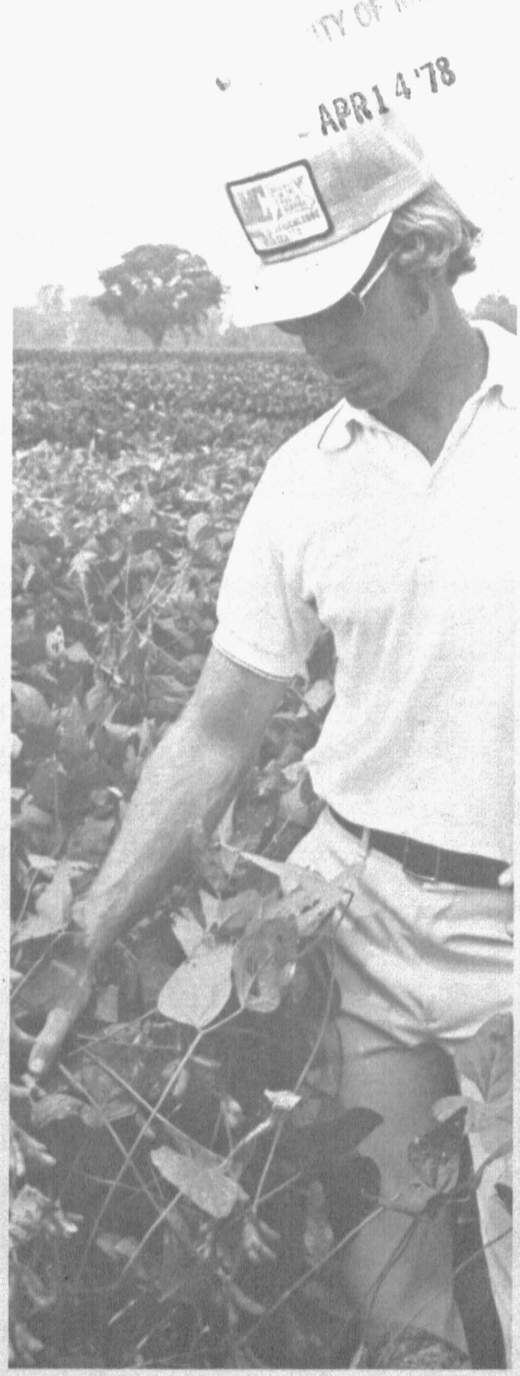
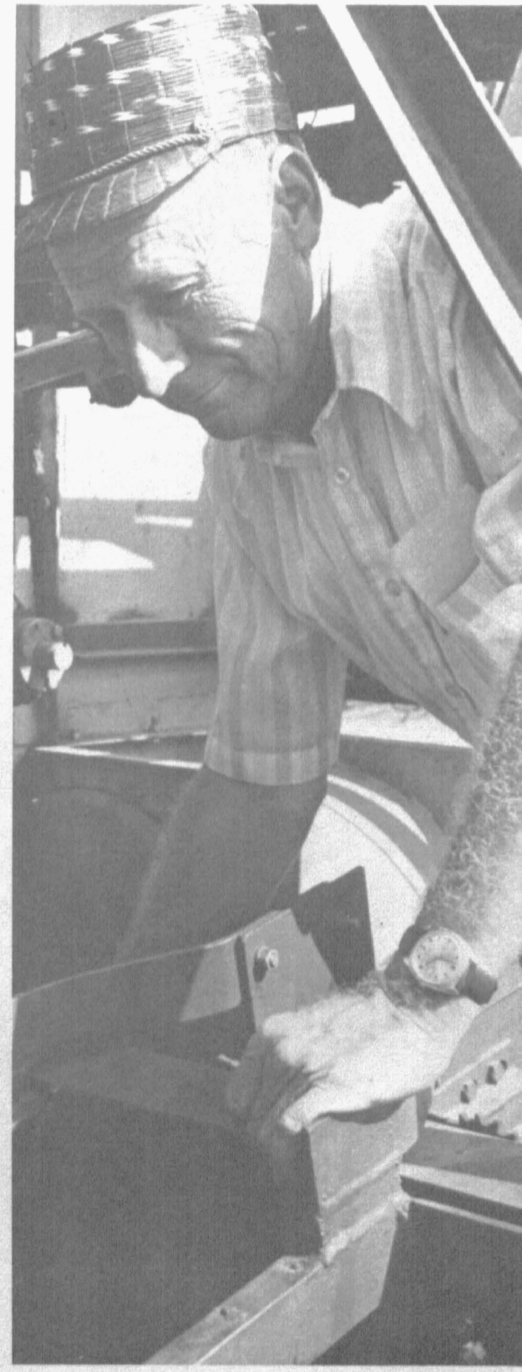
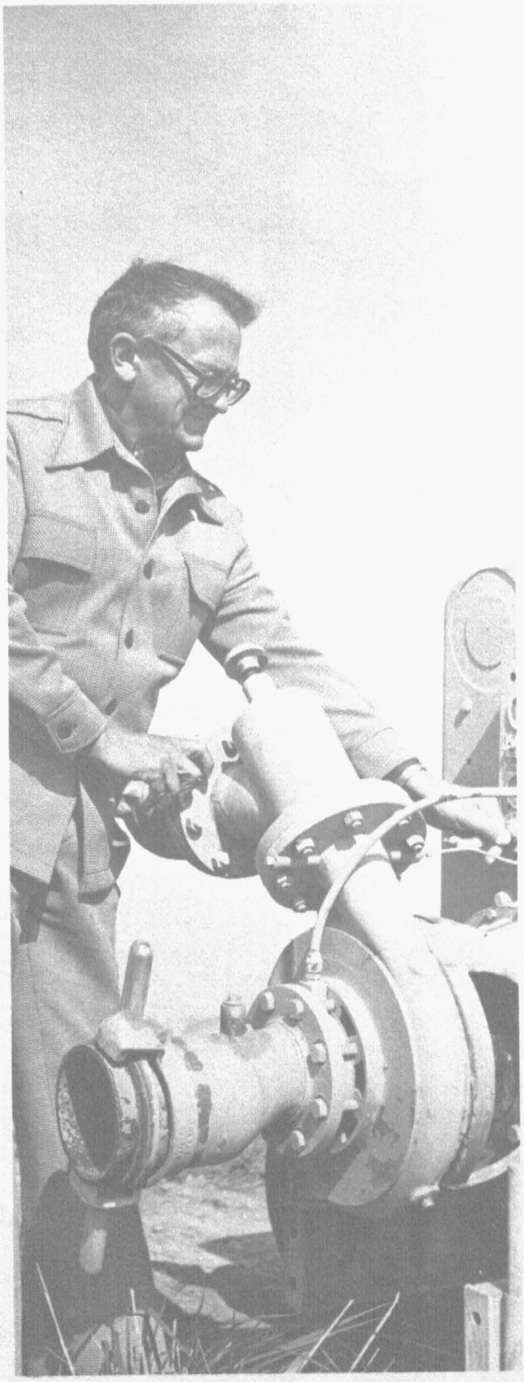
Delta Center Research Report '77





An Area Center of the
University of Missouri-Columbia
Special Report 206



FIELD DAY 1977

Irrigation was a very important tool in support of research at the Delta Center in 1977. Tomatoes and young cotton were irrigated on the Roger F. Rhodes Memorial Agricultural Research Farm north of Clarkton beginning May 18 and again a month later. Corn, tomatoes, soybeans, cotton and grain sorghum research plots were irrigated at the Lee Farm south-east of Portageville as needed between June 6 and August 12. General rains between August 13 and 17 ended the 1977 irrigation season.

There are three tour options for 1977 Field Day. NORTH and SOUTH tours will ride wagons. This year there is also a WALKING tour. You will have time for at least two of these tours. Each is about half the length of recent years tours on Field Day. The mimeographed list of TOUR STOPS will help you decide which tour to take first.

Welcome to another Field Day. Make yourself at home. Check out the exhibits in the Machinery building. Try the WALKING tour east of the buildings. Its a new effort for us. Tell us what you think of it. Come see us again next year. Chuck Cromwell

EFFECT OF PLANT POPULATION ON VARIETIES DIFFERING IN LODGING RESISTANCE

A. L. Hoggard and J. Grover Shannon

PURPOSE: The tendency among growers is to plant above the optimum rate needed for maximum yield. High seeding rates result in smaller stems and usually more lodging under good growing conditions. Severe lodging has been shown to cause reductions in yield of up to 20 percent. We studied the effect of low and high seeding rates on productivity of varieties differing in lodging resistance.

PROCEDURE: Three productive varieties, Essex (most lodging resistant), Forrest (intermediate lodging resistant), and Mack (least lodging resistant) were planted at 7, 10, 13 and 17 seeds per foot of row in 38 inch rows. Yield and other characteristics were studied.

RESULTS: Table 1 shows yield for each of the three soybean varieties at four planting rates. Highest yield values were shown in all varieties at the lowest rate of planting. However, yield differences were small regardless of rate of planting within each variety. Even though varieties differed in susceptibility to lodging, lodging was not a significant factor in yield reduction at the planting rates studied.

Farmers in southeast Missouri who often plant 15 to 17 seeds per foot of row could cut down on seeding rates and still maintain maximum yield as well as lower seed bills. Ten plants per foot or about 140,000 plants per acre should be optimum for most situations in 38 inch rows. Ten plants per foot should allow enough plants to compete with weeds and also not be too thick to cause severe lodging. In clean fields with few problems, maximum yields could be attained at seeding rates lower than 10 plants per foot. Higher seeding rates would be advantageous in very weedy fields or where crusting is a problem.

Table 1. Yield for each of three soybean varieties at four populations, 1975-76.

Variety	Lodging[1/] Score	Population (Plants/A) 96,320 (7)*	137,600 (10)	178,879 (13)	220,159 (17)	Variety Means
		Bushels Per Acre				
Essex	1.6	41.5	40.2	39.7	40.4	40.4
Forrest	2.3	43.1	41.7	39.1	40.4	41.1
Mack	2.8	39.9	36.7	37.5	37.2	37.8
Population Means		41.5	39.5	38.7	39.3	

1/ 1 is best, 5 is lodged flat

* Numbers in parenthesis represents plants per foot.

FRANKLIN, A NEW EARLY SOYBEAN VARIETY

J. Grover Shannon

Franklin is an early maturing, Race 3 cyst nematode resistant soybean variety intended to replace Custer, a variety which had not gained wide acceptance in the "bootheel". It is from a cross of L12(Clark with light hilum and resistance to Race 1 of Phytophthora rot and downey mildew) x Custer. Franklin was co-developed by the University of Illinois Agricultural Experiment Station and USDA and the Missouri Agricultural Experiment Station. Crossing and early selection was done at the University of Illinois. Screening for cyst nematode resistance was conducted at the UMC Delta Center Portageville, Missouri.

Performance of Franklin as compared to Custer is presented in Table 1. Franklin has performed considerably better at Portageville than Custer for various situations. It has yielded better than Custer on clay or loam and in the presence or absence of cyst nematode. Franklin has averaged the same in maturity two inches shorter, and better in seed quality, protein content, lodging resistance, and shatter score than Custer. Like Custer, it has resistance to Race 3 cyst nematode, Race 1 of phytophthora rot and bacterial pustule. Franklin is not as subject to leaf hopper feeding as Custer because it has normal and not the appressed pubescence which Custer possesses. Although performance of this variety has been better than Custer at Portageville, this advantage has not been as great in other areas outside the delta.

In tests outside the Delta yield performance was not as good as Kent or Columbus, but in the Delta performance was better than the above two strains.

Foundation seed of Franklin will be available in 1978.

The new soybean variety, Franklin, is checked by Grover Shannon, soybean breeder at the Delta Center. Franklin is resistant to Race 3 of the soybean cyst nematode. Shannon says another variety, resistant to Races 3 and 4, will be released in early October.

Table 1. Comparison of Franklin and Custer for several characteristics Portageville, Missouri 1974-1976.

	Yield Bushels Per Acre						
	1974		1975		1976		
Entry	Loam*	Loam	Loam	Clay	Loam*	Clay	Clay*
Franklin	38.3	57.4	48.2	46.1	48.9	27.3	32.8
Custer	37.8	45.5	47.3	42.5	36.6	18.7	29.7

	Means				
	All Tests	Cyst Infested	Non-infested	Loam	Clay
Franklin	42.7	40.0	44.8	48.2	35.4
Custer	36.9	34.7	38.5	41.8	30.3

*Infested with Race 3 of Cyst Nematode

	Maturity Date	Height Inches	Lodging Score	Seed Quality	Shatter Score
Franklin	9/22	35	2.0	2.0	1.5
Custer	9/22	37	2.3	2.5	2.1

	Disease Reaction		
	Cyst Race 3	Phytophthora Race 1	Bacterial Pustule
Franklin	R	R	R
Custer	R	R	R

Maturity date, height and seed quality are means of seven tests. Lodging and shatter scores are means of six tests and four tests, respectively.
Scores for lodging, seed quality and shattering are based on:

1 = best
5 = poorest

CENTENNIAL, A NEW FULL SEASON SOYBEAN FOR SOUTHEAST MISSOURI

J. G. Shannon

Centennial is a highly productive soybean variety of Group VI maturity selected from the cross of D64-4636 x a tawny pubescent Pickett 71 type made at Stoneville, Mississippi in 1967. Early generation selection for disease and nematode resistance in Centennial was carried out jointly at the Delta Branch Experiment Station, Stoneville, Mississippi and the West Tennessee Branch Experiment Station, Jackson, Tennessee. It has resistance to races 1 and 3 of the soybean cyst nematode, the root knot nematode, *Meloidogyna incognita*, the reniform nematode and phytophthora root rot. Plants have purple flowers, tawny pubescence and a tan pod wall. Seed is of medium size, yellow with black hila. Centennial has a lighter green foliage making it easy to recognize from other varieties of similar maturity.

Centennial has been tested in southeast Missouri since 1973. A comparison of Centennial, Pickett 71, and Tracy for several characteristics is listed in Table 1. In southeast Missouri, Centennial has averaged higher in yield than Pickett 71 but less than Tracy in the absence of cyst nematode. In the presence of cyst nematode Centennial has yielded more than Tracy or Pickett 71. Centennial is similar to Pickett 71 in maturity, resistance to cyst nematode and Phytophthora rot. It differs from Pickett 71 in that it is about 6 inches taller, has tawny pubescence and is resistant to root knot nematode. The advantages of Centennial over Pickett 71 are its better lodging resistance and resistance to root knot nematode. These advantages give Centennial a broader adaptation than Pickett 71 over the diverse soil types in southeast Missouri where various disease pressures and production capabilities are found.

Missouri is participating in the release of Centennial with several other states. Registered Foundation seed will be available to growers in 1978.

Table 1. Comparison of Centennial, Pickett 71, and Tracy for several characteristics 1973-1976.

Variety	(5)* Loam	(5) Clay	(2) Dexter[1/]	(1) Bertrand	Mean 13 Tests
	Yield Bushels Per Acre				
Centennial	41.9	35.2	37.1	35.4	37.4
Pickett 71	43.2	35.6	32.5	35.2	36.6
Tracy	45.5	37.5	30.4	39.3	38.2

	(13) Maturity Date	(13) Height Inches	(13) Lodging Score	(13) Seed Quality	Seed Per Pound
Centennial	10/26	35	2.5	1.7	3300
Pickett 71	10/25	29	3.1	1.6	3600
Tracy	10/24	36	3.0	1.7	2800

	Disease Reaction[2/] Cyst Race 3	RK	PR
Centennial	R	R	R
Pickett 71	R	S	R
Tracy	S	S	R

* Number in parenthesis over each heading is Number of Tests averaged to give the results for each variety.

1/ Cyst nematode present - Dexter in 1975 and Parma in 1976.

2/ R = resistant; S = susceptible; Cyst = cyst nematode; RK = Root Knot Nematode and PR = Phytophthora root rot.

RELEASE OF J74-46 SOYBEAN RESISTANT TO RACE 4 OF CYST NEMATODE

J74-46 will soon be released as the first soybean variety resistant to Race 4 of soybean cyst nematode.

J74-46 is from PI88788, a black seeded strain with resistance to Race 4 cyst nematode, backcrossed three times to Forrest. Tests with this strain have been conducted since 1975. Table 1 shows performance of J74-46 and Forrest on cyst nematode infested soil at East Prairie. Yield of J74-46 was 35.2 and Forrest 17.7. Tables 2 and 3 show performance of J74-46 and Forrest where cysts were not a problem as well as reaction to diseases. In the absence of cyst, yields of J74-46 averaged slightly lower than Forrest. J74-46 matures similar to Forrest, is about five inches taller and is more susceptible to lodging than Forrest. Seed quality and seed holding are excellent. J74-46 has similar reaction to other diseases as Forrest except having a slightly lower level of resistance to root knot nematodes. Growth on clay soils of J74-46 has been very good and appears to have more resistance to phytophthora rot than Forrest.

Table 1. Comparison of Forrest and J74-46 for Several Characteristics on Race 4 Cyst Nematode Infested Soil, East Prairie, Mo., 1975.

	Yield Bu/A	Maturity Date	Height Inches	Lodging	Seed Quality
Forrest	17.7	10/12	21	1.0	2.0
J74-46	35.2	10/15	35	1.4	2.0

Table 2. Comparison of Forrest and J74-46 Averaged Over Three Tests on Soil Where Cysts Were not a Problem, Portageville, Mo., 1976.

	Yield Bu/A							
	Test 1	Test 2	Test 3	Mean	Maturity Date	Height Inches	Lodging	Seed Quality
Forrest	35.7	42.0	39.8	39.2	10/9	40	1.9	2.0
J74-46	35.8	37.9	39.4	37.7	10/9	45	3.1	2.0

Table 3. Comparison of Forrest and J74-46 for Disease Reaction and Shattering.

	Disease Reaction*					
	Cyst Race 3	Cyst Race 4	Phytophthora Rot	Bacterial Pustule	Root Knot Nematode	Seed Holding
Forrest	R	S	F	R	R	Excellent
J74-46	R	R	F	R	MR	Excellent

R = Resistant; S = Susceptible; F = Field Tolerant;

MR = Moderately Resistant

RESULTS OF SOYBEAN VARIETY TESTS IN SOUTHEAST MISSOURI, 1976

B. V. Emerine, J. G. Shannon, T. E. Fisher,
T. D. Laster, J. H. Scott

PURPOSE: To keep farmers up to date with performance of soybean varieties and breeding lines grown on soils and under climatic conditions of southeast Missouri.

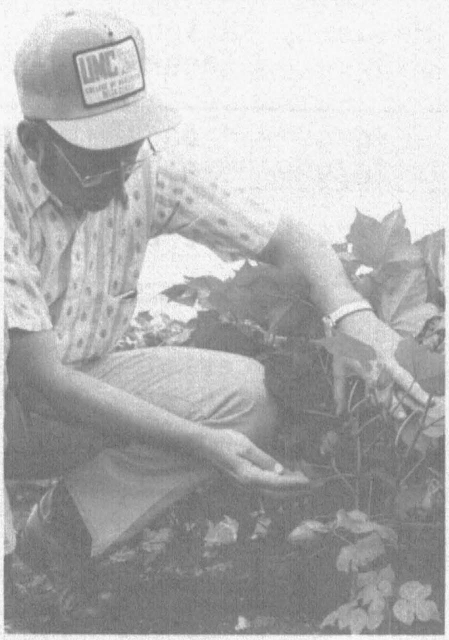
PROCEDURE: Variety tests were conducted on four soil types in 1975. All, except the test on Bertrand sand, were non-irrigated. The tests were as follows:

Location	Cooperator	Soil Type
Parma	Bob Lowry	Waverly Silt Loam
Bertrand*	Kenneth Heath	Bertrand Sand
Portageville	Delta Center	Sharkey Clay
Portageville	Delta Center	Tiptonville Silt Loam

* Cyst nematode present

RESULTS: Table 1 shows yield and other characteristics of early, mid-season and full season soybean varieties in 1976. The early variety which yielded best across locations was Columbus which is very good in seed holding.

Mitchell which has performed consistently well in prior years, shattered severely in 1976, a very dry year. Forrest, Mack and York performed best for the mid-season varieties in that order. Commercial strains which lack cyst resistance have not performed as well as Forrest or Mack in southeast Missouri. Centennial, a new cyst resistant soybean variety was the best of the full season varieties. It averaged almost five bushels per acre or more than other entries in the full season class.



Chuck Baldwin, plant pathologist, checks boll rot induced by bacterial blight. Baldwin says this is the most serious disease of cotton and is of special concern to the seed industry because the rot reduces seed germination and quality.

Table 1. Soybean Variety Performance Averaged Over Four Locations, 1976.

Variety	Yield Bu/A	Rank	Maturity Date	Height Inches	Lodging Score	Seed Quality
			Early Varieties			
Cutler 71	23.0	6	9/21	27	1.3	1.9
SRF 450	26.3	4	9/25	25	1.2	2.2
Mitchell*	24.9	5	9/20	25	1.3	3.0
Custer	27.3	3	9/21	26	1.2	1.9
Columbus	31.5	1	9/28	30	1.5	1.5
GS 7445	28.5	2	9/24	30	2.2	2.1
			Mid-Season Varieties			
Hill	29.6	11	9/30	27	1.6	1.5
Essex	32.5	6	9/30	24	1.4	1.3
Dare	30.6	9	10/ 7	29	1.6	1.3
Mack	34.5	2	10/ 6	29	2.1	1.6
York	33.5	3	10/ 6	31	1.7	1.6
Forrest	35.9	1	10/ 8	30	1.5	1.9
McNair 500	29.6	11	10/ 9	31	1.8	1.7
Coker 136	33.0	4	10/13	34	1.2	1.3
FFR 556	29.8	10	10/13	43	2.1	1.8
A 5305	28.9	14	10/ 2	28	1.8	1.8
A 5312	31.0	8	10/ 2	28	1.3	1.5
RA 500	29.2	13	10/ 6	30	1.6	1.8
RA 501	32.3	7	10/ 8	40	2.1	1.6
NK-B100	32.9	5	10/ 8	30	1.9	1.9
GS 7459	26.4	15	10/ 9	27	1.6	1.6
			Full Season Varieties			
Tracy	30.5	2	10/16	33	2.3	1.6
McNair 600	24.5	6	10/16	32	1.7	1.6
Lee 74	30.2	3	10/18	33	2.3	1.5
Pickett 71	27.9	5	10/19	28	2.7	1.6
Centennial	35.3	1	10/20	35	1.6	1.6
Lancer	29.7	4	10/16	33	1.3	1.8

*Mitchell average for three locations only.

1977 VEGETABLE RESEARCH

V. N. Lambeth and Henry F. DiCarlo

Research was continued on processing tomatoes, watermelons, cantaloupes and sweet potatoes as in earlier reports. Processing tomato research was expanded to include pilot canning plantings at the Roger F. Rhodes Memorial Agricultural Research Farm. In this planting emphasis was placed on varietal characteristics, yield, suitability for machine harvest, and canning qualities. Evaluation and selection was continued on 100+ Missouri developed lines. Seed was increased of several lines showing commercial promise.

Watermelon varietal trials were continued in cooperation with several southern state experiment stations and commercial seedsmen. Sweet potato variety trials were conducted in cooperation with the National Sweet Potato Collaborators Group.

Results of the 1976 research program follow.

Hank DiCarlo (left), Bootheel horticulture specialist, and Vic Lambeth, University of Missouri-Columbia tomato breeder, talk about some of the firm tomatoes that could bring a new agricultural industry–tomato processing–to Southeast Missouri.

1976 WATERMELON VARIETY TRIALS

Dr. V. N. Lambeth and Henry F. DiCarlo

University of Missouri

LOCATION - Delta Center Research Farm, Portageville, Missouri

SOIL TYPE - Loam

FERTILIZATION - 200 lbs./A 17-17-17 placed under the row at time of bed preparation.

NEMATODE CONTROL - Granular nemagon was used as a row treatment (banded about 8 inches under the row with fertilizer before bedding). The rate of use was 86 pounds of 25% granules per acre of area treated. (A band of soil one foot wide and centered on the row, was the treated area.)

PLANTING DATE - Seeds were planted in 3-inch peat pots in the greenhouse on April 15. The plants were set in the field May 12.

PLANT SPACING - Plants were spaced at 6 foot intervals in rows 12 feet apart.

INSECT AND DISEASE CONTROL

DATE	INSECTICIDE	FUNGICIDE
May 21	carbaryl (Sevin)	mancozeb (Dithane M-45)
June 16	carbaryl	mancozeb (Dithane M-45)
June 22	carbaryl	chlorothanonil (Bravo)
June 30	carbaryl	captafol (Difolatan)
July 14	carbaryl	benomyl (Benlate)
July 28		captafol

IRRIGATION - None

HARVESTS - August 12, 18, 26, September 2, 9.

COMMENTS - Excessive rainfall in May and June was detrimental to growth and development. Over 12 inches was recorded from rains occurring on 24 days of the 2 month period. Moisture was deficient during the remainder of the watermelon season.

Variety	Total Melons/A	% Defective: Sunburn	% Defective: Mis-shapen	% Defective: Hollow Heart	% Defective: Blossom-End Rot	% Defective: Total Culls	Number Market-able/A	Average Weight Per Melon (Lbs.)	Pounds Market-able/A	% Soluble Solids (Sugar)
210	938	3	19	-	-	22	732	22.7	16,616	9.7
212	787	-	4	-	-	4	756	23.7	17,917	11.2
214	1059	6	3	6	-	15	900	18.1	16,290	10
215	847	-	4	11	-	15	720	21.3	15,336	10.3
216	1180	-	3	18	-	21	932	15.1	14,073	10.6
Allsweet	756	8	8	-	-	16	635	22.7	14,415	10.6
Charleston Gray	847	4	11	-	4	19	686	22.0	15,092	10.5
Charleston 76	787	-	8	-	-	8	724	23.1	16,724	10.6
Crimson Sweet	908	-	7	-	-	7	844	21.4	18,062	9.8
Family Fun	1603	-	4	-	-	4	1539	13.2	20,315	9.2
Jubilee	696	-	22	-	-	22	543	27.1	14,716	9.7
PSX 573	1089	-	6	-	-	6	1024	25.1	25,702	10.3
Royal Charleston	1240	-	5	-	-	5	1178	19.9	23,442	10.4
Smokylee	968	-	16	-	-	16	813	25.2	20,488	11.1

Notes on New Entries

210 - From Iowa State University and named Iopride in 1974. Large oblong dark green striped fruits. Resistant to Wilt and Anthracnose. Medium-late maturity.

212 - Experimental entry from Florida. Dixie Queen type, light green with dark striping. Variety has intense red flesh with dark seeds, attractive and good quality. Resistant to Wilt and Anthracnose.

214 - Blocky or roundish fruit having a light green rind with stripes or splashes of black-green. Flesh is pink with black seeds. Early maturity, fair quality, resistant to Wilt and Anthracnose. From University of Arkansas.

215 - F_1 hybrid from North Carolina State University. Blocky, light green with dark green stripes. Resistant to Wilt. Has small black seeds.

216 - Small early F_1 hybrid from North Carolina State University. Fruits are blocky, medium-dark green with darker green stripes. Black seeds.

FAMILY FUN - Small oval striped variety of early maturity. Bright red flesh with small black seeds. Possesses resistance to Wilt, Anthracnose and Mildew.

PSX573 - An experimental selection of Charleston Gray type from Peto Seed Company. Similar quality with better fruit shade.

ROYAL CHARLESTON - Oblong or blocky light green hybrid from Peto Seed Company. It has red flesh with small light brown seeds. Rind suitable for shipping. Resistant to Wilt, Anthracnose, and Mildew. A little earlier than Charleston Gray.

STEP-PT OBSERVATIONAL TRIAL 1976

Cooperator: V.N. Lambeth & Henry DiCarlo Station: MO. AES - Delta Center

Fertilizer Application: 300 lbs/A 8-24-24; 100 lbs/A 16-48-0 starter; 100 lbs/A 33-0-0 topdress Irrigation: Twice - furrow

Planting Spacing: Rows 5 ft; in row 2 ft. Check : TAMU Chico III Plants/Plot: 15

STEP-PT entry	Plant conformation			Earliness			Appearance of fruit				Firmness of fruit			Total yield			Holding ability in field				Quality char.		Mention		
	More upright	Equal to check	More sprawling	Early	Equal to check	Late	Shape of fruit 6/	Better than	Equal to check	Not equal to	Firmer than	Equal to check	Softer than	Greater than	Equal to check	Less than	Better than	Equal to check	Not equal to	Estimated % marketable yield at peak harvest once over	Core materials	Color	Repeat in Obs.	Advance to Rep.	Rank 3 best lines
1043 (CK)		x			x		G		x				x			x			x	40	3.8	4.0	ck		
1015 (CK)		ck			ck		pr		ck			ck			ck			ck		60	3.5	3.5	ck		
1068		x			x		pr			x		x			x				x	65	3.4	3.6			
1069	x				x		pl	x				x				x		x		65	4.0	3.8	x		
1070		x			x		pl	x			x				x				x	50	4.0	3.8	x		
1073	x					x	G			x		x				x			x	60	3.2	4.0			
1074		x				x	pr		x		x				x			x		65	3.5	3.6	x		
1075	x				x		pl		x		x					x			x	55	3.0	3.2	x		
1076	x				x		pl		x		x					x			x	55	3.7	3.2	x		
1077	x				x		G		x		x					x			x	50	3.2	4.0			
1078	-	x				x	pr			x	x					x		x		60	3.2	3.6			
1079	x					x	G		x		x				x				x	55	4.0	4.0	x		
1080	x					x	pl		x		x			x				x		60	4.5	4.3		x	2
1081	x			x			G	x			x				x			x		65	3.8	3.6		x	3
1082	x					x	G		x		x					x		x		50	3.8	4.0	x		
1083	x				x		G	x				x			x				x	65	3.2	3.6	x		
1084	x				x		G	x				x			x			x		60	3.4	3.8	x		
1085		x				x	G		x			x			x			x		55	3.4	3.8	x		
1086		x			x		G		x		x					x			x	55	4.0	4.0	x		
1087			x		x		pl	x			x					x			x	50	3.5	4.0	x		
1088	x				x		pl	x			x				x				x	60	3.8	4.0		x	
1089	x					x	pr			x		x				x			x	65	3.0	3.2			
1090		x				x	pr		x			x				x		x		60	3.5	3.2	x		
1091		x			x		pr		x			x				x		x		50	3.4	3.5			

TOMATOES-STEP REPLICATED TRIAL FOR PROCESSING TYPES 1976

Cooperator: V.N.Lambeth & Henry DiCarlo Station: MO. AES - Delta Center

Fertilizer Application: 300 lbs/A 8-24-24
100 lbs/A 16-48-0 starter Irrigation: Twice - furrow
100 lbs/A 33-0-0 topdress

Planting Spacing: Rows 5 ft; in row 2 ft. Check 2/: TAMU Chico III Plants/Plot: 15

STEP-PT entry	Plant conformation: More upright	Plant conformation: Equal to check	Plant conformation: More sprawling	Earliness: Early	Earliness: Equal to check	Earliness: Late	Appearance of fruit: Shape of fruit 6/	Appearance of fruit: Better than	Appearance of fruit: Equal to check	Appearance of fruit: Not equal to	Firmness of fruit: Firmer than	Firmness of fruit: Equal to check	Firmness of fruit: Softer than	Yield of tpa	Holding 3/ ability in field: Better than	Holding ability in field: Equal to check	Holding ability in field: Not equal to	Estimated % marketable yield at peak harvest once over	Disease or disorder 4/: Flower drop high temp.	Disease or disorder	Disease or disorder	Quality char. 5/: Core materials	Quality char.: Color	Quality char.	Mention: Repeat in Obs.	Mention: Advance to Rep.	Mention: Rank 3 best lines
1043 (CK)		x			x		G		x				x	10.0			x	40				3.8	4.0			Ck	
1015 (CK)		Ck			Ck		pr		ck			ck		14.8		ck		60				3.5	3.5		ck		
1003	x				x		pl		x				x	8.6			x	50				3.0	3.8				
1018	x				x		pl	x					x	11.1		x		60				3.8	4.0			x	
1040		x		x			pl			x	x			10.1			x	65				3.5	3.5				
1053		x				x	G		x			x		11.7		x		55				4.4	4.0			x	1
1056		x			x		G	x			x			9.4		x		55				3.8	4.0			x	2
1057		x			x		pl	x			x			10.4		x		60				3.4	4.0			x	3
1060	x				x		G	x			x			5.6	x			45				3.6	3.5			x	

Comments: 5 Quality characteristics 1 = poorest, 5 = best
Chico III usually puffy this season.
Rows are single; yields could be almost doubled by twin rows on bed.

6 Fruit shapes -- p=pear, pl=plum, g=globe.

SWEET POTATO

SUMMARY OF DATA FOR REGIONAL (REPLICATED) TRIALS - 1976

STATE AND LOCATION REPORTING Mo. AES Delta Res. & Ext. Center, Portageville, Mo.

DATE TRANSPLANTED: 5/12/76 ; **DATE HARVESTED** 9/29/76; **NO. GROWING DAYS** 140 ; **DISTANCE BETWEEN ROWS (INCHES)** 48 ; **DISTANCE IN ROWS (INCHES)** 12 ; **PLOT SIZE: NO. OF ROWS** 8 ; **LENGHT (FT)** 30 ;

NO. REPLICATIONS 4 .

Variety or Selection	Yield in Bushels (55 lbs.) Per Acre						
	US #1*	Canners*	Jumbo or Oversize*	Total Marketable	Percent US #1**	Culls*	Crack
1. Centennial (ck)	270	101	51	422	63.9	16	-
2. Jewel (opt ck)	344	84	74	502	68.5	3	-
3. L1-207	332	84	131	547	60.7	6	-
4. NC 320	301	150	27	478	62.9	39	3
5. Ti 1885	156	202	10	368	42.4	28	-
Others:							
6.							
7.							
8.							
9.							

LSD @ .05 69.2 Bu/A. (U.S. No. 1)

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

SWEET POTATO

SUMMARY OF DATA FOR OBSERVATIONAL TRIALS - 1976

STATE AND LOCATION REPORTING MO. AES Delta Research and Ext. Center, Portageville, M

DATE TRANSPLANTED: 5/12/76 ; DATE HARVESTED: 9/29/76 ; NO. GROWING DAYS: 140 ; DISTANCE BETWEEN ROWS (INCHES): 48 ; DISTANCE IN ROWS (INCHES): 12 ; PLOT SIZE: NO. OF ROWS 2 , LENGTH (FT.) 30 , NO. REPLICATIONS 2 .

Variety or Selection	Yield in Bushels (55 lbs.) Per Acre						
	US #1*	Canners*	Jumbo or Oversize*	Total Marketable	Percent US #1**	Culls*	Crack
ob 1 Centennial (ck)	270	101	51	422	63.9	16	-
ob 2 Jewel (opt ck)	344	84	74	502	68.5	3	-
ob 3 NC 311	150	93	21	264	56.8	6	-
ob 4 VPI 63	454	91	162	707	64.2	5	-
ob 5 Ti 1895	-	-	-	-	-	-	-
ob 6 Ti 1896	206	92	15	313	65.8	297	-
ob 7 Lo-323	331	143	64	538	61.5	35	-
ob 8 L3-186	276	105	35	416	66.3	5	-
ob 9 M3-702	264	148	33	445	59.3	29	-
ob10 NC 345	160	153	5	318	50.3	30	-
others:							
ob 11 Jasper	214	200	14	428	50.0	52	-
ob 12							
ob 13							
ob 14							
ob 15							
LSD @ .05							

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

Canners - 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.

Culls - 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).

COTTON VARIETY X ROW-WIDTH X SOIL TYPE INTERACTIONS

W. P. Sappenfield

Selecting an adapted, productive variety often is the first major decision in establishing a profitable cotton production system. The sequence of land preparation, planting, cultural management, use of harvest aids and harvesting, each contribute a major input toward production of maximum lint yields at lowest cost. The need to increase production efficiency stimulated interest, in recent years, in variety, plant populations, row-width and soil type relationships. Few trials had been conducted in Missouri prior to 1970 relating varieties and variable row widths. Skip-row culture had not been researched. Preliminary trials with varieties grown in 20" and 40" row widths initiated in 1956 were discontinued because of the lack of narrow-row harvesting equipment.

Objectives of exploratory research, 1970-74, included (1) determination of current varieties best suited for narrow-row and wide-row (skip row culture), (2) optimum row-width on heavy and light textured soils, (3) reselection within current varieties for improving their adaptation to minimum spacing, (4) soil type influences on variety and row-width culture, and (5) responses to genotype, row-width and soil type. A summary of these studies is presented.

Innoculating cotton plant with Verticillium wilt is William Sappenfield, cotton breeder. Only resistant plants are kept in the program as Sappenfield works to develop good yielding, high quality, multiple disease resistant cotton varieties.

Narrow Row Variety Trials, 1970-74

Cotton grown in 20-inch rows produced lint yields equal to or better than that produced by 38-inch conventional rows. During two of five years 20-inch row production was significantly better than 38-inch row production, but when combining varieties and years yield differences between 20 and 38-inch rows were insignificant on sandy loam soil. On clay soil, data were not sufficient to be conclusive but 20-inch rows tended to produce the highest lint yields.

Yield differences between hill dropped and drilled seeding methods were non-significant. Minor differences among the characteristics measured were observed.

Varietal response to variable row widths was inconsistant but generally those varieties that performed best in conventional 38-inch rows also performed well in 20-inch rows. Performance of new strains, selected for adaptation to narrow rows, demonstrated potentials for developing "narrow row varieties". Improved semi-determinate varieties appeared generally better suited to the 20-inch row, "wide-bed" cultural system in most years than either full season, indeterminate or extremely determinate varieties.

The lint fraction, seed index, boll size, fiber length, length uniformity and elongation frequently varied with row width, variety and sometimes, row width-variety interactions. However, fiber fineness as measured by the micronaire showed frequent trends toward production of finer fiber as row widths decreased. Although yarn tenacity generally was not significantly reduced as row width decreased in 1974, some varieties produced the strongest yarns from fiber obtained from 38-inch rows.

"Once-over" harvest, early maturity, optimum lint yields, acceptable fiber quality, and new strain performances were suggestive of potential positive economic gains through use of narrow-row, short season cultural systems.

Inconsistant performance of current varieties, lack of varieties adapted to narrow culture, limited harvesting equipment and inconclusive data for clay soils suggest cautious conversion to the narrow row production system. Commercial production should be limited presently to field-scale trials to permit development of "on farm" total operations under production conditions where narrow-row culture appears advantageous and as suitable harvesters become available.

Skip-Row Variety Trials, 1971-73

Sandy Loam Soil: The plant two-skip two production system produced only 64% as much lint per acre as did solid 38-inch row plantings when total acreage was considered during the 3-year period, 1971-73. The plant two-skip one system produced an estimated 89% of solid plantings during two years, 1972-73. Although the plant-two-skip two and plant two-skip one systems produced more lint per acre compared to solid plantings when actual planted acreage was considered, the additional production was less than the potential of solid plantings over total acres. The semi-determinate, medium early Delcot 277 and the indeterminate, intermediate maturing Stoneville 213 used the additional between row space in skip rows more efficiently and produced more lint than did Auburn M, an early determinate variety. Auburn M utilized soil areas best in solid plantings and least in the plant two-skip two system.

Larger seed were produced in plant two-skip two rows but no overall response to skip rows was observed for lint fraction, boll size, 2.5% span length, fiber length uniformity, strength, elongation and micronaire. However lint fraction was highest for Delcot 277 in solid plantings. Micronaire was greater in plant two-skip one than in solid plantings of Stoneville 213.

<u>Clay Soil</u>: The overall response of plant two-skip two was roughly one-half of the lint yield of solid plantings, suggesting that the actual production potential of cotton plants is relatively constant over a wide range of between-row spacings on clay soil. When actual planted acres were considered the lint yields, combining varieties, were equal. No border row effect was measured; thus there was no significant beneficial yield response to skip rows.

Lint fractions tended higher in solid plantings. Micronaire was highest for Stoneville 213 in plant two-skip one plantings.

COTTON VARIETY AND NEW STRAIN TESTS, 1976

W. P. Sappenfield and B. V. Emerine

Total Lint and First-Pick Lint Yields of Cotton Varieties and New Strains Grown in Southeast Missouri, Combining Seven Tests Over Four Locations, 1976.

Variety	Total Lint-Lbs/Acre	Variety	Lint-Lbs/Acre 1st Pick
*Mo 63-277 BR-1	898.28 a	Mo 63-277 BR-2A	804.27 a
*AM2-MDR-1	886.63 ab	Mo 63-277 BR-1	801.33 a
*Mo 63-277 BR-2A	883.43 abc	AM2-MDR-1	790.12 a
*Mo 69-495 A	869.64 abc	Mo 69-495 A	781.77 ab
*Mo 63-277 BR-2	848.01 bcd	Mo 63-277 BR-1A	751.74 bc
*Mo 63-277 BR-1A	843.76 cde	Mo 63-277 BR-2	742.17 cd
Coker 304	824.73 def	Mo 63-277 J	713.52 de
*Mo 63-277 J	822.82 defg	Coker 304	694.10 ef
Coker 310	804.77 efg	Auburn M	693.12 ef
*SDC-MDR-1	799.92 fg	Delcot 277	680.86 ef
Delcot 277	794.94 fg	McNair 220	678.65 ef
Dixie King 3	792.41 fg	SDC-MDR-1	677.69 ef
McNair 220	789.83 fgh	Coker 310	674.09 f
Auburn M	781.79 ghi	Dixie King 3	635.41 g
Stoneville 256	752.55 hi	Stoneville 603	607.38 gh
Stoneville 603	744.59 ij	Stoneville 256	604.44 ghi
Deltapine 55	709.04 jk	New Rex	575.75 hij
Stoneville 731 N	702.45 kl	Deltapine 55	571.39 ij
New Rex	676.72 klm	Stoneville 731 N	554.15 jk
Deltapine 61	674.25 klm	Deltapine 61	529.59 kl
Stoneville 213	665.55 lm	Brycot 4	503.72 lm
Brycot 4	662.36 lm	Deltapine 16	492.47 mn
Deltapine 16	641.60 m	Stoneville 213	490.06 mn
Deltapine 2553	594.89 n	McNair 612	458.68 no
McNair 612	578.58 n	Deltapine 2553	433.13 o

* Experimental Strains.

POTASH FERTILIZATION HELPS FIGHT SOYBEAN CYST NEMATODE

J. Grover Shannon, C. H. Baldwin, Jr., Gary W. Colliver
University of Missouri Delta Center
E. E. Hartwig
USDA, Delta Branch Experiment Station
Stoneville, Mississippi

Soybean-cyst nematode attacks the soybean root, feeds off the plant, reduces nodulation, and limits water and nutrient uptake. This pest damages soybeans from Florida to Central Illinois.

Losses from cyst nematode range from total failure to none, depending on nematode population, variety, moisture supply, and fertility.

Races 3 and 4 of this pest cause most damage. Varieties resistant to Race 3 are available, but not to Race 4.

Breeders will soon have varieties resistant to Race 4. If Race 4 is a problem, nematicides may be needed to make profitable yields.

Much of the cyst damage occurs on soils low in fertility and water holding capacity.

Soybeans grown on soils with marginal potassium (K) levels tend to show deficiency more readily if cyst nematode is present. Yields on many of these soils may be only 3 to 10 bu/A.

Soybean trials are checked by Jake Fischer, research technician. Scientists at the Delta Center are breeding for earlier maturity and incorporating nematode resistance, improved seed quality and shattering resistance in improved varieties.

Many of the sandy soils in the southeast Missouri Delta are low in available K and infested with soybean cyst nematode. These soils are low producers and should be irrigated and properly fertilized to make profitable soybean yields.

A two-year experiment studied how nematicide treatment and potash and nitrogen fertilization affected the yield of soybean varieties differing in resistance to cyst nematode.

The field was near East Prairie, Missouri. The soil type was a Bertrand sand with a pH of 6.1 and testing high P but very low K (48 lbs/A). This field was infested with Race 4 cyst nematode.

The experiment is outlined as follows:

<u>Two Nematicide Levels</u>

(1) None
(2) 3 qt/A DBCP (Dichlorobromopropane)

<u>Three Varieties</u>

(1) Dare (susceptible to cyst nematode)
(2) Forrest (resistant to Race 3 cyst nematode)
(3) D72-C57 (resistant to Races 3 & 4 cyst nematode)

<u>Four Fertility Treatments</u> (sidedressed 3 weeks after planting)

(1) None
(2) 100 lbs K/A
(3) 150 lbs N/A
(4) 100 lbs K/A + 150 lbs N/A

Influence of Potash

Figure 1 shows how all varieties responded to potash fertilization, regardless of susceptibility to soybean cyst nematode - Dare Variety (susceptible), 6 bu/A increase; Forrest (Race 3 resistant) 10 bu/A; and D72-C57 (Race 3 and 4 resistant), 14 bu/A.

The most resistant variety responded better than the more susceptible strains Dare and Forrest. The resistant variety was limited by potash only, while the susceptible strains were limited by both nematodes and potash.

Yields of unfertilized plots were about the same for all varieties. Only when K deficiency was corrected did the benefits of a resistant variety over the Race 4 susceptible varieties show up.

Applying nematicide alone did not increase yield as much as adding potash alone. This shows yield may be limited more from potash deficiency than cyst-nematode.

The K and nematicide team produced highest yield for the susceptible strains - Dare, 13 bu/A; Forrest, 18 bu/A more than the untreated plots.

Nematicide plus K on the Race 4 resistant strain increased yield no more than K alone.

The K-nematicide team gave susceptible varieties a good yield boost.

Nematicide benefited little when K deficiency was not corrected.

Influence of N & N + K

Figure 2 shows soybean yield (averaged over two nematicide levels and the three varieties) for unfertilized, 100 lbs K, 150 lbs N, and 100 lbs K + 150 lbs of N.

In this case, N did not help K boost yield more than K alone - though previous work has shown positive response to N fertilization on soybeans grown in soil infested with cyst nematode.

This would be expected since nematodes limit nodulation. Lack of response probably came from "burn" by the high N rate we used. We sidedressed at least four-six inches from the row but still got burn.

Plants of susceptible strains, already damaged by cyst nematode, were shocked even more from the high N rate. The nitrogen may have had a positive effect if we had applied lower rates sidedress or broadcast.

Summary

More research is needed to study mode of application, time of application and rates of potassium required on soils infested with cyst nematode with marginal K levels.

But one fact seems clear: Neither resistant varieties, nematicides, nor crop rotation will help soybean yield unless good management practices are used on cyst nematode infested soil.

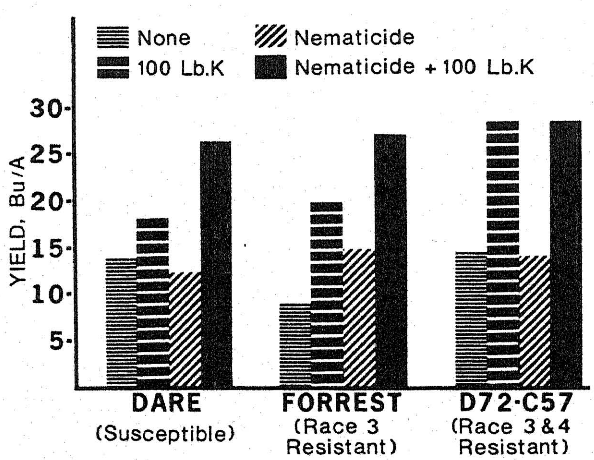


Figure 1—Yield of soybean varieties as affected by nematicide treatment and potash fertility, East Prairie, Missouri 1975-76.

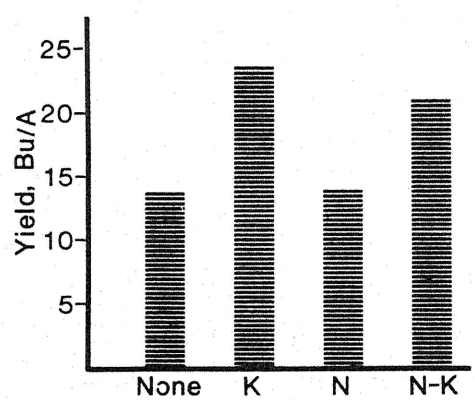


Figure 2—Yield of soybeans as affected by nitrogen and potash fertility, East Prairie, Missouri 1975-76.

SOIL FERTILITY RESEARCH

James A. Roth and Michael Barton

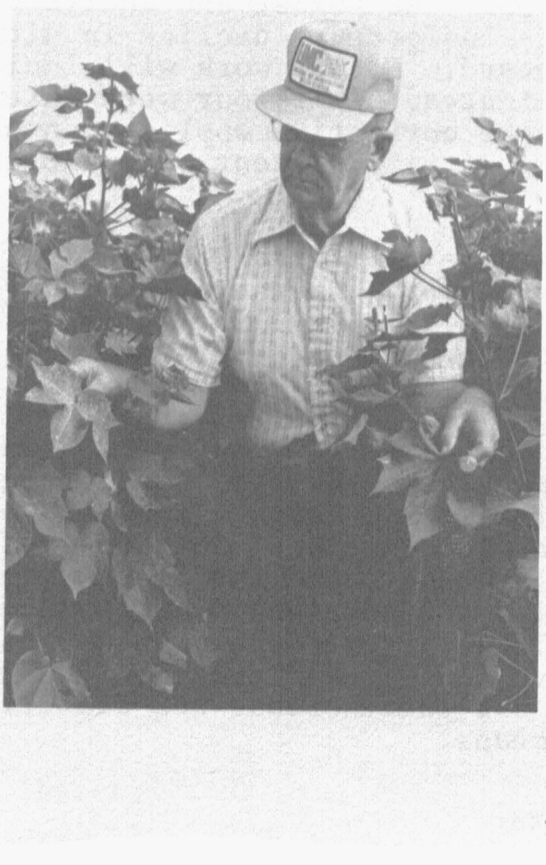
Soil fertility experiments in southeast Missouri include wheat, cotton, grain sorghum, and corn. Experiments have been located on the Tiptonville silt loam soil and Portageville clay (gumbo) soil on the Lee Farm at the Delta Center. Wheat experiments were conducted on the sandy soil of the Rhodes Memorial Research Farm located near Clarkton.

Research has intensified in the development of a cotton nitrate monitoring program in southeast Missouri. Experiments are in progress at the Delta Center and with cooperating farmers so as to include other soil types. Nitrogen continues to be the most critical plant nutrient in cotton production in southeast Missouri.

Nitrogen

Objective: To preduct nitrogen requirements as determined by nitrate soil test for optimum production of cotton.

Methods: Fifteen cotton experiments were planted on various soil types of the area in 1976 which included sand, silt loam, and clay soils. Ample phosphorous and potassium was applied at each location prior to planting but nitrogen was not applied (sidedressed) on twelve experiments until after the first of June soil samples were obtained. Three experiments included preplant applications so as to determine if the soil test would indicate these early applications of nitrogen (Table 3).



Foliar fertilization of cotton offers promise for boosting yields, says Jim Roth, agronomist at the Delta Center.

Soil samples were obtained from four levels of each plot (0-6", 6-12", 12-18", 18-24") June 1 (or as close to the date as possible) and analyzed for nitrate-nitrogen content using the specific ion electrode. Results of the tests are included in the following tables. After samples were obtained varying rates of nitrogen were sidedressed to correlate the yield with the soil test obtained in June.

On the Tiptonville silt loam soil at the Delta Center near Portageville and on the Malden sandy soil near Malden the experiments followed grain sorghum which had from 50 to 200 pounds of nitrogen applied in 1975. The purpose to determine the influence of nitrogen applied on the previous grain sorghum crop on the following cotton crop and soil test nitrate-nitrogen values obtained the first of June.

In addition to varying rates of nitrogen two varieties, Stoneville 213 and Delcot 277, were included at Portageville and Malden. These varieties were selected to determine the influence of nitrogen residue and sidedressed nitrogen on an early determinate variety (Delcot 277) as compared to an indeterminate cotton variety (Stoneville 213).

Thirteen cotton experiments were located on cooperating producer farms from which soil samples were obtained the first of June. These experiments to be used in correlating the nitrate-nitrogen soil test values with rate of nitrogen sidedressed after soil samples were obtained. The data obtained from these experiments will be used in a pilot program which will be available to cotton producers of the area in 1977.

In addition to the soil test (nitrate-nitrogen) tissue samples, petioles, were collected in July and August and analyzed for nitrate content. The results indicated a decline in nitrate content as the season progressed. Future work will include sampling of petioles weekly instead of at four week intervals so as to be in position to make corrective application of nitrogen by foliar methods if nitrate content of petioles indicate a deficiency.

Cotton producers of the area have expressed interest in the research and many plan to participate in the pilot program to be initiated by the Extension Area Soil Specialist. Additional research is needed to refine the nitrogen requirements of cotton.

Discussion: The data in Table 1 indicates that on the Tiptonville silt loam soil that there was a carry over of the nitrogen applied to the previous grain sorghum crop. Increased yields were obtained by sidedressing an additional 50 pounds of nitrogen. The soil test values indicated the plots which had high rates of nitrogen applied the previous year, 1975. In 1976 the yield of Delcot 277 was significantly higher than Stoneville 213. Seventy-five pounds of nitrogen sidedressed produced the highest yields and the increase was significant in summary of all nitrogen means.

At the Malden experiment on the sandy soil 25 pounds of nitrogen sidedressed was sufficient. Higher rates of nitrogen indicated a reduction in yield, although not significant, as compared to the 25 pounds nitrogen rate of application. The residue nitrogen from the previous grain sorghum crop did not significantly influence yields. The soil nitrate nitrogen test indicate that nitrogen moves down beyond the root zone during the winter months.

Table 3 reports the data obtained from the experiment in which nitrogen was applied broadcast two week before planting as compared to sidedressing. The soil nitrate tests obtained in June indicated the nitrogen which was broadcast preplant. Fifty pounds of nitrogen broadcast preplant produced the most optimum yield of the broadcast treatments but sidedressing 75 pounds of nitrogen exceeded the yields of the broadcast treatments. The results indicate that nitrogen could be applied either preplant broadcast or sidedressed on this Tiptonville silt loam soil. The nitrate nitrogen in the tissue, petioles, decreased to approximately one-half in August as compared to the July content. Nitrogen did not significantly influence staple or micronaire of the cotton in this experiment in 1976.

Nitrogen continued to be the most critical plant nutrient on cotton as a sufficient quality is required for maximum yields but too much is very often determental. The lack of rain in August and September in 1976 prevented the usual damage caused by excessive rates of nitrogen.

Table 1: The Influence of Residue Nitrogen on Cotton - 1976 - Portageville Field - Tiptonville Silt Loam Soil

Soil Test:	% O.M.	Pounds Per Acre P_2O_5	Ca	K	Mg	pHs	N.A.	C.E.C.
Topsoil 0- 6"	2.4	357	3200	574	310	5.8	2.0	12.0
Subsoil 6-12"	2.0	371	3600	400	270	6.2	1.0	11.5

Soil Treatment Lbs Nitrogen/A 1975	1976	June Soil NO_3-N (Lbs/A 0-18 in)	%NO_3-N Petioles July	August	Staple (32)	Micro-naire	Total Yield Seed Cotton (Lbs/A)
50	None	8.9bc	0.29d	0.11f	36.1abc	4.2c	1100f
50	25	8.6c	0.82c	0.08f	36.1abc	4.1c	1232ef
50	50	9.9abc	1.58ab	0.25de	36.5ab	4.2c	1648bc
50	75	11.9ab	1.61ab	0.60b	36.5ab	4.2c	1868ab
100	None	10.2abc	0.43d	0.10f	36.4abc	4.3bc	1173ef
100	25	10.1abc	0.85c	0.17ef	35.9c	4.1c	1385de
100	50	9.1bc	1.33b	0.34cd	36.5ab	4.1c	1763ab
100	75	10.8abc	1.61ab	0.69ab	36.3abc	4.3bc	1985a
150	None	9.8abc	0.32d	0.10f	36.1abc	4.2c	1175ef
150	25	9.5bc	0.76c	0.14ef	36.5ab	4.1c	1551cd
150	50	10.3abc	1.55ab	0.34cd	36.4abc	4.2c	1843ab
150	75	10.4abc	1.71a	0.64ab	36.0bc	4.5a	1834ab
200	None	10.0abc	0.29d	0.13f	36.1abc	4.4ab	1196ef
200	25	11.4abc	0.76c	0.20ef	36.3abc	4.3bc	1518cd
200	50	11.8abc	1.35b	0.40c	36.6a	4.1c	1832ab
200	75	12.7a	1.71a	0.73a	36.6a	4.2c	1855ab
Nitrogen Means 1976							
	None	9.7b	0.34d	0.11c	36.2b	4.3a	1161d
	25	9.9b	0.80c	0.15c	36.2b	4.1b	1421c
	50	10.3ab	1.45b	0.33b	36.5a	4.2b	1772b
	75	11.4a	1.66a	0.67a	36.3ab	4.3a	1885a
Nitrogen Means 1975							
50		9.8b	1.08a	0.26b	36.3b	4.2a	1462b
100		10.0b	1.06a	0.32ab	36.3b	4.2a	1576a
150		10.0b	1.08a	0.31ab	36.3ab	4.3a	1601a
200		11.5a	1.03a	0.37a	36.4a	4.3a	1600a
Variety Means							
Stoneville 213			1.00a	0.30a	36.1b	4.5a	1438b
Delcot 277			1.12a	0.33a	36.5a	3.9b	1681a

Planted: April 27, 1977
Herbicide: Cotoran premerge
Fertilizer: All plots 50 P_2O_5 + 50 K_2O; nitrogen sidedressed
Harvested: First picking October 19; second picking November 16

Table 2: The Influence of Residue Nitrogen on Cotton - 1976 - Malden Airbase - Dunklin County - Malden Sandy Soil

Soil Test:	% O.M.	Pounds Per Acre P_2O_5	Ca	K	Mg	pHs	N.A.	C.E.C.
Topsoil 0- 6"	1.6	105	900	216	280	5.4	2.0	5.5
Subsoil 6-12"	1.3	151	900	246	250	5.5	2.0	5.5

Soil Treatment Lbs Nitrogen/A 1975	1976	June Soil NO_3-N (Lbs/A 0-18 in)	%NO_3-N Petioles July	August	Staple (32)	Micro-naire	Total Yield Seed Cotton (Lbs/A)
50	None	5.8ab	0.34gh	0.14f	35.9ab	3.4ab	1312e
50	25	6.4ab	0.79a-e	0.32e	35.4b	3.6ab	1473a-e
50	50	5.2b	0.85a-d	0.50c	35.6ab	3.6ab	1492a-d
50	75	6.5ab	0.99a	0.55bc	35.8ab	3.5ab	1593ab
100	None	6.2ab	0.63c-f	0.28ef	35.8ab	3.7a	1450a-e
100	25	7.0a	0.58d-g	0.47cd	35.8ab	3.5ab	1620a
100	50	6.2ab	0.62def	0.57bc	35.8ab	3.7a	1463a-e
100	75	6.0ab	0.73a-f	0.75a	35.8ab	3.5ab	1524abc
150	None	6.3ab	0.29b	0.17f	35.6ab	3.4b	1316e
150	25	6.7ab	0.65b-f	0.34de	36.0a	3.6ab	1526abc
150	50	5.9ab	0.78a-e	0.52c	35.6ab	3.5ab	1436b-e
150	75	5.8ab	0.92ab	0.53bc	35.9ab	3.4ab	1394cde
200	None	7.0a	0.56efg	0.20ef	35.8ab	3.5ab	1341de
200	25	7.6a	0.50fgh	0.47cd	35.9ab	3.6ab	1536abc
200	50	6.4ab	0.90abc	0.61abc	35.5ab	3.4ab	1469a-e
200	75	7.1a	0.91ab	0.68ab	35.6ab	3.6ab	1559abc
Nitrogen Means 1976							
	None	6.3ab	0.45c	0.20d	35.8a	3.5a	1355b
	25	6.9a	0.63b	0.40c	35.8a	3.6a	1539a
	50	5.9b	0.79a	0.55b	35.6a	3.6a	1465a
	75	6.3ab	0.89a	0.63a	35.8a	3.5a	1518a
Nitrogen Means 1975							
50		6.0a	0.74a	0.38a	35.7a	3.5a	1468a
100		6.4a	0.64a	0.52a	35.8a	3.6a	1515a
150		6.1a	0.66a	0.39a	35.8a	3.5a	1419a
200		7.0a	0.72a	0.49a	35.7a	3.5a	1476a
Variety Means							
Stoneville 213		6.3a	0.59a	0.41a	35.6a	3.7a	1455a
Delcot 277		6.4a	0.79a	0.48a	35.8a	3.4a	1484a

Planted: May 5, 1977 Stoneville 213 and Delcot 277
Herbicide: Treflan incorporated; Cotoran premerge
Fertilizer: All plots 50 P_2O_5 + 50 K_2O; nitrogen sidedressed June 4
Harvested: One picking October 21

Table 3: Comparison of Broadcasting Nitrogen Preplant and Nitrogen Sidedressed - 1976 - Portageville Field - Tiptonville Silt Loam Soil

Soil Test:	% O.M.	P_2O_5	Ca	K	Mg	pHs	N.A.	C.E.C.
		Pounds Per Acre						
Topsoil 0- 6"	2.5	334	3800	364	350	6.4	1.0	15.0
Subsoil 6-12"	2.7	284	3800	236	350	6.4	1.0	12.5

Lbs Nitrogen/A Broad-Cast	Lbs Nitrogen/A Side dress	June Soil NO_3-N (Lbs/A 0-18 in)	NO_3-N Petioles July	NO_3-N Petioles August	Staple (32)	Micro-naire	Total Yield Seed Cotton (Lbs/A)
None	None	21.3b	0.43i	0.10j	37.3a	3.6a	2566g
None	25	21.3b	0.65hi	0.13ij	36.6b	3.7a	2815ef
None	50	21.3b	1.21b-e	0.31fgh	36.7ab	3.7a	2970b-e
None	75	21.3b	1.29a-d	0.49de	36.6b	3.7a	3071a-d
25	None	23.6b	0.59hi	0.18hij	36.7ab	3.7a	2709fg
25	25	23.6b	0.94fg	0.25ghi	36.7ab	3.6a	2867c-f
25	50	23.6b	1.27a-d	0.48de	36.9ab	3.7a	3112abc
25	75	23.6b	1.38abc	0.56cde	36.7ab	3.6a	3250a
50	None	26.4ab	0.18gh	0.23g-j	36.9ab	3.7a	2846def
50	25	26.4ab	1.16c-f	0.34fg	36.9ab	3.5a	3003b-e
50	50	26.4ab	1.21b-e	0.59bcd	36.7ab	3.6a	2966b-e
50	75	26.4ab	1.44ab	0.61bcd	36.9ab	3.7a	3202ab
75	None	32.6a	0.95fg	0.42ef	36.7ab	3.6a	2907c-f
75	25	32.6a	1.04d-g	0.48de	36.7ab	3.7a	2922c-f
75	50	32.6a	1.33abc	0.68abc	36.7ab	3.7a	3049a-e
75	75	32.6a	1.46ab	0.71ab	36.9ab	3.6a	3209ab
100	None	34.6a	0.97efg	0.64abc	36.9ab	3.8a	2892c-f
100	25	34.6a	1.24a-d	0.61bcd	36.9ab	3.8a	2991b-e
100	50	34.6a	1.36abc	0.77a	36.4b	3.5a	3038a-e
100	75	34.6a	1.47a	0.72ab	37.0ab	3.7a	2979b-e
Broadcast Means							
None		21.3b	0.90c	0.26d	36.8a	3.7a	2856b
25		23.6b	1.05b	0.37c	36.8a	3.6a	2985ab
50		26.4ab	1.15ab	0.44c	36.8a	3.6a	3005a
75		32.6a	1.19a	0.57b	36.8a	3.6a	3022a
100		34.6a	1.26a	0.68a	36.8a	3.7a	2975ab
Sidedress Means							
	None		0.75d	0.31b	36.9a	3.7a	2784d
	25		1.01c	0.36b	36.7a	3.6a	2920c
	50		1.28b	0.57a	36.7a	3.6a	3028b
	75		1.41a	0.62a	36.8a	3.6a	3143a

Planted: Delcot 277, May 7
Herbicide: Cotoran premerge
Fertilizer: All plots 50 P_2O_5 + 50 K_2O; nitrogen broadcast April 22; sidedressed June 21
Soil Sampled For Nitrate Test: June 9
Petioles Sampled: July 13 and August 13
Harvested: First picking October 18; second picking November 16

IDENTIFYING CORN GERM PLASM WHICH IS RESISTANT TO THE SOUTHWESTERN CORN BORER

Dean Barry, USDA, ARS

Five-hundred and three individual corn plant selections from 1780 plots (about 20 plants per plot) were made for first generation southwestern corn borer (SWCB) resistance. These plants were selfed for further testing. Two lines: 1) H6 x CI38B x Tuxpantigua) and 2) (Oh 41 x Tuxpantigua) (Mo 22 x Tuxpantigua), were selected from corn breeding materials from Ohio and 4 lines: 1) (Oh 43 x B14), (842 x Pioneer W. Ind. Syn.)-1-1-B, 2) (Ms153 x 719-10) (Pioneer CBTC x Iowa Sel. ETO)-3-1-1, 3) (7110-2 x MX153) x (Pioneer W. Ind. Syn.) C1-241, 4) (8670 x MS153-R) x P80F (La.) C1-2-1-1 were selected from corn breeding materials from Michigan. These were all selected for first generation SWCB resistance. From 200 lines of corn from the North Carolina breeding program, 28 lines were selected for retesting for second generation European corn borer resistance.

The materials selected for SWCB have been included in a corn breeding program. Although the resistance was confirmed from data taken in Columbia, all are being retested this season at the two locations and appear to retain the resistance. However, the selections for second generation ECB appear to have been "escapes" (non-infested in 1976).

We have identified a composite population from Cargil's breeding material with a high level of first generation SWCB resistance.

CONTROLLING WEEDS IN COTTON AND SOYBEANS

Harold D. Kerr

Consider the reasons for controlling weeds in producing crops. Maximum yield return per unit of capital unvested is crucial for the farm manager. High quality of the harvested crop insures the best grade of produce at the primary marketing point. Harvesting efficiency is a problem if weeds infest fields. Dockage for foreign matter in weedy crops cuts into the profit margin. Green weeds raise the moisture content of harvested grain and stain the cotton fiber -- monetary loss and storage problems! Weeds uglify the farmstead and if left to grow will "brand" the farmer as to his competence. Weed management involves both money and aesthetic values. If left to mature seeds, weeds involve subsequent crops and future generations of farmers. Yet, what does it profit a man to control all his weeds and spend all of his "furnish" money? Especially if the environment becomes contaminated in the process.

Cost of a herbicide is regulated in the market place by its unique properties for controlling one or more species of weed and by its nearest competitor placed beside it on the dealer's shelf. Competition is just as important at the company store as it is among crop and weed plants out in the field. Pricing is set by the demand for the supply of chemical in the herbicide market. Farmers can quickly regulate demand for a herbicide but changes in supply occur more slowly and less directly. Availability of alternate choices is very important in weed management. How much control is enough still is a question to be answered for individual crop-weed situations.

Today we will look at a field study comparing herbicides for control of grasses in cotton and soybeans. Three ways of incorporating the herbicides into the soil are being compared. Responses of three cultivars each of cotton and soybeans are included in the study. Cultivation of the whole study has been very timely. One uniform weeding by hoeing was done as an aid in studying the longevity of the herbicides for controlling weeds.

Weed management research trials by Harold Kerr, weed researcher at the Delta Center, show that Roundup applied preplant and followed by Karmex at planting time provides good weed control when used in conservation tillage practices in cotton production.

COMBINATIONS OF VARIABLES IN STUDY

Method of Incorporating Herbicide Preplanting

Disk - Spray - Bed
Disk - Spray - Disk - Bed
Disk - Bed - DoAll - Spray - DoAll

Herbicide in Grams/Are

Amex	22
Basalin	9
Cobex	4
Cobex+Rydex	2+2
Tolban	9
Treflan	9
Dual,pre	18

Cultivar of Crop

Cottons
- Auburn M
- Delcot 277
- Stoneville 213

Soybeans
- Forrest
- Mack
- Mitchell

Experiment started on 10 May 1977 with all treatments and planting on that date.

CORN AND SORGHUM INSECT RESEARCH IN 1977

R. D. Sheeley

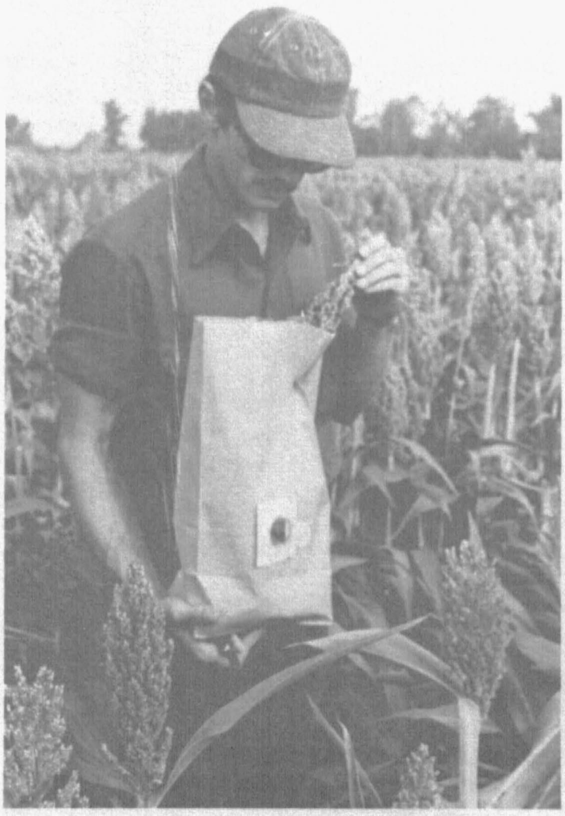
Because all data have not been gathered yet and none have been analyzed it is impossible to report on the results of the experiments conducted in 1977. Below is a brief outline of these experiments.

This year most insecticide evaluations have been conducted with lower gallonage applications to simulate aerial applications since most of the area farmers do not use ground equipment. The insecticide tests that are being conducted are as follows:

- Corn Borer Systemics + Foliar Applications
- Corn Borer Foliar Applications (X2)
- Sorghum Midge Evaluations
- Sorghum Headworm Evaluations
- Sorghum Fall Armyworm Evaluations
- Mesurol Bird Repellent Evaluation on Sorghum

This year a study of the life history of the sorghum midge was begun to eventually aid us in finding or confirming the most efficient method of control in our area. Observations were also made on the egg laying behavior of the Southwestern Corn Borer with its seasonal correlation.

We were also involved with USDA personnel in their corn screening trials looking for resistance to corn borers and corn diseases.



In the bag go sorghum heads treated with insecticides to find out which chemical is most effective for controlling sorghum midges. Ron Sheeley, entomologist, hangs the bagged heads in a greenhouse so that any midges that survive the insecticides will emerge. That way, he can tell which insecticides are most effective.

RESULTS OF SOME OF THE 1976 INSECTICIDE TRIALS ON CORN AND GRAIN SORGHUM

Ron D. Sheeley

Eight insecticides were evaluated in 1976 as to their effectiveness in controlling European Corn Borer (ECB) and general foliage feeding insects in purple hull peas. Although the test was affected by factors beyond our control significant results were obtained. UC-51762 75SP, Pencap-M 2ME, Toxaphene 6EC, Dylox 80SP, Sevin 80WP and Imidan 50WP, were among the best materials in ECB control. UC-51762 75SP, Zolone 3EC, Imidan 50WP, and Sevin 80WP were among the best in reducing foliar damage.

Seventeen liquid materials and one wettable powder were evaluated in 1976 for their effectiveness in control of the Sorghum Midge via two applications during bloom. Midge infestation was abnormally low resulting in loss of most data. From the combination of evaluation criteria gathered, Trithion 4EC, Ethion 4EC, SD-41706 2.4EC, Lorsban 4EC, and Supracide 2EC were most effective; Ethyl Parathion 4EC, Cygon 2.67EC, Sevin 80WP and Pencap-E 2 ME were least effective.

Three granular insecticides, one of which was used in combination with a spray and one with two applications, were evaluated in 1976 for effectiveness in reducing European Corn Borer (ECB) and Southwestern Corn Borer (SWCB) damage to field corn. Furadan 10G at 1.00#ai/A in the furrow at planting followed by Furadan 4F foliar applications in late whorl and late dough stage at 0.50 #ai/A provided the best control by far. Furadan 10G applied in the furrow at planting and sidedressed in late whorl at 1.00 #ai/A, and CGA-12223 20G applied in a 7" band at planting at 1.00 #ai/A also provided good control. Banding the phytoxic CGA-12223 20G compound appeared to reduce its toxicity. The in-furrow applications of CGA-12223 20G were least effective probably due to phytotoxicity.

Five granular and nine liquid insecticides were evaluated in 1976 for control of European Corn Borer and Southwestern Corn Borer via foliar applications. Moth flights were abnormally low and peaks were erratic thus making properly timed applications difficult. Two applications were made with dissections after each. From the first application Furadan 10G and Diazinon 14G at 1.00 #ai/A were the most efficient compounds examined while SD-43775 2.4EC at 0.10 #ai/A was the least effective. From the second dissection Dyfonate 20G at 1.00 #ai/A was most effective while Furadan 4F at 0.50 #ai/A was least effective. Granular materials, although more difficult to apply by airplane, gave far better control of corn borer than liquid materials.