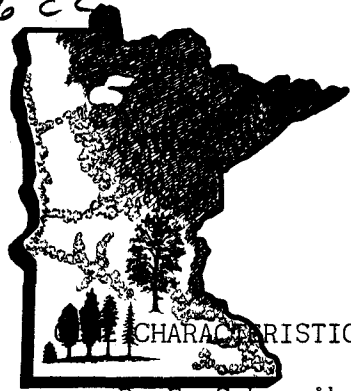


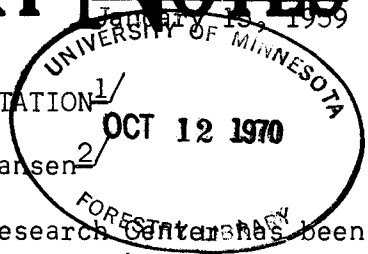
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MINNESOTA FORESTRY NOTES

COPY 2

CHARACTERISTICS IN A JACK PINE SEED SOURCE PLANTATION
R. E. Schoenike, T. D. Rudolph, and T. Schantz-Hansen



The jack pine seed source plantation at the Cloquet Forest Research Center has been described by Schantz-Hansen and Jensen^{3/}. They noted differences among the seed sources with reference to survival, height growth, winter injury, and tree form. The present study was designed to supplement their data by providing information regarding some morphological features associated with the different seed sources. Particular attention was given to the cone since even casual observation revealed marked differences in various cone characteristics between trees.

From 9 to 50 trees were examined in each of 23 seed sources. The variation in number of trees examined was due to mortality, lack of cones, or a combination of these factors. The trees were classified as open-cone, closed-cone (serotinous), or where both types were present in the same tree, mixed-cone. In addition, approximately five cones were measured for length, classified as straight or curved, and grouped into one of six cone-angle classes depending on the position that the cone formed with the branch on which it was borne. These latter are illustrated below. (Fig. 1)

The results are presented in the accompanying table and map (Fig. 2). Since the study was designed primarily for other purposes, these data should be considered only as indicating trends. The closed-cone trees appeared most frequently in sources from northeastern Minnesota and adjacent parts of Ontario and Manitoba, northern Michigan, and much of Canada. The open-cone trees appeared with highest frequency in sources from lower Michigan, southern and western Minnesota, New Brunswick, and Maine. Sources from the northwest showed a large percentage of mixed-cone trees.

Trees with straight cones were found most frequently in sources from Michigan, Wisconsin, southern and western Minnesota, and eastern Canada. Trees with curved cones occurred more frequently in eight sources from the western portion of the species' range.

Cone length varied between 1.04 inches for an Alberta source to 1.45 inches for a source from Quebec. There was no indication of a size gradient between these two areas. Two sources from Michigan, and one from Ontario also produced trees with long cones.

Cone angle was defined as the angle produced between a line connecting the tip and point of attachment of the cone, and the branch upon which the cone was borne. For straight cones this is a true angle of inclination. For curved cones, the angle of inclination is confounded with cone curvature, and not readily separated without sectioning the cone. Hence in classifying cone angles, the strongly curved cones which crossed the branch axis were assigned negative cone angles (Fig. 1A). Using this definition, trees with cone angles ranging from -45° to 120° were found. Reflecting the high percentage of straight cones, eastern and Great Lakes sources had the largest cone angles. Western sources, with more curved cones, had more acute cone angles.

^{1/} This study was made possible by a grant from the Charles K. Blandin Foundation of Grand Rapids, Minnesota.
^{2/} Research Assistants and Professor, respectively, University of Minnesota, School of Forestry.
^{3/} Schantz-Hansen, T. and R. A. Jensen, 1954. A study of jack pine source of seed. Minn. For. Notes No. 25.

FIG. 1 CONE ANGLE CLASSES

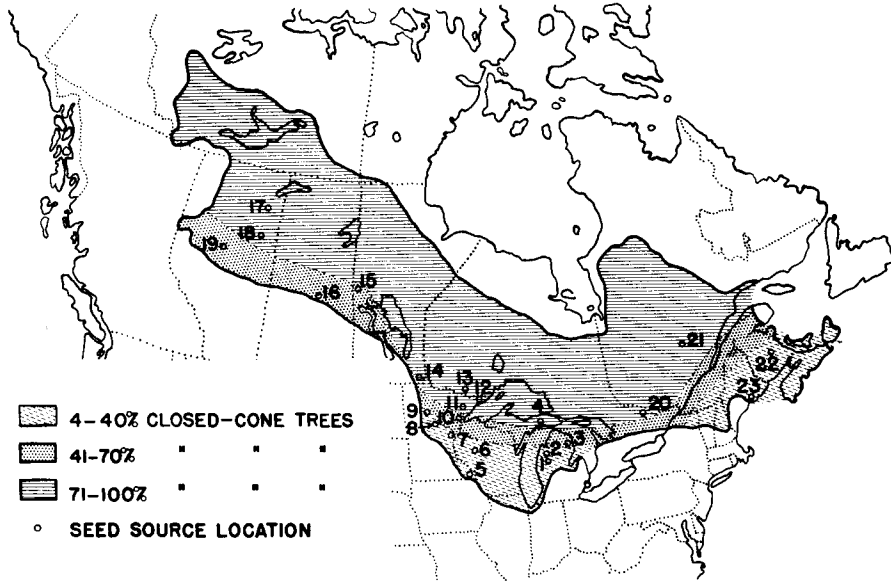
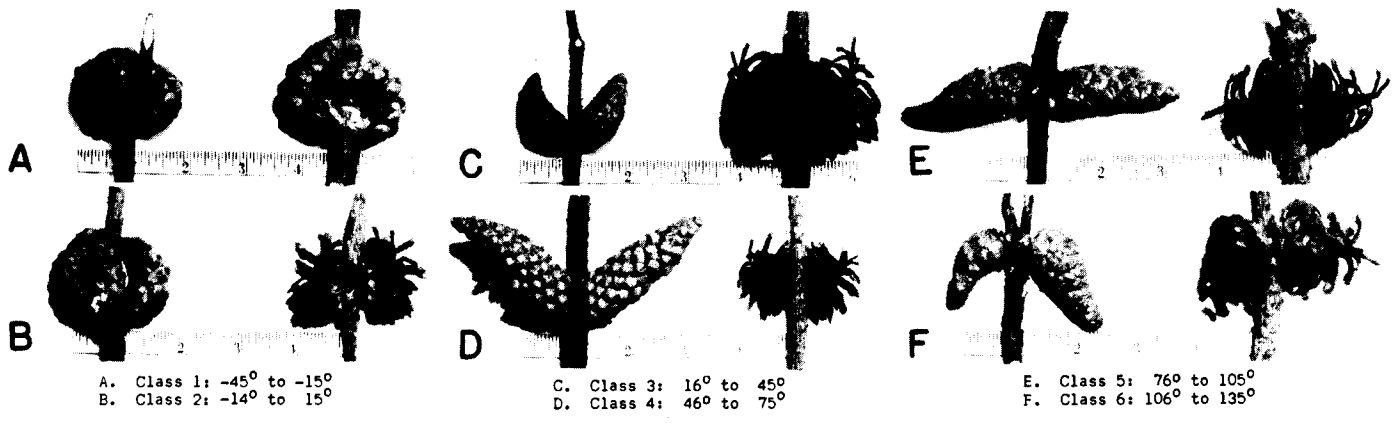


FIG. 2
 Geographic distribution of closed-cone trees throughout the range of jack pine, based only on data from seed source plantings at Cloquet. Mixed-cone trees were not included in percentage computations.

CONE CHARACTERISTICS OF JACK PINE SEED SOURCES AT THE CLOQUET FOREST RESEARCH CENTER

	Cone Length (Mean in Inches)	Cone Type			Cone Shape		Cone Angle Classes					
		Closed	Open	Mixed	Straight	Curved	1	2	3	4	5	6
		(No. of Trees)			(No. of Trees)		(No. of Trees)					
1. Baldwin, Mich.	1.32	4	21	6	28	7	0	3	9	22	2	0
2. Wellston, Mich.	1.36	6	13	8	24	3	0	0	6	21	5	0
3. Huron, Mich.	1.41	16	8	4	27	2	1	1	12	20	2	0
4. Mantistique, Mich.	1.42	24	6	7	32	5	0	3	15	18	6	0
5. Peterson, Mich.	1.23	1	23	0	24	0	0	0	6	13	4	0
6. Eau Claire, Wis.	1.40	3	4	0	8	1	0	0	1	6	2	0
7. Hinckley, Minn.	1.39	9	14	8	28	5	0	3	11	18	1	0
8. Jenkins, Minn.	1.30	12	19	11	36	7	0	3	15	15	6	0
9. Park Rapids, Minn.	1.40	11	18	10	26	14	1	9	9	14	5	0
10. Cloquet, Minn.	1.39	14	18	11	34	8	0	12	10	14	5	0
11. Chisholm, Minn.	1.28	27	9	5	15	26	1	24	9	2	0	0
12. Grand Marais, Minn.	1.30	28	9	7	10	33	0	30	6	4	2	0
13. Fort Frances, Ont.	1.30	19	0	7	3	29	0	26	3	0	0	0
14. Sandilands, Man.	1.39	26	7	6	15	23	2	23	12	3	0	0
15. The Pas, Man.	1.16	19	11	5	7	27	0	31	4	0	0	0
16. Regina, Sask.	1.34	9	5	11	11	18	0	25	4	2	0	0
17. Fort McMurray, Alb.	1.34	20	5	10	17	22	1	29	3	4	2	0
18. Iroquois Lake, Alb.	1.04	14	6	3	20	2	1	6	10	6	3	0
19. Athabasca-Lesser Slave, Alb.(4)	1.28	14	10	12	15	22	1	26	5	2	2	2
20. Chalk River, Ont.	1.42	25	5	6	22	19	0	16	14	12	0	0
21. Lake St. John, Que.	1.45	19	7	5	26	9	0	9	9	16	4	0
22. Miramichi, N. B.	1.29	5	19	5	16	11	0	18	5	9	2	0
23. Bar Harbor, Maine	1.10	2	31	2	27	10	0	13	13	4	0	0

(4) This source is located in the zone of overlap with lodgepole pine.