

Institute of Paper Chemistry Field Trials on
the Ripco Industrial Forest

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The Institute of Paper Chemistry has several field plots on the Ripco Industrial Forest of the Rhinelander Paper Company near Eagle River, Wis. These plots include trials of some larch species and hybrids, and field tests of various aspen polyploids, hybrids, and other selected material.

Exploratory Studies in Larch

There has been renewed interest in larch as a source of rapidly growing pulpwood. The fast growth of certain larch species and hybrids (especially Larix eurolepis) has been widely recognized, and polyploidy in larch is also an approach that looks promising. The materials planted in this area are part of a preliminary trial established to acquaint us with the proper methods of handling larch seedlings, check the suitability of several species of larch for use in this area of Wisconsin, and serve as a source of material for future experimental work with larch. Two additional larch species trials were established this past spring employing eight additional sources of material.

Early survival has been very good and height growth quite promising for the five lots planted here (table 1). The trees listed as Dunkeld hybrid larch (Larix eurolepis) Trailside No. 9 are seedlings obtained from Dave Cook/ as 2-0 stock in 1957. He collected the seed from one of the Dunkeld hybrids growing on the Cooxrox Forest in New York. The trees were field-planted in 1957. The other four sources of larch listed below were also obtained from Dave Cook and planted out as 2-2 stock in 1958.

1. S-1894--Larix decidua var. polonica from Kroscienko Forest District, Pieniny Mt., Poland, elevation 2,300 feet.
2. S-1887--Larix decidua from Paternion, Austria, elevation 2,130 feet.
3. Kurile Dahurian larch selection--Larix gmelini var. japonica from a plantation in Central Hokkaido, elevation 1,500-1,650 feet.
4. S-357--Kurile Dahurian larch selection--Larix gmelini var. japonica from a plantation in Central Hokkaido, elevation 1,500-1,650 feet.

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Table 1.--Height and survival--Ripco larch measurements, fall 1960

Species	Selection	Survival	Average height
		<u>Percent</u>	<u>Feet</u>
Dunkeld larch	Trailside No. 9	90	5.5
Polish larch	SL-1894	98	5.8
European larch	SL-1887	100	3.7
Kurile Dahurian larch	S-357	100	6.2
Kurile Dahurian larch	<u>L. gmelini</u> var. <u>japonica</u>	100	6.2

Comparison of Several Aspen Hybrids

During 1959 a series of crosses was made between native aspens (bigtooth and quaking aspens) and Populus alba, P. tremula var. davidiana, and P. sieboldi. Our interest in these crosses included possible resistance to Napicladium tremulae and Hypoxylon pruinaum and their general suitability in the Lake States. None of the materials used as test trees in this trial, with the exception of XA-G-22-59, demonstrated exceptional growth in the year they were grown in the nursery.

Despite these results, it seemed desirable that this material be tested further because of the multiple interests involved. Consequently Experimental Trial XII was established in the spring of 1960 as a 3-replicate, randomized block design, employing 36 trees per plot. A 9x9-foot spacing was maintained, and growth measurements are to be confined to the interior 16 trees, with the outer 20 trees serving as border trees. Four of the eight types of test materials had enough additional test trees for the establishment of another replication.

Table 2 provides growth and survival information on Experimental Trial XII. All materials planted in this trial were root-pruned and cut back to a height of 12 to 14 inches when the trees were lifted prior to field planting. Again XA-G-22-59, which attained a height of 3.2 feet from seed in 1 year in the nursery, had the best average height after the first year in the field.

Table 2.--First-year growth and survival in Experimental Trial XII

Parent species (all <u>Populus</u>)		Cross no.	Average	Survival,
Seed parent	Pollen parent		height	1960
			1960	1960
			Feet	Percent
<u>P. tremuloides</u>	<u>P. tremuloides</u>	XT-9-59 (Control)	2.6	98
Do.	<u>P. sieboldi</u>	XT-S-29-59	2.4	92
Do.	<u>P. tremula</u> var.			
	<u> davidiana</u>	XT-DA-30-59	2.8	98
<u>P. alba</u>	<u>P. grandidentata</u>	XA-G-22-59	3.8	92
<u>P. tremuloides</u>	<u>P. tremula</u> var.			
	<u> davidiana</u>	XT-DA-18-59	2.8	100
<u>P. grandidentata</u>	do.	XG-DA-26-59	2.7	98
Do.	<u>P. alba</u>	XG-A-5-57	2.8	92
<u>P. tremula</u> var.				
<u> davidiana</u>	(Open pollinated)	DA-4-59	2.5	98

Comparison of Natural and Artificially Produced

Triploids with Diploid Control Trees

Experimental Trial X was established in the spring of 1959 to compare growth and general field performance of several sources of triploid aspen with each other and with selected diploids. The trial has an additional objective of checking the feasibility of a so-called "root sucker" method of establishing experimental materials. This method involves planting the experimental trees at a wide spacing (9x9 feet), treating the area to control weeds, and then cutting back the trees after 2 or 3 years' growth to induce root suckering. The objective of such a procedure is the production of a high-density stand which would be less prone to insect damage and could be established with the expenditure of a minimum amount of experimental material.

The experimental material involved in this trial included root sprouts from two natural triploid trees (T-160 and T-2-56); triploid seedlings from two crosses between northern sources of diploid quaking aspen and tetraploid P. tremula from Sweden (XT-TA-10-58 and XT-TA-14-58); diploid seedlings from a cross between two quaking aspen of average form and rate of growth (XT-12-58); and seedlings from an open pollinated seed source near the Ripco Experimental Farm. The planting stock used in this experimental trial had been grown 1 year in the nursery and was 18 to 24 inches in height when lifted and cut back to 12 to 14 inches prior to field planting.

A four-replicate, randomized block design was employed. Each plot contained 16 test trees planted at a 9x9-foot spacing. A single row of border trees was placed around the entire trial and between each plot in the trial. The objective of the border trees was to reduce border effects and reduce mixing of root suckers from adjoining experimental plots. Table 3 presents first and second year survival and growth information on this trial.

Table 3.--Growth and survival in Experimental Trial X

Kind of material	Lot number	Average height		Survival	
		1959	1960	1959	1960
		Feet	Feet	Percent	Percent
Interspecies cross	XT-TA-10-58	3.2	5.2	98	100
Interspecies cross	XT-12-58	3.8	6.2	100	100
Interspecies cross	XT-TA-14-58	3.4	5.8	100	100
Open-pollinated	T-66A-57	3.2	5.4	98	100
Root sprouts	T-160	2.8	5.2	100	97
Root sprouts	T-2-56	2.8	4.9	97	100

Comparison of Performance

of Selected Materials on Contrasting Sites

Experimental Trial XI was established in the spring of 1959 and consists of field plantings located at the Kimberly-Clark test area near Marenisco, Mich; the Cornell test area near Cornucopia, Wis.; and the Ripco Experimental Farm near Eagle River, Wis. The objective of this study was to test the reaction of selected materials to contrasting environments (including climate, soils, and vegetation). The importance of this type of approach has become increasingly evident because of the practical information such testing provides regarding the adaptability of improved materials.

As a preliminary approach to this problem, three types of test materials were planted in three locations that differ considerably in climate and soils. Vegetative competition also varied from heavy on the Kimberly-Clark test area to light on the Ripco Experimental Farm. The three test materials used were widely divergent in their origin as indicated on the following page.

1. T-36-56--Root sprouts of a natural triploid quaking aspen found in Upper Michigan.
2. XT-TA-14-58--Seedlings from a cross between a diploid Populus tremuloides and a tetraploid P. tremula.
3. XT-G-13-58--A hybrid between P. tremuloides and P. grandidentata.

This experimental trial, of which a single replication is represented here, was established with what might be called 1-0 stock. In the fall of 1960, after two growing seasons, the survival of the test trees was 100 percent, and XT-TA-14-58 averaged 5.9 feet, T-36-56 averaged 5.2 feet, and XT-G-13-58 averaged 3.6 feet in height.