Clonal Evaluation Based on Topcross Progeny Testing in Bromegrass, *Bromus inermis* Leyss¹

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Most breeding investigations with perennial forage grasses have concentrated primarily on developing methods for improving forage yield. Relatively little attention has been given to obtaining information concerning breeding behavior for important components of forage and seed yield or their selection potentials. Moreover, many basic studies on grass breeding have been confined to evaluating relatively few selections representing a rather restricted range of possible genotypes within any one species. The present study was designed to gain additional information on breeding behavior of a substantial number of bromegrass clones representing two diverse levels of selection for each of three components of forage and seed yield. Detailed evaluations of clones, their topcross progenies, and check varieties for several forage and seed attributes were made for elucidation of breeding concepts, predictability for combining ability of clonal measurements, and agronomic merits of original selections. Results should be of interest to grass breeders since this represents one of the first attempts to relate mean performance of selected clones in space-planted nurseries with that of their topcross progenies in solid planting for important agronomic traits in addition to forage yield.

The development and importance of grass breeding concepts was reviewed and discussed by Smith (7) in 1956. That same year, an extensive paper covering perennial forage grass breeding was presented by Hanson and Carnahan (1). Johnson (3) emphasized problems and methods for evaluating forage breeding materials for combining ability. Generally, isolation of clones high in combining ability for desirable characteristics and their use in producing synthetic varieties was considered one of the promising approaches to forage grass improvement.

Breeding programs with smooth bromegrass, *Bromus inermis* Leyss., and other cross-pollinated grasses have been initiated with major emphasis upon developing breeding methods for improving forage yield. Knowles (4) studied the relationship between bromegrass polycross progenies and mean single cross performance and found no association, and...