it at the end of the third growing season. Trees from North Carolina had no second flush, trees from Nova Scotia had abundant second flush. So it's quite a variable thing from what we could observe in eastern white pine. I was wondering if there might be any practical significance to increasing the photoperiod in the nursery artificially.

FARRAR. We are trying that, yes.

SANTAMOUR. What was the largest difference in latitude between your five sources of Norway spruce?

FARRAR. We got the seed from Germany, but I couldn't say offhand.

SANTAMOUR. We found that there is a nice relationship with latitude with regard to the duration of the growth period under normal day conditions even though the difference is only two weeks.

FARRAR. In the southern pines there may be quite a large difference.

SANTAMOUR. Well, the southern pines just keep on growing.

LITTLEFIELD. Dr. Farrar, have you obtained any clues on this general situation through observing this so-called extra-seasonal growth that occurs under natural conditions. I refer particularly to this extra-seasonal growth that has been reported a couple of times in the Journal on red pine. Have you observed any extra-seasonal growth in Norway spruce under natural conditions?

FARRAR. About red pine, that usually occurs when we have a warm fall.

LITTLEFIELD. My recollection is a little bit hazy about these cases that have been reported. I'm not sure that there was any specific correlation between the incidence of this extra-seasonal growth and the season. I know that we have found a lot of this extra-seasonal growth on planted red pine on the rather heavy soils in Central New York, and it seemed to be more prevalent there than it did while it was growing under a more normal habitat for red pines. I don't know whether that is any indication or not.

FARRAR. The condition of the root does effect a second flush on Norway spruce; prolonged summer periods also caused the trees to break dormancy. It may be that the northern trees require less duration of a warm period than the southern trees. But then on heavy soils you may get better moisture conditions later in the season.

BUCKINGHAM. Can't this flush in summer be attributed to an abnormal amount of rainfall? This is the first year we have noticed any second flush of the white pine in the plantation and we have had an abnormal amount of rain in July, eight inches to be exact. Normal is around three inches.

FARRAR. Certainly when there is a deficiency of rain you will not get it. Then there is the case of someone who went away for the long Labor Day weekend and left the irrigation system running and at the end of September he got a second flush.

BUCKINGHAM. We get this second growth every year in the nursery and we can't prevent that. Our rain in September puts on a second growth in the seedbed. This is the first time that we have ever seen it in the plantation.

LARSSON. Dr. Farrar, did you get any results of a second flush by different degrees of trimming. The reason why I ask this question is that we have been trimming Austrian pine to different intensities and we have found that in some cases what might be similar to your second flush occurs in this species following very intensive trimming. At first no buds appear to form on the trimmed stem, and then suddenly within about 4 to 6 weeks after the treatment very small needles appear in the axil of the old clusters and these produce a shoot. Normally, when we trim Scotch pine, buds form following treatment and these are the typical buds. In this case no buds form, instead needles shoot out from the axil of old needle clusters and a stem appears which elongates. I was wondering what was the cause of this phenomena. Is it from the accumulation of meristematic tissue at the needle cluster which causes this peculiar growth?

FARRAR. Well, I couldn't say; but when the bud of a tree first stops growing, dormancy is rather light. Then dormancy deepens as time goes on. So it might be that when you did your trimming you were dealing with some buds that were not completely dormant and that started them to growing again.

LARSSON. That could well be true because we start trimming at the flush of growth in the spring and continue at ten-day intervals right through until October. This phenomena in Austrian pine continues until the end of the second week in August after which time no further buds or shoots appear. I'd like to ask you one more question. Did you do any microscopic work in the area where the trees stopped growing? It might be interesting to see just what cell formation occurs there.

FARRAR. No.

LANDIS. Dr. Farrar, this summer we noticed that there was a distinct second flush in a plantation of white pine that had mist blown last summer, about this time, with 2-1-5T to kill overtopping hardwoods. There seemed to be hardly any second flush in the area untreated with the 2-4-5T. Did you notice anything like that?

FARRAR. No.

GABRIEL. Dr. Farrar, as I gather you haven't been able to observe consistent second flushes from year to year in any one particular seedling.

FARRAR. That's right.

GABRIEL. Do you have any evidence of physiological changes occurring as a result of these second flushes that might lead to a necessary build-up of nutrients and other factors in the plant before it can develop another flush? As I understand it your material was in a fairly uniform environment. Do you have any physiological studies that might indicate the changes that occur during or after a second flush?

FARRAR. You mean the idea that the tree puts on a great spurt of growth this year and then next year rests and accumulates food reserve?

GABRIEL. Yes.

FARRAR. We thought of that and I dug up some spruce trees that were producing a second flush and some that were dormant to see what effect that was having on the roots. I was rather surprised to find that those which were

producing a second flush had a much more vigorous root system. Now whether this was a cause or an effect I dont know, in any case it certainly rules out the possibility that the plant was putting on top growth at the expense of root growth. The root growth was keeping right up with the top growth. However, a physiological condition such as you mention is a real possibility to explain the situation.

GABRIEL. Whether its an environmentally or genetically controlled phenomenon would be interesting to find out. It may be that it is the inherent ability of a tree to accumulate necessary food reserves that controls second flushes.

FARRAR. Well, we know its environmentally controlled to some extent because a long photoperiod will produce a second flush in quite a few cases. What we were hoping to find of course was a genetic control, too. I felt that a plant which did respond to a long photoperiod would possibly also have some genes which would make it respond under normal conditions and possibly by breeding we could get a strain that would always respond under natural conditions. I am still not convinced that it can't be found, but I havent been able to do it so far.

FARRAR. Dr. Klaehn, I didn't quite understand the purpose of the fence in connection with the large seed orchard. Could you elaborate on that a little bit?

KLAEHN. We are planning to establish fences or only a simple wire system or something like that in an easterly-westerly direction. Southern aspects are very favorable localities. The grafts are placed very close to the fences and the branches of the plants tied to the wire. By doing so we open up the, crowns of the grafts which, as far as we see it, is a very effective method of flower stimulation. Certain orchards of this type that I have seen in Europe are very productive. We have ourselves established larch orchards of this type which we might call vineyard type and orchards of the regular type using, by the way, the same clones. Seed production in the vineyard type started much earlier and the amount of cones produced was larger than in the latter type.

BALDWIN. In establishing these seed orchards you select a place where there are no natural trees within a certain distance that might pollinate. the seed orchard, is that not true? You would have none of the same species-of genera in that region.

KLAEHN. It is certainly true that we have to look for special areas when establishing our seed orchards. We would never plant our white pine grafts in the center of the Adirondack Mountains where we have white pine all over the place. There are suitable areas available in other parts of the State where white pine occurs only sporadically. I might say that we here in the Northeast are in a much better position than the tree breeders. in the South where the four southern pines occupy large areas and you have to count on con-taminating pollen from surrounding stands. In the South it is sometimes a very difficult job to find areas where there is little or no pollen of the seed orchard species in the air. Often clearcutting or elimination of stands is required to obtain an isolation strip. I think the general figures on the width of these strips range from 500 up to 3000 feet.

BUCKINGHAM. Do you think there is any danger in our trying to grow more and more rapid growing trees? In growing trees so rapidly will they lose their strength?

KLAEHN. I didn't get your question. What do you mean by "will they lose their strength?" The reason why we make our white pine selections over a really wide range, which means more or less all over the entire Adirondack Mountains (Pack Forest, Indian Lake, Huntington Forest, etc.) is because we assume that there is very little or no genetic relationship between the trees in the different areas. By establishing seed orchards with a number of different ecotypes, we might expect something which in extreme cases results in so-called hybrid vigor of the offspring. We are sure that we will obtain vigorous offspring. If we would, however, select five or ten trees of the same ecotype, there could be in extreme cases something occurring which is similar to inbreeding depressions. Anyway we think at the present that this type of selection (inter-ecotypic) is the most promising one for our objectives.

BUCKINGHAM. I bring this point up because the pulp and paper people have commented that the rapid growth of plantation trees does not produce the volume of pulp and they would rather have slow growing trees. Some of the lumbermen have also commented that they are afraid that the lumber cut from these very rapid growing trees will be weak, not have the strength for construction purposes. Is there any danger of that happening?

KLAEHN. Sometimes I think it is very difficult for people to decide what they really want. I consider our white pine in the Adirondack Mountains the most important sawtimber we have. The objective of our white pine seed orchard is therefore to produce seed for planting purposes where the plantations will provide a high amount of sawtimber. These are our intentions.

BUCKINGHAM. We have white pine in Maryland 26 years old, 21 inches in diameter, and 71 feet tall. Now that's way above everything else around it., and some people comment that its growing too fast. Then we have another plantation of red pines, a plot that is now growing at the rate of 2 cords per acre per year and that's faster than our loblolly pines.

KLAEHNIf you are afraid that our orchard trees grow too rapidly, then plant the seedlings on a poor or poorer site.