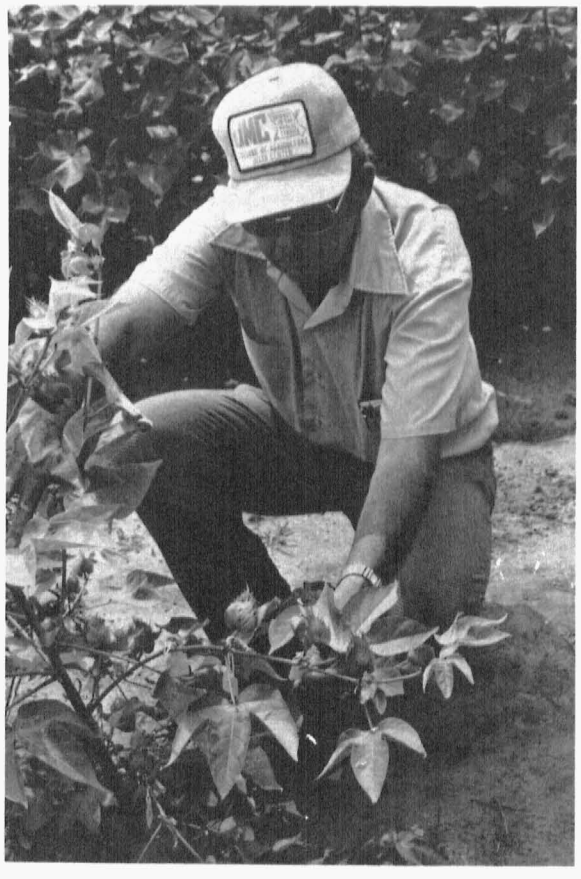

Delta Center

Research Report

1981

Special Report 271

CONTENTS

Once again the University of Missouri welcomes visitors to Field Day at the Delta Center. We encourage our visitors to take more than one of the field wagon tours at the Lee Farm and to visit machinery exhibits at the headquarters site. Ladies will be interested in exhibits prepared by Extension Staff in the Auditorium.

Reports for 1980 from various experiments are included. Three weeks of very high temperatures and low rainfall in July, 1980, adversely affected many of our tests. The data below contrasts the two years.

	Mean Daily High Temperature Degrees F		Rainfall Inches	
	1980	1981	1980	1981
May	78.5	74.9	2.91	5.55
June	89.2	87.7	1.86	5.17
July	97.3		2.57	
(First 20 Days)	100.8	91.8		3.58
August	93.9		1.44	
September	85.2		4.11	

Enjoy your day at the Delta Center.

Sincerely

Charles F. Cromwell, Jr.
Superintendent

S O I L S R E S E A R C H

*ROGER G. HANSON
MICHAEL J. BARTON
PHILLIP M. SIMS
JONI K. SMITH

In recent years southeast Missouri, as well as other parts of the nation, has been devastated with the problem of the Soybean Cyst Nematode. As with all new problems, observations and theories of control and treatment of these problems have emerged, some correct and some incorrect. Soils research has now begun a long term study of these observations as they relate to soil conditions and plant growth.

In 1981 the efforts of Soil Fertility research at the Delta Center were redirected, taking a closer look at the interrelationship between pH, moisture stress, soybean varieties, soil texture and soil fertility levels on cyst nematode populations within the soil. This new direction of study was supported by two USDA Grants which made possible the hiring of new personnel and the acquisition of some much needed equipment, such as microscopes and a plot combine.

During the cropping season of 1981 four off-station experiments were established ranging from clay soils located west of Bertrand to sandy soil located south of Senath. Each location consisted of twelve 38" rows of Forrest soybeans approximately one-fourth mile long. Textural analysis of soil was run every 50 feet of row within the test area. These soil differences will be plotted against cyst nematode population counts, taken with the same 50 feet area, to determine if any relationship exists between soil texture and cyst nematode populations. Aerial infared photographs were also taken to determine if plant stress due to cyst nematode infestation can be determined by remote sensing.

Sidedressed nitrogen, phosphorous and potash fertilizer were included in these off-station experiments with a twofold purpose. First to monitor the effects of fertility levels on cyst nematode population increases during the growing season and secondly, to determine the fertility levels required to produce optimum yields of soybeans on known cyst nematode infested ground.

A long term study involving the affects of soil acidity on cyst nematode population was initiated this year on soil which, since the establishment of the Delta Center in 1961, had never been limed. The pH salt at the beginning of the experiment was 4.6. Three rates of Calcarious Lime were added bringing the individual plots pH to 5, 6, and 7, respectively. The pH's will be maintained for several years while the increase of the cyst nematode population is monitored. Three varieties of soybeans ranging from completely susceptible to resistant and several fertility treatments were also included within the parameter of this experiment.

Two experiments located on the Delta Center Farms south of Portageville and north of Clarkton are aimed directly at determining if fertilizer treatments alone could be responsible for the control of cyst nematode populations.

The final phase of this "new look" is the effects of irrigation on soybean cyst nematode populations. Three varieties of soybeans and five different fertility treatments were incorporated under irrigated and non-irrigated conditions. Gypsum Blocks were placed at 10 and 20 inch depths. Readings were taken weekly to determine available moisture at these depths. When available moisture dropped to a point that the soybean plant would normally experience moisture stress irrigation water was applied to the irrigated portion of the experiment. No irrigation was applied to the non-irrigated portion of the test regardless of the amount of moisture stress experienced.

In 1980 when the possibility of the need for this type of study was realized two preliminary experiments were conducted to aid in guiding the 1981 research. Three varieties of soybeans ranging from completely susceptible to resistant, along with six soil fertility treatments and two soil types were established. Nematode populations were monitored throughout the year. Yield and fertility data were also collected.

The results of these experiments are as follows. It should be remembered that this is only one year's data and the cropping season of 1980 was certainly not typical.

*James A. Roth, Assoc. Prof. of Agronomy, Project Leader Soil Fertility, now retired, is responsible for the initiation of this project. We, in soil fertility, would like to acknowledge his many years of service to the project.

TABLE 1

The Effect of Rates and Types of Fertilizer on Cyst Nematode Populations in Soybeans

LOCATION: Lee Farm, UMC Delta Center, Portageville, MO
SOIL TYPE: Tiptonville Silt Loam

Variety	Soil Treatment Lb/A	Yield Bu/A	% Moisture	Height Inches	% K Before Bloom	Cysts Per 100 Grams of Soil			Seed Quality
						Preplant	Bloom	Harvest	
Forrest	None	36.4 de	11.76 a	32 ab	1.41 c-f	.25 a	2.75 abc	17.00 a-d	2.75 ab
"	0+50+ 0	40.9 a-e	11.16 b	31 b	1.34 def	.75 a	2.00 abc	22.00 a-d	2.87 a
"	0+ 0+ 60	41.4 a-e	11.31 b	33 ab	1.44 b-f	.50 a	7.50 ab	9.75 cd	2.75 ab
"	0+50+ 60	43.4 a-d	11.29 b	34 ab	1.45 a-f	.50 a	2.25 abc	24.50 abc	2.62 abc
"	0+50+120	44.3 ab	11.19 b	33 ab	1.55 a-e	1.00 d	4.25 abc	30.25 ab	2.87 a
"	0+ 0+120	41.9 a-e	11.54 ab	32 ab	1.43 b-f	1.00 a	3.50 abc	13.75 a-d	2.75 ab
Essex	None	40.0 a-e	10.40 cd	24 c	1.31 ef	1.00 a	2.75 abc	13.75 a-d	2.37 cd
"	0+50+ 0	36.7 cde	10.52 cd	26 c	1.36 def	.25 a	2.25 abc	31.50 a	2.25 d
"	0+ 0+ 60	37.9 b-e	10.57 c	24 c	1.31 ef	1.25 a	2.50 abc	27.25 abc	2.25 d
"	0+ 50+ 60	40.0 a-e	10.49 cd	24 c	1.42 b-f	.25 a	8.00 a	29.00 ab	2.25 d
"	0+50+120	35.5 c	10.46 cd	26 c	1.27 f	1.25 a	7.50 ab	26.00 abc	2.50 bcd
"	0+ 0+120	37.3 b-e	10.33 cd	25 c	1.19 f	1.00 a	3.00 abc	11.75 bcd	2.37 cd
Bedford	None	42.4 a-e	10.46 cd	36 ab	1.62 a-d	.75 a	1.50 bc	12.75 bcd	2.50 bcd
"	0+50+ 0	39.5 b-e	10.46 cd	35 ab	1.58 a-e	.75 a	1.00 c	4.75 d	2.75 ab
"	0+ 0+ 60	41.2 a-e	10.38 cd	34 ab	1.72 a	.50 a	1.00 c	4.50 d	2.62 abc
"	0+50+ 60	44.0 abc	10.49 cd	36 ab	1.69 ab	1.00 a	2.75 abc	13.00 bcd	2.50 bcd
"	0+50+120	42.4 a-e	10.07 d	33 ab	1.65 abc	.25 a	2.00 abc	5.50 d	2.75 ab
"	0+ 0+120	47.5 a	10.69 c	37 a	1.65 abc	.75 a	2.00 abc	11.75 bcd	2.50 bcd
VARIETIES									
Forrest		41.4 a	11.37 a	33 a	1.44 b	.67 a	3.71 a	19.54 a	2.77 a
Essex		32.9 b	10.46 b	25 b	1.31 c	.83 a	4.33 a	23.21 a	2.33 c
Bedford		42.8 a	10.43 b	35 a	1.65 a	.67 a	1.71 a	8.71 a	2.60 b
SOIL TREATMENT									
	None	39.6 a	10.88 a	31 a	1.45 a	.67 a	2.33 a	14.50 a	2.54 ab
	0+50+ 0	39.0 a	10.71 ab	31 a	1.43 a	.58 a	1.75 a	19.42 a	2.62 ab
	0+ 0+ 60	40.2 a	10.75 ab	30 a	1.49 a	.75 a	3.67 a	13.83 a	2.54 ab
	0+50+ 60	42.5 a	10.75 ab	32 a	1.52 a	.58 a	4.33 a	22.17 a	2.46 b
	0+50+120	40.7 a	10.58 b	31 a	1.49 a	.83 a	4.58 a	20.58 a	2.71 a
	0+ 0+120	42.2 a	10.85 a	31 a	1.43 a	.92 a	2.83 a	12.42 a	2.54 ab

Continued----

Table 1 continued

Soil Test

				Pounds Per Acre						PPM		
	pHs	N.A.	% O.M.	P_2 P_2O_5	P_1 P_2O_5	Ca	Mg	K	Zn	B	S	C.E.C.
Topsoil 0- 6"	6.0	1.1	1.9	352	239	3170	241	281	6.0	.37	2.0	10.4
Subsoil 6-12"	6.1	1.2	1.8	284	186	3180	300	234	3.9	.44	1.5	10.8

Planting: April 30
Fertilizer: Sidedressed May 30
Herbicide: Treflan incorporated preplant
Insecticide: None
Irrigation: July 10 and 17
Harvested: October 10

DISCUSSION: Yield levels of soybeans were not effected by fertility treatments but they were effected significantly by variety. Height was also effected by variety. Essex was the lowest yielding and also the smallest in height. Cyst counts were not significantly different at any sampling period during the growing season although varietal trends were indicated. Nematode populations were not effected this year at this location due to fertility treatments but increased as the season progressed. Essex contributed to higher cyst nematode populations as compared to Bedford which had the lowest population of cysts at harvest. The soybean cyst population at this location may have reduced yields of the Essex soybeans but had very little influence on the yields of the Forrest and Bedford varieties.

TABLE 2

The Influence of Soil Fertility Treatments on Soybeans Growing on Soil Infested with Cyst Nematode - 1980

LOCATION: Rhodes Farm, UMC Delta Center, Clarkton
SOIL TYPE: Broseley Fine Sandy Loam

Varieties	Soil Treatment Lbs/Acre $N+P_2O_5+K_2O$	Yield Bu/Acre	% Moisture	Height Inches	% Leaf K Bloom	Cysts Per 100 Grams Soil Preplant	Cysts Per 100 Grams Soil Bloom	Cysts Per 100 Grams Soil Harvest	Seed Quality
Forrest	None	17.1 abc	11.18 b	19.0 efg	1.03 c-f	23.25 a	76.75 bcd	35.75 abc	2.87 ab
"	0+50+ 0	18.4 ab	10.98 b	20.8 def	1.27 b-e	25.75 a	45.00 d-g	28.75 abc	2.87 ab
"	0+ 0+ 60	18.3 ab	11.28 b	23.0 b-e	0.98 ef	18.00 a	53.25 c-f	38.25 abc	2.87 ab
"	0+50+ 60	19.7 ab	12.28 b	22.3 cde	1.14 b-f	15.50 a	48.75 d-g	44.75 a	2.87 ab
"	0+50+120	16.1 bc	12.27 b	20.0 ef	1.14 b-f	23.75 a	58.25 cde	36.25 abc	2.87 ab
"	0+ 0+120	18.4 ab	11.74 b	21.3 c-f	0.89 f	17.50 a	49.50 d-g	36.25 abc	3.00 a
Essex	None	7.9 d	15.14 ab	16.5 fgh	1.12 b-f	20.75 a	104.75 ab	42.25 ab	2.37 c
"	0+50+ 10	7.3 d	13.95 ab	14.8 ghi	1.35 abc	18.75 a	29.25 efg	24.75 abc	2.37 c
"	0+ 0+ 60	6.3 d	12.84 ab	11.8 hi	0.99 ef	17.25 a	88.75 abc	34.00 abc	2.50 bc
"	0+50+ 60	8.0 d	15.11 ab	10.8 i	1.16 b-f	17.75 a	115.25 a	20.00 bc	2.37 c
"	0+50+120	6.8 d	20.86 a	12.3 ghi	1.00 def	15.75 a	75.50 bcd	45.50 a	2.50 bc
"	0+ 0+120	10.1 cd	13.43 ab	14.3 ghi	1.30 a-e	25.00 a	55.00 c-f	30.00 abc	2.50 bc
Bedford	None	23.9 ab	15.30 ab	30.0 a	1.45 ab	21.50 a	30.50 efg	28.75 abc	2.75 abc
"	0+50+ 0	20.5 ab	15.52 ab	28.8 a	1.25 b-e	17.50 a	16.75 fg	18.00 c	2.87 ab
"	0+ 0+ 60	24.6 a	10.44 b	27.8 ab	1.33 a-d	20.00 a	21.25 efg	20.75 bc	2.62 abc
"	0+50+ 60	23.8 ab	10.93 b	26.0 abc	1.60 a	19.25 a	13.50 g	18.50 c	3.00 a
"	0+50+120	19.4 ab	7.64 b	25.3 a-d	1.31 a-e	19.75 a	15.00 g	28.00 abc	2.75 abc
"	0+ 0+120	24.6 a	11.20 b	26.3 abc	1.45 ab	19.50 a	19.50 fg	20.75 bc	2.75 abc
Varieties									
Forrest		18.0 ab	11.62 a	21.0 b	1.08 b	20.62 a	55.25 ab	36.67 a	2.90 a
Essex		7.7 b	15.22 a	13.4 c	1.15 ab	19.21 a	78.08 a	32.75 ab	2.44 b
Bedford		22.8 a	11.84 a	27.3 a	1.40 a	19.58 a	19.42 b	22.46 b	2.79 a
Soil Treatment									
	None	16.3 a	13.88 a	21.8 a	1.20 ab	21.83 a	70.67 a	35.58 ab	2.67 a
	0+50+ 0	15.4 a	13.48 a	21.4 a	1.29 a	20.67 a	30.33 c	23.83 b	2.71 a
	0+ 0+ 60	16.4 a	11.52 a	20.8 a	1.10 b	18.42 a	54.42 ab	31.00 ab	2.67 a
	0+50+ 60	17.2 a	12.77 a	19.7 a	1.30 a	17.50 a	59.17 ab	27.75 ab	2.75 a
	0+50+120	14.1 a	13.59 a	19.2 a	1.15 ab	19.75 a	49.58 bc	36.58 a	2.71 a
	0+ 0+120	17.7 a	12.13 a	20.6 a	1.22 a	20.67 a	41.33 bc	29.00 ab	2.75 a

Continued----

Table 2 continued

	Soil Test											
				Pounds Per Acre						PPM		
	pHs	N.A.	%OM	P_2 P_2O_5	P_1 P_2O_5	Ca	Mg	K	Zn	B	S	CEC
Topsoil 0- 6"	6.4	0.4	1.3	400+	400+	1190	323	432	3.7	.43	2.0	5.1
Subsoil 6-12"	6.2	0.6	0.9	326	286	1050	353	300	1.7	.27	1.2	5.1

Planting:	April 30
Fertilizer:	Sidedressed May 20 all treatments
Herbicide:	Treflan incorporated preplant
Insecticide:	None
Irrigation:	July 7, 13; August 12, 26; September 2 and 16
Harvest:	October 14

DISCUSSION: At this location yield differences due to varieties were statistically significant but yield differences due to fertility were not. Height also indicated varietal differences, Essex being the lowest yielding variety and also the shortest in height. Bedford soybeans were shown to be significantly higher in % K than the Forrest variety at bloom. The host and dry season resulted in lower yields as compared to previous seasons. Six irrigations were not justified for normal crop production but were needed for experimental work to determine the influence on the soybean cyst nematode. Cyst counts preplant indicate soil infestation was high enough to reduce yields as indicated by the yield of the susceptible variety Essex. Bedford soybeans produced the highest yield but the increase was not significantly higher than the yield of the Forrest soybeans.

PRODUCTION POTENTIALS OF SHORT-SEASON COTTON IN DELAYED PLANTINGS ON VARIABLE SOILS IN SOUTHEAST MISSOURI - 1980

The group of investigators concerned with these demonstrations of narrow-row stripper harvest cotton production in 1980 include the following:

C. F. Cromwell, Jr.	Superintendent, Delta Center
Joe Scott	State Agronomy Specialist, Delta Center
W. D. Boon	Asst. Superintendent, Delta Center
W. P. Sappenfield	Professor of Agronomy, Delta Center
U. U. Alexander	Extension Agronomist, Dunklin County
David Guethle	Extension Agronomist, Pemiscot County
Dale Klobe	Extension Agronomist, New Madrid County

Four replications of eight varieties were planted at four sites. The varieties planted in 1980 were as follows:

Mo 73-1203 - An early maturing multiple disease resistant, highly productive variety with excellent fiber qualities developed by the University of Missouri Agricultural Experiment Station for short season production. During dry seasons, the variety may lack adequate storn resistance.

HYC 76-59 - An early maturing multiple disease resistant, coarse short-fibered variety developed by the University of Missouri Agricultural Experiment Station for short season production.

Tamcot CAMD-E - A Texas Experiment Station developed variety that is ultra early maturing with short compact plants. It is resistant to bacterial blight. Fiber length averages approximately one inch.

DES 56 - An early maturing variety developed by the Mississippi Agricultural Experiment Station with fiber qualities similar to Deltapine and Stoneville varieties. It is susceptible to most cotton diseases.

McNair 235 - An intermediate to full season variety with good quality fiber and tolerance to fusarium wilt.

Stoneville 213 - An intermediate to full season variety in Missouri that is adapted to most soil types and is considered a standard variety in the tests. It is tolerant to verticillium wilt but is very susceptible to the fusarium wilt and root knot nematode disease on sandy soil.

Coker 304 - An early maturing variety with a shorter stalk than Coker 310. It is moderately tolerant to fusarium and although susceptible to verticillium wilt it often produces good yields if wilt developes late.

Deltapine 41 - An early maturing variety with good storm resistance, similar to Deltapine 55. It is early to intermediate in maturity and with moderate height.

The 1980 tests were made possible by the granting of sites for the test by:

Charles Parker at Senath
Lloyd Massey between Netherlands and Pascola
Talmadge Burgess at Hayward
Lloyd Winters at Matthews

The locations and significant dates chosen for the 1980 plantings were as follows:

Charles Parker Farm - Senath, MO - Sandy Loam Soil

Treflan applied	05-15-80
Planted	05-15-80
Cotoran	05-19-80
Up to stand	05-21-80
First cultivation	06-04-80
Harvest	10-11-80

No N applied
Some grass and weed escaped chemical treatment

Lloyd Winters Farm - Matthews, MO - Silt Loam Soil

Treflan applied	05-19-80
Planted	05-19-80
Cotoran applied	05-20-80
Up to stand	05-28-80
First cultivation	06-06-80
25# N sidedress	06-20-80
Harvest	10-16-80

Talmadge Burgess Farm - Hayward, MO - Fine Sandy Loam Soil

Treflan and Fertilizer applied before by owner	05-20-80
Planted two varieties (rain)	05-22-80
Planted six varieties	05-27-80
Up to stand	05-29-80
First cultivation	06-03-80
Harvest	10-14-80

Lloyd Massey Farm - Netherlands/Pascola - Silty Clay Soil

Treflan applied	05-28-80
Planted	05-28-80
Cotoran applied	05-28-80
Up to stand	06-10-80
First Cultivation	06-10-80
50# N sidedress	06-19-80
Harvest	11-07-80

The plots were harvested as split plots in the following fashion:

Charles Parker Test - Senath

Split plot - Method of weighing

Talmadge Burgess Test - Hayward

Split plot - Method of weighing
Split plot - Method of harvest

Lloyd Winters Test - Matthews

Split plot - Method of harvest

Lloyd Massey Test - Netherlands/Pascola

Incomplete data

The two methods of harvesting were:

Three row brush-roll-header stripper with field cleaner, shop built from IHC components

One row IHC spindle picker, 20 year old model

The two methods of weighing were:

Hydraulic scales under each wheel for full trailer weighing
Bagged samples weighed on field scales tripod supported

Analysis of harvest data follows:

Varieties	Seed Cotton Pounds Per Acre	
Charles Parker - Senath		
Deltapine 41	1314.4	a
Stoneville 213	1266.1	ab
DES 56	1210.2	abc
Tamcot CAMD-E	1178.9	abc
Coker 304	1157.2	abc
McNair 235	1135.2	abc
HYC 76-59	1096.6	bc
*Mo 73-1203	1016.9	c
Min LSD 183.6		
Max LSD 211.8		

* A very large amount of seed cotton had fallen out of the bur onto the ground prior to harvest.

Varieties	Seed Cotton Pounds Per Acre	
Lloyd Winters - Matthews		
Mo 73-1203	1799	a
McNair 235	1754	a
DES 56	1592	ab
HYC 76-59	1526	ab
Coker 304	1500	ab
Deltapine 41	1449	ab
Stoneville 213	1380	bc
Tamcot CAMD-E	1088	c
Min LSD 315.2		
Max LSD 363.6		
Stripper Harvest	1975.4	a
Spindle Picker	1046.4	b
LSD 455.6		
Talmadge Burgess - Hayward		
McNair 235	2619.6	a
DES 56	2563.4	ab
Stoneville 213	2302.6	bc
Coker 304	2248.6	c
Deltapine 41	2153.6	cd
Mo 73-1203	2124.5	cd
HYC 76-59	1916.0	de
Tamcot CAMD-E	1779.2	e
Min LSD 289.9		
Max LSD 334.3		
McNair 235	2111.1	a
DES 56	1963.8	ab
Coker 304	1834.6	bc
Stoneville 213	1741.2	cd
Deltapine 41	1622.8	de
HYC 73-59	1518.0	e
Mo 73-1203	1504.0	e
Tamcot CAMD-E	1312.0	f
Min LSD 175.4		
Max LSD 202.3		
Stripper	2203.1	a
Spindle Picker	1198.8	b
LSD 428.3		

Means followed by the same letter are not significantly different.

There was no significant difference in weighing method between the whole trailer after each machine dump compared to bagging samples and weighing with a spring scale and tripod.

The method of harvest showed highly significant differences between the brush-roll stripper and once-over harvest with a spindle picker. At the two locations where valid comparisons were made the spindle picker in once-over picking picked 53 and 54% of the seed cotton weights compared to the stripper. In 1980 the cotton was severely drought stressed, causing "tight locks" and shattering as the spindle picker moved down the row.

Turnout data (lint percentage of field weights) are not yet available. Sixty or more pounds of seed cotton were taken from each test plot to the USDA Ginning Laboratory in Stoneville, MS. Lint samples from these field samples are to be delivered to Cotton Incorporated in Raleigh for spinning and dyeing tests. These data are expected to be included in a terminal report after three seasons of stripper experience.

The 1980 season was unusually hot and dry. Ranking of varieties in a single season is misleading. For example, Mo 73-1203 ranked first at Matthews and last at Senath. At Senath an estimated one-fourth of the seed cotton had dropped on the ground prior to harvest, probably due to drouth stress.

Plans are now being made to replace the cleaner unit mounted on the stripper for the 1981 season. The demonstrations will be repeated at four locations. A new test will be added in 1981 to compare methods of preparing the plant for harvest.

The series of brush-header cotton stripper harvester trials at UMC Delta Center on both 20" and 30" row spacings has been possible only through donations of a chassis with wheels, engine and transmission from International Harvester Corp. at the beginning of the series in 1974 and the donation of components by IHC at later dates; especially the furnishing of four single row header units in 1980. Reconstruction of these units into a field harvester has been supported by various Cotton Incorporated research contracts. The work has been carried out in UMC Delta Center shop under the direct supervision of W. D. Boon, Assistant Superintendent.

P L A N T P A T H O L O G Y

AL WRATHER

A major threat to soybean productivity in southeast Missouri is an unseen pest which lives below the ground. This is the Soybean Cyst Nematode (SCN) a microscopic worm that can cause tremendous damage to soybeans. This nematode feeds on soybean roots thus hampering or even destroying the plant's ability to absorb nutrients and water.

Losses of our soybean crop in the southern U.S. due to this pest are estimated by the Southern Soybean Disease Workers to be approximately 4% annually. In southeast Missouri the cyst nematode has caused up to a 10% loss of our crop in years past.

This pest will cause more damage in some fields than in others. Some growers, as a result will not lose any of their crop to SCN whereas others may lose 50% or more. The amount of damage done to a soybean crop by SCN will depend on the number of cysts in the soil, the vigor of the plants, soil fertility, soil moisture, soil type and a few other conditions.

Growers with an SCN problem have three control practices they can use; crop rotation, resistant varieties, and nematicides. A decision as to what type of control to use should be based on knowledge of the number and race of SCN cysts in your soil.

Dr. Baldwin, a plant pathologist at the Delta Center, has been evaluating the usefulness of crop rotation for control of SCN since 1974. The data in the following table is from his experiments and indicates that crop rotation is a useful SCN control technique.

The data shows that when soybeans are planted year after year the number of cysts in the soil goes up. When a non-host crop of SCN is planted one year the number of cysts in the soil goes down and when the non-host crop is planted two years in a row the numbers continue to decline. However, the population of cysts will increase the next time soybeans are planted. The goal is to rotate a field to non-host crops long enough for the cyst numbers to decline to a very low level at which they will not affect soybean yields.

Table 1. Influence of Crop Rotation on the SCN Population

Treatment	Crops 1979	Crops 1980	Cysts in Soil* May 1979	Cysts in Soil* Oct. 1979	Cysts in Soil* Oct. 1980
Continuous Beans	Beans	Beans	52	95	132
One Year without Soybeans	Cotton	Beans	45	9	128
Two Years without Soybeans	Cotton	Cotton	63	11	5

* Numbers of SCN cysts per 100 gm of soil (113 gm = 1/4 lb)

S O Y B E A N B R E E D I N G

S. C. ANAND
G. S. BRAR
T. E. FISHER
T. D. NEWMAN
P. E. HINKLIN
C. R. SHUMWAY

Soybean is the most important crop in the state of Missouri. Missouri ranks fourth in acreage and production in the country. The area under soybeans has been increasing rapidly in the past 20 years. The crop is worth more than 1.60 billion dollars and is the single most important commodity. Of the 5.5 million acres planted in the state in 1980, 1.20 million acres were in the seven southeastern counties.

Soybean varieties have been classified in ten maturity groups depending upon the day length. The earlier groups are adapted to longer day lengths in the north whereas the later maturity (V through VIII) are more suitable for the south. In northern areas of Missouri varieties belonging to maturity groups II and III are planted, whereas for the southern and southeastern region, varieties of maturity groups IV, V and VI are most suitable. Traditionally, varieties in maturity groups 0 - IV are indeterminate, on the other hand, later maturing varieties are determinate in growth habit. Consequently, both determinate and indeterminate varieties are planted in Missouri.

Soybean crop is attacked by several pathogens during the life cycle of the plant. Among the seedling and root diseases, charcoal rot, Rhizoctonia and phytophthora root rot are important. Other diseases which may cause economic losses to soybean crop in Missouri are pod and stem blight, bacterial blight, brown spot and downy mildew. In southeast Missouri, soybean cyst nematode is the most important pest which can cause almost complete loss to the crop. It is estimated that about 80% of the land in this area is infested with cyst nematodes. Thus, it is necessary to either grow resistant varieties or use nematicides to avert nematode losses. Race 3 of SCN was the most predominant one ten years ago. With the widespread use of race 3 resistant varieties, there was a gradual shift in cyst population. At present both races 3 and 4 are important. It is also likely that there are other races which have not yet been described.

OBJECTIVES IN SOYBEAN BREEDING

The objectives in soybean breeding are to develop varieties resistant to major diseases and nematodes, with desirable lodging and shattering resistance and adapted to southeastern region of Missouri.

The breeding procedure involves crossing between various soybean strains to combine desirable characters from different sources. The parents are selected on the basis of their yield performance,

adaptability, disease resistance and cyst nematode (SCN) resistance. Since resistance to SCN is the prime objective in the breeding program, the segregating progenies are subjected to rigorous selection for resistance. Individual plants are screened in the greenhouse by growing them in cyst infested soil. The progenies are also tested in the cyst nursery. The preliminary lines are yield tested in different soil types and also in SCN infested soil in southeast Missouri. The advance lines with superior performance are entered in the uniform group tests which are conducted at various locations in the country. This helps in identifying varieties with wide adaptability.

RELEASE OF A NEW CYST NEMATODE RESISTANT VARIETY

Missouri released 'Nathan' a new soybean variety resistant to race 4 of soybean cyst nematode. Prior to the release of 'Nathan', Bedford was the only variety resistant to race 4. Nathan which was tested under the designation J74-51, belongs to maturity group V and is about 7-8 days earlier than Bedford. Because of its earliness, it offers greater latitude for harvesting. Nathan is resistant to races 3 and 4 of SCN and has almost the same yield potential as that of Bedford. It is also resistant to two species of root knot nematodes and has field tolerance to phytophthora rot. Nathan is recommended for areas in southeast Missouri which have infestations of race 4 of SCN.

DEVELOPMENT OF CYST NEMATODE ON DIFFERENT SOYBEAN VARIETIES

Several varieties resistant to SCN race 3 have been developed and released. These included Custer, Dyer, Mack, Pickett, Forrest, Centennial, Franklin, and McNair 770. These varieties carried resistance from Peking. However, Peking is not resistant to race 4. PI 88788 which carries high degree of resistance to race 4 was the donor parent in the development of Bedford, Nathan and D75-10710. Of these, Bedford and Nathan have been released. D72-8927 derived its resistance apparently from Peking and PI 90763 and was selected primarily for resistance to race 2 (Personal communication with Dr. E. E. Hartwig).

Under greenhouse conditions, while screening against a mixture of SCN races, all the lines mentioned above show reproduction of at least few white females. This experiment was undertaken to study the rate of SCN population growth in the soil under several of these genotypes. The test was laid out in a randomized block design with four replications. The soil samples were taken after planting and at every 1 month intervals, about 5 cm away from the plants. One hundred grams of soil was washed with an elutriator and cyst counted with the help of a stero-scope. The data is presented on the following page.

EFFECT OF DIFFERENT GENOTYPES ON SCN POPULATIONS

Variety	Number of Cysts Per 100 Grams of Soil Date of Sampling June 1st	July 1st	Aug 1st	Sept 1st	Oct 1st	Yield B/A
Essex	9	12	40	232	175	26.2 cde
Forrest	6	6	11	40	88	34.8 a
Peking	10	6	9	45	34	31.2 abc
Bedford	5	6	7	18	30	29.1 b-e
Nathan	15	14	10	41	51	28.8 b-e
D75-10710	7	10	7	9	25	25.2 de
D72-8927	12	17	20	43	75	23.6 e
Bedford 70%-Forrest 30%	10	10	18	58	54	30.6 a-d
Mean	7	10	15	61	66	

Date of Planting 5-28-80

During the first 2 months, there was only a slight increase in SCN population. This was probably due to the severe hot and dry weather prevailing during 1980. The population increased tremendously between August 1 and September 1. Maximum increase of SCN population was observed under Essex, which is a susceptible variety. Peking, Bedford and Nathan gave almost similar response. The higher population under Nathan may be due to the presence of more cyst in the soil to start with. D75-10710 showed fewer cysts whereas, D72-8972 had more cysts compared with that of Bedford. A mixture of 70% Bedford and 30% Forrest gave intermediate response to the two varieties.

SHIFT IN CYST NEMATODE POPULATION

The cultivation of a resistant soybean variety puts a selection pressure on SCN population in the soil. If a variety is resistant to a particular race of the pathogen, that race tends to decrease, however the other races to which the variety is not resistant tend to increase. This was observed in case of cultivation of race 3 resistant varieties where a rapid increase in race 4 was noticed. To test its validity in case of race 4, soil samples were collected from fields with different history of variety cultivation. They were screened against several standard differentials and other R lines. In the Clarkton soil, Essex was grown for the last two years (1979 and 1980), Sikeston soil had Bedford in 1979 and Forrest in 1980, whereas Kewanee had Bedford in 1979 and 1980. One plant was grown in a 7½ cm pot in each soil and the number of cysts (white females) were washed and separated from the roots 30 days after planting. The cysts were counted with the help of a stereo-scope. There were 3-5 replications for each line. The data is presented in the table on the following page.

	Number of Cysts Per Plant					
	Source of Soil					
	Clarkton		Sikeston		Kewanee	
		% of Essex		% of Essex		% of Essex
Essex	114	100	283	100	27	100
Forrest	104	91	242	85	15	55
Peking	41	36	67	31	3	11
Bedford	12	10	53	19	12	44
88788	8	7	21	7	10	37
89772	35	31	31	11	05	2
90763	21	18	35	12	1	4
87631-1	10	9	32	11	12	44
209332	12	10	17	6	12	44
Cloud	82	72	94	33	20	74
416762	--	--	20	7	--	--

The number of cysts per plant on Essex (susceptible check) varied considerably. This was due to the presence of different number of cysts in each soil sample. Forrest, which carries genes for resistance from Peking, always had a higher count which indicated that Peking has some additional genes for resistance. Based on the cyst count, Bedford has almost same degree of resistance to SCN as PI 88788. The Clarkton data showed that PI 89772 and PI 90763 were less resistant whereas, Kewanee data indicated these two lines to be more resistant compared with PI 88788. It is likely that planting of Bedford two years in a row increased the frequencies of pathotypes virulent on it. It seems that PI 89772 and PI 90763 carry greater degree of resistance to those pathotypes which reproduce on Bedford or PI 88788. PI 87631-1 and PI 209332 showed response similar to that of PI 88788. Cloud was more susceptible than other lines.

INSECT RESISTANCE IN HYBRID COTTON

WALTON MULLINS
MARTIN GALLAHER

The primary objective of programs on insect resistance in crop plants is to develop cultivars that are resistant to an insect while maintaining or improving their basic agronomic characteristics. One of the problems facing the plant breeder-entomologist is the incorporation of insect resistant traits into an agronomically acceptable, high-yielding variety. Unfortunately, many of these desirable insect resistant traits appear to be genetically linked to low-yielding and other undesirable characteristics in the strains in which these traits have been identified. The traditional process of incorporation of resistant characters into agronomically acceptable varieties consequently has been slow and tedious, if not futile. A new approach is feasible.

As a result of heterosis, hybrid cottons have been shown in most cases to produce higher yields than either of the parent lines from which the hybrids are produced. Similar to corn, hybrid cotton may potentially be used to tailor varieties and fiber to meet changing environmental conditions and market demands. Discovery of inherant traits for cytoplasmic male sterility, chemical induction of male sterility, and genes for restoration of pollen fertility make possible hybrid cotton development. The ability to tailor cotton varieties by production of commercial hybrids offers several potential advantages:

1. Higher yield potential (5-30%)
2. Superior seed quality
3. Superior seedling and plant vigor
4. Tremendously less time for development of new varieties possessing traits for immediate demand:

    a) fiber quality
    b) desired plant morphology
    c) diseases and insect resistance

Dr. W. P. Sappenfield (Cotton Breeder, Department of Agronomy, Delta Center) has initiated a program to investigate the agronomic potential of hybrid cotton particularly suited to southeast Missouri growing conditions. Only a few other cotton breeders are conducting research on hybrid cottons. The hybrid approach to breeding for insect resistant cotton plants has not been investigated.

RELEVANCE TO MISSOURI

Commercial hybrid cotton production is dependent on active insect pollinators for cross-pollination to occur. Because most effective

insect pollinators are susceptible to currently used insecticides, a season-long insecticide-free environment must be provided for hybrid seed production. There are only three areas in the cotton belt that approach this type of environment, the High Plains of Texas, Arizona-New Mexico and the Bootheel of Missouri. Hybrid seed production in southeast Missouri would benefit not only local cotton producers, but may possibly serve as a source of hybrid seed to those areas that could not produce it. The research will focus on three primary objectives:

1. Determine which insect resistant traits or combinations of traits can be combined in a cotton hybrid and which parents containing these traits demonstrate the best combining abilities to produce the most productive and agronomically acceptable F_1 hybrids.

2. Determine the insect resistant quality of the hybrids and how it relates to the resistant qualities of the parents.

3. Determine the nature of resistance and the effect of the cotton hybrids on pest insect biology and bionomics.

EVALUATION OF COTTON LINES FOR RESISTANCE TO THE BOLLWORM

Insect resistant cotton varieties will ultimately lessen our dependence on insecticides for insect control and consequently reduce the cost of production. Currently, 25 lines with a variety of resistant traits are being evaluated for bollworm resistance and general agronomic quality. Bollworm resistance is being evaluated under three different regimes: heavy bollworm pressure, natural infestation and no bollworm pressure. Heavy bollworm pressure is being simulated by inoculating the plants weekly with approximately ten bollworm larvae per row foot. Insecticides will be sprayed in 1/3 of the plots to prevent establishment of bollworms. Yields will be compared among the heavy, natural and zero bollworm pressure treatments.

INSECTICIDE TESTING

Insecticide use will remain a vital component of insect control strategies for some time and it is clearly evident that we should learn to use them more sensibly and effectively. New insecticides and new uses for old insecticides become available every year and

their applicability to southeast Missouri's crop production systems must be tested. Consequently, commercial and candidate insecticides will be compared with standard materials as to their effectiveness in controlling insect pests in cotton, soybeans and alfalfa. Factors such as rates, methods of application, treatment intervals, formulation, selectivity, persistence, effects on beneficial insects and interaction with other control practices will be investigated to determine their utility in an integrated control system. Studies are currently being conducted to test the use of some available insecticides at low rates to selectively control plant bug populations in cotton while leaving the beneficial populations unharmed. Some of the newer insecticides will be tested at various rates this year for their effectiveness in cotton and soybeans for bollworm-podworm control. Seed treatment tests are also being conducted in cotton and soybeans for thrips and other early season insect-pest control.

SOYBEAN PODWORM THRESHOLDS IN SOYBEANS

The soybean podworm, Heliothis zea, is the most destructive insect pest on soybeans in southeast Missouri. Population levels of H. zea in soybeans fluctuate from year to year and problems are sporadic and localized, however, infestations can often become uniform and widespread. Economic threshold values (level of pests at which control measures become economical) established by neighboring states range from .5 to 3 larvae per row foot. The current threshold in Missouri is 3 larvae per row foot. There is a strong contention among entomologists in southeast Missouri that soybean plants can withstand more than one larva per foot without yield loss. Results from threshold studies in other states in general have been inconsistant and inconclusive, and the applicability of such works to southeast Missouri's 1.25 million acres of soybeans is uncertain. Consequently, threshold research has been initiated in 1981. The research will have two primary objectives: to determine the influence of various infestation levels of H. zea on soybean yield for the purpose of establishing an economic threshold, and to investigate the effect of date of planting and row spacing on the levels of podworm populations in soybeans and possible implications on podworm threshold values.

W E E D R E S E A R C H

HAROLD KERR
DAVID GUETHLE
PAMELA SWIMS
CHRIS HON

TRAE1L81 - Controlling Grass in NOTILL Soybeans after Wheat

Treatments

OTS in Early May in Standing Wheat

1.	Surflan	1	lb ai/acre
2.	Lasso	2	lb ai/acre
3.	Dual 6E	2	lb ai/acre
4.	Prowl	.8	lb ai/acre
5.	Surflan	1.25	lb ai/acre
6.	Surflan	2.5	lb ai/acre
7.	Lorox + Surflan	1 lb ai + 1.25	lb ai/acre
8.	Modown + Surflan	1.5 lb ai + 1.25	lb ai/acre
9.	MC10108 + Surflan	1 lb ai + 1.25	lb ai/acre
10.	Sencor + Surflan	.5 lb ai + 1.25	lb ai/acre

PRE-(+ Paraquate, 1 qt + surfactant - after planting)

11.	Surflan	1.25	lb ai/acre
12.	Lasso	2	lb ai/acre
13.	Dual 6E	2	lb ai/acre
14.	Prowl	.8	lb ai/acre
15.	Surflan + Sencor	1.25 lb ai + .5	lb ai/acre
16.	Surflan + Lorox	1.25 lb ai + 1	lb ai/acre
17.	Surflan + Modown	1.25 lb ai + 1.5	lb ai/acre
18.	Surflan + MC10108	1.25 lb ai + 1	lb ai/acre
19.	Surflan + Goal	1.25 lb ai + .5	lb ai/acre
20.	Check		

SOHA1L81 - Controlling Johnsongrass for Cotton and Soybean Production

Treatments

Crops	Row Spacings	Herbicides	Rate a.i./Acre
1) Cotton	1) 38"	1) Fusilade	.25
2) Soybeans	2) 7"		.38
			.50
			.75
		2) Poast	.25
			.38
			.50
			.75
		3) Treflan	2X
		4) Tolban	2X
		5) Basalin	2X
		6) Prowl	2X

SOHA2L80 Postemerge Control of Johnsongrass in Soybeans

	Key to Treatment	ai Dosage dg/are	% CIR	Johnsongrass % Control	Johnsongrass Clumps/m^2	Soybean Yield KG/HA
1	KK-80 + X-77	28 + .25%	2 cd	72 a-d	4 ab	1924 a-d
2	KK-80	28	7 bc	48 c-f	4.3 ab	1575 b-e
3	KK-80	56	3 cd	41 def	1.5 ab	1468 cde
4	KK-80	84	0.5 d	81 abc	1.8 ab	1931 a-d
5	KK-80	112	5 cd	72 abc	1 ab	2133 abc
6	KK-80	140	1 d	68 a-d	1.5 ab	1837 a-e
7	KK-80	168	1 d	85 ab	0 b	2398 abc
8	BAS-9052 + O.C. (Poast)	34	0 d	91 a	0 b	2283 abc
9	BAS-9052 + O.C. (Poast)	45	1 d	94 a	0 b	2401 abc
10	BAS-9052 + O.C. (Poast)	56	0 d	96 a	0 b	2642 ab
11	CGA-82725	28	1 d	86 ab	0 b	2722 a
12	CGA-82725	56	3 cd	71 a-d	1.8 ab	2157 abc
13	CGA-82725	84	1 d	93 a	0 b	2677 ab
14	CGA-82725 + Basagran	28 + 84	3 cd	82 abc	0 b	2513 ab
15	CGA-82725 + Basagran	56 + 84	5 cd	53 b-e	1.5 ab	2151 abc
16	CGA-82725 + Basagran	84 + 84	1 d	82 abc	0 b	2300 abc
17	Vistar	84	13 a	40 def	6.3 a	1195 def
18	Vistar	112	11 ab	39 def	6.3 a	1039 def
19	Roundup "Rope Wick"	2 H_2O/1	2 cd	14 f	6.3 a	418 f
20	Check	------	0.4 d	25 ef	5 ab	969 ef

Multiply dg/are by .00893 to get Lb/A.

%CIR = percent crop injury.

% Control = visual rating of johnsongrass control.

Clumps/m^2 = johnsongrass clumps counted in a 3x6 dm frame, 4 counts per plot after soybean harvest.

Means followed by the same letter are not significantly different at the 5 percent level by Duncan's Multiple Range Test.

GLMA1L80 Yields of Wheat after Overtop Sprays to Control Grass in Soybeans Following Hart Wheat

Key to Treatment		ai Dosage dg/are	Yield Treated	Yield Untreated
1	Surflan	112	3666 ab	3624 ab
2	Surflan	140	3750 ab	3624 ab
3	Surflan	168	3652 ab	3624 ab
4	Surflan + Sencor	112 + 56	3137 bc	3768 ab
5	Surflan + Sencor	140 + 56	3053 c	3847 a
6	Surflan + Sencor	168 + 56	3011 c	3820 a
7	Lasso	224	3373 abc	3945 a
8	Lasso + Sencor	224 + 56	2314 c	3847 a
9	Modown	224	3360 abc	3638 ab
10	Dual + Sencor	168 + 56	2189 c	3624 ab
11	Dual	168	3276 abc	3652 ab
15	Check	---	3597 ab	3638 ab
16	PPG-844	14	2955 c	3499 ab
17	PPG-844	21	3220 abc	3945 a
18	PPG-844	28	3109 c	3764 a
19	PPG-224	56	2997 c	3847 a
20	PPG-224	112	2872 c	3820 a

Multiply dg/are by .00893 to get Lb/A.

Means followed by the same letter are not significantly different at the 5 percent level by Duncan's Multiple Range Test.

Each plot was of treated for 1/2 the plot and the other 1/2 plot was untreated.

TRVU0180 Effect of Early Spring Applications of Herbicides to Winter Wheat

	Key to Treatment	ai Dosage dg/are	Yield KG/HA April 21	Yield KG/HA May 21
1	Surflan	168	3481 abc	3835 abc
2	Prowl	92	3758 a	3871 abc
3	Lasso	224	3655 abc	3958 a
4	Dual 8E	224	3933 a	3691 abc
5	2,4-D Amine	56	3722 ab	3599 abc
6	2,4-D Amine	84	3640 abc	3794 abc
7	2,4-D Amine	112	3645 abc	3810 abc
8	2,4-D Ester LV	56	3542 abc	3907 abc
9	2,4-D Ester LV	84	3419 abc	3923 ab
10	2,4-D Ester LV	112	3393 abc	3234 c
11	2,4-D Ester OS	84	3532 abc	3635 abc
12	Surflan	112	3594 abc	3748 abc
13	Surflan	140	3620 abc	3778 abc
14	Surflan + Sencor	140 + 56	3157 bcd	3250 bc
15	Surflan + Sencor	140 + 84	2721 de	3265 bc
16	Surflan + 2,4-D Amine	140 + 56	3147 cd	3373 abc
17	Surflan + 2,4-D Amine	140 + 84	3532 abc	3496 abc
18	Sencor	56	2474 e	3702 abc
19	Sencor	84	2608 e	3291 abc
20	Untreated	---	3897 a	3912 abc

2,4-D treatments were not applied after April 21, 1980.

Multiply dg/are by .00893 to get Lb/A.

Means followed by the same letter are not significantly different at the 5 percent level of error probability by the Duncan's Multiple Range Test.

S H O R T - S E A S O N C O T T O N P R O D U C T I O N
F O R
S O U T H E A S T M I S S O U R I

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Production of any crop must return profits. Short-season cotton production could return more dollars per acre than presently followed production practices and systems.

The benefits of successful short-season cotton production could be:

1. Maximum $$$$ returns
2. Minimum cost inputs
3. Minimum production hazards
4. Higher per acre yields, more consistant year-to-year production

SHORT-SEASON PRODUCTION SYSTEM

There are two concepts of short-season production:

TEXAS CONCEPT (in Texas)

PLANT EARLY -- HARVEST EARLY

1. Short-season varieties
2. Reduced cultural requirements
3. Reduced number of irrigations
4. Reduced insect control needs

MISSOURI CONCEPT (north Delta and southeast Missouri)

DELAYED PLANTING (after May 15) -- NORMAL HARVEST DATE (October)

1. Short-season varieties
2. Avoid early planting and early season hazards of:
   a. Seedling diseases
   b. Chilled seedlings
   c. Poor stands
   d. Low vigor-slow growth
3. Reduced boll rot potential
4. Early maturity

5. High Yield potential
6. Once-over harvest
   a. Standard row-width (38") = spindle picker
   b. Narrow rows (30") = brush strippers

POTENTIALS IN SHORT-SEASON PRODUCTION SYSTEMS FOR COTTON are evident in research data acquired over more than 15 years, 1965 to 1980, and involving varieties, date-of-planting studies, variable row widths, variable within row plant populations and different soils.

Table 1. 20" vs 38" Rows and HYC 72-234, a Short-Season Cotton

	Average Lint Lbs/Acre		
	Total	1st Pick	
38"	678	538	
20"	*788	*788	"Once-Over" Brush Stripper
HYC 72-234 (20" rows)	*960	*960	Brush Stripper
Deltapine 16 (20" rows)	633	633	Brush Stripper
Deltapine 16 (38" rows)	566	*398	Spindle Picker

Loam Soil: Date Planted - May 13: 1st Pick - October 13: 2nd Pick - November 27: 10 varieties - variable maturity

Table 2. 20" vs 38" Rows and Averages for Variable Varieties on Loam and Clay Soil, 1978.

25 Experimental Varieties and Strains Planted May 16

	Loam	Clay
Average - 20" rows	629	*776
Average - 38" rows	619	521
McNair 235 - 20" rows	825	*991
McNair 235 - 38" rows	779	621
Stoneville 213 - 20" rows	757	*740
Stoneville 213 - 38" rows	846	601

Table 3. Potentials of Short-Season Varieties in Delayed Plantings with Irrigation, 1979.

	(Pounds Lint Per Acre) Planted	
	May 8	May 30
Stoneville 825	----	1062
McNair 235	1084	993
Stoneville 213	993	891
Mo 63-277 1B	1177	1083
Delcot 311	1151	1023
CAMD-E	944	937
Mo 73-1203	----	*1194
HYC 77-43	----	*1229

Loam (38"); Irrigated 7/24 alternate rows; 8/9 both rows

Table 4. Performance of Early, Intermediate and Late-Maturing Cotton Varieties Planted at Different Dates in Southeast, Missouri, 1965-67.

Date Planted and Variety	Total Lint (Lbs/Acre) 1965	1966	1967	Average
April 21				
Auburn M	----	----	684	----
Deltapine 45A	----	----	638	----
Stoneville 7A	----	----	493	----
Average	----	----	605	----
April 29-May 6				
Auburn M	1196	1000	826	1051
Deltapine 45A	1218	1045	704	989
Stoneville 7A	1276	929	645	950
Average	1264	991	725	993
May 8-10				
Auburn M	1351	1083	748	1061
Deltapine 45A	1394	1073	695	1054
Stoneville 7A	1360	880	601	947
Average	1368	1012	681	1021
May 17-20				
Auburn M	1206	1118	782	*1035
Deltapine 45A	1268	912	547	909
Stoneville 7A	1328	594	486	803
Average	1268	875	605	916
May 30-June 2				
Auburn M	1221	473	394	696
Deltapine 45A	1069	277	252	533
Stoneville 7A	1073	121	230	475
Average	1122	290	292	568
June 9-10				
Auburn M	841	0	0	280
Deltapine 45A	598	0	0	199
Stoneville 7A	479	0	0	160
Average	640	0	0	213

Table 4a. Average Lint Yields for Varieties in All Date-of-Planting, 1965-67.

Variety	Lint Yield (Lbs/Acre) 1st Picking 1965	1966	1967	Avg	Total 1965	1966	1967	Avg
Auburn M	1031 a	778 a	593 a	801	1183 a	918 a	687 a	*929
Deltapine 45A	913 b	639 b	452 b	668	1109 b	827 b	567 b	834
Stoneville 7A	885 b	427 c	373 c	564	1104 b	732 c	491 c	776

Auburn M - early to very early-maturing and determinate (short-season)
Deltapine 45A - intermediate to early-maturing and semi-determinate to indeterminate (intermediate)
Stoneville 7A - intermediate to late-maturing and indeterminate (full-season)

Table 5. Lint Cotton Yields for Four Cotton Varieties of Variable Maturity Planted on Three Dates at Four Seeding Rates on Sandy Loam Soil, Portageville, MO 1979.

Variety or Strain	Method & Seeding Rate No. Seed	No. Plants[2]	Dates of Planting: May 2	May 11	May 18	Rates[3] X	Variety[4] X	Rates[5] X
			Lbs Lint/Acre					
Delcot 311 (Mo 74-944)	Drilled 10-12/ft[1]	7.3 ab	996 e-1	939 k1	991 f-1	975 d		
	" 5- 6/ft[1]	3.1 c	1187 a	1068 a-j	1082 a-i	1112 a		
	HD 5-6/ 12-14"[1]	3.0 c	1083 a-i	1022 c-1	1062 a-k	1056 ab		
	HD 5-6/ 18-20"[1]	2.2 de	1029 c-1	1058 b-1	1100 ab	1063 ab		
	X	3.9 a	1074 abc[7]	1022 cde[7]	1059 bcd[7]		1051 a	
Mo 63-277 1B	Drilled 10-12/ft	7.1 ab	1120 a-e	1027 c-1	1092 a-h	1080 ab		
	" 5- 6/ft	2.8 cd	1006 d-1	1016 c-1	1135 abc	1052 abc		
	HD 5-6/ 12-14"	2.9 c	1075 a-j	1070 a-j	1180 ab	1108 a		
	HD 5-6/ 18-20"	2.1 e	1039 c-1	1078 a-j	1067 a-j	1061 ab		
	X	3.7 ab	1060 bcd	1048 cde	*1118 a		1075 a	
Mo 63-2776	Drilled 10-12/ft	6.7 b	1051 c-1	1029 c-1	1092 a-h	1057 ab		
	" 5- 6/ft	2.5 cde	1008 c-1	1130 a-d	1110 a-g	1083 ab		
	HD 5-6/ 12-14"	2.8 c	1023 c-1	1074 a-j	1119 a-f	1072 ab		
	HD 5-6/ 18-20"	2.1 e	1070 a-j	1091 a-h	1117 a-g	1093 a		
	X	3.5 b	1038 cde	1076 abc	*1115 ab		1076 a	
Stoneville 213	Drilled 10-12/ft	7.7 a	978 h-1	955 i-1	1034 c-1	989 cd		
	" 5- 6/ft	2.8 cd	1093 a-h	961 i-1	996 e-1	1016 bcd		
	HD 5-6/ 12-14"	3.0 c	934 1	952 jk1	989 g-1	958 d		
	HD 5-6/ 18-20"	2.0 e	1004 d-1	935 k1	956 i-1	965 d		
	X	3.9 a	1002 def	951 f	994 ef		982 b	
	Dates of Planting[6] X		1043 a	1024 a	1071 a			
	Rates[5] X Drilled 10-12 seed/ft (7.2 plants/ft)							1025 b
	Drilled 5- 6 seed/ft (2.9 plants/ft)							1066 a
	Hill Dropped 5-6 seed/12-14" (2.8 plants/ft)							1049 ab
	Hill Dropped 5-6 seed/18-20" (2.1 plants/ft)							1045 ab

1/ Seeding rate at planting
2/ Average number surviving plants, combining dates
3/ For rates by variety combining dates
4/ For variety combining dates and rates
5/ For rates combining varieties and dates
6/ Yields by dates combining varieties and rates
7/ Yields by variety and dates combining rates

Although the highest yield recorded was for Delcot 311 when planted May 2, consistant and equally high lint yields were produced by the short season strains Mo 63-277 1B and Mo 63-2776, planted May 18; two weeks later, thus shortening the season.

Table 6. Total Lint Cotton Yields for Five Cotton Varieties of Variable Maturity, Planted on Five Dates at Four Seeding Rates on Sandy Loam Soil, Portageville, MO 1980.

Variety or Strain	Method and Seeding Rate No. Seed	Dates of Planting: April 22	May 1	May 9	May 20	May 29	Rates[2]	Variety[3]	Rates[4]
		Total Lint - Lbs/Acre							
Stoneville 213 (Full-Season)	Drill 10-12/'[1]	933	986	976	1016	878	958		
	" 5- 6/'[1]	953	1132	1008	1115	1043	1050		
	HD 5-6/12-14"[1]	1164	1098	1053	1162	1089	1113		
	HD 5-6/12-14"[1]	1174	1079	1076	1131	1015	1095		
	$\bar{X}$[6]	1056	1074	1028	1106	1006		1054	
Delcot 311 (Full-Season)	Drill 10-12/'	1035	1015	1010	1001	974	1007		
	" 5- 6/'	1000	1096	1090	1082	961	1045		
	HD 5-6/12-14"	1000	1082	1090	1007	947	1025		
	HD 5-6/18-20"	1082	1104	942	962	889	996		
	$\bar{X}$[6]	1022	1073	1033	1013	943		1018	
Mo 73-1203 (Short-Season)	Drill 10-12/'	1023	799	832	907	957	904		
	" 5- 6/'	809	876	910	938	974	902		
	HD 5-6/12-14"	853	910	920	1055	923			
	HD 5-6/18-20"	878	893	886	1062	932	930		
	$\bar{X}$[6]	891	869	887	990	936		915	
HYC 76-59 (Short-Season)	Drill 10-12/'	930	909	932	979	836	917		
	" 5- 6/'	1078	1061	983	1125	900	1030		
	HD 5-6/12-14"	1017	1037	951	995	991	998		
	HD 5-6/18-20"	1080	1041	1113	1050	1048	1066		
	$\bar{X}$[6]	1026	1012	985	1037	944		1003	
CAMD-E (Ultra-Short-Season)	Drill 10-12/'	830	742	708	770	861	782		
	" 5- 6/'	919	765	750	860	926	844		
	HD 5-6/12-14"	802	775	801	881	915	835		
	HD 5-6/18-20"	796	764	801	857	854	815		
	$\bar{X}$[6]	837	761	765	842	889		819	
Dates of Planting[5] $\bar{X}$		968	958	942	*998	943			

Rates[4] $\bar{X}$

Drilled 10-12 seed/ft (7.2 plants/ft)	914
Drilled 5- 6 seed/ft (2.9 plants/ft)	974
Hill Dropped 5-6 seed/12-14" (2.8 plants/hill)	979
Hill Dropped 5-6 seed/18-20" (2.1 plants/hill)	980

1/ Seeding rate at planting
2/ For rates by variety combining dates 56*
3/ For variety combining dates and rates 28*
4/ For rates combining varieties and dates 34*
5/ Yields by dates combining varieties and rates 37*
6/ Yields by variety and dates combining rates 63*

*LSD (.05)

Table 7. Lint Yields for Seeding Rates Combining Five Varieties Planted on Five Different Dates on Sandy Loam Soil, Portageville, MO 1980.

	Dates of Planting					
	April 22	May 1	May 9	May 20	May 29	
	Total Lint - Lbs/Acre					Average
Drill 10-12/ft (7.2 plants)	950	890	892	934	901	914
Drill 5-6/ft (2.9 plants)	952	985	948	1024	*974	*974
Hill Drop 5-6/12-14" (2.8 plants)	967	980	963	1020	964	*979
Hill Drop 5-6/18-20" (2.1 plants)	1002	976	964	1012	948	*980
Average	968	958	942	*998	943	

LSD (.05) = 77 lbs

The very hot and dry season of 1980 was not typical for southeast Missouri. The full-season varieties, Stoneville 213 and Delcot 311 produced generally higher yields than Mo 73-1203, a short-season type and the very early CAMD-E. However, HYC 76-59, also a short-season cotton produced top yields. Overall, planting made May 20 produced higher yields than those made May 1 and May 29 and were equal to or greater than those made April 22 - nearly 30 days shorter season. The short-season varieties tended to produce higher yields in late plantings than in early plantings. However, HYC 76-59 produced rather consistantly at all dates as did Delcot 311 (except May 29) and Stoneville 213.

Stoneville 213 tended to exhibit sensitivity toward thick within-row plant populations, also a general trend among all varieties but some appear less sensitive than others.

Table 8. Total Lint Cotton Yields for Five Cotton Varieties of Variable Maturity, Planted on Two Dates on Two Row Widths on Sandy Loam Soil, Portageville, MO, 1980

Variety or Strain		Dates of Planting May 1	May 27	R.W.[2]	Variety[3]	R.W.[4]
		Total Lint-Lbs/A				
Stoneville 213	RW 38"[1]	890 cde	955 cd	922 bc		
(Full-Season)	RW 30"[1]	989 bc	1063 ab	1026 a		
	X[6]	939 b	1009 a		974 a[7]	
Delcot 311	RW 38"	852 de	943 cd	897 cd		
(Full-Season)	RW 30"	855 de	1092 a	974 ab		
	X[6]	853 c	1017 a		935 a	
Mo 73-1203	RW 38"	595 g	706 f	651 f		
(Short-Season)	RW 30"	696 fg	708 f	702 ef		
	X[6]	646 e	707 de		677 c	
Mo 76-59	RW 38"	819 e	870 de	845 d		
(Short-Season)	RW 30"	837 e	902 cde	869 cd		
	X[6]	828 c	886 bc		857 b	
CAMD-E	RW 38"	658 fg	695 fg	676 ef		
(Ultra Short-Season)	RW 30"	643 fg	819 e	731 e		
	X[6]	651 e	757 d		704 c	

Table 8 continued

		May 1	May 27	R.W.[4]
Dates of Plantings[5]		783 b	*875 a	
Row Widths[4]	RW 38"			798 b
	RW 30"			*860 a

1/ Row width at planting
2/ For row widths by variety combining dates
3/ For variety combining dates and row widths
4/ For row widths combining varieties and dates
5/ Yields by dates combining varieties and row widths
6/ Yields by variety and dates combining row widths
7/ Lint yields followed by the same letter are not significantly different

May 27 plantings in this test, Portageville, 1980, produced higher lint yields than plantings made May 1. Full-season varieties, Stoneville 213 and Delcot 311, produced the best yields. The poor yields of Mo 73-1203 was attributed to low storm resistance and excessive dropping of seed cotton prior to harvest. The 30" row plantings produced higher lint yields than 38" rows.

Table 9. Total Lint Cotton Yields for Five Cotton Varieties of Variable Maturity Planted on Two Dates on Two Row Widths on Sandy Soil, Lightly Infested with the Fusarium Wilt Root Knot Disease Complex, Clarkton, MO, 1980.

Variety or Strain		Dates of Planting May 1 Total Lint-Lbs/A	May	R.W.[2]	Variety[3]	R.W.[4]
Stoneville 213	RW 38"[1]	976 ab	776 bcd	876 abc		
(Full-Season)	RW 30"[1]	944 abc	918 a-d	931 ab		
	X[6]	960 a	847 abc		904 a	
Delcot 311	RW 38"	853 a-d	827 a-d	840 abc		
(Full-Season)	RW 30"	1057 a	897 a-d	977 a		
	X[6]	955 ab	862 abc		909 a	
Mo 73-1203	RW 38"	737 bcd	853 a-d	795 bc		
(Short-Season)	RW 30"	762 bcd	709 cd	736 c		
	X[6]	749 cd	781 bcd		765 b	
Mo 76-59	RW 38"	842 a-d	891 a-d	866 abc		
(Short-Season)	RW 30"	864 a-d	786 bcd	825 abc		
	X[6]	853 abc	838 a-d		846 ab	
CAMD-E	RW 38"	667 d	747 bcd	707 c		
(Short-Season)	RW 30"	672 d	846 a-d	759 bc		
	X[6]	669 d	796 a-d		733 b	
Dates of Planting[5]		837 a	825 a			
Row Widths[4]	RW 38"					817 a
	RW 30"					846 a

1/ Row width at planting
2/ For row widths by variety combining dates
3/ For variety combining dates and row widths
4/ For row widths combining varieties and dates
5/ Yields by dates combining varieties and row widths
6/ Yields by variety and dates combining row widths

At Clarkton, on sand during 1980, full-season varieties also produced the highest yields but Mo 76-59 (HYC76-59) approached their yield. Mo 73-1203 was a victim of season and ground loss of seed cotton while CAMD-E appeared entirely too determinate and sacrificed yield for earliness. May 1 plantings and May 27 plantings produced similar yields. Full-season varieties tended to produce less in late plantings while short-season varieties (except Mo 76-59) were favored when planted later than normal. The 38" and 30" row widths produced similar yields.

Table 10. Average Lint Cotton Yields for Five Varieties Grown in 30 and 38" rows on Sand and Sandy Loam Soil, Planted May 1 and May 27, 1980.

	38"		30"		
	Portageville	Rhodes	Portageville	Rhodes	Average
Date 1 (May 1)	763	815	804	860	811
Date 2 (May 27)	834	819	916	831	*850
Average	799	817	860	846	
Avg (2 locations)	808		*853		

Combining yield data from the two locations, Portageville and Clarkton, the 30" rows produced greater yields than 38" rows and delayed plantings produced more lint than early plantings.

SUMMARY, IMPLICATIONS AND SUGGESTIONS

1. Healthy stands make the most cotton.

2. Healthy stands result more consistantly in plantings made after May 15.

3. Healthy stands in delayed plantings more consistantly produce the highest lint yields probably with less cost inputs.

4. Thick stands of full-season varieties often result in reduced yields.

5. Short-season varieties appear less sensitive to thick stands.

6. Short-season varieties in delayed plantings produce yields equal to or better than full-season varieties planted early.

7. 30" row cotton culture likely will produce consistantly higher yields than 38" row plantings and conform to 30" culture of beans, corn, grain sorghum, etc. (Something to think about for the future.

8. 30" row culture of short-season varieties in delayed plantings, irrigated if needed, and harvested once-over during October may be the production system for future good profits from cotton????

KEYS TO SUCCESSFUL PRODUCTION OF SHORT-SEASON COTTON IN MISSOURI

S O M E S U G G E S T I O N S

1. VARIETY:

   Stoneville 825
   McNair 235
   DES 56
   Coker 304
   Deltapine 41
   *Tamcot CAMD-E (Sikeston Ridge)
   Stoneville 506
   **Delcot 311 (clay soils)

   * Grow where cotton frequently is too rank

   ** Grow where cotton frequently is too short

2. LAND PREPARATION:

   Soil Tests: Phosphorous+Potash+Starter Nitrogen (if needed)

   Seedbed = Beds

3. PLANTING:

   May 10-20 (June 1??)
   Beds: Warmer soil
   High quality seed
   Seed treatment
   In-furrow fungicides
   Warm soil - quick emergence
   Fast grow off - healthy plants

4. PLANTING RATE: Reduced

   Sandy and Loam Soils (Drill or Hill Drop)
   5-6 good seed = 2-4 good plants per row foot

   Clay Soil (Drill)
   7-8 good seed = 3-4 plants per row foot

   Stands too thick = reduced yields

5. WEED CONTROL:

   Herbicide selection = kind of weeds and soil type
   Shallow incorporation (2")
   Postemergence herbicides = directed
   "Overtop" application = NO!! (except as salvage)
   Shallow cultivation = avoid late and/or deep cultivation (root pruning)

6. FERTILIZATION:

Soil Tests: Preplant fertilizer (Phosphorous-Potash + starter nitrogen)

Nitrogen: Caution (Minimum necessary amount)

Soil Test: Nitrate-nitrogen early-mid June
Sidedress or plow in 10-14 days prior to 1st bloom

7. GROWTH REGULATORS:

To control excessive vegetative growth if necessary or anticipated

8. INSECT MANAGEMENT:

Scouting field (begin early)
Recognize insect damage
Plant bugs - easily overlooked

9. IRRIGATION:

First application: after fruiting begins (except dry seasons)
Moisture Stress Sign:
Wilting mid-day: Short moisture
Dull, gray cast of plants
Wilting before noon
Blooms in top 1/3 of plants

10. DEFOLIATION: (if needed)

Mature top bolls
Bottom defoliation: reduce boll rot, early harvest, seed production

11. HARVESTING:

Dry cotton
Minimum trailer time (especially for seed crops)

DELTA REGIONAL SOIL TESTING LABORATORY

DON BACKFISCH, LABORATORY SUPERVISOR
JEANNIE YOUNG, LABORATORY TECHNICIAN
JEWELL STAFFORD, LABORATORY TECHNICIAN

Price List of Services Available

Routine Soil Test	$ 4.00
Zinc Soil Test	$ 2.00
Micronutrient Soil Test	$11.00
Nitrate-Nitrogen (Soil or plant)	$ 4.00
Plant Analysis	$14.00
Plant Analysis with Sulfur	$15.75
Pesticide Residue	
Fertilizer Analysis	
Cotton Nitrate Monitoring	$25.00/field
21" Hoffer Soil Probe	$10.00
36" Hoffer Soil Probe	$30.00

Soil Boxes and information sheets available at Lab.

1981 VEGETABLE RESEARCH

V. N. LAMBETH
HENRY DICARLO

National and Regional Trials of advanced breeding lines of watermelons, sweet potatoes and southern peas were conducted in 1980 and are reported herein. Because of budgetary restraints, the research on sweet potato, processing tomatoes and field peas was discontinued this year at the Delta Center. The most promising processing tomato lines from the 1980 planting are being evaluated this summer at the Horticulture Research Facility at New Franklin.

NEW CULTIVARS OF WATERMELON AND SOUTHERN PEA

Sugarlee is a new high quality watermelon variety which was developed by the University of Florida Experiment Station at Leesburg, Florida. It was tested for the past four years in the Southern Cooperative Watermelon trials as #218. Performance data and a brief description is contained in the watermelon trial report.

Erectset is a new cream type southern pea recently released by the University of Arkansas. As the name suggests, the pods develop in an erect position above the foliage, facilitating harvest. The variety is reported to have good processing quality and resistance to both Bacterial Blight and Root Knot Nematodes. Tested as AR 77-197, our report of the 1980 trials shows it to be the top yielder.

1980 WATERMELON VARIETY TRIALS

HENRY F. DICARLO AND DR. V. N. LAMBETH
UNIVERSITY OF MISSOURI

LOCATION - Roger F. Rhodes Memorial Agriculture Research Farm - Clarkton, Missouri

SOIL TYPE - Sandy

SOIL TEST VALUES

Org. Matter	Phosphate	Potassium	Calcium	Magnesium	N.A.	pHs	C.E.C.
1.8	357	336	700	170	2	5.5	5
Ave.	V. High	V. High	Low	Med			

FERTILIZATION - 40-20-63 per acre applied under rows at bed preparation (approximately April 21)

NEMATODE CONTROL - Row treatment of Telone II applied at the rate of 30 fluid ounces per 1,000 feet of row. The fumigant was applied during bed preparation.

PLANTING DATE - Seeded in 3 inch peat pots in the greenhouse approximately April 17. Transplanted to the field May 15.

INSECT AND DISEASE CONTROL

Spray Dates	Material
June 19	carbaryl (Sevin) + captafol (Difolatan)
July 28	malathion + chlorothalonil (Bravo)
August 15	chlorothalonil

IRRIGATION - July 9, 20 and 2 or 3 additional applications

HARVEST PERIOD - July 21 to September 4

VARIETY	TOTAL MELONS/A	% DEFECTIVE					NUMBER MARKET-ABLE/A	AVERAGE WEIGHT PER MELON (LBS)	POUNDS MARKET-ABLE/A	% SOLUBLE SOLIDS (SUGAR)
		SUNBURN	MISSHAPEN	HOLLOW HEART	BLOSSOM END ROT	TOTAL CULLS				
Crimson Sweet	1694	1.8	3.7	-	-	5.5	1601	19.9	31,860	10.4
Charleston Gray	1059	-	8.6	-	-	8.6	968	25.4	24,587	10.1
Jubilee	1301	-	46.5	-	2.3	48.8	666	22.2	14,785	9.4
Desert King	1271	4.8	9.5	-	-	14.3	1089	21.3	23,196	8.9
*218	1664	-	5.5	-	-	5.5	1572	18.6	29,239	10.6
222	1573	-	3.8	-	-	3.8	1513	21.6	32,681	9.7
226	1542	-	-	2.0	3.9	5.9	1451	23.4	33,953	10.9
224	1150	-	26.3	-	5.3	31.6	787	22.7	17,865	10.3
225	1271	4.8	19.0	-	14.3	38.1	786	25.1	19,729	10.8
227	1392	-	21.7	-	4.3	26.0	1030	22.7	23,381	10.4
228	2904	-	-	-	-	-	2904	5.9	17,134	10.1
231	1755	3.4	-	3.4	-	6.8	1636	15.0	25,540	8.9
232	847	-	21.4	-	-	21.4	666	7.9	5,261	-
233	2360	-	33.3	-	-	33.3	1574	17.5	27,545	10.7
234	1271	-	14.3	-	-	14.3	1089	25.8	28,096	10.4
235	1513	-	8.0	-	-	8.0	1392	24.6	32,243	10.9
Sugar Delicata	1513	20.0	8.0	-	-	28.0	1089	15.7	17,097	9.4
Yellow Doll	4477	-	1.4	5.4	-	6.8	4173	6.0	25,038	9.5

*218 was named and released as Sugarlee by the University of Florida in December of 1980. Sugarlee is described as a nearly round striped Dixie Queen type ranging from 25-30 lbs. However, in our trials it ranges from 18-22 lbs. It is black seeded with light red flesh. The variety is resistant to Fusarium Wilt and race 1 Anthracnose.

1980 SWEET POTATO TRIALS

STATE & LOCATION REPORTING: University of MO, Delta Center, Portageville

TRANSPLANTED: 5/14/80 HARVESTED: 10/1/80 GROWING DAYS: 139

DISTANCE BETWEEN ROWS: 48" DISTANCE IN ROWS: 12"

IRRIGATION: Four 1½" applications

FERTILIZER: N 28, P 20, K 63, (PER ACRE)

Variety or Selection	Yield in Bushels (50 lbs) Per acre						
	US #1*	Canner*	Jumbo or Oversize*	Total Marketable	Percent US #1**	Cull*	Cracked
Centennial	324	44	58	426	76.0	24	0
Jewel	505	84	100	689	73.3	12	0
L3-151	359	75	63	497	72.2	29	1
L4-62	442	96	328	866	51.0	23	5
NC-719	392	151	38	581	67.5	18	11
NC-345	370	76	53	499	74.1	16	0
Observational Entries							
Coromex	327	38	68	433	75.5	5	5
Jasper	405	65	11	481	84.2	74	0
Redmar	434	112	11	557	77.9	7	0
L4-131	209	193	31	433	48.3	16	0
L6-16	391	122	34	547	71.5	13	0
Md-722	367	94	51	512	71.7	7	0
Ti 1898	406	259	0	665	61.0	47	0
Ti 1900	210	321	0	531	39.5	7	0
Tx-4	531	72	75	678	78.3	7	0
8W2641	464	96	73	633	73.3	16	0
V4-292	487	104	43	634	76.8	21	0
W-125	396	101	55	552	71.7	7	0

* - US #1 - Roots 2" to 3½" diameter, length 3" to 9", must be well shaped and free of defects.

Canner - Roots 1" to 2" diameter, 2" to 7" in length

Jumbo or Oversize - Roots that exceed the diameter, length and weight requirements of the above two grades, but are of marketable quality.

Cull - Roots must be 1" or larger in diameter and so misshapen or unattractive that it could not fit as a marketable root in any of the above three grades.

** - Percent US #1 is calculated by dividing the weight of US #1 by the total marketable weight (culls and cracks not included)

1980 SOUTHERN PEA TRIALS

ROGER F. RHODES MEMORIAL RESEARCH FARM - CLARKTON

CULTURAL DETAILS

Rain---------- .45" June 16
Planted---------- June 18; seeds 3-4" apart in 38" rows
Crop emergence------ June 25
Herbicide---------- Treflan preplant incorporated
Thrips and aphids--- Malathion spray July 7
Rainfall---------- Approximately 5"
Irrigation---------- 4 applications
Curculio control---- Toxaphene at bloom
Harvest dates------- August 25 - AU 70.4; AR 197; L 894; TX 63-7; Pinkeye Purple Hull
September 2 - L 573; L 920; V 306; Mississippi Silver

PERFORMANCE DATA

Variety	Yield Lbs/Acre* In Pod	Shelled	Leaf Blight
Auburn U. 70.4 (Large Blackeye)	1861	1303	None
AR 77-197	2743	1975	None
L 573	2412	1254	Light
L 894 (Brown eye)	1365	1024	Heavy
SC 72-3	Failed to set pods		None
L 920	1723	827	Light
V 306	1213	776	None
TX 63-7	1434	875	None
Big Boy Purple Hull	No stand, weevily seed,		none
Mississippi Silver	1640	1000	Light-Medium
Pinkeye Purple Hull	2316	1320	Light

* Yield Measurements - A single hand harvest was made from uniform length of row of each trial variety. All pods with fully developed seeds (green or dry) were harvested, weighed, shelled and from this, per acre yields were calculated.

V A R I E T Y T E S T I N G

HARRY MINOR
VIRGIL SPARKS

The objective of the University of Missouri's variety testing program is to make available reliable unbiased and up to date information about experimental and commercial varieties. Results obtained should aid the individual grower to judge the relative merits of many of the commercial varieties in Missouri today. In southeast Missouri, variety testing includes the major row crops, soybeans, cotton, corn, grain sorghum, and sunflower, as well as small grains.

The tests are conducted under as uniform conditions as possible and small plots are used to reduce the chance of soil and climatic variations occuring between one plot and another.

Sixty four soybean varieties are being tested at three locations in southeast Missouri in 1980. Yield tests are being conducted on a sandy loam soil at the Claude Keasler farm, Parma, MO; a clay test is being grown on the Delta Center Lee Farm, Portageville, MO; and on the sandy soil of the Kenneth Heath Farm, Bertrand, MO. The tests on the Heath and Keasler farms were planted with nematicide.

In 1980 a new research project was started in soybeans to test existing varieties under narrow row conditions. A revived interest in narrow row spacings prompted a test including 47 varieties grown on a sandy loam soil. The two tests are being conducted on the Delta Center's Lee Farm. Forty seven varieties are being grown in 30" and 10" row spacings to give an idea of each individual variety's potential at a given row spacing.

Thirteen cotton varieties are being evaluated in 1980. Three sites in southeast Missouri were selected to represent three soil types. The Delta Center's Rhodes Farm, Clarkton, MO, was selected as the sandy soil representative. This site has a high degree of Fusarium wilt and root knot nematode, making it ideal for testing the sixteen against these diseases. A clay test was planted but lost on the Delta Center's Lee Farm, Portageville, and a test was placed on a loam soil North of Senath, MO, on the David Andrews farm.

There are three corn tests in southeast Missouri, two at the Delta Center and one at Cape Girardeau, MO. The two tests at the Delta Center are being grown together, one having 81 varieties and will be irrigated, and the other has 100 varieties and will not be irrigated. We hope some good information comes out of this test, especially for those in this area that grow non-irrigated corn. The test at Cape Girardeau is being grown on the John Lorberg Farm.

There will be 100 varieties tested under no-irrigation at this location.

Grain Sorghum (milo), in 1981 is being grown on the Claude Keasler Farm, north of Parma, MO in Stoddard County, and on the Kenneth Heath Farms near Bertrand. Eighty one (81) varieties will be tested on both farms under irrigation.

1981 will be the second year sunflowers will be tested as part of the University of Missouri's Variety Testing Program. Twenty seven varieties will be tested on a sandy loam soil at the Delta Center's Lee Farm.

Small grains testing, wheat and barley, were tested in 1981 on the Delta Center's Lee Farm for wheat and barley and on the Hubert Swinger Farm, Frisco, MO for wheat. The wheat yield results can be found in this publication.

The 1980 test results will be available Field Day. The 1981 test results should all be available by the end of January 1982. You may pick up a free copy of the results here at the Delta Center or through your County Extension Office.

SMALL GRAIN VARIETY TRIALS IN MISSOURI 1980-81

DALE SECHLER
PAUL ROWOTH
VIRGIL SPARKS

Small grain variety trials were conducted at the Agronomy Research Center, Columbia; North Missouri Center, Spickard; Greenley Center, Novelty; Sheats Farm, Lamar; Southwest Center, Mt. Vernon; Swinger Farm, Dexter and Delta Center, Portageville.

Testing Procedures

All tests consisted of four row plots, 15 feet long, and were replicated four times. Plots were trimmed to 9.5 feet in late spring and were harvested with a Chain plot combine. Plants were in 10½ inch row spacings and all plots were seeded at the rate of 96 lbs of seed per acre - equivalent approximately to 1½ bu of wheat. A four row cone planter was used to sow the grain.

All plots were fertilized for maximum yield, according to soil test indications, at the time of seeding and fall seedlings were top-dressed with nitrogen in the spring. Wheat tests received a total of about 70 lbs of nitrogen per acre at Delta Center and 75 lbs at Dexter.

YIELD TRIALS

Growing Season

The fall of 1979 was relatively 'open' in most areas permitting the harvest of soybeans and the seeding of fall grains. Moisture was very deficient, however, in many areas which delayed seeding or, if the grain was seeded, germination. The tests were seeded in early November at Portageville and Dexter. With below normal rainfall over most of the state in 1980, subsoil as well as surface soil moisture was deficient at the time of seeding. Periodic rains late in the spring were adequate for good growth of wheat and grain filling. Continuing late spring rains caused difficulty in harvesting the '81 crop, yet southeast Missouri experienced one of its best wheat crops in years. Temperatures were relatively mild throughout the winter. While snowfall was not heavy, it provided cover during some very cold periods and resulted in almost no winterkilling at any location.

Disease and Insect Problems

Pest problems were minimal, probably due to low moisture and high temperatures. *Septoria tritici* could be observed in most wheat fields but damage was minimal. Considerable mildew was present. Leaf rust was prevalent in Southeast Missouri and to a lesser extent in southwest and central Missouri.

Yield Trials

Wheat - Forty two varieties or experimental lines were grown in trials at seven locations. All entries were not grown at every location but 36 lines that were tested have been or are being put into commercial production. Performance data follows.

Wheat Over the Years at Portageville

Variety	1981	Averages 1980-81	1979-81	1978-81	1977-81
Arthur	59.2	49.9	52.4	49.9	49.0
Arthur 71	55.3	48.6	52.9	48.6	47.7
Abe	60.3	49.3	52.0	49.3	49.9
Oasis	56.7	48.3	53.3	48.3	49.0
Beau	54.2	48.2	51.5	48.2	48.7
Sullivan	58.1	49.6	51.7	49.6	----
Caldwell	57.8	----	----	----	----
Auburn	59.2	----	----	----	----
Doublecrop	56.9	47.0	45.0	47.0	43.0
Stoddard	60.3	47.1	46.1	47.1	49.5
Hart	59.5	52.6	52.3	52.6	52.2
Pike	55.0	50.9	53.3	50.9	54.7
Rosen	66.4	57.5	----	----	----
McNair 1003	60.6	55.9	55.7	55.9	53.1
Coker 747	55.3	55.3	54.9	55.3	----
S76	59.0	51.3	52.0	51.3	53.9
S78	58.4	50.3	54.3	50.3	49.5
HW 3002	56.0	----	----	----	----
Tyler	61.6	----	----	----	----
Roy	59.8	----	----	----	----
Southern Bell	58.9	----	----	----	----
Delta Queen	57.9	----	----	----	----

Wheat Variety Test 1, Portageville, 1981

	Height(in.)	Lodging %	Yield-Bu/A	SEPL %
Arthur	32.5	9.3	59.2	18.8
Arthur 71	32.8	6.0	55.3	21.3
Abe	30.5	6.8	60.3	17.5
Oasis	33.3	8.3	56.7	20.0
Beau	31.8	8.3	54.2	20.0
Sullivan	33.0	3.3	58.1	15.0
Caldwell	33.5	4.0	57.8	10.0
Auburn	32.3	2.8	59.2	10.0
Doublecrop	31.0	1.5	56.9	20.0
Stoddard	35.0	7.0	60.3	18.8
Hart	32.8	6.0	59.5	16.3
Pike	32.3	6.8	55.0	10.0
Rosen	30.5	4.3	66.4	7.5
McNair 1003	33.8	4.5	60.6	5.0
Coker 747	32.3	8.0	55.3	5.0
S76	33.8	5.8	59.0	8.8
S78	32.0	4.3	58.4	17.5
HW 3002	35.5	4.5	56.0	11.3
Tyler	35.8	5.5	61.6	3.5
Roy	33.8	4.0	59.8	4.3
Southern Bell	28.3	4.5	58.9	10.0
Delta Queen	31.5	7.5	57.9	6.3

5% LSD -- 5.5 Bu/A

4 Replications; 42 entries; 9.5 ft Row Length; 4.00 ft Row Width.