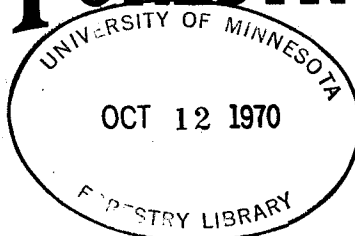


# MINNESOTA FORESTRY NOTES

COPY 2



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## GROWTH OF 60 YEAR-OLD NORWAY (RED) PINE PLANTATION TREES IN NORTHERN MINNESOTA

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Three Norway pine (Pinus resinosa) plots established in 1900 near Grand Rapids, Minnesota, and described in some detail in Minnesota Forestry Note No. 34,<sup>2/</sup> were remeasured in 1955. These half acre plots provide a case study of the influence of stocking upon the growth of a planted Norway pine stand on level fine sands to sandy loams having moisture equivalents from 7.9 to 14.6. The height growth of the dominants and codominants classifies them as representing a good site for Norway pine.<sup>3/</sup> This is one of the oldest successful plantations in Minnesota and gives some idea of the potential growth for northern Minnesota plantations on good sites.

Thinning undertaken in 1950 and a small amount of natural mortality, reduced plot A to 404 trees and C to 200 trees per acre in 1955 (at age 60 from seed). The number of trees in plot B was reduced to 298 in 1955 by periodic thinning and some natural mortality. On plots A and C, spacing has been quite evenly distributed over the entire area of the plots, whereas on plot B, following the 1905 fire, most of the trees were concentrated in three clumps jointly covering about 75 percent of the area. The clumpy arrangement of plot B is gradually being reduced with the concentration of natural mortality and thinning within these clumps.

The tables (over) provide a comparison of the growth and yield of these plots with each other and with yield table data<sup>3/</sup> for good site Norway pine in fully stocked natural unmanaged stands. It is apparent from examination of the data in the tables that on all plots, volumes greatly exceed those shown in the yield table. Mean annual growth varies on the plots from 1.3 cords to 1.6 cords per acre and from 452 board feet to 560 board feet per acre at age 60. It also appears that density has little influence on height growth, although greater density does result in increased volume growth both in merchantable cords and in board feet. The larger more desirable trees from the standpoint of value per thousand board feet, occur in the less densely stocked stands. The data also indicate that Norway pine on good sites will cease basal area growth when a level of about 250 square feet per acre is reached.

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- <sup>2/</sup> Allison, J. H. 1954. Growth of Planted Norway (red) Pine in Northern Minnesota, Minnesota Forestry Note No. 34.
- <sup>3/</sup> Eyre, F. H. and Zehngraff, Paul. 1948. Red pine management in Minnesota, U.S.D.A. Circ. No. 778. pp. 32 and 33.

Comparison of different stand densities of Norway pine plots at Grand Rapids with each other and with yield table figures for "good site" Norway pine.

Age from seed	Number of Trees per Acre				Av. Height of Dominants and Co-Dominants, Feet			
	A <sup>4/</sup>	B <sup>5/</sup>	C <sup>6/</sup>	Yield Table	A	B	C	Yield Table
20	548	436	*	1,330	20	20	*	19
30	546	427	*	640	36	37	*	36
40	540	370	220	433	52	52	53	49
50	517	317	220	436	62	62	63	60
60	404	298	200	272	72	70	72	68

Age from seed	Av. Breast Height Diameter, Ins.				Basal Area, Sq. Ft.			
	A	B	C	Yield Table	A <sup>7/</sup>	B	C	Yield Table
20	4.6	4.7	*	2.6	62	52	*	88
30	6.7	7.0	*	4.5	134	116	*	112
40	8.0	8.8	10.0	6.2	188	156	119	130
50	8.9	10.1	11.3	7.5	224	178	153	144
60	10.2	11.3	12.9	8.7	233	213	170	153

Cords per Acre

Age	Merch. Vol.				Periodic An. Growth				Mean An. Growth			
	A	B	C	Yield Table	A <sup>8/</sup>	B <sup>8/</sup>	C <sup>8/</sup>	Yield Table	A <sup>8/</sup>	B <sup>8/</sup>	C <sup>8/</sup>	Yield Table
20	6	5	*	1	*	*	*	*	0.3	0.2	*	*
30	23	21	*	10	1.7	1.7	*	0.9	0.8	0.7	*	0.3
40	41	39	31	22	1.8	1.9	*	1.2	1.0	1.0	0.8	0.5
50	71	56	49	33	3.0	2.0	1.8	1.1	1.4	1.2	1.0	0.7
60	87	78	77	42	2.4	1.9	2.8	0.9	1.6	1.4	1.3	0.7

Board Feet per Acre, Scribner Dec. C. Rule

Age	Total Volume				Periodic An. Growth				Mean Annual Growth			
	A	B	C	Yield Table	A <sup>8/</sup>	B <sup>8/</sup>	C <sup>8/</sup>	Yield Table	A <sup>8/</sup>	B <sup>8/</sup>	C <sup>8/</sup>	Yield Table
20	*	*	*	*	*	*	*	*	*	*	*	*
30	2700	3,900	*	1,000	*	*	*	*	90	130	*	33
40	11800	11,400	10,300	3,000	910	758	*	200	295	287	256	75
50	23400	19,800	18,200	5,500	1160	905	790	250	468	412	365	110
60	32200	29,700	27,100	8,700	1020	1020	890	320	560	515	452	145

\* Indicate no data available.

4/ Plot A was thinned fairly heavily at age 55.

5/ Plot B was thinned lightly at ages 30, 35, 48, and 55.

6/ Plot C was thinned lightly at age 55.

7/ Basal area reached its maximum at 246 sq. ft. and cord vol. at 88 cds. at age 55.

8/ Including thinnings.