Plant and Soil Science Research Results 1978-79

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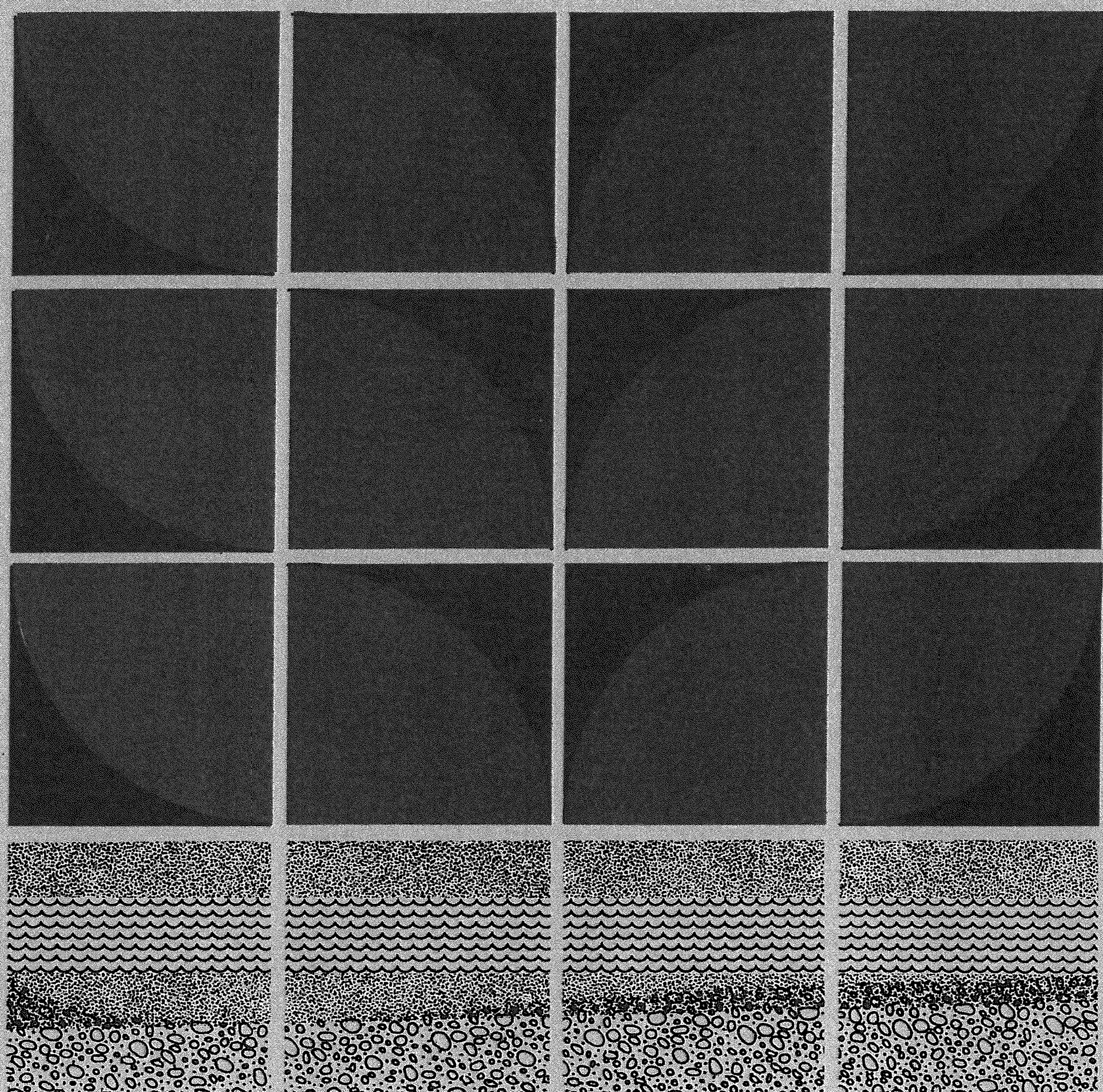

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PLANT AND SOIL SCIENCE RESEARCH RESULTS, 1977-78[1]

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INTERPRETATION OF DATA

All yield data from agronomy research plots are statistically analyzed to help readers make valid comparisons. An L.S.D. (least significant difference) (.05) indicates that 95 of 100 times differences as large or larger than the L.S.D. are real; that is, they would happen by chance alone no more than 5 to 100 times. The L.S.D. give in bushels per acre is simply the difference in number of bushels needed before one can be reasonably confident that one treatment is superior to another. The abbreviation n.s. opposite L.S.D. means that yields do not differ significantly.

One year's results from any investigation can vary from results the next year so such results are tentative. No matter how promising one year's data may appear, recommendations always should be based on several years' results.

In this report grain yields have been corrected to a standard moisture content (wheat and grain sorghum, 12.5% soybeans 13.0%) to make differences comparable.

Product names are for clarity only; no endorsement is intended.

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WHEAT

Small Grain Variety Tests

In 1978, 31 winter wheat varieties and 16 spring oat varieties were tested. And experimental winter wheat varieties were evaluated in our small nursery plots by wheat breeders from Fort Hays Branch Station and Kansas State University. Statewide performance of varieties is given in the 1978 Kansas Performance Tests with Fall-planted Small Grains, Report of Progress 339 (available at county Extension offices).

Fall and Spring Nitrogen Applications Compared for Wheat

Previous nitrogen studies in southeastern Kansas have shown little difference among ammonium nitrate, urea, and nitrogen solutions as spring topdressing for wheat. However, N lost from fall applications is a common concern when winter percipitation is above normal.

Procedure: Since 1975 we have compared fall and spring N applications of urea and ammonium nitrate at 30, 60, and 90 pounds of nitrogen per acre.

Results: The wetter-than-normal 1977-78 provided good conditions for comparing fall and spring N applications, and showed no significant differences in yield between times N was applied or N carriers. With 90 pounds of N, Triumph 64 lodged severely. Grain protein in 1978 increased in direct proportion to N added, but time N was applied did not affect protein content.

Other studies have shown that applications later in spring (nearer harvest) increase protein content.

Table 1. Effects of N rates and time applied on wheat yield, grain protein, and plant lodging Columbus, 1976-78.

N rates lbs/A	Fertilizer carrier	Time applied	1978 Yield bu/A	1976-78 Yield bu/A	1978 Lodging[1/] %	1978 Protein %
0	----------	-------	29.9	37.5	0	10.8
30	Am. Nit.	Fall	34.0	42.2	0	11.0
60	" "	"	43.2	45.4	3	11.3
90	" "	"	48.1	45.5	60	12.0
30	Urea	Fall	33.7	41.3	0	10.8
60	"	"	45.9	44.9	5	11.5
90	"	"	43.4	44.6	50	12.3
30	Am. Nit.	Spring	36.6	42.0	0	10.4
60	" "	"	46.8	46.6	5	11.1
90	" "	"	42.5	43.1	65	12.5
30	Urea	Spring	40.3	42.3	0	10.6
60	"	"	46.6	43.3	2	11.6
90	"	"	42.1	41.1	55	13.8
LSD .05			6.2	----	--	.9
Mean values						
N rates						
30			36.2	42.0	0	10.7
60			45.6	45.1	4	11.4
90			44.0	43.6	58	12.7
LSD .05			2.7	----	--	.5
Carriers						
Am. Nitrate			41.9	44.2	22	11.4
Urea			42.0	42.9	19	11.8
LSD .05			n.s.	----	--	n.s.
Time						
Fall			41.4	44.0	20	11.5
Spring			42.5	43.1	21	11.7
LSD .05			n.s.	----	--	n.s.

1/ Variety grown in 1978 was Triumph 64.

Effects of Fungicide Seed Treatments on Wheat Yields

Since abandoning mercurial seed treatments, farmers generally have not used a fungicide at wheat planting time. However, when wheat is planted late in the fall after soybean harvest, soils are somewhat wet and soil temperatures are not always conducive to rapid seed germination, so treating wheat seed might be good management.

Procedure: For the past three years we have evaluated effects of fungicide seed treatment at two planting dates: October representing optimum environmental conditions; November, colder soil conditions. Wet soil in the fall of 1977 let us use only one planting date (late November). All fungicides were planter-box, powder formulations, except for flowable Vitavax-200. Each was applied according to label directions.

Results: Because the fall of 1977 was wetter and colder than normal, it provided a good environment to evaluate fungicide seed treatments. However, the late planted wheat did not germinate until early spring; then there were no visual differences in emergence between plots that received fungicide and those that received none. And there were no differences in yields.

Previously, fungicide treatments for late November plantings had given a yield advantage of approximately 3 bushels per acre over the control. But the past three years' results indicate that a fungicide seed treatment for wheat will not always increase yields but it is good insurance when soil is wet and cool at planting time.

Table 2. Effects of fungicide seed treatments on wheat yields, Parsons, 1976-78.

Fungicide treatment 1/	1978 yield, bu/A November planting	1976-78 yield, bu/A October planting	1976-78 yield, bu/A November planting
No fungicide (control)	26.3	44.9	28.9
Vitavax-200	26.3	46.2	29.5
Captan-25	26.4	46.1	30.1
Arasan 50-Red	27.2	50.1	30.6
Maneb	29.0	48.6	32.0
Manzate-200	27.5	45.9	30.6
Terra-coat	26.5	----	----
Treatment LSD .05	n.s.	----	----

1/ Fungicide treatments were applied according to label rates.

Table 3. Effects of seeding rates on yields, test weights, and seed size of indicated wheat varieties, Parsons, 1978.

Variety	Seeding rate lbs/A	Grain yield, bu/A	Test wt. lbs/bu	Seed size gr/500 seeds
Newton	60	32.7	59.5	13.4
Newton	90	34.9	59.5	13.1
Newton	120	39.1	60.3	14.2
Centurk	60	28.3	59.0	12.6
Centurk	90	32.2	59.9	12.6
Centurk	120	34.2	59.9	12.0
Abe	60	17.1	58.3	15.1
Abe	90	25.4	59.0	15.5
Abe	120	30.6	59.8	15.7
Trison	60	21.3	59.8	15.9
Trison	90	24.1	59.3	15.8
Trison	120	24.2	59.3	15.5
LSD .05		4.1	n.s.	----
Mean values				
Newton		35.6	59.8	13.6
Centurk		31.6	59.3	12.4
Abe		24.4	59.0	15.4
Trison		23.2	59.5	15.7
LSD .05		2.4	----	----
60 lbs/A		24.9	59.2	14.3
90 lbs/A		29.1	59.3	14.3
120 lbs/A		32.0	59.7	14.4
LSD .05		2.1	----	----

Effect of Seeding Rate on Yield, Test Weight, and Seed Size With Selected Wheat Varieties.

Wheat seeding rates in southeastern Kansas have gradually increased the past several years. Also, more semi-dwarf varieties, like Newton, are being grown. Farmers now want to know how seeding rates affect wheat yields.

Procedure: In 1978 four wheat varieties (Trison, Newton, Centurk, and Abe) were seeded at 60, 90, and 120 pounds per acre. Due to wet fall conditions, the plots were not seeded until November 22, and the wheat did not germinate until early spring--not a normal year!

Results: The 120-pound rate gave the highest grain yield regardless of variety. Newton and Centurk yielded significantly more than Abe or Trison. The 120-pound seeding rate probably had more effect on final yield than it would in a normal year when wheat emerges in the fall.

Seeding rate did not affect test weight or seed size, although seed sizes varied according to variety. Centurk seed is considerably smaller than seeds of the other three varieties.

CORN

Corn Herbicides Compared

Corn is not so sensitive as other row crops are to herbicide injury. The primary objective with corn is to select the herbicide combination that will control problem weeds in a particular field situation.

Procedure: In 1978 we compared selected herbicides and combinations of herbicides at two locations with different soil types. The major weed competition at both sites was crabgrass with some pigweeds.

Results: In comparisons between the two major broadleaf herbicides AAtrex controlled pigweeds better than Bladex did, but Bladex controlled crabgrass better. A Bladex-AAtrex combination was more effective than either herbicide alone.

The grass herbicides (Lasso, Dual, Eradicane, Sutan+, Prowl, and Bexton) were about equal in controlling crabgrass, except that Bexton did not control grasses so long as the other herbicides did.

No corn injury was apparent from any herbicide treatment even though one site's organic matter content was only 1.2%.

Table 4. Herbicides in corn, compared, 1978.
(No crop injury from any treatment 1 week after corn emerged.)

Labette County

Treatment	Lbs A.I./A	When applied 1/	% Weed Control 2/ Broad-leaf	% Weed Control 2/ Grass
No herbicide	---	---	0	0
AAtrex Nine-O	2.0	PRE	95	80
Bladex 4L	2.5	PRE	75	90
AAtrex 4L + Bladex 4L	.75 + 1.5	PRE	90	85
AAtrex 4L + Lasso 4E	1.5 + 2.0	PRE	95	95
Bladex 4L + Lasso 4E	1.5 + 2.0	PRE	80	95
AAtrex 4L + Dual 8E	1.5 + 2.0	PRE	95	95
Bladex 4L + Dual 8E	1.5 + 2.0	PRE	85	95
Eradicane 6.7E + AAtrex 4L	4.2 + 1.0	PPI	95	95
Eradicane 6.7E + Bladex 4L	4.2 + 1.5	PPI	85	95
Sutan + 6.7E + AAtrex 4L	3.3 + 1.0	PPI	95	95
Sutan + 6.7E + Bladex 4L	3.3 + 1.5	PPI	85	95
Prowl 4E + AAtrex 4L	1.5 + 1.5	PRE	95	95
Prowl 4E + Bladex 4L	1.5 + 1.5	PRE	85	95
Bexton 4L + Bladex 4L	3.0 + 1.5	PRE	80	85
Bexton 4L + AAtrex 4L	3.0 + 1.5	PRE	95	85

Soil Type: clay loam; organic matter = 2.4%

Cherokee County

Treatment	Lbs A.I./A	When applied 1/	% Weed Control 2/ Broad-leaf	% Weed Control 2/ Grass
No herbicide	---	---	0	0
AAtrex 4L	2.0	PRE	95	75
Bladex 4L	2.5	PRE	80	95
AAtrex 4L + Bladex 4L	.75 + 1.5	PRE	95	95
AAtrex 4L + Lasso 4E	1.5 + 2.0	PRE	95	95
Bladex 4L + Lasso 4E	1.5 + 2.0	PRE	85	95
AAtrex 4L + Dual 8E	1.5 + 2.0	PRE	95	95
Bladex 4L + Dual 8E	1.5 + 2.0	PRE	85	95
Prowl 4E + AAtrex 4L	1.5 + 1.5	PRE	95	95
Prowl 4E + Bladex 4L	1.5 + 1.5	PRE	85	95
Bexton 4F + Bladex 4L	3.0 + 1.5	PRE	80	85
Bexton 4F + AAtrex 4L	3.0 + 1.5	PRE	95	80

Soil type: Cherokee sand silt loam; organic matter = 1.2%

1/ PPI = incorporated with a disc before planting.
PRE = applications made after planting prior to corn emergence

2/ Major weed competition from crabgrass and pigweed. Grain yields were not taken because an extremely dry summer resulted in poor pollination.

GRAIN SORGHUM

Grain Sorghum Performance Test

Sixty-two grain sorghum hybrids were tested in 1978 to evaluate those best adapted to southeastern Kansas. Results are reported in the 1978 Kansas Grain Sorghum Performance Tests, Report of Progress 348 available annually from County Extension Offices.

Effect on Yields of Time Nitrogen is Applied to Grain Sorghum

Nitrogen normally is applied to grain sorghum in the spring in southeastern Kansas. Applying it in late fall might be more advantageous some years, depending on labor and weather. However, we have little research data comparing fall and spring N applications in the clay-pan soils of the area.

Procedure: For the past two years we have compared responses to N as anhydrous ammonia and as urea applied in late fall or early spring at four rates (40, 80, 120, and 160 pounds per acre).

Results: The two-year results indicate no difference between N carriers nor time of application. The 1977-78 fall and winter was wetter than normal, which gave a good comparison between fall and spring applications, but the summer of 1978 was extremely dry so grain sorghum yields were extremely low. Nitrogen rates exceeding 120 pounds per acre have not increased yields here under dryland conditions.

Effects of Tillage Methods on Grain Sorghum Yield.

Evaluations of primary tillage methods are of interest to farmers in southeastern Kansas, particularly where claypan soils predominate.

Procedure: Since 1976, we have compared four tillage methods (plow, disc, chisel, and no-till) with grain sorghum grown on a Parsons silt loam soil. The previous crop each year was grain sorghum. Nitrogen fertilizer was applied on the soil surface, and incorporated (except for the no-till plot) with a springtooth before planting. Phosphorus and potassium were applied with the planter. Herbicide rate was 6 pounds of Ramrod/atrazine; 1 1/2 pints of Paraquat per acre also was added on no-till plots. All plots were planted with a no-till Buffalo planter, equipped with a slot-shoe attachment.

Results: In 1978 yields did not differ significantly among the four tillage methods, although extremely dry soil conditions existed throughout the growing season. Three-year averages show yields from no-till plots somewhat below yields from any of the three conventional tillage methods.

Cost comparisons in 1977 indicated that although conventional tillage costs the most and takes the most time, it still gave highest economic returns. The energy saved with the no-till method is offset somewhat by lower yields and higher herbicide costs.

Table 5. Effects on yields of time nitrogen is applied to grain sorghum, Parsons 1977-78.

N rate lbs/A	N carrier	Time applied	Yield, bu/A 1978	Yield, bu/A 1977
0	---	---	49.8	48.6
40	Ammonia	Fall	55.8	69.4
80	"	"	58.8	75.9
120	"	"	52.9	88.7
160	"	"	50.8	90.6
40	Urea	Fall	55.6	57.4
80	"	"	53.9	61.7
120	"	"	57.4	77.7
160	"	"	58.9	75.4
40	Ammonia	Spring	57.7	66.1
80	"	"	56.9	84.1
120	"	"	56.5	87.2
160	"	"	55.3	84.5
40	Urea	Spring	56.0	71.3
80	"	"	55.8	73.5
120	"	"	55.1	90.7
160	"	"	56.2	88.7
Treatment LSD .05			n.s.	16.7
Mean values:				
N rates				
40 lbs N			56.3	66.1
80 lbs N			56.4	73.8
120 lbs N			55.5	86.1
160 lbs N			55.3	84.8
N carrier				
Anhydrous ammonia			55.6	80.8
Urea			56.1	74.6
Time of N				
Fall			55.5	74.6
Spring			56.2	80.8

Table 6. Effect of tillage methods on grain sorghum yields, Parsons, 1976-78. (Previous crop each year was grain sorghum)

	Grain yield, bu/A			
Tillage treatment	1976	1977	1978	3-year average
Plow	73	85	34	64
Chisel	74	80	34	63
Disc	72	77	38	62
No-till	63	70	39	57
LSD .05	7	6	n.s.	--

Grain Sorghum Herbicides Compared

Grain sorghum is more sensitive to herbicide injury than corn, so the main concern in southeastern Kansas is to select a herbicide combination that controls weeds acceptable without excessive seedling injury. Major weed competition in 1978 was from crabgrass.

Results: Preplant incorporation of Igran resulted in poor control of crabgrass probably because the herbicide was incorporated too deep with the springtooth. Igran must be incorporated shallow for good grass control; normally, preplant applications injure grain sorghum seedlings less than preemerge applications.

Bexton has the same active ingredient (propachlor) as Ramrod but in flowable liquid form.

Bladex combinations did not injure sorghum seedlings in 1978; previously when cool, wet conditions prevailed after planting, Bladex caused seedling injury. Bladex controls crabgrass better than atrazine, but atrazine controls pigweed better than Bladex.

Modown gives acceptable broadleaf control, but its grass control is weak.

Ramrod/atrazine has proved to be a safe, effective grain sorghum herbicide, although grasses may appear later in the season after Ramrod has been diluted by rainfall. However, late season grass invasion does not seem to reduce grain yields nearly so much as early season competition.

Table 7. Grain sorghum herbicides compared, Parsons, 1978.

Treatment	Lbs. A.I./a	When applied 1/	Yield bu/A	%Grass control 2/	Crop injury 3/
No herbicide	---	---	2.1	0	0
Hand weeded	---	---	41.0	98	0
Bexton 4L	3.0	PRE	27.1	40	0
Bexton 4L + AAtrex 4L	3.0 + 1.0	PRE	45.3	87	0
Bexton 4L + Bladex 4L	3.0 + 1.0	PRE	45.6	92	0
Bexton 4L + Modown 80W	3.0 + 1.5	PRE	31.3	53	*
Dow M-4213 + MC 2188	3.0 + 1.5	PPI	3.1	5	0
Ramrod/atrazine 69WP	4.1	PRE	50.0	95	0
Ramrod 65W + Bladex 80W	3.0 + 1.0	PRE	52.7	93	0
Igran 80W	1.5	PPI	4.8	2	0
Igran 80W + AAtrex 4L	1.5 + .75	PPI	9.7	13	0
Igran 80W + AAtrex 4L	1.5 + .75	PRE	47.7	95	0
AAtrex 4L	1.5	PPI	14.0	20	0
AAtrex 4L	1.5	PRE	47.7	87	0
AAtrex 4L	1.5	POST	13.1	23	0
Treatment LSD .05			9.4	--	--

1/ PRE = application after planting (5/17)
PPI = incorporated with a springtooth before planting (5/17)
POST = application after sorghum emerged (5/26)

2/ Weed control rating made Aug. 20. Weed competition predominantly from a heavy infestation of crabgrass.

3/ Crop injury rated on percentage stand loss one week after sorghum emerged.

* Modown applied before sorghum emerged showed phytoxicity (leaf chlorosis) when sorghum was 1 foot high.

Soil type: Parsons silt loam; organic matter = 1.4%.

Precipitation (inches) after planting date (5/17): 5/18 = .89; 5/19 = .29; 5/20 = .31; 5/23 = .27.

SOYBEANS

Soybean Variety Performance Test

Southeastern Kansas is the leading soybean-producing area in the state, so extensive research is devoted to soybeans. In 1978, 38 varieties were tested in the standard performance trials, 38 new variety strains were compared in a regional testing program, and 40 experimental lines from Kansas were tested. Results are included in the 1978 Kansas Soybean Variety Tests, Report of Progress 347 (available at County Extension Offices).

Soybean Response to Fertilizer Applied to a Previous Crop (Grain Sorghum)

Soybeans grown in southeastern Kansas normally are not fertilized, but many farmers think they benefit from residual fertilizer applied to a wheat or row crop previously.

Procedure: In 1973 we established a grain sorghum and soybean crop rotation on an acid soil that was low in phosphorus and potassium. Fertilizer was applied each year to the grain sorghum, but the succeeding crop (soybeans) received no additional fertilizer.

Results: Soybean yields the past five years (Table 8) have demonstrated that soybeans on soils of low fertility use residual phosphorus and potassium, from the previous crop. Because the soil site was extremely low in phosphorus, the largest increase in yield came from added phosphorus. However, yields were highest when lime, phosphorus, and potassium were applied. Soybeans in general have not responded to residual nitrogen, except for a slight increase on unlimed plots that received no phosphorus or potassium.

Table 8. Soybean's response to fertilizer applied to a previous crop (grain sorghum), Parsons, 1974-78.

Fertilizer 1/ lbs/A			Gr. Sorg. yield bu/A, 1973-77			Soybean yield bu/A, 1974-78		
N	P_2O_5	K_2O	No lime	Lime 2/	Mean	No lime	Lime 2/	Mean
0	0	0	36.1	44.4	40.3	18.3	23.0	20.6
100	0	0	36.9	44.4	40.7	19.6	22.1	20.8
200	0	0	39.1	44.5	41.8	20.9	22.8	21.8
0	75	0	61.8	60.5	61.1	24.9	25.4	25.1
0	150	0	60.7	63.6	62.1	27.2	26.8	27.0
0	0	75	40.8	52.5	46.6	20.0	24.0	22.0
0	0	150	45.1	50.5	47.8	21.2	26.0	23.6
0	75	75	64.3	69.8	67.1	26.1	28.4	27.2
100	75	0	65.7	63.0	64.3	24.4	25.6	25.0
100	0	75	40.1	49.5	44.8	21.6	24.8	23.2
100	75	75	713	74.5	72.9	25.6	28.1	26.8
0	150	150	65.4	75.0	70.2	30.8	33.7	32.2
200	150	0	68.4	67.8	68.1	27.7	27.4	27.5
200	0	150	42.5	53.3	47.9	23.3	26.0	24.6
200	150	150	80.1	79.6	79.8	31.9	33.9	32.9
Mean			54.5	59.5		24.2	26.5	
Mean value LSD .05								
Lime					n.s.			n.s.
Fertilizer					10.3			3.6
Lime x Fertilizer					n.s.			n.s.

1/ Fertilizer applied each year to the grain sorghum crop.
2/ Lime applied in 1973.

Table 9. Soil analysis (lbs per acre) after soybean harvest where fertilizer was applied to grain sorghum in a grain sorghum-soybean rotation, Parsons, 1978.

Fertilizer			Lime			No lime		
N	P_2O_5	K_2O	pH	Avail. P	Exch. K	pH	Avail. P	Exch. K
0	0	0	6.6	10	122	5.7	6	120
100	0	0	6.6	10	114	5.6	9	118
200	0	0	6.4	9	105	5.4	8	103
0	75	0	6.7	16	102	5.7	14	113
0	150	0	6.7	31	101	5.7	34	101
0	0	75	6.6	6	118	5.6	6	121
0	0	150	6.6	8	136	5.6		152
0	75	75	6.9	16	139	5.6	14	127
100	75	0	6.7	18	108	5.5	15	114
100	0	75	6.7	10	129	5.7	7	134
100	75	75	6.6	20	124	5.6	15	125
0	150	150	6.8	35	135	5.8	33	143
200	150	0	6.6	31	105	5.5	29	110
200	0	150	7.0	11	151	5.4	5	144
200	150	150	6.9	32	144	5.5	30	148

Initial soil test: pH = 5.3, ECC = 5,000 lbs/A, O.M. = 2.3%, Avail P = 6 lbs/A, Exch. K = 126 lbs/A.

Soybean Response to Fertilizer Applied to Wheat, in a Double-cropping Rotation.

Double-cropping wheat and soybeans is common in southeastern Kansas. However, farmers seldom apply any more phosphorus and potassium to the wheat where soybeans follow in a doublecropping rotation. And seldom are the soybeans fertilized directly.

Procedure: In 1976 we established a study to determine how applying additional phosphorus and potassium to wheat would influence soybeans that follow the same year. We also included lime as a variable. Soil site selected was medium in available phosphorus and low in exchangeable potassium; pH was moderately low.

Results: Wheat yields in 1977-78 at the Columbus field were significantly increased by phosphorus applications up to 60 lb/A (Table 10). Potash and lime did not increase wheat yields, but lime increased yields of the double-cropped soybeans that followed the wheat an average 5 bushels per acre. Additional phosphorus and potassium did not affect the soybean yields significantly; at higher fertilizer rates yields were increased slightly.

Table 10. Soybean's response to fertilizers applied to wheat in a double-cropping rotation, Columbus, 1977-78.

Fertilizer, lbs/A			Wheat yield, bu/A 2 yr. av.			Soybean yield, bu/A 2 yr. av.		
N	P_2O_5	K_2O	No lime	Lime 2/	Mean	No lime	Lime	Mean
70	0	0	35.5	36.9	36.2	16.3	21.7	19.0
70	0	100	36.0	36.6	36.3	18.0	22.8	20.4
70	30	100	40.8	40.6	40.7	17.4	22.7	20.1
70	60	100	44.5	44.0	44.3	17.7	22.9	20.3
70	90	100	45.4	45.9	45.7	18.0	24.5	21.3
70	120	100	46.3	44.8	45.6	16.6	23.5	20.1
70	150	100	46.9	45.8	46.4	18.7	23.6	21.2
70	60	0	44.9	42.5	43.7	17.6	24.3	21.0
70	60	50	43.9	42.8	43.4	17.0	23.7	20.4
70	60	100	44.0	44.0	44.0	17.8	23.9	20.9
70	60	150	43.2	42.9	43.1	18.4	24.4	21.4
70	60	200	42.3	43.9	43.1	19.9	23.8	21.9
70	60	250	45.1	45.0	45.1	18.5	23.7	21.1
	Mean		43.0	42.8	--	17.8	23.5	--

1/ Fertilizer applied before wheat was planted.

2/ Lime applied in the fall of 1975.

Table 11. Soil analysis after soybean harvest when fertilizer was applied to wheat in a double-cropping rotation, Columbus, 1978.

Fertilizer, lbs/A			Lime, lbs/A			No lime, lbs/A		
N	P_2O_5	K_2O	pH	Avail. P	Exch. K	pH	Avail. P	Exch. K
70	0	0	6.6	17	141	5.8	15	142
70	0	100	6.4	16	174	5.9	16	182
70	30	100	6.5	16	190	5.9	18	199
70	60	100	6.6	18	215	5.6	16	178
70	90	100	6.7	22	181	5.7	18	206
70	120	100	6.7	29	153	5.6	20	178
70	150	100	6.6	33	189	5.6	30	190
70	60	0	6.5	19	159	5.6	17	140
70	60	50	6.5	20	176	5.4	17	166
70	60	100	6.5	16	210	5.5	16	193
70	60	150	6.5	19	208	5.6	17	213
70	60	200	6.5	16	233	5.5	16	242
70	60	250	6.6	19	234	5.5	18	282

Initial soil test: pH = 5.5, ECC = 2,000 lbs/A, O.M. = 1.1%, Avail. P = 19 lbs/A, Exch. K = 137 lbs/A.

Effects of Phosphorus and Potassium on Soybean Yields.

Response of soybeans to fertilizer has been erratic in many research studies throughout the Midwest. Available soil phosphate and potassium likely is responsible for much of the variation, although soil acidity also is a factor.

Procedure: In 1978 soybeans on two locations in Cherokee county were fertilized with various rates of phosphorus and potassium to evaluate responses to them. Both sites had medium amounts of available phosphate and potassium according to soil test. Fertilizer was applied before planting and incorporated into the soil with a springtooth.

Results: Soybean yields made no significant response to P or K in 1978. Had soil sites been extremely low in residual fertility, response likely would have been greater. However, our data reaffirm that soybeans normally do not respond to P and K when soil tests indicate adequate amounts already in the soil.

Table 12. Effects of phosphorus and potassium on soybean yields, 1978.

Fertilizer, lbs/A		Yield, bu/A	
P_2O_5	K_2O	Columbus expt. field	Cherokee co. field
0	0	28.9	20.7
30	0	28.6	21.0
0	30	31.3	18.7
30	30	27.7	17.1
30	60	28.9	18.7
30	90	28.1	17.7
60	0	28.4	19.0
0	60	29.0	19.1
60	30	30.3	20.3
60	60	30.2	19.4
60	90	31.8	18.1
90	0	27.4	20.3
0	90	29.5	18.4
90	30	30.5	19.1
90	60	31.3	20.6
90	90	32.0	19.4
Treatment LSD .05		n.s.	n.s.
		Initial Soil Test	
pH		6.8	6.0
ECC, lbs/A		0.0	2500
Avail. P, lbs/A		33	26
Exch., K, lbs/A		160	138

Effects of Foliar Fertilization on Soybean Yields.

Some research has indicated that foliar fertilization of soybeans when pods begin to fill will increase yields.

Procedure: The past two years we evaluated foliar fertilization with late-maturing soybeans adapted to southeastern Kansas. Three formulations were used Folian and two from Tennessee Valley Authority (TVA) . Folian and one from the TVA contained 12% nitrogen, 4% phosphorus, 4% potassium, and 0.5% sulfur. The other TVA formulation was a 20% urea solution. Applications made late in the evening, were 5, 10, and 20 gallons per acre when soybean pods at the top of the plant were about one half inch long.

Results: Some leaf burning was noticeable at the 10-and 20-gallon rates. None of the foliar fertilization rates increased soybean yields.

Residual Effects of Phosphorus on Soybean Yields.

Many of the soils in southeastern Kansas are low in available phosphorus. When phosphorus fertilizer is applied, part of it becomes unavailable over time so it cannot be used. The degree of phosphorus fixation resulting from residual P applications is not fully known with our acid soils.

Procedure: Beginning in 1978, we initiated comparisons to see if heavy, first-year applications (200 pounds P_2O_5 per acre) would be as effective for soybeans as 100 pounds P_2O_5 per acre applied every other year, or as effective as annual applications of 50 pounds P_2O_5 per acre. After 4 years all plots will have received the same total amount of P.

The two P sources used were diammonium orthophosphate (AOP, 18-46-0) and ammonium polyphosphate (APP, 15-62-0).

Results: Soybean yields in 1978 showed significant responses: 3 bushels an acre for 50 lbs per acre and, somewhat higher yields for the 100 and 200-lb-per-acre rates. Available soil phosphate was low at this site. Results show that soybeans will benefit from phosphorus applied before planting when the soil's P level is low. Soil samples taken after harvest reveals that soil P levels were raised substantially as a result of fertilizer treatments.

Table 13. Residual effects of phosphorus on soybean yields, Parsons, 1978.

Phosphorus carrier	P_2O_5 rate lbs/A	Yield, bu/A	Avail. soil P, lb/A Before P fertilizing	After harvest
Control	0	21.7	9	9
AOP (18-46-0) 1/	50	25.1	12	20
AOP	100	25.0	11	21
AOP	200	26.3	10	34
APP (15-62-0) 2/	50	23.8	14	23
APP	100	27.0	11	24
APP	200	27.5	12	44
Treatment LSD .05		2.2	--	--

1/ Ammonium orthophosphate

2/ Ammonium polyphosphate

Effect of Long-term Fertility Treatments on Soybean Yields.

Since the beginning of the long-term soil-fertility study at Columbus in 1923, several cropping systems and soil amendments have been used. Beginning in 1977, a double-cropping rotation involving wheat and soybeans was established.

Soybean yields in 1977-78 reflect the long-term fertility treatments. Highest grain yields have consistently come from plots receiving lime, phosphorus, and potassium. Manure also has significantly increased yields through the years.

Table 14. Effects of residual fertility treatments on soybean yields, Columbus, 1977-78.

Soil fertility treatment	Yield, bu/A 1/ 1978	1977
Lime	15.6	12.5
Lime, phosphorus	17.1	16.0
Lime, phosphorus, potassium	28.2	21.1
Lime, phosphorus, potassium, magnesium sulfate	27.8	20.2
Lime, phosphorus, potassium, boron	29.5	21.4
Lime, manure	29.5	21.0
Lime, manure, phosphate	30.0	21.1
Lime, manure, phosphate, potassium 2/	31.3	----

1/ Yield is average of 6 reps.

2/ Potassium was added to this treatment beginning in 1977.

Effects of Fluid Lime on Soybeans.

Interest in fluid lime has developed in areas where commercial vendors are not operating and farmers want to apply a lime suspension with sprayer equipment.

Beginning in 1977, a study of fluid lime was established at the Parsons field to determine how much fluid lime affects soil pH, lime requirements and to compare rates of reaction from fluid lime materials with rates from coarse agricultural lime.

Procedure: Fluid lime was formulated from a 200-mesh calcium carbonate material (100% ECC). A 30% solids - 70% fluid (by weight) formulation was prepared with 1.5% attapulgite clay as a suspending agent and water as the carrier. In 1977 this material was applied at 500,1,000, and 5,000 ECC per acre. Also, conventional ag lime (50% ECC) was applied at 5,000 lb/A for comparisons. The 500-and 1,000-lb. rates were repeated in 1978 and will be from the annual "maintenance" applications of lime will be compared with results from the 1977 heavy application.

Results: The fluid lime being finer (less coarse) with higher calcium carbonate purity produced a quicker pH response than conventional ag lime at the 5,000 ECC rate. But the end of the 1977 season, ag lime response was approaching that of the high-fluid lime. And the trend continued in 1978, when both types gave similar pH responses.

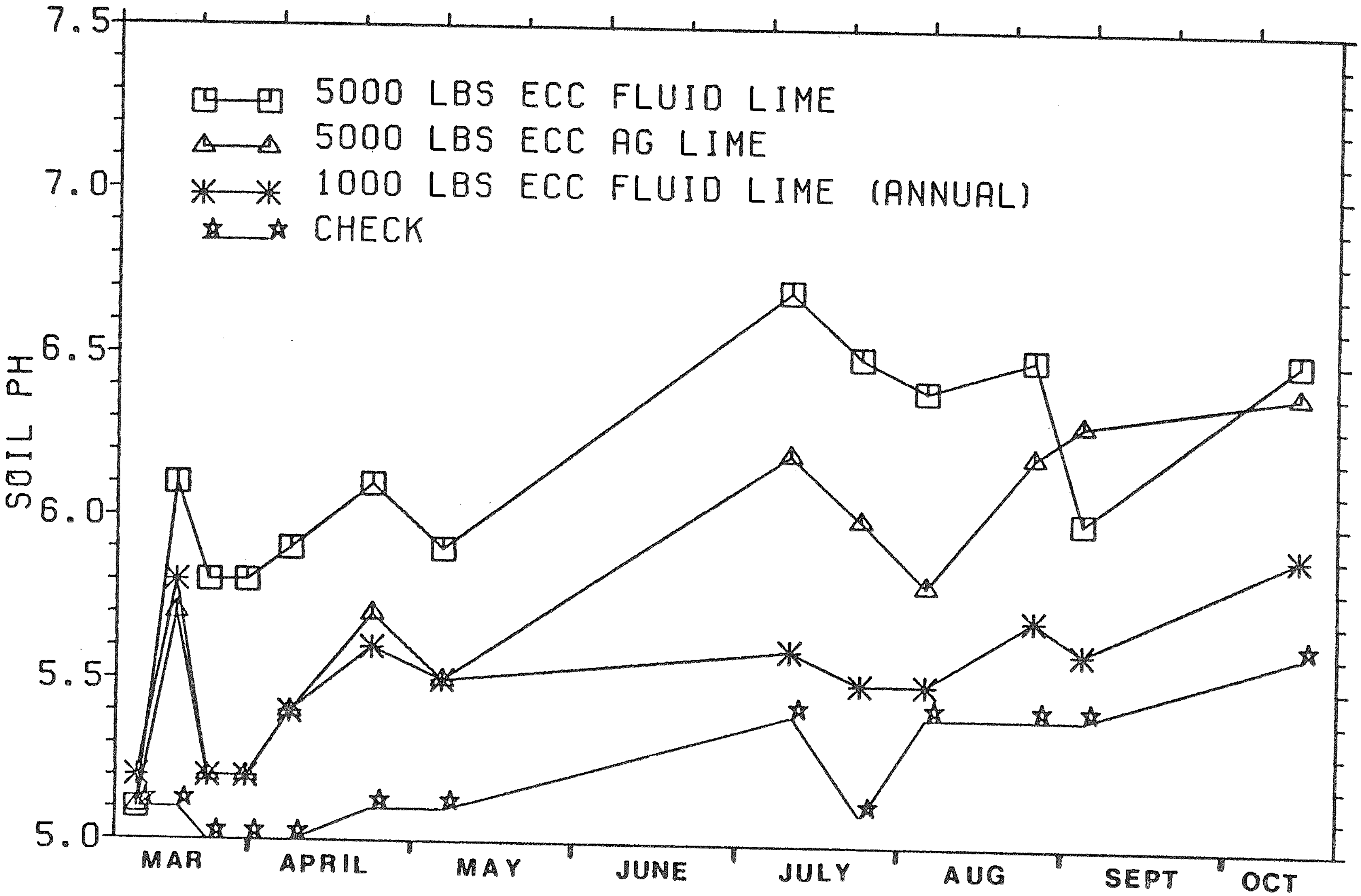
Effects of Boron Fertilization on Soybean Yields.

Legume crops, like alfalfa and soybeans, need more micronutrient boron than do row or cereal crops.

Procedure: During the past four years we studied the effect of boron on soybeans at the Columbus field, by applying 0.75, 1.5, 2.25, and 3.0 pounds per acre annually.

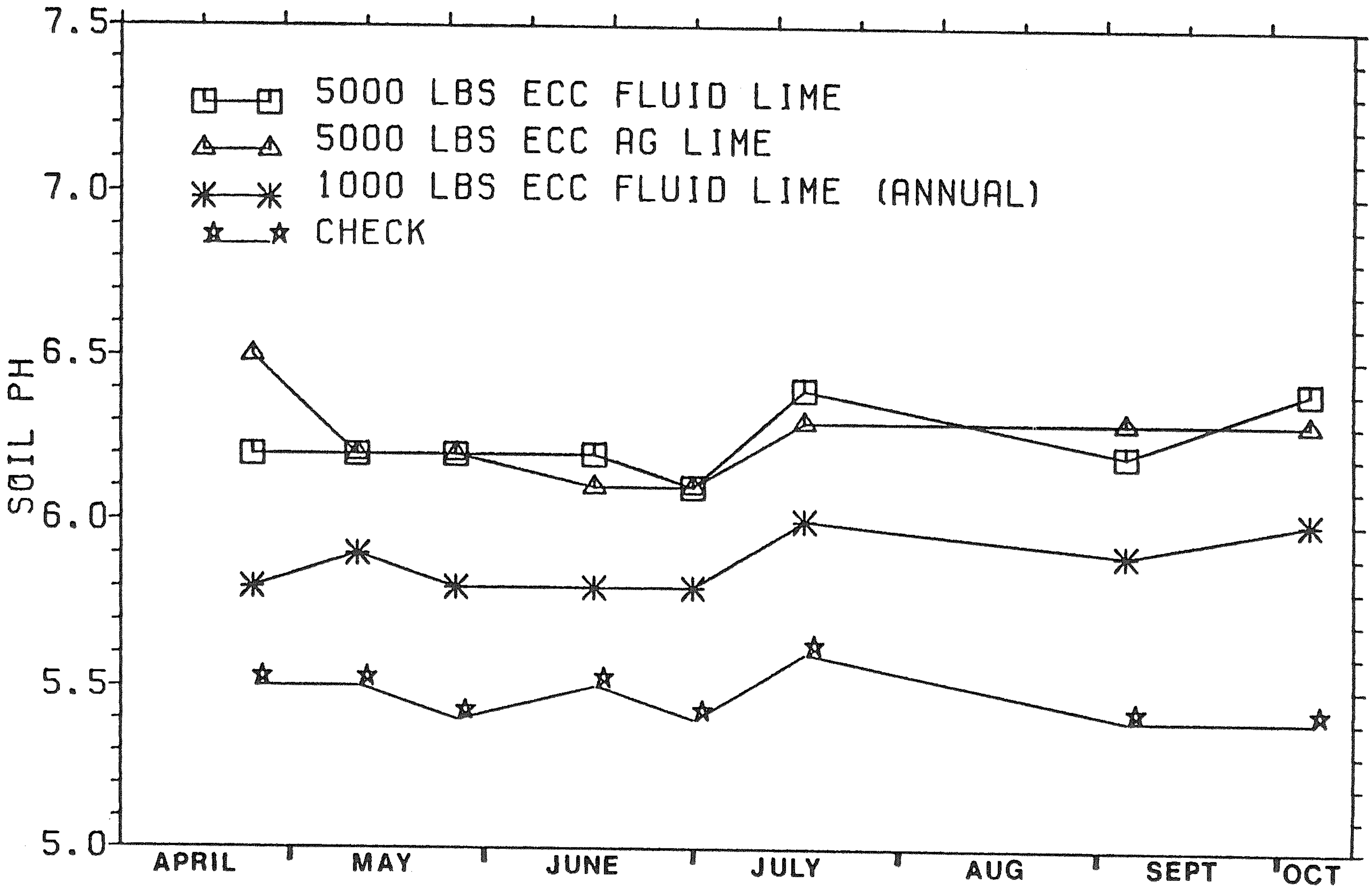
Results: We've had no response from boron, which indicates that it is unlikely that soybeans will respond to boron on most southeastern Kansas soil.

FIGURE 1. 1977 FLUID LIME ØN DRYLAND SØYBEANS.



LABETTE CØUNTY KANSAS.

FIGURE 2. 1978 FLUID LIME ON DRYLAND SOYBEANS.



LABETTE COUNTY KANSAS.

Effects of Row Spacing and Plant Population on Soybean Yield, Columbus, 1977-78.

Narrower rows have been advocated as one method to increase soybean yields. Research data are scarce on that practice in southeastern Kansas and on longer season varieties in narrow rows.

Procedure: The past two years we compared Essex and Forrest soybeans in two narrow row spacing (7 and 14 inches) with 3 seeding rates (2.5, 5.0, and 7.5 seeds per foot of row). Results from narrower rows were compared with results from standard 30-inch rows with 8 seeds per foot of row. Excellent weed control was obtained both years with a tank-mix of Treflan and Sencor applied before planting.

Results: Narrow rows improved soybean yields in some plots in 1978 with Forrest outyielding Essex. However, two-year averages show no significant differences among row spacings. However, the results indicate that with 7-inch rows, 2 or 3 plants per foot is enough and that 4 plants per foot seem to be the optimum in 14-inch rows.

Table 15. Effects of row spacing and plant population on soybean yields, Columbus, 1977-78.

Soybean variety	Distance between rows (in.)	1978 plant population (plants ft. of row)	Yield, bu/A 1978	Yield, bu/A 1977
Essex	7	2.6	18.3	31.8
Essex	7	4.5	24.2	28.2
Essex	7	5.6	21.7	29.2
Essex	14	2.0	20.9	27.2
Essex	14	3.8	23.2	29.8
Essex	14	6.0	20.5	32.5
Essex	30	6.7	21.8	31.2
Forrest	7	2.3	27.4	31.8
Forrest	7	3.6	28.2	33.0
Forrest	7	4.0	29.2	31.8
Forrest	14	2.1	27.9	28.6
Forrest	14	3.4	30.5	28.7
Forrest	14	4.8	25.8	30.9
Forrest	30	4.3	24.7	30.8
Treatment LSD	.05		3.4	n.s.
Mean values:				
Essex			21.5	30.0
Forrest			27.7	30.8
7-inch row			24.8	31.0
14-inch row			24.8	29.6
30-inch row			23.3	31.0

Soybean Varieties and Planting Dates Compared.

The growing season in southeastern Kansas permits a wide range of soybean varieties with various maturities, so soybeans may be planted from May through July. In general, varieties that mature later (Essex and Forrest) and planted in mid-June, have yielded best. However, some of the newer varieties have not been evaluated over a wide range of planting dates.

Procedure: Since 1976, six to seven soybean varieties with a wide maturity range have been planted on each of five planting dates. Agronomic factors measured were yield maturity, lodging, plant height, seed size, and seed quality. The approximate flowering period of each variety at each planting date also was recorded.

Results: Due to wet weather in May, 1978, the first planting date was June 2; the last planting date, July 25th. Because the first killing frost (Nov. 7) was later than normal, the long season varieties planted in late July matured. Results the past 3 years indicate that Essex can be planted until about July 15, provided available soil moisture will germinate the seed. But late June or early July plantings have given best yields.

Varieties of Forrest and York maturity probably should be planted no later than June 20-25 in southeastern Kansas to mature before the first killing frost. Stems of late maturing varieties planted late do not dry out enough for good combine harvesting.

Crawford, a newer medium-maturity variety should normally be planted in June, but may be planted until mid July. Both Crawford and Essex are good varieties to plant after wheat harvest when soybeans are double-cropped.

How Supplemental Irrigation Applied at Different Growth Stages Affects Soybean Yields.

When soybeans reach the reproductive growth stage, adequate water is essential for optimum yields, but we know very little about yield benefits from supplying water to soybeans when they are flowering or setting on pods under dry soil conditions in southeastern Kansas.

Procedure: Essex soybeans were planted June 12 and 2 inches of water was applied in furrows with a trickle type garden hose at different reproductive growth stages: full bloom only, full bloom and early pod fill, early pod fill only.

Results: The 1978 summer was very dry, therefore soybeans benefited significantly from applied water. Plots that received supplemental water at the full bloom stage and early pod fill yielded 7 bushels an acre more than control plots that got no additional water. Water applied only at full bloom increased yields more than water applied only at early pod fill. However, the soil became dry again during late pod filling in 1978.

Drought stress during late pod filling will decrease yields, although the major effects are smaller seed size and lower seed quality. However, drought stress during earlier reproductive growth stages, like flowering and early pod filling, will depress yields substantially more.

Table 16. Results from indicated soybean varieties and planting dates compared, Columbus, 1978.

Variety	Planting date	Yield bu/A	Maturity	Lodging 1/	Height in.	Seeds lbs.	Seed 1/ quality
Williams	June 2	13.9	Sept. 26	1.0	24	2870	3.5
	June 13	20.6	Sept. 28	1.0	22	2908	2.5
	June 26	23.6	Oct. 2	1.0	23	2929	1.4
	July 17	21.8	Oct. 13	1.0	20	3199	1.4
	July 25	18.1	Oct. 20	1.0	21	3014	1.8
Cutler 71	June 2	12.7	Sept. 29	1.0	24	2491	4.0
	June 13	17.6	Oct. 1	1.0	21	2635	3.0
	June 26	22.4	Oct. 4	1.0	23	2745	1.4
	July 17	23.6	Oct. 15	1.0	22	3203	1.4
	July 25	21.8	Oct. 21	1.0	23	3200	1.8
Crawford	June 2	22.4	Oct. 2	1.0	25	2596	1.9
	June 13	21.5	Oct. 5	1.0	24	2815	1.9
	June 26	27.5	Oct. 6	1.2	26	2899	1.4
	July 17	26.3	Oct. 18	1.1	24	3112	1.4
	July 25	24.5	Oct. 23	1.1	25	3256	1.3
Essex	June 2	22.4	Oct. 6	1.0	19	3220	1.8
	June 13	23.3	Oct. 7	1.0	19	3744	1.1
	June 26	28.7	Oct. 15	1.0	21	3664	1.3
	July 17	27.2	Oct. 23	1.0	22	4284	1.4
	July 25	24.2	Oct. 30	1.0	18	4205	1.3
Forrest	June 2	28.7	Oct. 10	1.2	26	3721	1.2
	June 13	29.9	Oct. 13	1.3	26	3784	1.2
	June 26	34.2	Oct. 20	1.5	30	3960	1.6
	July 17	32.7	Oct. 30	1.2	30	4438	1.3
	July 25	20.0	Nov. 3	1.3	24	4066	1.5
York	June 2	28.7	Oct. 13	1.2	26	2310	2.0
	June 13	29.3	Oct. 16	1.1	25	2424	1.9
	June 26	33.3	Oct. 20	1.4	26	2605	1.8
	July 17	33.0	Oct. 26	1.2	26	3021	1.3
	July 25	25.7	Oct. 31	1.2	19	2995	1.6
Mean values:							
Williams		19.6	Oct. 5	1.0	22	2984	2.1
Cutler 71		19.6	Oct. 8	1.0	23	2855	2.3
Crawford		24.4	Oct. 11	1.1	25	2936	1.6
Essex		25.2	Oct. 16	1.0	20	3823	1.4
Forrest		29.1	Oct. 21	1.3	27	3994	1.4
York		30.0	Oct. 21	1.2	24	2671	1.7

1/ Based on 1 to 5 score with 1=excellent, 5=poor.

Killing frost date: Nov. 7, 1978.

Table 17. Effects of date-of-planting and variety on soybean flowering period, Columbus, 1978.

Date planted	Flowering period					
	Williams	Cutler 71	Crawford	Essex	Forrest	York
June 2	July 15 - Aug. 10	July 17 - Aug. 15	July 20 - Aug. 20	July 25 - Aug. 20	July 25 - Aug. 20	July 25 - Aug. 20
June 13	July 20 - Aug. 20	July 20 - Aug. 20	July 25 - Aug. 20	July 28 - Aug. 20	Aug. 1 - Sept. 5	Aug. 1-31
June 26	Aug. 1-31	Aug. 1-31	Aug. 5-31	Aug. 12-31	Aug. 15 - Sept. 5	Aug. 15 - Sept. 5
July 17	Aug. 20 - Sept. 10	Aug. 20 - Sept. 10	Aug. 20 - Sept. 15	Aug. 25 - Sept. 10	Sept. 1-15	Aug. 28 - Sept. 10
July 27	Aug. 25 - Sept. 15	Aug. 25 - Sept. 15	Aug. 25 - Sept. 15	Aug. 28 - Sept. 15	Sept. 5-20	Sept. 1-15

Table 18. Yield effects of supplemental irrigation at indicated growth stages of soybeans, Columbus, 1978.

Water added	Yield bu/A
None	21.3
2 inches at full bloom (8/7)	25.2
2 inches at full bloom (8/7) and 2 inches at early pod fill (8/21)	28.1
2 inches at early pod fill (8/21)	22.3

Variety: Essex, planted June 12.

Precipitation (inches) during August and September: 8/3 = .45; 8/4 = .21; 8/5 = .07; 8/12 = .39; 8/16 = .45; 8/19 = .24; 8/27 = 2.23; 8/28 = .30; 9/14 = 1.24; 9/30 = .20.

Soybean Herbicides Compared

Selecting the right herbicide is important in controlling troublesome weeds in southeastern Kansas soybean fields. Grain yields are reduced in many cases by strong competition from broadleaf and/or grassy weeds.

Procedure: In 1978 we compared soybean herbicides in four conventional tillage studies and one no-till, double-cropping system. Weed species evaluated were velvetleaf, venice mallow, pigweed, common ragweed, annual morningglory, prickly sida, crabgrass, fall panicum, and johnsongrass.

Under conventional tillage, herbicides were applied preplant then incorporated by discing twice; others were applied immediately after planting.

One of the conventional tillage studies involved herbicides that control rhizome and seedling johnsongrass. Roundup and Basfapon applied when the johnsongrass was 18"-24" tall were evaluated for rhizome control. One week later, the johnsongrass was disced under and herbicides for seedling control were applied and incorporated by discing twice.

In the no-till study, soybeans were planted, with a Buffalo slot-shoe planter directly into wheat stubble. Residual and contact herbicides were applied immediately after planting.

(Conventional Tillage)

Broadleaf results: Among broadleaf herbicides (Sencor and/or Lexone, Lorox, Modown, Dyanap, Amiben, and Basagran), Sencor appeared to give the best overall control of weeds observed — somewhat better when Sencor was applied immediately after planting rather than before.

Lorox at 1.0 or 1.25 lbs/A only partially controlled velvetleaf. More Lorox is needed to control thick velvetleaf populations.

Modown gave only slight control of velvetleaf and common ragweed. Soybeans in Modown plots emerged slower and were stunted in ealy growth. Yields were depressed in some instances.

Basagran, applied after soybeans emerged, and before velvetleaf exceeded 2 inches in height gave excellent control.

Dyanap, appled before soybean emerged, provided fairly good control of broadleafs. A cultivation is needed with Amiben because it does not remain active in the soil so long as most other herbicides. None of the herbicides tested completely controlled annual morningglory.

<u>Grassy Weeds</u>: The preplant (Treflan, Tolban, Basalin, Prowl, Vernam, and Cobex) and preemergent (Lasso, Dual, H-22234, Surflan, and Bexton) herbicides gave good control of crabgrass and fall panicum in most cases. Bexton seems to remain active a shorter time than the others. Cobex caused some seedling injury and our grass control with it was erratic. During dry summers soybeans in plots treated with Surflan tend to have weak stems just above the soil line, which leads to lodging.

<u>Johnsongrass</u>: In a johnsongrass study in Montgomery County we compared Roundup with Basfapon for rhizome control. One week after spraying johnson-grass, Roundup had completely killed the rhizone plants while Basfapon had not. Later, however, Basfapon controlled rhizome johnsongrass as well as Roundup did. Basfapon weakened the plant apparently enough to control rhizomes.

Preplant herbicides (Treflan, Tolban, Basalin, Prowl, and Vernam) for seedling control were 50 to 80% effective. Johnsongrass populations were not uniform through the plot area, so that factor clouded our results.

MB-9057 for seedling control applied after soybeans emerged was not effective in 1978; it also produced some crop injury and substantially reduced yields.

<u>No-Till soybeans in wheat stubble</u>: Despite the dry summer, yields were surprisingly good. Since the weed population was light when soybeans were planted, a contact herbicide (Paraquat) or 2,4-D did not improve weed control. Both Lorox and Sencor gave good broadleaf weed control; the major weed competition was from pigweeds and prickly sida. Crabgrass competition was not great enough to evaluate herbicides on grass control.

Table 19. Soybean herbicides compared, Columbus, 1978.

Treatment	Lbs. A. I./a	When applied 1/	Yield bu/A	Weed control, % Broad-leaf	Grass	Crop injury 3/
No herbicide	---	---	10.8	0	0	---
Hand weeded	---	---	19.5	95	95	---
Lasso 4E + Amiben 2E	2.0 + 2.0	PRE	20.6	65	95	0
Sencor 4F + Amiben 2E	.38 + 2.0	PRE	21.3	95	85	0
Lorox 50W + Amiben 2E	.5 + 2.0	PRE	16.0	75	75	0
Treflan 4E + Amiben 2E	.75 + 2.0	PPI	17.1	40	90	0
Treflan 4E + Amiben 2E	.75 + 2.0	PPI + PRE	19.4	60	90	0
Modown 80W + Dual 8E	1.6 + 2.0	PRE	15.8	50	90	4
MC 2188 + Surflan 4E	1.6 + 1.0	PRE	15.0	70	90	5
MC 2188 + Bexton 4L	1.2 + 3.0	PRE	15.8	70	70	4
MC 2188 + Tolban 4E	2.0 + .75	PPI	15.7	40	90	1
Modown 80W + Treflan	2.0 + .75	PPI	16.0	40	90	1
MC 2188 + Prowl 4E	2.0 + 1.0	PPI	16.1	40	90	1
Modown 80W + Lasso 4E	2.0 + 2.0	PPI	15.7	40	80	1
Treflan 4E + Lexone 4L	.75 + .38	PPI	21.8	85	95	0
Tolban 4E + Lexone 4L	.75 + .38	PPI	21.8	85	95	0
Treflan 4E + Lexone 75DF	.75 + .38	PPI + PRE	21.8	95	95	0
Tolban 4E + Lexone 75DF	.75 + .38	PPI + PRE	22.0	95	95	0
Lexone 4L + Dual 8E	.38 + 2.0	PRE	21.6	95	95	0
Lexone 4L + Lasso 4E	.38 + 2.0	PRE	21.1	95	95	0
Lexone 4L + Surflan 4E	.38 + 1.0	PRE	21.3	95	95	2
Lorox 50W + Lasso 4E	.63 + 2.0	PRE	21.6	90	95	0
Lorox 75DF + Dual 8E	.63 + 2.0	PRE	22.7	85	95	0
Lorox 50W + (H-22234)	.63 + 2.0	PRE	21.8	85	95	0
Lorox 75DF + Surflan 4E	.63 + 1.0	PRE	19.4	85	95	2
Lorox 50W + Prowl 4E	.63 + 1.0	PRE + PPI	20.5	90	90	0
Bexton 4L	3.0	PRE	16.5	50	65	0
Dow-M-4213 + Lexone 4L	3.0 + .38	PRE	21.6	95	85	0
Dow-M-4213 + Lorox 50W	3.0 + .5	PRE	16.9	75	75	0
H-22234 + Sencor 4F	2.0 + .38	PRE	21.4	95	95	0
Lasso 4E + Dyanap 3E	1.5 + 4.5	PRE	18.1	80	95	0
Basalin 4E + Basagran 4E	.75 + 1.0	PPI + POST	19.6	85	90	0
Treatment LSD .05			5.1			

1/PPI = incorporated with a disc before planting (6/12)
PRE = applied after planting (6/13)
POST = applied after soybeans emerge (7/10)

2/Weed control rating Aug. 10. Major weed competition was from pigweed, common ragweed, venice mallow, teaweed, annual morningglory, and crabgrass.

3/Crop injury rating (0=no injury, 10=complete kill), Modown treatments applied after planting resulted in slow emering soybeans and stunted plants. Surflan applications resulted in weakened stems just above the ground.

Soil type: Cherokee silt loam; organic matter = 1.3%.

Percipitation (in inches) from planting date (6/13): 6/18 = .82; 6/19 = .20; 6/20 = 1.16.

Table 20. Soybean herbicides compared for control of velvetleaf, Columbus, 1978.

Herbicide	Lbs A.I./a	When applied 1/	Yield bu/A	% Velvet-leaf control 2/	Crop injury 3/
None	---	---	8.4	0	0
Hand weeded	---	---	19.4	93	0
Lorox 50W	.5	PRE	8.0	27	0
Lorox 50W	.63	PRE	12.8	40	0
Modown 80W	1.2	PRE	5.5	10	5
Modown 80W	1.6	PRE	8.4	17	7
Sencor 4F	.38	PRE	14.6	95	0
Sencor 4F	.38	PPI	15.5	77	0
Sencor 4F	.25	PRE	16.1	88	0
Lexone 4L + Lorox 50W	.25 + .25	PRE	17.1	95	0
Dyanap 3E	4.5	PRE	14.9	82	0
Amiben	2.0	PRE	8.7	23	0
Basagran 4E + Cultivation	1.0	POST	18.7	97	0
Basagran 4E	1.0	POST	15.2	98	0
Treatment LSD .05			3.4	--	-

1/ PPI = incorporated with a disc before planting (6/12).
PRE = applied after planting (6/13).
POST = applied after soybeans emerged (7/10).
2/ Weed control rating made Aug. 20. Velvetleaf population was very thick.
3/ Crop injury rating made one week after soybean emerged (0 = no injury, 10 = complete kill). Modown treatments resulted in slow soybean emergence and stunted plants.

Soil type: Cherokee silt loam; organic matter = 1.3%.

Precipitation (in inches) after planting date (6/13): 6/18 = .82; 6/19 = .20; 6/20 = 1.16.

Table 21. Soybean herbicides compared for grass control, Parsons, 1978.

Treatment	Lbs. A.I./a	When applied 1/	% Grass control 2/	Crop injury 3/
No herbicide	---	---	0	0
Hand weeded + cultivation	---	---	0	0
Amiben 2E	2.0	PRE	60	0
Lasso 4E	2.0	PRE	95	0
Dual 8E	1.5	PRE	95	0
H-22234	2.0	PRE	95	0
Surflan 4E	1.0	PRE	90	2
Treflan 4E	.75	PPI	85	0
Tolban 4E	.75	PPI	85	0
Basalin 4E	.75	PPI	85	0
Prowl 4E	1.0	PPI	85	0
Cobex 2E	.5	PPI	75	3
Vernam 7E	2.5	PPI	80	0

1/ PPI = incorporated with a disc before planting (5/30).
PRE = applied after planting and before soybeans emerged (5/31).

2/ Grass control rating Aug. 20. Major weed competition was from crabgrass and fall panicum.

3/ Crop injury rating (0 = no injury, 10 = complete kill). Surflan applications resulted in weakened stems just above the ground. Cobex resulted in slow emerging soybeans and stunted plants.

Severe shattering loss from hail before harvest made grain yields meaningless, so none was taken.

Soil type: Parsons silt loam; organic matter = 1.4%.

Precipitation (inches) after planting date (5/30): 6/5 = .18; 6/6 = .21; 6/18 = 2.51; 6/20 = 1.15.

Table 22. Herbicides compared for use with no-till soybeans in wheat stubble, Columbus, 1978.

Treatments 1/	Lbs. A.I./a	Yield bu/A	% Broad-leaf 2/	Crop injury 3/
No herbicide	---	12.8	0	0
Lorox 50W + 2,4-D amine	1.0 + .25	18.5	90	0
Lexone 4L + 2,4-D amine	.5 + .25	17.4	90	0
Lorox 50W + Paraquat + 2,4-D amine	1.0 + .25 + .25	18.9	90	0
Lexone 4L + Paraquat + 2,4-D amine	.5 + .25 + .25	17.0	90	0
Lasso 4E + Lorox 50W + Paraquat	2.0 + .5 + .38	19.5	90	0
Surflan 4L + Lorox 50W + Paraquat	1.0 + .75 + .38	17.9	90	0
Dual 8E + Lorox 50W + Paraquat	2.0 + .5 + .38	18.5	90	0
Lasso 4E + Sencor 4F + Paraquat	1.5 + .25 + .38	18.8	90	0
Surflan 4L + Sencor 4F + Paraquat	1.0 + .38 + .38	18.0	90	0
Dual 8E + Sencor 4F + Paraquat	1.5 + .25 + .38	19.2	90	0
Treatment LSD .05		n.s.	--	-

1/ All treatments applied (6/29) after planting and before soybean emergence. Ortho X-77 spreader applied with Paraquat at the rate of 32 fl. oz./100 gallons of spray.

2/ Weed population was erratic in the plot area, however, major competition was from pigweeds and prickly sida.

3/ Crop injury rated one week after soybean emerged (0 = no injury).

Soil type: Cherokee silt loam; organic matter = 1.4%.

Preciptation (in inches) after planting date (6/29): 7/7 = .32; 7/14 = .02; 7/15 = .75.

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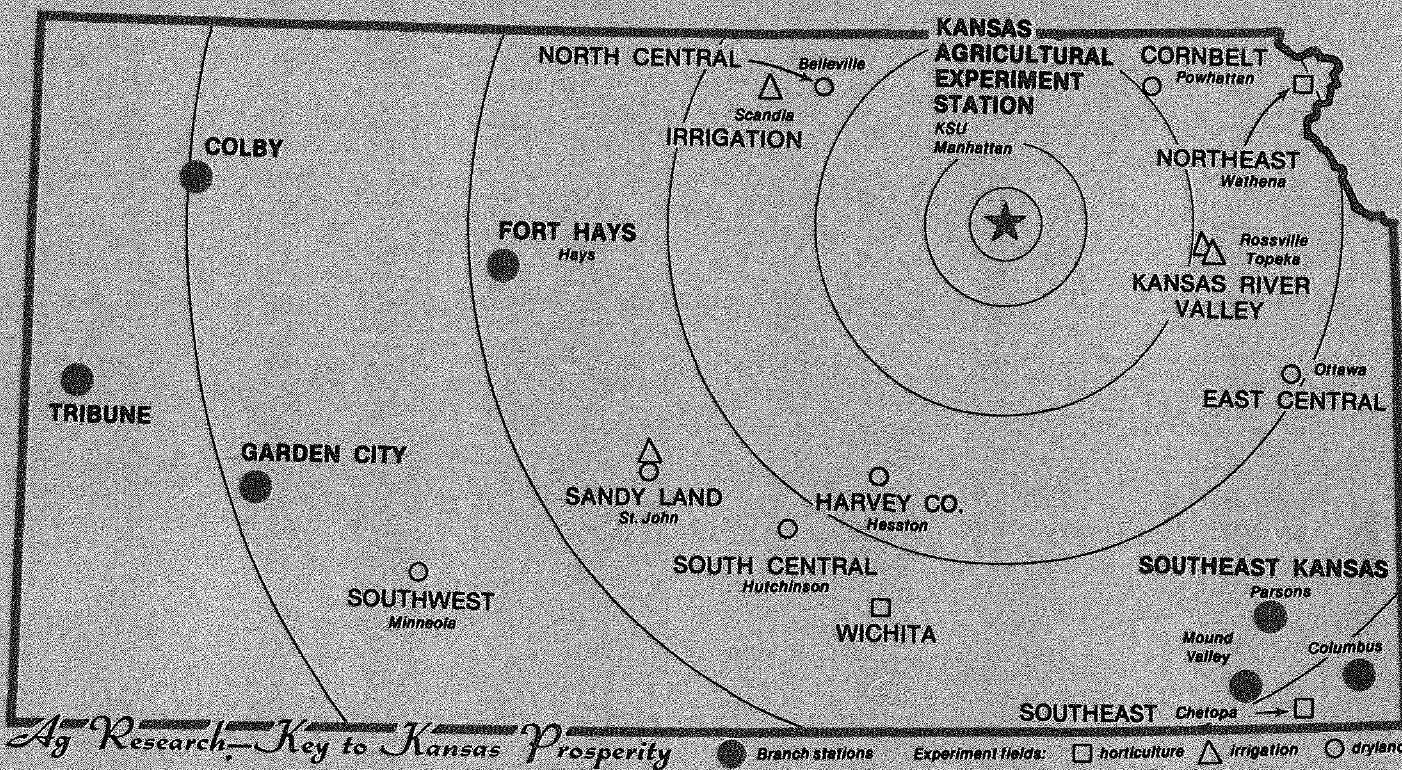

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