

NEW VEGETATIVE PROPAGATION METHODS FOR ASPEN AND WHITE PINE

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During this spring and summer we have tried out two new methods of vegetative propagation that look promising enough to be reported to this meeting.

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ASPEN

Aspen does not root from stem cuttings; propagation by means of root cuttings is rather circumstantial in a nursery where a great number of different aspen and poplar materials are being raised. Not all aspens lend themselves well to this method, i.e., they do not regenerate well from root cuttings planted vertically in the fall in the nursery, which is the only practical method for us. During several years we have tried to propagate aspens by means of bench-grafting of dormant scions onto dormant rooted cuttings of silver poplar (Populus alba) and willow (Salix purpurea and S. viminalis), but with very variable success. The method used was whip-and-tongue grafting. The grafts were put in boxes with moist moss at room temperature to produce callus and then kept at slightly above freezing where they remained relatively dormant until they were set out in the nursery in the spring. Many grafts produced according to this method rotted instead of forming callus, and thus far we have had only fair success with this method.

This year we tried plate budding (Jones budding) in our bench-grafting of aspens. The grafting was done in February-March. Buds were taken from dormant scions kept in snow in a deep freeze at about 25 F. or collected outside while still dormant. The rootstocks were rooted cuttings (0-1) dug up in the nursery, root-pruned, and with their tops removed to a stump of about 3 inches. They were stored in a box with moist moss in an unheated garage until used. The buds were removed from the scions as in ordinary shield budding, but instead of a T-shaped cut in the bark of the stock, a downward cut in the rootstock was made, through the bark and slightly into the wood. The cut was about 1 inches long. About one-half of the upper bark flap was removed and the bud was inserted behind the remaining bark flap. The lower part of the bud shield should fit snugly into the crotch formed by the bark flap and the stem. The top of the bud shield was tied with an ordinary rubber band (stationery rubber band No. 32) and a blob of grafting wax was placed over it. (See Kerr, W. L. 1937. Early spring budding by the plate method. *Sci. Agr.* 17(12): 713-719.)

The grafts were then allowed to callus in moist moss at room temperature, kept at slightly above freezing until planting time in the spring, and set out in the nursery. They were planted deeply, with the grafted bud just at the surface of the ground. The graft was made on the basal portion of last year's shoot from a rooted cutting.

The results obtained thus far are very encouraging. We have obtained about 80- to 90-percent take in most aspens. The buds sprout right through the blob of wax and the rubber bands rot away during the summer, requiring a minimum of care.

have been told by several prominent plant propagators that bench-grafts should be put into a root cellar in barely moist coarse sand to form callus, and should be left there until planting time in the spring. We have no root cellar, but we do have access to ample refrigeration at

slightly above freezing. To those unfortunate people who work with aspens and have no root cellar, this method of grafting is highly recommended. Even if we had a root cellar with plenty of barely moist coarse sand, we would probably be inclined to stick to Jones budding with our aspen bench-grafts after the results obtained this year. If this method can be used with reasonable success in bench-grafting onto dormant unrooted cuttings of poplar and willow, there is reason to believe that a cheap method of vegetative mass propagation of aspens can be developed out of it.

WHITE PINE

At the Third Southern Conference on Forest Tree Improvement held in New Orleans early in January of this year, Mr. H. C. Grigsby of the Mississippi Forestry Commission reported the following:

"A new type of grafting, a variation of the bare-root method used with ornamentals, showed considerable promise last year and will be tried again this spring. Seedlings used for grafting stock are placed in sand (heeled in) in a greenhouse and the humidity is kept high. A side graft is made after root action begins. When union takes place, the stock plant is pruned back in the conventional manner. It is then potted and moved to a lathhouse. The advantage in using this method of grafting is that it saves the costly greenhouse space that is consumed by pots. About 30 grafts per square foot can be made when this method is used."

(See Proceedings of this Conference, p. 116. The materials grafted were southern pines.)

Bouvarel (Bouvarel, P. 1954. L'Amelioration des arbres forestiers en Suede et au Danemark, Annales de l'Ecole Nationale des Eaux et Forts et de la Station de Recherches et Experiences 14(1): 40) states that bench-grafting onto stock with bare roots is being practiced in France with spruce, Douglas-fir, true firs (Abies), and Austrian pine, The stock is dormant at the time of grafting, and the author believes this to be one cause of rather heavy losses among the grafts during the winter following the grafting. The Mississippi method obviates this by grafting when root action begins.

This year we tried a modification of this method with white pine, At the time of lifting, in April, we selected some good, straight, and vigorous 2-2 white pine at one of our Provincial forest nurseries, The plants were trimmed a little at their base and heeled-in in a cold-frame with moist sand. The cold-frame was covered with sash and an unbleached cotton shade, and the plants were kept moist and warm until new root growth began. They were then lifted and bench-grafted with scions from selected blister rust resistant 12-year-old seedlings of resistant parents. Side grafting low on the stem was used and the grafts were tied with No. 32

stationery rubber bands. The roots were kept between moist burlap during transportation. The grafts were set out into inoculation beds and planted so that the place of grafting was partly below the soil surface. The inoculation beds are ordinary 4-foot-wide nursery beds surrounded by an fl-inch frame of lumber. The beds were covered with a lath screen and wet burlap and kept moist with a plastic hose sprinkler. All new growth on the stocks was removed shortly afterwards. As the grafts started new growth, the shades were gradually removed, but frequent watering was necessary during this very dry and hot summer. About 4 months later an average of 82 percent of the grafts were successful (table 1).

Table 1.--Success of bare root grafting of eastern white pine transplants

Clone	Plants grafted		Clone	Plants surviving	
	early May	late August		early May	late August
	<u>Number</u>	<u>Percent</u>		<u>Number</u>	<u>Percent</u>
449	20	5	497	20	100
450	20	65	501	20	70
451	20	45	502	20	95
452	20	85	505	19	100
453	20	100	509	20	100
455	20	10	510	20	90
457	20	80	511	20	95
458	20	80	514	20	100
460	20	80	515	20	90
462	20	100	517	20	100
464	20	100	518	20	90
465	20	95	520	20	85
467	20	65	523	20	55
472	20	85	524	20	95
473	20	90	526	20	75
475	20	100	534	20	60
485	20	100	540	20	100
493	20	85	544	20	90
494	20	80	<u>546</u>	<u>20</u>	<u>100</u>
495	20	40	All	<u>779</u>	<u>82</u>

Possibly some of the clones showing poor take and survival are poor grafters. The rubber bands on the grafts have now largely rotted away. The grafting took about half the time of ordinary pot grafting and the grafts are ready for inoculation during next fall without much further care. They have produced about 4 inches of new growth, and all the tops of the stocks have recently been removed. The growth is bushy and compact and much better suited for inoculation than the somewhat leggy pot grafts. Of

disadvantage is the time of grafting when pressure for other work is very high. The scions were of the best possible quality, collected from young trees. Poorer scions will probably still require pot grafting. The method shows promise for mass propagation of white pine in conjunction with testing for resistance to blister rust.