

**PROFIT—Productive Rotations On Farms In Texas  
ANNUAL REPORT**

**Enhancing Producer Profitability in Southern High Plains Cropping Systems through Sorghum  
Education, Demonstrations, and Applied Research  
(Regional Project)**

1. **Dryland Sorghum/Cotton Rotation vs. Continuous Cotton—Sorghum Agronomy, Residue Management, and Rotational Benefits**  
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SECTION 1

Project Description, Expected Results, Benefit to Producers, Project Accomplishments, Most Important Outcome, Producer Adaptation and Constraints

Numerous Texas South Plains cotton producers often comment that their cotton *looks* better following sorghum, but they don't know what this means in terms of yields. In addition, we believe that sorghum residue management (leaving the stubble standing as long as possible vs. mowing it down) and modest sorghum N fertility will enhance cotton production. We attempted to maintain two:one cotton-sorghum rotations (continuous cotton also at each location) were continued at TAES-Lubbock and AGCARES, Lamesa. Due to severe drought in at both locations no harvestable yield was achieved for either cotton or grain sorghum (Lubbock not planted). Once harvestable yields can be achieved, we anticipate that residue and nitrogen fertility on sorghum will enhance rotational benefit to cotton compared to continuous cotton. The presence of sorghum residues may benefit producers by reducing sandfighting costs as well.

We have not yet had sufficient moisture to test the objectives of this dryland project. The rotation has been maintained at AGCARES (no moisture for sorghum planting in 2001 at Lubbock). Producer constraints to adoption of sorghum rotation include low sorghum prices, lack of equipment (combine), etc. In regards to management most producers are rarely inclined to consider any fertilizer expenditure for dryland sorghum. Furthermore, many producers are not accustomed to leaving sorghum stubble standing until planting (or even further) rather they tend to mow it down. Further constraints may be the lack of appropriate planter attachments such as coulters or trash whippers, which can handle the sorghum residue while planting cotton.

SECTION 2

Kind of project—Regional

Project Objectives—

- A) Continue a long-term dryland research rotation sites for 2:1 cotton:sorghum rotation vs. continuous cotton at TAES-Lubbock and AGCARES, Lamesa.

- B) Evaluate sorghum and cotton yields in response to residue management and nitrogen on sorghum.
- C) Determine the rotational yield benefit to cotton rotated with sorghum compared to continuous cotton.

#### Methodology

Two:one cotton-sorghum rotations were continued at the Glover Farm unit (5 acres, Exhibit 1)) of TAES-Lubbock and AGCARES, Lamesa (21 acres, Exhibit 2). Insufficient sorghum growth (no harvestable yield) was achieved in 2000 so testing of 2001 cotton yields in response to previous residue treatments was not possible as treatments could not be initiated. Due to the limited area only sorghum residue treatments were specified for the Glover farm (cotton planted May 17), but due to drought no planting moisture was received until July 23. Thus sorghum was not planted. At AGCARES, Lamesa, residue treatments were applied on December 5, 2000. Residue treatments (leaving stubble standing vs. mowing) were applied in a replicated rotation system. Cotton was planted May 29, 2001, but due to dry conditions a poor stand was achieved. A medium maturity sorghum hybrids, Cargill 737, was planted on June 28, 2001, into marginal moisture (either 26,000 seeds/A, a seeding rate suitable to the minimal moisture conditions, or 52,000 seeds/A, a seeding rate considered much too high, but too often used by growers in dryland sorghum; Exhibit 3). Due to poor stand, nitrogen treatments at 30 lbs. N/A were not applied to sorghum. As in 2000, plans again called for initiating residue treatments after sorghum harvest, but little residue was produced. No treatments were applied to the cotton ground.

#### Results and Discussion

No harvestable dryland cotton yields were achieved at either location due to drought. Cotton at AGCARES was zeroed by crop adjusters, but we left the cotton there in hopes that conditions might turn favorable for sufficient growth to justify continuous cotton and the rotation for 2002, and in fact about 90 lbs./A of lint was harvested. Sorghum achieved little vegetative growth at AGCARES, so residue treatments for 2002 rotation cotton could not be established. As noted in the report for the sorghum hybrid trial at AGCARES, the delay in planting the sorghum by 2-3 days after the June 23 rain while AGCARES irrigated research was taken care of probably hurt the stand substantially. Quick planting in 2001 would have been far more advantageous than any agronomic practice for sorghum.

Is the project meeting stated objectives? No, due to drought and lack of planting moisture or harvestable grain and lint yield. A key component of this project is not only the sorghum work, but evaluating cotton production after sorghum. To effectively achieve this not one but two years of moisture and reduced drought are needed. To date, this has not occurred at either the Glover Farm or AGCARES. The two:one cotton:sorghum rotation remains in place.

#### Technology Transfer and Education Activity

Technology developed and available to producers: No sorghum or cotton yield data is yet available due to drought, but the project has enhanced efforts to address sorghum-cotton rotation issues with producers. We believe that leaving sorghum residues standing, i.e. delaying their contact with soil, will afford erosion control and moisture infiltration benefits to subsequent cotton, and we are discussing this with a number of producers.

Publications: Summary of the project will be published in the Dawson County/AGCARES report.

Presentations: Field demonstration and talk, AGCARES dryland crop tour, Dawson Co., September 11, 2001.

Student Education: One college student received training in grain sorghum and cotton rotation concepts due to his help in planting and maintaining the study.

Exhibit 1.  
 Dryland Sorghum/Cotton Rotation vs. Continuous Cotton  
 Glover Farm, Lubbock, 2001

Row number	North Side				
1 to 4	CCC	CCC	CCC	CCC	Border  Cotton (C) or sorghum (S) for years 2000/2001/2002.
5 to 12	CCS	SCC	CCS	CSC	
13 to 20	CSC	CCS	SCC	CCS	
21 to 28	CCC	CSC	CCC	SCC	
29 to 36	SCC	CCC	CSC	CCC	
	<- 225' ->	<- 225' ->	<- 225' ->	<- 225' ->	

Exhibit 2.  
 Dryland Sorghum/Cotton Rotation vs. Continuous Cotton  
 AGCARES Dryland, Lamesa, 2001

Starting on North End		# of Rows
Row #		
161-168	Solid continuous cotton (border)	8
169-200	32 rows sorghum, 2001	32
201-232	32 rows continuous cotton	32
233-264	32 rows cotton (Year 1)	32
265-296	32 rows cotton (Year 2); to sorghum, 2002	32
297-328	32 rows sorghum, 2001	32
329-360	32 rows continuous cotton	32
361-392	32 rows cotton (Year 1)	32
393-424	32 rows cotton (Year 2); to sorghum, 2002	32
425-456	32 rows sorghum, 2001	32
457-488	32 rows continuous cotton	32
489-520	32 rows cotton (Year 1)	32
521-552	32 rows cotton (Year 2); to sorghum, 2002	32
553-560	Solid continuous cotton (border)	8

Exhibit 3. Planned treatments for AGCARES sorghum production in 2001 upon which cotton response would be tested in 2002.

Rows Rows

from to	North End	0-400'	400-800'
169 176	26,000 seeds/A	0 N	30 lbs. N/A
177 184	26,000 seeds/A	30 lbs. N/A	0 N
185 192	52,000 seeds/A	0 N	0 N
193 200	26,000 seeds/A	30 lbs. N/A	0 N
297 304	26,000 seeds/A	30 lbs. N/A	0 N
305 312	26,000 seeds/A	0 N	30 lbs. N/A
313 320	52,000 seeds/A	0 N	0 N
321 328	26,000 seeds/A	0 N	30 lbs. N/A
425 432	26,000 seeds/A	30 lbs. N/A	0 N
433 440	26,000 seeds/A	0 N	30 lbs. N/A
441 448	52,000 seeds/A	0 N	0 N
449 456	26,000 seeds/A	30 lbs. N/A	0 N