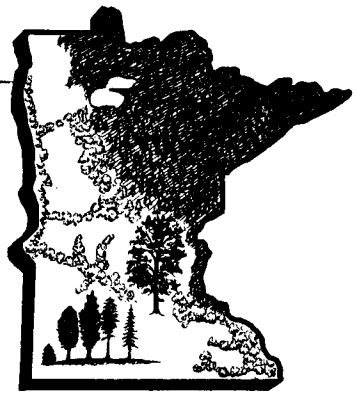

MINNESOTA FORESTRY NOTES

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AVERAGE HEIGHT AND DIAMETER FOR SOME MINNESOTA FARMSTEAD WINDBREAK SPECIES

Harold Scholten[1]

In the early 1920's, 330 demonstration farmstead windbreaks were planted in western Minnesota through the cooperation of the School of Forestry, the Agricultural Extension Service, and the State Division of Forestry. These windbreaks consisted of 6 to 10 rows of conifer and hardwood species with spacings ranging from 4 by 6 to 6 by 12 feet. A sample considered to be representative of the plantings was measured in 1936,[2] 1948,[3] and 1961. The 1961 sample consisted of 24 windbreaks which were included in both the 1936 and 1948 studies.

Average heights for ten major windbreak species are shown in Figure 1. Following are some conclusions drawn from this graph:

1. With the exception of northwest poplar there was essentially no difference in average heights of hardwoods and conifers at 38 years of age. Hardwoods grew somewhat faster than conifers the first 25 years[4] while the reverse appears to be true after 25 years of age.

2. Northwest poplar had the most rapid early growth and attained the greatest height, but it is rapidly dying out and only scattered individuals remain.[5]

3. Green ash grew at about the same rate as American elm and silver maple during each of the first two periods but slowed down considerably during the last period.

4. Height growth of boxelder virtually ceased after 25 years of age.

5. Both white spruce, the shortest of the conifers, and white pine had uniform height growth throughout the three growing periods; jack pine and Scotch pine put on their best height growth early; and red pine, although reasonably uniform, has grown best during the first and third periods.

6. Statistical tests indicate that on the average (1) northwest poplar is taller (1961) than all other species, boxelder and white spruce are shorter than all species except green ash, and there is no difference among other species; and (2) northwest poplar, American elm, and Scotch pine are larger in diameter (1961) than all other species, and there is no difference among these three or among the other seven species. (Fig. 2)

Although diameter is not a major factor in influencing the function of a windbreak, it is a measure of growth. Figure 2 shows average diameter for ten major windbreak species. Northwest poplar, American elm, and Scotch pine show distinctly better diameter growth than other species studied.

If wider initial spacings or recommended thinning practice had been employed, average heights and diameters would have been greater because of fewer suppressed trees. Relative growths might not have followed the same patterns shown in Figures 1 and 2 because various species would not necessarily respond similarly to the wider spacing--nor do various species respond equally on different soil types. However, these studies do provide useful guides in locating species within the windbreak on the basis of height growth. Trees attaining lower average height, for example, should not be flanked by taller growing trees.

1/ Instructor, University of Minnesota School of Forestry.

2/ Hansen, H. L. and Henry Schmitz. 1938. A resurvey of the Demonstration Prairie Shelterbelts in Minnesota. U. of Minn. Agr. Exp. Sta. Bull. 337, 16 pp.

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4/ Collins, P. E., H. L. Hansen, and Donald P. Duncan. 1953. Species Survival and Height Growth in Some Minnesota Windbreaks. Minn. For. Notes 32.

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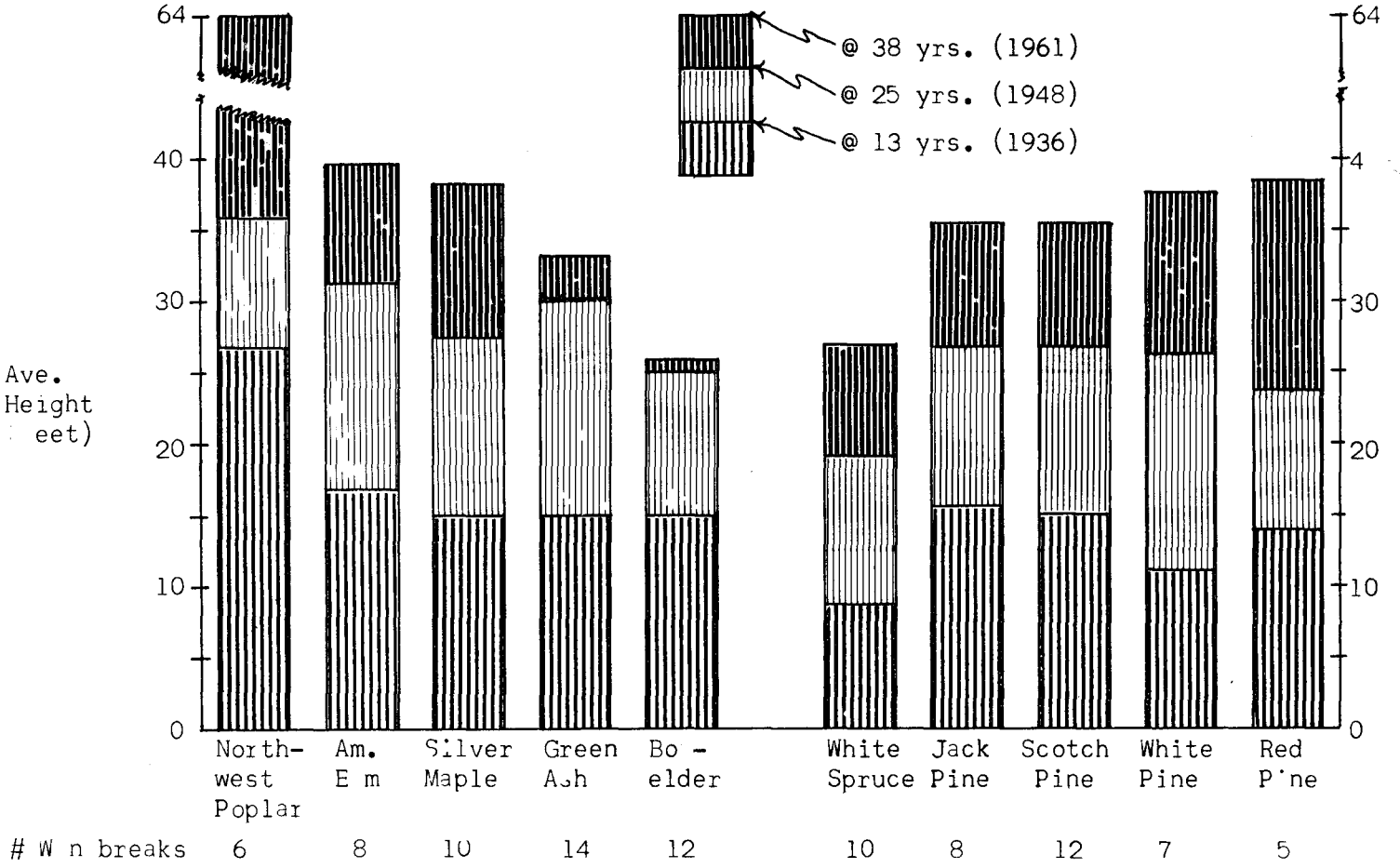

Fig. 1. Average height of major windbreak species at 13, 25, and 38 years of age.

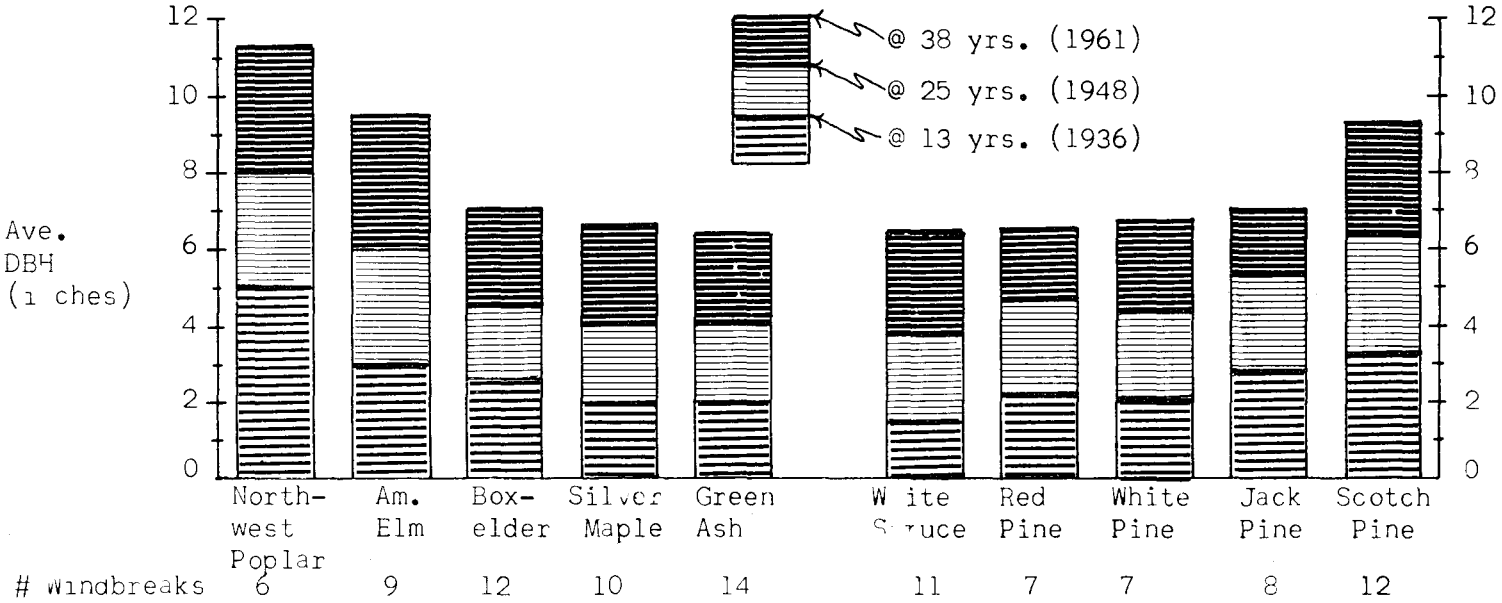

Fig. 2. Average diameter of major windbreak species at 13, 25, and 38 years of age

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