Yield of a Hand-Produced Hybrid Sorghum
J. C. Stephens and J. R. Quinby

HYBRID vigor in sorghum(s) has been the title of three papers (1, 2, 3) and has been discussed in some detail in several others. Early examples of "maximum vigor" (3) expressed in extreme height and lateness and heavy forage yield have been largely accounted for by the effects of a relatively few complementary genes for elongation and for number of internodes (4, 5, 6). In some crosses earliness is dominant or partly dominant to lateness (6), although to what extent this is generally the effect of one or a relatively few genes and to what extent an expression of hybrid vigor has not been determined. If the parents of an F₁ intermediate in maturity carry the same height factors, the hybrid is intermediate in height due to a shorter growing period than that of the later parent. For grain production under present farm practices this type of hybrid is of more interest than the hybrids with "maximum vigor" because the trend during the past decade has been toward quick-maturing and short-stalked varieties that are more likely to escape drought, frost, and other hazards and that may be harvested readily with a combine.

It seemed desirable to obtain yield and other information regarding an early-maturing hybrid over a period of several years in comparison with the principal varieties in commercial production. Male-sterile (ms₂) Texas Blackhull kafir (7) provided a satisfactory female parent for crossed seed. Among many F₁ hybrids that had been observed after finding the kafir male-sterile, one of the better resulted from pollination with Day Selection G.C. 38311.

PROCEDURE

Planting seed was obtained each year by hand pollinating male-sterile kafir plants with Day Selection. Plots in the sorghum variety test consist of six 40-inch rows 38.9 feet long with the four inside rows harvested for yield. All plots between series are 40 inches wide. There are 56 duplicated plots in the April 15 planting and 64 in the June 15 planting. Most of the extra plots in the June planting are sorgos that are not well adapted to early planting. The male parent, Day Selection, has not been included in results reported here.

RESULTS

Only 19 grain sorghum varieties (table 1) were included in this test, each entry being grown in single-row plots in five randomized replications planted on two dates, April 15 and June 15, respectively. The regional uniform nursery is grown at stations in Michigan, Dakota to Texas and consists of strains on which information regarding adaptation over a wide area is desired. The list submitted by the sorghum breeders of the different states and stations.

The Blackhull kafir × Day Selection hybrid again had the highest average yield. Its yield exceeded the average of all varieties by 27% in the April planting, 16% in the June planting, and 11% in the 6-year average. Its yield exceeded that of Bonita by 10%, Code by 32%, and Kalo by 20%, Hegari by 107%, and the average of all varieties by 44% in the June planting. In 1944 to 1950, inclusive, and only 16 in the period from 1942 to 1950. All of these are commercial, and, with the exception of Westland, Kalo, and Cody, have occupied substantial acreages in the Great Plains at some time in the past. Further results include all grain sorghums that were of importance in this territory in 1942. At present the best grain sorghum acreage is occupied by Martin and Plainsman. Newer varieties, such as the Double milos, Dwarf kafir 44-14, and more recently Redbines, and Combine kafir 60, will probably supplant the Blackhull kafir × Day Selection hybrid in the future.

The Blackhull kafir × Day Selection hybrid had the highest mean yield. Its mean yield exceeded the average of check varieties by 42% in the April planting, 21% in the June planting, and 30% in the 6-year average. Its yield was higher than that of any of the 16 commercial varieties in the 6-year average. However, it had the highest mean yield in 3 of the 6 years in the April planting and in 4 of the 8 years in the June planting. In every one, the variety that outyielded the hybrid least 6 days later, and it is generally recognized that, within certain limits, the later varieties outyield the early varieties in good seasons.

In the advanced strain test (table 2), each entry was grown in single-row plots in five replications planted on April 26 in 1950 and 1951. In 1950 the Blackhull kafir × Day Selection hybrid was included in this test because its yield was recorded in a preliminary supplemental test. The hybrid again had the highest mean yield in 3 of the 6 years in the April planting and 4 of the 8 years in the June planting. In every one, the variety that outyielded the hybrid least 6 days later, and it is generally recognized that, within certain limits, the later varieties outyield the early varieties in good seasons.