ADAPTIVE VARIATION -- MANIFESTATIONS IN TREE SPECIES AND USES IN FOREST MANAGEMENT AND TREE IMPROVEMENT

Hans Nienstaedt 1/

ABSTRACT.--Adaptive variation and the genetic system that maintains adaptive fitness are described. It is emphasized that optimum fitness and genetic flexibility are opposing demands on the plant populations and have led to a compromise between fitness to existing environments and the capacity for further change. Using as examples phenological and edaphic adaptation, patterns of variation are discussed. Clinal variation is described and the importance of adequate sampling stressed in establishing discontinuous, ecotypic variation patterns. Variation patterns are character specific and may be highly complex depending on the pattern of the environmental variation -- clines within clines, clines within ecotypes and ecotypes within clines must exist within north temperate tree populations. The breeding systems and the factors determining the size of breeding groups are important aspects of the genetic system and must be considered in planning by foresters and tree breeders alike.

1/ U.S. Dept. of Agriculture, Forest Service, Institute of Forest Genetics, North Central Forest Experiment Station, Rhinelander, Wisconsin.