

VARIABILITY OF FLOWER AND CONE PRODUCTION IN NORWAY SPRUCE

E. J. Eliason and Donald E. Carlson 1/

Seven years of observations on 109 Norway spruce, Picea abies (L.) Karst., planted in 1940 near Ballston Spa, New York, showed great variation among individual trees in cone production. The ability to produce cones made it possible to group some trees into coners and nonconers. The distribution between individual trees and groups were consistent during the five years of relatively poor crops. During a heavy crop in 1967, this difference was less distinct, yet the coners still outproduced the nonconers by a ratio of 8,921 to 787. Cf the 21 nonconers, which produced no cones for the first five years, all but four produced some in 1967. In 1968, 12 out of 21 nonconers produced cones, while during the five poor crop years these trees had produced none. Rainfall records over the period of primordial flower formation indicated that there may have been an effect of aheavy rainfall in June 1966 on a heavy cone crop in 1967. Both groups were well distributed throughout the planting, with no apparent effects from site. The mean diameter and height e each group showed that the coners were larger than the nonconers. Observations on the flushing stage of the vegetative terminal buds showed some delay among the coners as contrasted to the nonconers. The location of the male and female flowers in the tree crown were distributed throughout all levels. The male flowers were more evenly distributed than the female; nearly 60% of the female flowers were in the upper third of the crown. The trees were classified into branching habit, ranging from the open comb type to the more dense formation. The dense forms had less male and female flowers and cones. White pine weevil attacks on the leaders were not affected by branching habit, except possibly the comb type with the lesser weeviling. Since there appeared to be a rather strong inherent tendency for certain trees to be good cone producers, the selection of plus trees should consider this characteristic. The effect of topping to facilitate cone collecting and on selfing was discussed. Calculations for seed yield of 109 trees for seven years over the approximate two acres indicated an annual yield of three pounds per acre.

---

<sup>1/</sup> Head and Forester, respectively, Forest Research Unit, New York State Conservation Department, Albany, New York.