

Amount of Fertilizer Makes the Difference In Sorghum Yields

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The grain sorghum yield story is just about told in one statement: *The amount of fertilizer applied to any variety directly influences the yield obtained.* There is an amount that is economical to use and an amount necessary to get the highest yield. However, all hybrids or standard varieties give like responses for any given rate of nitrogen or phosphate applied.

The hybrids or standard varieties of sorghums may differ in yield potential. A late maturity group may exceed an early maturity group at any location. Within any group, yield increases follow the same general pattern of additional fertilizer increments giving larger yield increases up to the point of diminishing returns.

Varieties and Hybrids

The basic question usually asked is, "Will a short season hybrid require less fertilizer than a full season one to make the maximum yield?" To answer this question, experiments were conducted using three maturity groups of hybrids and one standard variety at each of four locations in 1958 and three in 1959. Maturity groups were given primary consideration rather than specific hybrids, since yield at various locations is directly related to the adaptation of the group.

The specific sorghums selected were: (a) short season—RS 501, (b) medium season—RS 610, (c) late season—DeKalb F-62A, Texas 660, and (d) the standards—DD 38, DD Yellow Sooner or Plainsman that were used as checks depending on the area. Tests were located in the major climatic areas in Arizona where grain is grown.

Included were Willcox (Cochise County), Eloy and Stanfield (Pinal County), Tolleson (Maricopa County) and Wellton and Roll (Yuma County). Nitrogen and phosphate fertilizers were applied in nine different treatments or combinations on the sorghums grown at each location.

Yield results indicate that: (a) longer season hybrids out-yield shorter season hybrids or standards and (b) hybrids generally out-yield standards as shown in Table 1. The test results give no indication that short season maturing sorghums use fertilizer more efficiently than do full season ones.

Fertilizer Rates Important

A favorable economic response within

the range of 60 to 120 pounds of nitrogen per acre is evident from Table 2. It was within this range that the economic level was reached, although the maximum at any location may be higher, as shown by the yield in Cochise County (1958). A grower may expect a response to higher rates of fertilizer in Cochise County than in Yuma County. Climate probably is an important factor in the yields obtained in Yuma County. However, with early planting dates the whole picture will probably change.

Phosphates used alone contributed little to yield increases in these tests and growers can expect similar results except for specific farms or locations. Phosphate applied with high rates of nitrogen resulted in higher yields in some instances.

Table 1. Relative Yields of Selected Sorghums Grown in 1958 and 1959 Expressed as Percent of a Check

Variety	Cochise Co.		Pinal Co.		Maricopa Co.	Yuma Co.	
	1958	1959	1958	1959	1958	1958	1959
Checks							
DD 38	—	—	100	—	—	—	—
DD Yellow Sooner	—	—	—	—	100	—	—
Plainsman	100	100	—	100	—	100	100
Early Maturity							
RS 501	100	75	—	106	102	154	148
Medium Maturity							
RS 610	106	86	—	108	108	111	129
Late Maturity							
DeKalb F-62A	—	—	105	—	—	—	—
Texas 660	118	108	—	99	—	118	126

Table 2. Effects of Fertilizer On Sorghum Yields 1958 and 1959 Expressed as Percent of Check (no fertilizer)

lbs/acre Rate	Cochise Co.		Pinal Co.		Maricopa Co.	Yuma Co.	
	1958	1959	1958	1959	1958	1958	1959
O (Check)	100	100	100	100	100	100	100
Economic Level							
60 N	143	126	127	111	128	111	114
120 N	163	125	140	114	145	121	118
Luxury Level							
240 N	182	114	136	110	169	134	121
120 N & P ₂ O ₅	179	122	134	114	145	113	116
240 N & P ₂ O ₅	209	110	141	112	181	121	112

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