Improvement in any crop depends on the breadth of variation available for manipulation. Possibilities for the development of varieties of bluestem superior in seed and forage characteristics are greatly enhanced by considering together big bluestem and sand bluestem, two of the important tall grasses of the prairies and plains. Hybrids have been obtained by crossing clones of diverse genotype selected from the taxonomic groups comprising big bluestem, *Andropogon gerardi* Vitman, and sand bluestem, *A. hallii* Hack. That these groups freely intercross has been established in a previous paper (3).

Clonal selections of sand bluestem used in the crosses originated from border areas of adaptation of the tall grasses in northern and western Nebraska and western Oklahoma, whereas the clones of big bluestem were derived from the true prairie in southeastern Nebraska and northern Iowa. The objectives of these investigations were to obtain hybrids between types with diverse agronomic as well as contrasting taxonomic characters as previously described. The purpose of this paper is to present an interpretation of the performance of the first and second generations of these crosses in relation to the potential improvement which may be realized from the hybridization of such divergent types.

MATERIALS AND METHODS

Second-generation progenies resulting from hybridization of big bluestem and sand bluestem were compared with parent clones at the Nebraska Agricultural Experiment Station in 1956 and 1957. The progenies were established in the spring of 1955 from seedlings space-planted in the field in family groupings for comparison with the clones of the F1 and the original parents propagated vegetatively. A few inbred and backcrossed progenies were also included for comparison.

Agronomic characters of parents and progeny were evaluated for 11 different crosses between sand bluestem and big bluestem. Pairs of sister F1 clones from each cross were compared with their parent clones propagated vegetatively and with progenies grown from seed produced by the F1 clones in the previous season. The second-generation propagules were 22 maternal-line F2 closebred progenies resulting from reciprocal mating of the sister F1 clones in each cross and 22 maternal-line Syn-2 progenies resulting from intercrossing among the 22 F1 clones. Likewise, certain taxonomic characters used in classification of the parent clones were evaluated for the progeny of 7 crosses involving 7 pairs of sister F1 clones from as many crosses, 14 maternal-line F1 closebred progenies and 14 Syn-2 intercross progenies.

Awn length, villousness of the inflorescence, and total yield were evaluated in both 1956 and 1957. Observations were made and data were obtained on individual plants. Foliage color and villousness were rated on a basis of 1 to 9 with the smaller figures applied to the characteristics of sand bluestem. A forage-index rating was based on observations of leafiness and suitability of forage type, with the smaller figures denoting the most desirable plants. Diameter of individual plants and the height of the leaves and total height of the plants were compared at the end of the second season in 1956.

Heritability estimates for eight characters were the ratio of additive genetic variance, \( \sigma_a^2 \), expressed in the second-generation intercross progenies, to the mean phenotypic variance, estimated by \( \sigma_e^2 + \sigma_a^2 \). Estimates of heritability were calculated from twice the regression, \( b \), since the expectation of twice the covariance of progenies on parent clones is an estimate...