

OHIO AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

Forestry Mimeograph No. 20

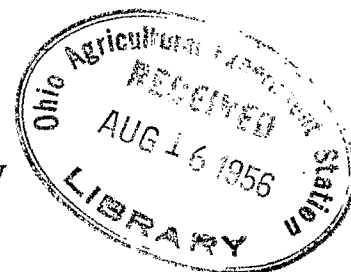
April 15, 1955

Wind Damage in the Secrest Arboretum

by

Oliver D. Diller and Harry R. Muckley

- - - - -



On March 22, 1955 a strong wind traveled through the vicinity of Wooster in a northeasterly direction at a speed of between 60 and 70 miles per hour. This wind which started early in the morning and persisted most of the day came at a time when the conifers in the Secrest Arboretum were particularly vulnerable to overthrow because the soil was saturated with water. Consequently, many shallow-rooted trees were uprooted. A total of 212 trees of 26 different species in 39 plots distributed throughout the arboretum were lost.

Such an occurrence, while unwelcome, does provide some valuable information concerning the behavior of certain species under the conditions which existed in the arboretum on March 22. For example, one of the most severely injured plots was Douglasfir (D-16) which was planted in 1915 at a spacing of 6' x 6'. The seed originated in Germany in 1908. In this plot the border trees stood firm, while most of the interior trees toppled over, indicating that the trees on the edge of this plot had a root system which was extensive enough to withstand the force of the wind. As a result of many years of very conservative thinning the trees on the inside of the plot developed small crowns and correspondingly small root systems.

Serious losses also occurred in the white, Engelmann, and Norway spruce plots. Here even the border trees with the exception of the Norway spruce, did not have sufficiently well developed root systems to prevent their being uprooted. Plots with European larch, Austrian pine, and red and white pine also showed heavy losses. In general, the damage to the Austrian pine and European larch was limited to the poorly drained areas where the trees had developed shallow root systems.

The following table shows the number of trees blown over in relation to the number left by species in the most seriously damaged plots.

Species	Plot No.	No. Trees Uprooted	No. Trees Left	% Uprooted
Engelmann spruce	J-15	10	0	100
White spruce	J-14	9	3	75
European larch	A-12	12	7	63
Douglasfir	D-16	20	23	46
Norway spruce	J-16	7	16	30
Red pine-white pine	E-1	5 red)	19	21
		3 white)	23	12
Austrian pine	D-10	11	54	17
European larch	D-14	13	66	16
Northern whitecedar	G-1	8	90	8

The management policy throughout the history of the arboretum has been essentially one of very conservative thinning, removing only dead trees and thinning from below.

As illustrated by the severe wind damage in Douglasfir, this method of thinning has resulted in shallow rooted trees on the interior of the plot. The same treatment given to the Corsican, Scotch and western yellow pine plots, however, resulted in virtually no damage. The northern whitecedar plot (G-1) which was row thinned as an exploratory experiment by removing alternate rows in 1949 might have been expected to be seriously damaged by wind. Actually, only 8 out of a total of 98 trees were blown over on March 22. The red pine-white pine mixed plot (E-1) which had been conservatively thinned for many years showed a loss of 19 percent of the trees.

No sweeping conclusions can be drawn from measurements and observations in the small plots in the Secrest Arboretum, but one thing is quite clear and that is that we need more information on how to thin coniferous plantations for maximum production of high quality wood per unit of time. Perhaps the problem goes back farther than mere thinning operations. It appears that we need more information on the effect of spacing of the trees at planting time on the later growth and development. Initial spacing undoubtedly has an important effect on later root development. The department has recently initiated a study of variable spacing on white pine in order to obtain more information on this. Other studies, such as spaced group plantings which would encourage the development of crop trees early or combined Christmas tree and forest plantings which are designed for early thinning through removal of Christmas trees are needed.

As our research program in forest tree improvement progresses and as our knowledge in silviculture and wood utilization increases we will eventually be able to develop forests which will produce high quality products in a shorter period of time and with a minimum of mortality through wind damage and other destructive agents.

.