REPORT ON ESTABLISHMENT OF TREE SEED ORCHARDS IN MARYLAND WITH A SPECIAL REFERENCE TO WHITE PINES

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Maryland has no technicians specifically engaged in establishment of tree seed orchards, The work leading toward this goal is conducted as a part of forest research by a small staff of the Natural Resources Institute in cooperation with the Maryland Department of Forests and Parks, Research is conducted in most tree species planted in Maryland for selection of the best provenances and individual clones to avoid risks of propagating inferior stock.

In Maryland, two future orchard sites were selected for white pines (Pinus strobus L.) in Baltimore and Cecil Counties, The first series of grafted seedlings, representing four selected clones, were planted in 1963. These areas will be used for further planting of selected strains of seedlings and grafted stock. The Department of Forests and Parks also started a small seedling-orchard of white pines near the State Forest Nursery in Harman, Maryland.

Selection of superior trees in Maryland involves difficulties. Outstanding phenotypes of Eastern white pine are found in Swallow Falls State Park, Garrett County, Some of these trees are 110 feet tall, straight, desirably branched and appeared to be what we wanted, The Institute produced some grafts from these trees, and also collected seed samples, which were added to the white pine provenance study of 120 other seed-sources (Figure 1), We hoped that the Swallow Falls white pine would prove to be what we wanted, Two year results, however, are disappointing. The Swallow Falls progeny (represented by two collections) were the slowest growing of 12 other provenances from Maryland (table 1). Supporting data from Germany confirmed these results.

Nursery studies (for what they may be worth) show that progenies from Pratts Hollow (Allegheny County) seed source grew 15 percent faster than the progenies from Swallow Falls, This Allegheny County seed comes from)5-year-old trees, only 45 feet tall, which would never attract an eye as "superior" trees.

These data emphasize the difficulties of deciding whether to sharpen the knives and graft the Swallow Falls stock or to consider other sources from Maryland and elsewhere.. For instance, some provenances from Ontario had two-year heights superior to those of our best sources by 5 percent, and some southern sources grew 10 percent faster than our Allegheny source (No. 608) and 23 percent faster than the Swallow Falls source (No. 601).

Research in Maryland with various tree species indicates that establishment of seed orchards, using selected trees prior to progeny testing may have been justified gambling; just like trying to select a typical Swede in Africa before learning that the best bet for such a selection is in Scandinavia. The ranges of height-growth potential of different provenances of trees tested in Maryland are quite large. Table 2 shows the percent of height of the slowest growing provenances compared to the height of the fastest growing provenance (listed as 100 percent).

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Work on establishment of tree seed orchards in Maryland is designed to follow two methods: (1) to work only with known facts and (2) to try promising but unproven concepts, In acceptance of the first concept, a white pine experiment with 150 sources of P. strobus is under way with replications in four different continents (North America, Europe, Asia and Australia). In acceptance of the second concept, a few hundred potted seedlings of white pines are being grown at the University of Maryland greenhouses for future grafting of less tested clones.

Table 1.--Data on height-growth of 12 provenances of Eastern white pine (Pinus strobus L.) from Maryland tested two years at the Maryland Forest Tree Nursery, and one-year heights of the same sources grown in Germany.

Seed No. MdF.	Origin of seed in Maryland Location and county	Two-year heights in Maryland*		One-year heights in Germany
		inches	percent	inches
608	Pratts Hollow, Allegheny	7.5	100	4.0
609	Pratts Hollow, Allegheny	7.1	95	3.8
562	Flint, Frederick	7.1	95	---
513	Tonoloway Ridge, Washington	6.8	90	3.4
610	Elk Lick Run, Allegheny	6.6	88	3.2
687	(Harrington Manor, Plantation)	6.6	88	3.5
617	Crab Run, Garrett	6.4	85	3.2
47	Oakland, Garrett	6.4	85	3.0
601	Swallow Falls, Garrett	6.3**	84**	3.4**
46	McHenry, Garrett	5.9	79	3.3
65	(Md. Seed, Commercial)	5.7	76	---
604	Swallow Falls, Garrett	5.2**	69**	2.8**

* Percent of the best was calculated on the basis that 7.5 inches = 100%.

** Heights of seedlings originating from a stand that was favored for phenotypic selection and use in a grafting program.

Table 2.--Percent of height of the slowest growing provenances compared to the height of the fastest growing provenances.

Species and age of trees	Provenances studied	Average height of the slowest growing provenance
	number	percent 1/
Pinus strobus L. - 2 years	120	54
Pinus griffithii McClell. - 2 years	12	71
Pinus monticola Dougl. - 2 years	7	66
Pinus sylvestris L. - 6 years	4	70
Pinus virginiana Mill. - 7 years	16	80
Picea glauca (Moench) Voss.-10 years	15	75
Liriodendron tulipifera L. - 1 year	25	36
Prunus serotina Ehrh. - 1 year	7	68
Larix sps. Mill. - 1 year	15	68

1/ The fastest growing provenance = 100 percent.