Guar Variety-Fertility Evaluation Trials & Dryland Guar-Cotton Rotation AG-CARES, Lamesa, TX, 2001-2002

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Guar is probably the most drought tolerant crop grown in the Texas South Plains, but it has received very little research since the early 1980s in the Vernon area. Although the gross returns for guar are low, the crop can also truly be grown as a minimal input crop. This affords the opportunity to include guar in crop rotations, which have been shown to increase dryland cotton yields by 15% in the Vernon area. Little is known about the potential for guar to respond to N and P fertility. In addition, the rotation at Lamesa is set up to measure cotton yields after guar vs. continuous cotton. Finally, nodulation using seedbox guar-specific *Bradyrhizobium* inoculant continues to be poor.

METHODS AND PROCEDURES (for guar planting):

Soil Type:	Amarillo fine sandy loam
Planting:	Guar, June 28, 2002 on 40" rows; dryland cotton, June 6, 2002
Previous Crop:	Cotton
Seeding Rate:	Guar, 80,000 seeds/acre with vacuum planter (~6.5 lbs./A)
Plot Set-up:	Four replicated strips, test area per variety 4 rows X 75'
Harvest Area:	2 rows X 25'
Fertilizer:	Treatments included 30 lbs. P_2O_5/A applied as 10-34-0 band (rolling coulters, 5" off top of bed) applied in April
Herbicide:	1.5 pt Treflan
Insecticide:	None
Rainfall:	See summary in AG-CARES report, 3.71" from June 28-Oct. 10 (period of physiological growth)
Date Harvested:	December 16, 2002

RESULTS AND DISCUSSION:

No economically harvestable cotton yield was obtained for cotton in 2002 due to drought, and the crop was released to insurance. This is the second year in a row that no cotton crop was achieved whereas fair and good guar yields were achieved.

A long-term 2:1 cotton-guar dryland rotation was established in 2000 at AGCARES as well as continuous cotton strips to gauge cotton yields in response to rotation with guar as well as guar variety and fertility P trials. No treatments were applied to the cotton. Continuous cotton is maintained to compare the rotational benefit of guar to cotton.

Guar was seeded on June 28 into fair moisture at 1.25" deep. A stand was achieved among Kinman and Lewis varieties at approximately 60,000 plants/A. Cotton stand was poor due to poor establishment and drought and in early June zeroed by insurance. The remaining cotton plants, however, were maintained to hopefully retain the rotation for 2003 if any later rain might occur to generate a minimum of cotton growth.

2002 Guar Variety & Treatment	2002 Yield (Lbs./A)^	2002 Test Weight (Lbs./bu.)^	2001-2002& Avg. Yield (Lbs./A)^	2001-2002& Avg. Test Weight (Lbs./bu.)^
Kinman	939 a	56.8 a	761 a	59.2 a
Kinman + 30 lbs./A P2O5	918 a	56.3 a	727 ab	58.5 b
Lewis	862 a	56.0 a	687 b	58.6 b
Lewis + 30 lbs./A P2O5	782 a	55.3 a	658 b	58.7 b
Mean	875	56.1	708	58.7
P-Value (Variety)	0.1089	0.0826	0.0510	0.5845
P-Value (P)	0.4291	0.2012	0.3700	0.2268
P-Value (Year)	---	---	<0.0001	<0.0001
Fisher's PLSD (0.05)	NS#	NS#	59	0.6
Coeff. of Variation, CV (%)	14.5	1.8	6.5	4.8

^ Means in the same column followed by the same letter are not significantly different at 0.05.
&2001 average results: 549 lbs./A @ 61.4 lbs./bu test weight.
#Not significant.

2001 Results in Review. No significant results were observed in yield (average yield 549 lbs./A) or test weight (average, 61.4 lbs./bu) with the above treatments in addition to the guar varieties Esser and Santa Cruz. 2001 average return at then prices was $78.25/A, and a net above variable costs, including $25/A for custom guar harvest, was $24/A (2.32" of rain during guar growth).

2002 Results. Yields improved over 2001 due to slightly more rainfall and cooler overall weather. We are pleased with the 2002 yields as they averaged about 100-200 lbs./A higher than we expected. Test weight was low due in part to nearly 4" of rain in mid-October. This delayed harvest due to both wet conditions on the ground as well as higher humidities, which make the stem tough. This October rainfall did not contribute to yield. Some breakage of pods off the stems occurred during harvest. Physiologically the guar should have been harvested in early November, and this would have preserved the test weight. Test weights for guar below 58 lbs./bu are discounted and in fact might be rejected at the delivery point (as was the case at Rhodia, Inc., Vernon, TX in 2002). In spite of the low rainfall, the crop performed well, rooting into deep moisture.

In this trial Kinman has yielded somewhat higher than Lewis, an average of 74 lbs./A over the two-year period. In other trial results Lewis, which pods mainly on the mainstem and is ideally planted on narrower row spacings, Lewis tends to yield more than Kinman. No evidence exists that sidedress P_2O_5 is helping yields. Test weights have been slightly higher with Lewis.

Costs and net return on variable costs: At $14.00/cwt. (contracted for Southwest Guar Cooperative, Brownfield, TX), the average return per acre was $122.50/A based on the test average. Variable costs per acre included bedding and one cultivation, $10; planting, $8; Treflan, $3; custom combine, $25; hauling to Brownfield, $0.60/cwt, $3.30; and seed, $5.00. This translates into a net return over variable costs of $71.25/A. This is an exceptional return, however, the penalty for low test weight guar would have reduced the return due to dockage. These trials, harvested one month earlier should have seen higher test weight. This guar hauled to Rhodia, Inc., Vernon, TX, would have been rejected due to low test weight. Thus the only use would be grinding for cattle feed.

Bradyrhizobium seedbox inoculant for guar. Seed was inoculated with Urbana Laboratories seedbox guar inoculant at the double rate of 1 pouch for 50 lbs. of seed. We noted on the day of planting (~94° F) that surface soil temperature was 130° F, and soil temperature at the 1.25" planting depth was 104° F. Little guar nodulation in the South Plains has been observed using guar inoculants, and these temperatures would particularly hard on any *Bradyrhizobium* or *Rhizobium* inoculant, especially for inoculants in the form of seedbox powder. As noted in last year's report, we found that concentrated liquid Lift peanut inoculant (from Nitragin, formerly LiphaTech), though often inoculating guar in a lab setting, did not nodulate guar in the field in 2001.

For more information about guar check with your local Extension office, Calvin Trostle, or the Texas A&M—Lubbock website at http://lubbock.tamu.edu