



**SOIL FERTILITY
AND
PLANT NUTRITION
RESEARCH
IN
SOUTHEAST MISSOURI
1961**

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SOIL FERTILITY AND PLANT NUTRITION RESEARCH IN SOUTHEAST MISSOURI - 1961

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The application of fertilizer to crops in Southeast Missouri was most profitable in 1961. Soybeans were the only crop that failed to give a favorable response when nutrients in proper amounts and balance were applied.

The 1961 season began with cold, wet weather followed by a dry period which lasted until the middle of June. This resulted in poor early stands of cotton on the clay soils. Good stands on these soils were not obtained until after the rains in June. Fortunately the fall season was late and dry, which was ideal for maturing and harvesting. In general cotton yields were good but the average yield was approximately 100 pounds of lint per acre less than in 1960.

Soil fertility experiments were conducted at two locations on the Delta Research Center, on the sandy loam soil of the Sikeston Field, and on two soil types of the Portageville Field. Long time studies were established on the clay soil of the Portageville field. These experiments include continuous cotton, three-year rotations, continuous cotton with annual cover crops, basic soil treatments with cotton, continuous cotton with variable nitrogen and limestone rates, alfalfa and limestone experiments, and wheat experiments which include annual and plowdown fertilizer treatments.

Appropriate data from the Portageville field are reported in the following pages but data from the rotation experiments will not be included as it will be several years before such data will be of value. Additional experiments on the clay soil will be initiated in 1962 as will permanent studies on the sandy loam soil. Up to date all experiments at the Portageville field are on graded land which will permit irrigation where desired or needed.

A soil fertility experiment with wheat was initiated at the Clarkton field in the fall of 1961. This field is located south of Clarkton on Highway 25 and is typical of the Dunklin sand ridge. In 1962 soil fertility studies in cotton, corn and soybeans will be started at this field.

Soil fertility studies were conducted in 1961 at seven locations with cooperating farmers. Three experiments were located on the Waverly soil type in Butler County. The remaining four experiments were located over the area and represented major soil types.

The results from the 1961 soil fertility experiments continue to emphasize the importance of nitrogen with a balance of phosphate and potash to insure satisfactory yields of cotton. Due to the short growing season, 50 pounds of nitrogen with the same amount of phosphate and potash proved adequate. In 1960, 100 pounds of nitrogen produced the highest yields. All sources of nitrogen used produced satisfactory yields of lint although ammonium nitrate and ammonium sulphate have consistently been good sources during past seasons.

The corn experiments in Southeast Missouri indicate the need for approximately 150 pounds of nitrogen for maximum yields providing an ample supply of other plant nutrients is made available by application, or is present in the soil. On the sandy loam soils irrigation has been essential in past seasons at most locations. In 1961 irrigation was not required at the Portageville experiment field.

There was little or no response by soybeans to applied fertilizers in 1961. Rotation experiments have been initiated at the Portageville field which include soybeans. The crop preceding soybeans may have some effect on their yields in the future.

Fertility requirements of sugar beets were included in the studies this season. Preliminary results indicate satisfactory yields of sugar beets can be produced in Southeast Missouri and that nitrogen should be included in the starter fertilizer.

SUMMARY OF COTTON RESPONSE TO SOIL TREATMENTS - 1961

Clay and Clay Loam Soils	Orton											
	French&Maddox		No Water		Blades		Roth-Filled		Roth-Subsoil		Lee	
	No Water		Machine &		No Water		Irrigated		Irrigated		No Water	
	Hand Pick		Hand Pick		Mach. Pick		Hand Pick		Hand Pick		Hand Pick	
	1st.	Tot.	1st.	Tot.	1st.	Tot.	1st.	Tot.	1st.	Tot.	1st.	Tot.
	Pick	Lint	Pick	Lint	Pick	Lint	Pick	Lint	Pick	Lint	Pick	Lint
<u>Comparison of Starter Fertilizers</u>												
No Fertilizer	527	747	192	466	255	255	105	204	203	352	260	500
25+25+25	625	875	375	718	467	467	310	569	150	380	445	760
50+50+50	580	858	424	825	462	462	262	603	162	433	314	780
100+100+100 (15-15-15)	628	923	486	909	221	221	368	828	233	625	338	964
100+50+50	632	913	492	887	414	414	304	716	172	462	345	905

The application of starter fertilizer was very profitable in 1961 on the clay soils of Southeast Missouri. Rates of application as high as 100+100+100 produced increased yields in 5 out of 6 locations.

The use of a starter fertilizer insures a good supply of plant food close to the seedlings and encourages their rapid growth. Previous experiments have shown that banding the fertilizer under the bed or banding at time of planting was superior to other methods of application. Banding fertilizers requires smaller amounts to produce optimum yields of lint when compared to broadcast applications.

<u>Rate of Nitrogen Application</u>												
	527	747	192	466	255	255	105	204	203	352	260	500
No Fertilizer	527	747	192	466	255	255	105	204	203	352	260	500
0+100+100	562	870	331	669	193	193	398	624	108	221	230	507
25+100 100	845	1105	412	843	255	255	217	603	295	541	341	972
50+100+100	810	1105	409	912	370	370	146	465	363	705	127	838
100+100+100	705	1041	368	901	419	419	146	452	376	805	117	633
50+0+0	447	651	380	705	331	331	355	640	196	415	371	707
100+0+0	443	599	455	871	364	364	419	676	389	664	338	820

The high rate (100 pounds of nitrogen) increased yields in only 2 of the 6 experiments. The 50 pound nitrogen application appeared to be the most practical rate. Results obtained in previous years on the clay soils have indicated satisfactory response to 100 pounds of nitrogen when balanced with adequate minerals. Due to the late start of the cotton crop in 1961, the high rate of nitrogen was not profitable.

The above data points out the need for the application of phosphate and potash with the nitrogen fertilizer.

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1

<u>Clay and Clay Loam Soils</u>	Orton											
	French&Maddox		No Water		Blades		Roth-Filled		Roth-Subsoil		Lee	
	No Water		Machine &		No Water		Irrigated		Irrigated		No Water	
	<u>Hand Pick</u>		<u>Hand Pick</u>		<u>Mach. Pick</u>		<u>Hand Pick</u>		<u>Hand Pick</u>		<u>Hand Pick</u>	
<u>Rate of Phosphate Application</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>
	No Fertilizer	527	747	192	466	255	255	105	204	203	352	260
100+0+100	537	924	384	889	277	277	338	717	269	692	288	919
100+25+100	598	994	344	888	397	397	239	614	325	725	125	766
100+50+100	617	1026	304	728	421	421	208	570	342	664	245	1033
100+100+100	705	1041	368	901	419	419	146	452	376	805	117	633

The above data indicates the need for phosphorus in practically all of the experiments regardless of the level of the soil test. An application of 25 to 50 pounds of phosphate appeared to increase the quantity of lint at first picking as well as total yields. In a few experiments the high (100 pounds) rate of phosphate appeared to depress the yields.

Rate of Potash Application

No Fertilizer	527	747	192	466	255	255	105	204	203	352	260	500
100+100+0	486	709	509	845	337	337	256	559	189	377	365	694
100+100+25	531	793	393	788	202	202	234	579	206	426	383	963
100+100+50	585	847	442	878	132	132	414	762	226	547	354	975
100+100+100	705	1041	368	901	419	419	146	452	376	805	117	633

In four of the above experiments, there appeared to be a definite need for potassium whereas in the other 2 experiments potash applications tended to reduce the yields of lint cotton. The results in 1961 and previous years indicate a need for 50 to 100 pounds of potash per acre. The need for potash may be more acute than realized as field observations and tissue tests indicated in 1961 that the potash level of the cotton plants was low in many instances. Potash deficiencies were also noted in many soybean fields in Southeast Missouri which may indicate that more attention needs to be given to the potash level in the soils of the area.

Trace Mineral Application

No Fertilizer	527	747	192	466	255	255	105	204	203	352	260	500
100+100+100	705	1041	368	901	419	419	146	452	376	805	117	633
100+100+100+50#Traces	573	966	348	831	401	401	94	352	453	828	191	740
100+100+100 (15-15-15)	628	923	486	909	221	221	368	828	233	625	338	964
100+100+100+50#Traces* (12-12-12-TM)	615	895	525	920	356	356	301	781	201	611	207	856

*Trace minerals added to 12-12-12 in process of granulation

Response to the application of a mixture of trace minerals was erratic in 1961 on the clay soils. In the majority of the experiments the yield was actually reduced by the application of trace elements whereas in 1960 just the opposite was true. In past experiments, responses to trace elements appeared to be influenced by seasonal conditions.

<u>Sandy and Sandy Loam Soils</u>	<u>Burge</u>		<u>Burge</u>		<u>Sikeston</u>		<u>Portageville</u>	
	<u>Irrigated</u>		<u>Irrigated</u>		<u>No Water</u>		<u>No Water</u>	
	<u>Hand Pick</u>		<u>Machine Pick</u>		<u>Machine Pick</u>		<u>Machine Pick</u>	
	<u>lst.</u>	<u>Tot.</u>	<u>lst.</u>	<u>Tot.</u>	<u>lst.</u>	<u>Tot.</u>	<u>lst.</u>	<u>Tot.</u>
	<u>Pick</u>	<u>Lint</u>	<u>Pick</u>	<u>Lint</u>	<u>Pick</u>	<u>Lint</u>	<u>Pick</u>	<u>Lint</u>
<u>Comparison of Starter Fertilizer</u>								
No Fertilizer	237	289	239	319	563	563	785	883
25+25+25	752	923	644	712	626	626	845	952
50+50+50	813	1028	722	811	591	591	894	1049
100+100+100 (15-15-15)	488	753	536	683	517	517		
100+50+50	538	837	613	752	572	572	889	1125

The application of starter fertilizers to cotton on the sandy soils increased efficiency of production in 1961. The same has been true in previous seasons. On these soils, 50+50+50 appeared to be the optimum fertilizer application. Higher rates gave reductions in yields.

<u>Rate of Nitrogen Application</u>								
No Fertilizer	237	289	239	319	563	563	785	883
0+100+100	560	623	482	555	398	398	784	871
25+100+100	640	724	592	671	754	754	909	1091
50+100+100	690	782	725	827	686	686	894	1049
100+100+100	655	784	677	830	580	580	889	1125
50+0+0	603	709	646	717	579	579		
100+0+0	547	725	559	670	428	428		

The application of 50 pounds of nitrogen continues to be the most favorable rate. In many instances the 100 pound application rate depressed yields through the production of a vegetative plant that is difficult to harvest. When nitrogen is applied the results indicate the necessity of phosphate and potash fertilizers also.

<u>Sandy and Sandy Loam Soils</u>	<u>Burge Irrigated</u>		<u>Burge Irrigated</u>		<u>Sikeston No Water</u>		<u>Portageville No Water</u>	
	<u>Hand Pick</u>		<u>Machine Pick</u>		<u>Machine Pick</u>		<u>Machine Pick</u>	
	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>	<u>lst. Pick</u>	<u>Tot. Lint</u>
<u>Rate of Phosphate Application</u>								
No Fertilizer	237	289	239	319	563	563		
100+0+100	599	788	691	862	540	540		
100+25+100	643	858	668	826	713	713		
100+50+100	599	772	568	732	611	611		
100+100+100	656	784	677	830	580	580		

The application of phosphorus was usually essential when nitrogen was applied. There is an indication that 100 pounds of phosphate per acre tends to depress the yields of cotton. Generally in Southeast Missouri, regardless of soil test, at least 50 pounds of P_2O_5 are required for maximum cotton yields.

Rate of Potash Application

No Fertilizer	237	289	239	319	563	563		
100+100+0	683	968	679	775	712	712		
100+100+25	815	1053	772	920	621	621		
100+100+50	671	878	747	900	638	638		
100+100+100	656	784	677	830	580	580		

The Burge Farm responded to 25 pounds of potash whereas at the Sikeston Field no response was obtained in 1961. In 1960 the Sikeston Field responded favorably when 50 pounds of potash increased the yield of lint by 76 pounds.

Trace Mineral Application

No Fertilizer	237	289	239	319	563	563	785	883
100+100+100	656	784	677	830	580	580	889	1125
100+100+100+50#Traces	705	826	632	801	727	727	818	1079
100+100+100 (15-15-15)	488	753	536	683	517	517		
100+100+100+50#Traces* (12-12-12-TM)	653	930	621	765	437	437		

*Trace minerals added to 12-12-12 in process of granulation.

The application of a mixture of trace minerals increased the yields of lint at two locations where the traces were applied separate from the fertilizer. At the Portageville Field trace minerals did not produce increases in yield.

SUMMARY OF COTTON RESPONSE TO VARIOUS SOURCES OF NITROGEN

	<u>Burge</u>		<u>Sikeston</u>		<u>Portageville</u>		<u>Alvin Blades</u>	
	<u>1st.</u> <u>Pick</u>	<u>Tot.</u> <u>Lint</u>	<u>1st.</u> <u>Pick</u>	<u>Tot.</u> <u>Lint</u>	<u>1st.</u> <u>Pick</u>	<u>Tot.</u> <u>Lint</u>	<u>1st.</u> <u>Pick</u>	<u>Tot.</u> <u>Lint</u>
No Nitrogen	563	622	295	295	784	871	423	504
Ammonium Nitrate	718	776	435	435	889	1125	387	630
Sodium Nitrate	360	435	451	451	848	1094	709	805
Urea	687	753	384	384	835	966	591	773
Ammonium Sulphate	703	775	347	347	826	1029	502	745
Anhydrous Ammonia	562	647	353	353	736	995	642	729
Liquid - 32% Nitrogen	668	742	467	467	855	1051	662	706
Acqua Ammonia							650	704
Total Soil Treatment	78+72+72		100+50+50		100+50+50		112+48+48	

Several of the above sources of nitrogen are satisfactory for the cotton plant. Ammonium nitrate and ammonium sulphate were consistently good sources in 1961 and in past seasons. The above results indicate that sodium nitrate was close to or gave maximum yields at 3 of the 4 locations. The different sources were applied at the same number of pounds of nitrogen per acre.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Donald French and W. D. Maddox

Location: Five miles south Malden on Highway 25 and 1 mile east of Mount Gilead Cemetery

Soil Type: Sharkey Clay Loam Sand 48%; Silt 32%; Clay 20%.

Soil Test:	OM	P	K	Mg	Ca	pH	H	GEC	Salt pH
Topsoil:	2.1	179	160	670	4580	6.1	2.0	15.5	5.7
Subsoil:	1.3	69	100	670	4880	6.4	1.0	16.1	6.0

Rex cotton replanted in May

Soil Treatment	Lint	Lint	%	%	Bolls Per Pound	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check	7-yr. Ave. Tot. Lint	
	1st. Pick	2nd. Pick	1st. Pick	Lint Turn Out						
No Treatment	527	220	70.5	40.4	68	1 1/16	29	747	----	715
0-100-100	562	308	64.6	41.9	66	1 3/32	33	870	123	699
25-100-100	845	260	76.5	42.9	65	1 1/16	33	1105	358	850
50-100-100	810	295	73.3	41.9	62	1 1/16	35	1105	358	975
@100-100-100	705	336	67.7	41.9	59	1 1/16	35	1041	294	955
@100-100-100-TM	573	393	59.3	41.1	61	1 1/16	35	966	219	957
@100-50-100	617	409	60.1	41.5	64	1 1/16	34	1026	279	1017
@100-25-100	598	396	60.2	41.5	66	1 1/16	37	994	247	984
@100-0-100	537	387	58.1	40.5	63	1 3/32	37	924	177	927
@100-100-50	585	262	69.1	42.2	66	1 1/16	36	847	100	917
@100-100-25	531	262	67.0	39.8	65	1 1/16	35	793	46	826
@100-100-0	486	223	68.5	39.8	63	1 1/16	36	709	-38	866
50-50-50	580	278	67.6	39.0	61	1 1/16	40	858	111	824
25-25-25	625	250	71.4	41.2	63	1 1/16	34	875	128	853
100-50-50	632	281	69.2	40.7	59	1 1/16	41	913	166	---
*100-100-100-TM	615	280	68.7	40.6	63	1 1/16	42	895	148	---
**100-100-100	628	295	68.0	40.2	63	1 1/16	40	923	176	---
50-0-0	447	204	68.7	40.2	69	1 1/16	32	651	-96	#800
@100-0-0	443	156	74.0	41.2	67	1 1/16	35	599	-148	#761

* Trace minerals added to fertilizer in process of manufacture.

** Supplied with 15-15-15 at time of planting.

@ 50 pounds nitrogen applied at planting and 50 pounds of nitrogen sidedressed June 29.
Balance of fertilizer applied at planting.

3 year data.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Byers Orton, Portageville, Missouri
 Location: South of Portageville Experiment Field, Highway TT
 Soil Type: Sharkey Clay Loam. Sand 5%; Silt 53%; Clay 42%. Salt
 Soil Test: OM P K Mg Ca pH H CEC pH
 Topsoil: 1.7 268 350 940 4300 5.9 3.0 18.1 5.5
 Subsoil: 1.1 221 300 620 3500 5.1 2.5 14.2 4.6

Soil Treatment	Lint	Lint	%	%	Bolls Turn Per Found	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over. Check
	1st. Pick	2nd. Pick	1st. Pick	Lint Turn Out					
No Treatment	192	274	41.2	40.1	62	1 1/8	33	466	---
0-100-100	331	338	49.5	41.2	67	1 1/8	36	669	203
25-100-100	412	431	48.9	42.3	64	1 1/8	41	843	377
50-100-100	409	503	44.8	41.2	63	1 1/8	42	912	446
@100-100-100	368	533	40.8	42.0	67	1 3/32	41	901	435
@100-100-100-TM	348	483	41.9	41.5	69	1 1/8	45	831	365
@100-50-100	304	424	41.8	41.7	63	1 1/8	42	728	262
@100-25-100	344	544	38.7	41.5	70	1 3/32	41	888	422
@100-0-100	384	505	43.2	42.7	66	1 3/32	41	889	423
@100-100-50	442	436	50.3	42.1	67	1 3/32	35	878	412
@100-100-25	393	395	49.9	42.8	62	1 3/32	37	788	322
@100-100-0	509	336	60.2	41.7	65	1 1/8	37	845	379
50-50-50	424	401	51.4	42.3	67	1 1/8	36	825	359
25-25-25	375	343	52.2	40.9	65	1 1/8	36	718	252
100-50-50	492	395	55.5	41.2	66	1 1/8	38	887	421
*100-100-100-TM	525	395	57.1	41.5	65	1 1/8	41	920	454
**100-100-100	486	423	53.5	42.4	65	1 1/8	39	909	443
50-0-0	380	325	53.9	41.9	67	1 3/32	38	705	239
@100+0+0	455	416	52.2	41.5	65	1 1/8	37	871	405
50+50+50 (Liquid 9-9-9)	470	439	51.7	42.2	69	1 1/8	38	909	443
@100+50+50 (Liquid 9-9-9 and Uran)	416	416	50.0	40.3	63	1 1/8	40	832	366

* Trace minerals added to fertilizer in process of manufacture.
 ** Supplied with 15-15-15 at time of planting.
 @ 50 pounds nitrogen applied at planting and 50 pounds nitrogen sidedressed.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Joe Burge, Malden, Missouri
 Location: 3 miles south of Malden.
 Soil Type: Dexter Sandy Loam. Sand 78%; Silt 12%; Clay 10%.
 Soil Test: OM P K Mg Ca pH H CEC Salt pH
 Topsoil: 0.7 254 210 210 150 6.3 1.8 3.4 5.6
 Subsoil: 0.9 124 210 210 50 6.0 2.0 3.3 5.3
 Rex Cotton planted May - hand harvested.

Soil Treatment	Lint 1st. Pick	Lint 2nd. Pick	% Lint 1st. Pick	% Lint Turn Out	Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
No Treatment	237	52	82.0	42.9	68	1 3/32	13	289	---
0+100+100	560	63	89.9	43.8	75	1 3/32	21	623	334
25+100+100	640	84	88.4	42.3	66	1 3/32	25	724	435
50+100+100	690	92	88.2	41.2	70	1 3/32	26	782	493
@100+100+100	656	128	83.7	39.0	69	1 1/6	30	784	495
@100+100+100+TM	705	121	85.4	38.8	67	1 1/16	32	826	537
@100+50+100	599	173	77.6	39.7	67	1 1/16	30	772	483
@100+25+100	643	215	74.9	38.9	67	1 3/32	27	858	569
@100+0+100	599	189	76.0	39.3	67	1 1/16	28	788	499
@100+100+50	671	207	76.4	39.0	64	1 1/16	30	878	589
@100+100+25	815	238	77.4	39.7	66	1 3/32	32	1053	764
@100+100+0	683	285	70.6	38.9	63	1 1/16	29	968	679
50+50+50	813	215	79.1	41.4	66	1 3/32	31	1028	739
25+25+25	752	171	81.5	41.4	66	1 3/32	26	923	634
100+50+50	538	299	64.3	39.5	64	1 1/16	32	837	548
*100+100+100+TM	653	277	70.2	38.6	62	1 3/32	30	930	641
**100+100+100	488	265	64.8	40.1	64	1 3/32	30	753	464
50+0+0	603	106	85.0	40.9	67	1 1/16	22	709	420
@100+0+0	547	178	75.4	40.1	68	1 1/16	26	725	436
50+50+50									
(Liquid 9-9-9)	626	176	78.1	40.5	71	1 1/16	27	802	513
@100+50+50									
(Liquid 9-9-9 + Liquid 32%)	562	191	74.6	38.6	62	1 3/32	31	753	464
100+100+100									
(Liquid 9-9-9)	584	294	66.5	38.9	60	1 3/32	35	878	589

- * Trace minerals added to fertilizer in process of manufacture.
- ** Supplied with 15-15-15 at time of planting.
- @ Sidedressed in June with 50 pounds nitrogen.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Joe Burge, Malden, Missouri
 Location: 3 miles south of Malden
 Soil Type: Dexter Sandy Loam. Sand 78%; Silt 12%; Clay 10%. Salt
 Soil Test: OM P K Mg Ca pH H CEC pH
 Topsoil: 0.7 254 210 210 150 6.3 1.8 3.41 5.6
 Subsoil: 0.9 124 210 210 50 6.0 2.0 3.25 5.3
 Rex Cotton planted May. Machine harvested.

Soil Treatment	Lint 1st. Pick	Lint 2nd. Pick	% Lint 1st. Pick	% Lint Turn Out	Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Per Acre	Inc. Over Check
No Treatment	239	80	74.9	42.9	68	1 3/32	13	319	---
0-100-100	482	73	86.8	43.8	75	1 3/32	21	555	236
25-100-100	592	79	88.2	42.3	66	1 3/32	25	671	352
50-100-100	725	102	87.7	41.2	70	1 3/32	26	827	508
@100-100-100	677	153	81.6	39.0	69	1 1/16	30	830	511
@100-100-100-TM	632	169	78.9	38.8	67	1 1/16	32	801	482
@100-50-100	568	164	77.6	39.7	67	1 1/16	30	732	413
@100-25-100	668	158	80.9	38.9	67	1 3/32	27	826	507
@100-0-100	691	171	80.2	39.3	67	1 1/16	28	862	543
@100-100-50	747	153	83.0	39.0	64	1 1/16	30	900	581
@100-100-25	772	148	83.9	39.7	66	1 3/32	32	920	601
@100-100-0	679	96	87.6	38.9	63	1 1/16	29	775	456
50-50-50	722	89	89.0	41.4	66	1 3/32	31	811	492
25-25-25	644	68	90.4	41.1	66	1 3/32	26	712	393
100-50-50	613	139	81.5	39.5	64	1 1/16	32	752	433
*100-100-100-TM	621	144	81.2	38.6	62	1 3/32	30	765	446
**100-100-100	536	147	78.5	40.1	64	1 3/32	30	683	364
50-0-0	646	71	90.1	40.9	67	1 1/16	22	717	398
@100-0-0	559	111	83.4	40.1	68	1 1/16	26	670	351
50+50+50 (Liquid 9-9-9)	657	103	86.4	40.5	71	1 1/16	27	760	441
@100+50+50 (Liquid 9-9-9 + Uran)	624	115	84.4	38.6	62	1 3/32	31	729	420
100+100+100 (Liquid 9-9-9)	673	127	84.1	38.9	60	1 3/32	35	800	481

* Trace minerals added to fertilizer in process of manufacturing.
 ** Supplied with 15-15-15 at time of planting.
 @ Sidedressed June with 50 pounds nitrogen.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Sikeston Experiment Field
 Location: 1 mile south of Sikeston, Missouri
 Soil Type: Dexter Sandy Loam. Sand 38%; Silt 49%; Clay 13%. Salt
 Soil Test: OM P K Mg Ca pH H CEC pH
 Topsoil: 1.5 328 320 152 1520 6.0 3.0 7.8 5.4
 Subsoil: 0.8 115 162 160 1595 6.0 2.0 6.9 5.5
 Rex Cotton planted in May - Machine harvested.

Soil Treatment	Lint lst. Pick	%		Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
		Lint Turn Out	Lint Per Pound					
No Treatment	563	38.6	62	1 3/32	32	563	---	
0+100+100	398	39.7	66	1 3/32	32	398	-165	
25+100+100	754	39.9	63	1 1/8	38	754	191	
50+100+100	686	38.5	59	1 3/32	40	686	123	
100+100+100	580	38.8	62	1 3/32	42	580	17	
100+100+100+TM	727	38.1	56	1 3/32	44	727	164	
100+50+100	611	38.7	61	1 1/8	43	611	48	
100+25+100	713	38.5	57	1 1/8	45	713	150	
100+0+100	540	38.1	57	1 3/32	45	540	-23	
100+100+50	538	38.5	60	1 3/32	44	638	75	
100+100+25	621	38.6	59	1 1/8	43	621	58	
100+100+0	712	39.1	61	1 3/32	44	712	149	
50+50+50	591	38.7	61	1 3/32	39	591	28	
25+25+25	626	39.2	61	1 3/32	37	626	63	
100+50+50	572	39.9	62	1 3/32	46	572	9	
*100+100+100+TM	437	38.7	60	1 3/32	46	437	-126	
**100+100+100	517	39.5	63	1 3/32	45	517	-46	
50+0+0	579	38.4	62	1 3/32	41	579	16	
100+0+0	428	38.9	59	1 3/32	43	428	-135	

* Trace minerals added to fertilizer in process of manufacture.
 ** Supplied by 15-15-15 at time of planting.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: J. R. Blades, Parma, Missouri (Same as Poeffler in 1960)
 Location: 3 miles west of Parma.
 Soil Type: Sharkey Clay Loam. Sand 27%; Silt 36%; Clay 37%.
 Soil Test: OM P K Mg Ca pH H CEC Salt
 Topsoil: 2.1 216 239 850 4435 5.8 2.2 17.1 5.7
 Subsoil: 1.0 54 162 900 5300 5.7 2.0 19.2 6.5
 Rex Cotton planted in May.

Soil Treatment	Lint lst. Pick	%		Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
		Lint Turn Out	Bolls Per Pound					
No Treatment	255	40.5	81	1 3/32	24	255	---	
0+100+100	193	39.3	74	1 3/32	23	193	62	
25+100+100	255	41.3	76	1 3/32	25	255	0	
50+100+100	370	40.3	71	1 3/32	28	370	115	
100+100+100	419	40.8	75	1 3/32	27	419	164	
100+100+100+TM	401	39.1	75	1 3/32	30	401	146	
100+50+100	421	39.9	67	1 3/32	29	421	166	
100+25+100	397	39.6	69	1 3/32	30	397	142	
100+0+100	277	39.9	67	1 3/32	28	277	22	
100+100+50	132	40.4	71	1 3/32	31	132	-123	
100+100+25	202	40.5	67	1 3/32	29	202	-53	
100+100+0	337	38.7	70	1 1/8	30	337	82	
50+50+50	462	38.6	70	1 3/32	31	462	207	
25+25+25	467	40.4	74	1 3/32	29	467	212	
100+50+50	414	39.9	72	1 3/32	31	414	159	
*100+100+100+TM	356	40.8	69	1 3/32	32	356	101	
**100+100+100	221	40.5	67	1 1/16	31	221	-34	
50+0+0	331	41.6	64	1 1/16	28	331	76	
100+0+0	364	40.7	69	1 3/32	30	364	109	

- * Trace minerals added to fertilizer in process of manufacture.
- ** Supplied with 15-15-15 at time of planting.

Only one picking with machine was made which was not complete. The high nitrogen plots had considerably more cotton which was not open at first picking. Adverse weather has prevented second picking.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: James Roth (Filled Field Irrigated)

Location: 2 miles northeast of Malden, Missouri.

Soil Type: Sharkey Clay Loam. Sand 39%; Silt 37%; Clay 24% Salt

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	pH
Topsoil:	1.1	154	120	800	2100	7.2	0	8.7	6.7
Subsoil:	0.6	46	90	900	3250	7.0	0.3	12.3	6.6

Soil Treatment	Lint		%		Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
	1st. Pick	2nd. Pick	Lint 1st. Pick	% Turn Out					
No Treatment	105	99	51.5	40.6	72	1 1/8	20	204	---
0-100-100	398	226	63.8	41.0	69	1 5/32	27	624	420
25-100-100	217	386	36.0	38.7	60	1 5/32	32	603	399
50-100-100	146	319	31.4	38.0	59	1 1/8	32	465	261
100-100-100	146	306	32.3	38.5	61	1 1/8	35	452	248
100-100-100-TM	94	258	26.7	38.5	59	1 1/8	34	352	148
100-50-100	208	362	36.5	38.6	60	1 1/8	33	570	366
100-25-100	239	375	38.9	36.9	58	1 5/32	36	614	410
100-0-100	338	379	47.1	38.1	61	1 5/32	36	717	513
100-100-50	414	348	54.3	38.5	60	1 5/32	32	762	558
100-100-25	234	345	40.4	38.5	59	1 1/8	31	579	375
100-100-0	256	303	45.8	38.5	63	1 1/8	32	559	355
50-50-50	262	341	43.4	38.8	57	1 1/8	32	603	399
25-25-25	310	259	54.5	39.4	62	1 1/8	31	569	365
100-50-50	304	412	42.5	38.9	58	1 3/32	39	716	512
*100-100-100-TM	301	480	38.5	37.8	56	1 5/32	44	781	577
**100-100-100	368	460	44.4	38.0	56	1 1/8	41	828	624
50-0-0	355	285	55.5	39.8	64	1 1/8	31	640	436
100-0-0	419	257	62.0	39.3	63	1 3/32	28	676	472
(Liquid Uran)	390	234	62.5	38.5	60	1 1/8	28	624	420
18+72+72	414	304	57.7	37.9	65	1 1/8	35	718	514
18+72+50# N- Sidedress (Uran)	593	292	67.0	38.3	62	1 5/32	35	885	681
18+72+72+50# N- Sidedress (Amo. Nit.)	710	271	72.4	38.8	64	1 1/8	32	981	777
18+72+72+50# N- Sidedress (Amo. Nit.)	434	331	56.7	38.4	62	1 1/8	34	765	561

* Trace minerals added to fertilizer in process of manufacture.

** Supplied with 15-15-15 at time of planting.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: James Roth (Cut Field Irrigated)
 Location: 2 miles northeast of Malden, Missouri.
 Soil Type: Sharkey Clay Loam. Sand 26%; Silt 53%; Clay 21%. Salt

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	pH
Topssoil:	1.5	300	250	830	2650	7.1	1.0	11.4	6.4
Subsoil:	1.4	226	220	900	2350	7.0	1.0	10.9	6.5

Soil Treatment	Lint		%		Bolls Turn Per Pound	Staple	Height of Plant Inches	Lbs.	
	1st. Pick	2nd. Pick	Lint 1st. Pick	% Turn Out				Per Acre	Inc. Over Check
No Treatment	203	150	57.7	39.8	67	1 1/8	27	352	---
0+100+100	108	113	48.9	40.8	78	1 1/8	19	221	131
25+100+100	295	246	54.5	41.2	71	1 1/8	30	541	189
50+100+100	363	342	51.5	37.9	66	1 1/8	34	705	353
100+100+100	376	429	46.7	37.2	67	1 3/32	40	805	453
100+100+100+TM	453	375	54.7	36.6	57	1 1/8	42	828	476
100+50+100	342	322	51.5	36.1	57	1 1/8	42	664	312
100+25+100	325	400	44.8	37.5	61	1 1/8	44	725	373
100+0+100	269	423	38.9	37.4	60	1 1/8	41	692	340
100+100+50	226	321	41.3	37.3	64	1 1/8	38	547	195
100+100+25	206	220	48.4	37.4	62	1 1/8	35	426	74
100+100+0	189	188	50.1	39.0	63	1 3/32	32	377	25
50+50+50	162	271	37.4	39.1	65	1 1/8	32	433	81
25+25+25	150	230	39.5	41.3	68	1 3/32	25	380	28
100+50+50	172	290	37.2	36.6	58	1 1/8	38	462	110
*100+100+100+TM	201	410	32.9	38.2	59	1 3/32	36	611	259
**100+100+100	233	392	37.3	38.5	58	1 1/8	34	625	273
50+0+0	195	219	47.2	41.0	69	1 3/32	28	415	63
100+0+0	389	275	58.6	38.8	63	1 3/32	31	664	312
100+0+0 (Liquid Uran)	345	287	54.6	38.6	64	1 1/8	28	632	280
18+72+72	124	228	35.2	40.0	62	1 3/32	27	352	---
18+72+72+50# N- Sidedress (Uran)	249	276	47.4	38.3	60	1 3/32	36	525	173
18+72+72+50#N- Sidedress (Amo. Nit.)	245	287	54.6	38.6	64	1 1/8	28	632	280
18+72+72+50#N- Sidedress (Amo. Nit.)	143	302	32.1	37.9	61	1 1/8	36	445	93

* Trace minerals added to fertilizer in process of manufacture.

** Supplied with 15-15-15 at time of planting.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOIL TEST CORRELATION

Cooperator: Harvey Lee, Quilin, Missouri

Location: 1 mile south of Quilin.

Soil Type:	Waverly Silt Loam.								Sand 0%; Silt 73%; Clay 27%.	Salt
Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	pH	
Topsoil:	1.7	230	275	540	4300	6.4	1.5	14.8	6.1	
Subsoil:	1.3	160	200	870	3400	5.5	3.0	15.4	5.0	

Soil Treatment	Lint	Lint	%	%	Bolls Per Pound	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
	1st. Pick	2nd. Pick	Lint 1st. Pick	Lint Turn Out					
No Treatment	260	240	52.0	37.9	60	1 1/8	35	500	---
0-100-100	230	277	45.4	40.2	64	1 1/8	28	507	7
25-100-100	341	631	35.1	38.2	59	1 1/8	40	972	472
50-100-100	127	711	15.2	36.9	59	1 1/8	48	838	338
100-100-100	117	516	18.5	36.3	57	1 1/8	53	633	133
100-100-100-TM	191	549	25.8	36.3	59	1 1/8	50	740	240
100-50-100	245	788	23.7	38.2	56	1 3/32	46	1033	533
100-25-100	125	641	16.3	38.8	61	1 3/32	42	765	266
100-0-100	288	631	31.3	39.3	59	1 3/32	33	919	419
100-100-50	354	621	36.3	38.7	57	1 1/8	35	975	475
100-100-25	383	580	39.8	40.8	63	1 3/32	38	963	463
100-100-0	365	329	52.6	39.9	63	1 1/8	37	694	194
50-50-50	314	466	40.3	39.1	59	1 1/8	36	780	280
25-25-25	445	315	58.6	40.5	61	1 3/32	33	760	260
100-50-50	345	560	38.1	40.7	61	1 1/8	35	905	405
*100-100-100-TM	207	649	24.2	39.3	57	1 3/32	41	856	356
**100-100-100	338	621	35.1	37.9	59	1 3/32	36	964	464
50-0-0	371	336	52.5	38.6	65	1 3/32	36	707	207
100-0-0	338	482	41.2	38.9	63	1 3/32	40	820	320

* Trace minerals added to fertilizer in process of manufacture.

** Supplied with 15-15-15 at time of planting.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

TRACE ELEMENT STUDY

Cooperator:	Portageville Experiment Field, Loam							
Soil Type:	Silt Loam.	Sand	49%	Silt	35%	Clay	16%	Salt
Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC
Topsoil:	1.8	300	380	380	3600	6.5	2.0	13.1
Subsoil:	1.5	256	415	290	3300	6.3	2.0	12.1
								5.9

Soil Treatment	Lint	Lint	%	%	Lint Bolls	Staple	Height of Plant	Lbs. Per Acre	Inc. Over Check
	1st. Pick	2nd. Pick	Lint 1st. Pick	Lint Turn Out					
No Treatment	785	98	88.9	42.4	66	1 1/8	31	883	---
25+25+25	845	107	88.8	41.4	61	1 3/32	34	952	69
0+50+50	784	87	90.0	42.6	65	1 1/16	29	871	-12
25+50+50	909	182	83.3	42.8	64	1 1/16	35	1091	208
50+50+50	894	155	85.2	42.1	62	1 1/16	35	1049	166
100+50+50 (Amm. Nitrate)	889	236	79.0	42.1	64	1 1/8	41	1125	242
100+50+50 (Es-Min-E1)	818	261	75.8	41.1	62	1 1/8	41	1079	196
100+50+50+Ca (300# Fine Lime)	864	198	81.4	41.4	62	1 1/16	37	1062	179
100+50+50+Traces (Less Iron)	810	251	76.3	41.3	62	1 3/32	39	1061	178
100+50+50+Traces (Less copper)	913	226	80.2	42.0	62	1 1/16	38	1139	256
100+50+50+Traces (Less Zinc)	826	236	77.8	40.9	62	1 1/8	42	1062	179
100+50+50+Traces (Less Manganese)	832	237	77.8	40.8	62	1 1/8	40	1069	186
100+50+50+Traces (Less Boron)	834	221	79.1	40.2	63	1 3/32	36	1055	172
100+50+50+Traces (Less Magnesium)	811	232	77.8	40.5	63	1 3/32	37	1043	160
100+50+50+Traces (Complete Mixture)	849	157	84.4	40.1	65	1 3/32	37	1006	123

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOURCE OF NITROGEN

Cooperator: Joe Burge, Malden, Missouri.

Location: 3 miles south of Malden.

Soil Type: Dexter Sandy Loam. Sand 83%; Silt 9%; Clay 8%. Salt

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	pH
Topsoil:	0.8	262	210	270	350	6.6	1.0	3.4	6.2
Subsoil:	0.7	108	160	240	150	6.6	1.0	2.6	6.0

Rex Cotton planted May

*Soil Treatment	Lint 1st. Pick	Lint 2nd. Pick	% Lint 1st. Pick	% Lint Turn Out	Bolls Per	Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check
No Nitrogen	563	59	90.5	42.1	74	1 3/32	22	622	---
60#N (Ammonium Nitrate)	718	58	92.5	41.6	62	1 3/32	28	776	154
60#N (Nitrate of Soda)	360	75	82.8	41.2	70	1 1/16	25	435	-187
60#N (Urea)	687	66	91.2	42.4	67	1 3/32	27	753	131
60#N (Ammonium Sulphate)	703	72	90.7	42.0	64	1 1/16	29	775	153
60#N (Anhydrous Ammonia)	562	85	86.9	43.2	64	1 1/16	27	647	25
60#N (Liquid 32% N)	668	74	90.2	42.2	66	1 1/16	26	742	120
110#N (Liquid 32% N)	679	80	89.5	41.9	71	1 3/32	25	759	137
60#N (Anhydrous Ammonia) applied in July	563	65	89.6	40.6	69	1 3/32	--	628	6

* All plots 18+72+72 starter at time of planting.

Nitrogen applied sidedress in June except anhydrous ammonia applied in July as indicated.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOURCE OF NITROGEN

Sikeston Experiment Field

Location: 1 mile south of Sikeston

Soil Type: Dexter Sandy Loam. Sand 29%; Silt 52%; Clay 19%

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	Salt pH
Topsoil:	1.7	200	356	160	1100	5.5	4.0	7.9	4.9
Subsoil:	1.0	160	250	152	1275	5.5	4.0	8.1	5.0

Rex Cotton planted in May.

<u>*Soil Treatment</u>	<u>Lint lst. Pick</u>	<u>% Lint Turn Out</u>	<u>Bolls Per Pound</u>	<u>Staple</u>	<u>Height of Plant Inches</u>	<u>Lbs. Lint Per Acre</u>	<u>Inc. Over Check</u>
No Nitrogen	295	40.5	66	1 3/32	25	295	-35
100#N (Ammonium Nitrate)	435	39.1	60	1 3/32	38	435	105
100#N (Urea)	384	38.9	60	1 1/8	38	384	54
100#N (Anhydrous Ammonia)	353	39.3	62	1 1/8	41	353	23
100#N (Sodium Nitrate)	451	38.3	57	1 1/8	37	451	121
100#N (Ammonium Sulphate)	347	39.2	60	1 3/32	43	347	17
100#N (Liquid 32% N)	467	38.4	60	1 1/8	42	467	137
50#N (Ammonium Nitrate) + 50#N Sidedressed in June	599	38.6	62	1 3/32	38	599	269
50#N (Ammonium Nitrate)	469	38.7	60	1 1/8	42	469	139

* All plots, except No Treatment, 0+50+50 plus nitrogen at time of planting. Sidedress nitrogen applied June 25, 1961.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOURCE OF NITROGEN

Portageville Experiment		Field - Silt Loam							
Soil Type:	Silt Loam.	Sand	49%	Silt	35%	Clay	16%	Salt	
Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	
Topsoil:	1.8	300	380	380	3600	6.5	2.0	13.1	
Subsoil:	1.5	256	415	290	3300	6.3	2.0	12.1	
								5.9	

Soil Treatment	Lint	Lint	%	%	Bolls Per Staple	Height of Plant Inches	Lbs. Lint Per Acre	Inc. Over Check	
	1st. Pick	2nd. Pick	Lint 1st. Pick	Lint Turn Out					
No Treatment	785	98	88.9	42.4	66	1 1/8	31	883	---
0+50+50	784	87	90.0	42.6	66	1 1/8	31	871	-12
100+50+50 (Anhydrous Ammonia)	736	259	74.0	40.7	62	1 1/16	37	995	112
100+50+50 (Urea)	835	131	86.4	40.2	60	1 3/32	39	966	83
100+50+50 (Sodium Nitrate)	848	246	77.5	41.0	60	1 1/16	39	1094	211
100+50+50 (Ammonium Sulphate)	826	203	80.3	41.9	62	1 3/32	39	1029	146
100+50+50 (32% N-Liquid)	855	196	81.4	40.5	58	1 3/32	36	1051	168
100+50+50 (Ammonium Nitrate)	889	236	79.0	42.1	64	1 1/8	41	1125	242
50+50+50 (Liquid) Uran 50# N	851	237	78.2	42.0	63	1 1/16	40	1088	205
Sidedress July 1 50+50+50 (Liquid)	846	198	81.0	40.8	65	1 1/16	39	1044	161

SOIL FERTILITY EXPERIMENT - COTTON - 1961

SOURCE OF NITROGEN

Cooperator: Alvin Blades, Parma, Missouri

Location: 4 miles east of Townley

Soil Type: Sharkey Clay. Sand 30%; Silt 44%; Clay 26%.

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	Salt
									pH
Topsoil:	1.9	240	158	850	3655	6.3	2.0	14.4	5.8
Subsoil:	1.0	44	118	900	3800	5.5	2.0	15.4	5.7

Soil Treatment	Lint	Lint	%	%	Bolls	Staple	Height	Libs.	Inc.
	1st.	2nd.	Lint	Lint			of		
	Pick	Pick	Pick	Turn	Per		Plant	Per	Over
	Pick	Pick	Pick	Out	Pound		Inches	Acre	Check
No Nitrogen	423	81	83.9	42.7	64	1 1/8	30	504	---
100#N (Ammonium Nitrate)	387	243	61.4	41.1	65	1 1/8	30	630	126
100#N (Ammonium Sulphate)	502	243	67.4	42.5	64	1 1/8	32	745	241
100#N (Urea)	591	182	76.5	41.3	57	1 1/8	33	773	269
100#N (Sodium Nitrate)	709	96	88.1	41.9	62	1 3/32	33	805	301
100#N (Anhydrous)	642	87	88.0	41.4	66	1 3/32	32	729	225
100#N (Aqua Ammonia)	650	54	92.3	41.6	63	1 3/32	33	704	200
100#N (Liquid 32% N)	662	44	93.8	40.1	63	1 3/32	33	706	202

* 12+48+48 starter applied to all plots at planting. Nitrogen sidedressed June 27, 1961.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

LIMESTONE AND NITROGEN

Portageville Experiment Field

Location: Seven miles east of Portageville

Soil Type: Sharkey Clay. Sand 20%; Silt 29%; Clay 51%.

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	Salt pH
Topsoil:	2.4	189	455	940	6500	5.7	4.0	24.8	5.5
Subsoil:	1.0	170	455	940	5800	5.6	3.0	22.0	5.5

Rex Cotton planted May.

Soil Treatment	Lint 1st. Pick	Lint 2nd. Pick	% Lint 1st. Pick	% Lint Turn Out	Bolls Per Pounds	Staple	Height of Plant Inches	Lbs. of Lint Per Acre	
Calcium Limestone Starter									
None 25+50+50	339	155	68.6	41.0	71	1 3/32	30	494	
None 50+50+50	336	179	65.2	39.8	63	1 1/8	33	515	
None 100+50+50	379	162	70.1	39.4	66	1 3/32	32	541	
2 Ton 25+50+50	313	144	68.5	40.6	71	1 1/8	31	457	
2 Ton 50+50+50	362	167	68.5	40.5	69	1 3/32	35	529	
2 Ton 100+50+50	321	220	59.3	39.0	--	-----	34	541	
4 Ton 25+50+50	413	192	68.3	38.6	63	1 1/8	36	605	
4 Ton 50+50+50	386	231	62.6	38.0	61	1 1/8	40	617	
4 Ton 100+50+50	355	195	64.5	36.8	60	1 1/8	39	550	
8 Ton 25+50+50	457	197	69.9	39.0	59	1 1/8	36	654	
8 Ton 50+50+50	527	255	67.4	41.4	67	1 1/8	41	782	
8 Ton 100+50+50	391	273	58.8	37.8	60	1 1/8	38	664	
12 Ton 25+50+50	368	168	68.7	40.6	70	1 1/8	30	536	
12 Ton 50+50+50	427	193	68.9	39.5	64	1 3/32	33	620	
12 Ton 100+50+50	402	313	56.2	38.1	60	1 1/8	38	715	
24 Ton 25+50+50	380	162	70.1	36.1	60	1 1/8	42	542	
24 Ton 50+50+50	365	246	59.7	36.5	59	1 1/8	44	611	
24 Ton 100+50+50	432	256	62.8	39.0	--	-----	43	688	
500# Fine Lime Annually	25+50+50	390	184	67.9	40.0	66	1 1/8	31	574
500# Fine Lime Annually	50+50+50	473	198	70.5	38.9	63	1 1/8	33	671
500# Fine Lime Annually	100+50+50	422	225	65.2	38.2	58	1 1/8	31	647

The above experiment was designed to measure the effect on cotton yields of various nitrogen and limestone applications over a period of years. The results from 1961 indicate a response to rates of limestone up to and including the 8 ton application. Higher rates (12 and 24 tons) of limestone resulted in lower yields than the 8 ton rate.

The 500 pound annual application of fine lime appeared to be equivalent to a rate somewhere between the four and six ton applications. This soil has a high calcium test and it will be interesting to note the effect of 100 pounds of nitrogen annually applied to these plots over a period of years.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

BASIC SOIL TREATMENTS

Portageville Experiment Field

Location: 7 miles east of Portageville.

Soil Type: Sharkey Clay. Sand 20%; Silt 29%; Clay 51%.

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	Salt pH
Topsoil:	2.4	189	455	940	6500	5.7	4.0	24.8	5.5
Subsoil:	1.0	170	455	940	5800	5.6	3.0	22.0	5.5

Rex Cotton planted May.

Soil Treatment		Lint	%	Bolls		Height	Lbs.	
1961	Annual	lst.	Lint	Per		of	Per	Inc.
Plowdown	Starter	Pick	Out	Pound	Staple	Plant	Acres	Over
						Inches		Check
None	None	276	40.9	81	1 1/8	20	276	---
None	50+50+50	469	40.3	68	1 1/8	26	469	193
None	100+50+50	507	38.7	60	1 1/8	35	507	231
None	100+0+0	537	39.2	62	1 5/32	29	537	261
None	100+100+100	485	40.3	66	1 1/8	29	485	209
None	150+100+100	515	40.1	67	1 1/8	28	515	239
0+200+0	100+0+0	570	38.7	65	1 1/8	30	570	294
0+200+0	100+50+50	572	38.4	61	1 5/32	37	572	296
0+0+200	100+0+0	460	38.8	65	1 1/8	31	460	184
0+0+200	100+50+50	494	39.2	64	1 5/32	30	494	218
0+100+200	100+0+0	437	38.8	63	1 1/8	31	437	161
0+100+200	150+50+50	498	39.6	66	1 1/8	28	498	222
0+200+200	100+0+0	522	39.5	70	1 1/8	28	522	246
0+200+200	150+50+50	565	39.9	66	1 1/8	29	565	289
0+400+200	100+0+0	594	38.8	64	1 1/8	32	594	318
0+400+200	100+50+50	519	39.5	70	1 1/8	29	519	243
0+1000+200	100+0+0	530	39.0	65	1 1/8	31	530	254
0+1000+200	100+50+50	461	38.7	68	1 1/8	32	461	185
0+200+100	100+0+0	450	39.2	63	1 3/32	29	450	174
0+200+100	100+50+50	607	39.5	64	1 1/8	34	607	331
0+200+400	100+0+0	607	39.7	66	1 1/8	36	607	331
0+200+400	100+50+50	490	39.1	61	1 1/8	39	490	214
0+100+100	100+0+0	538	38.4	64	1 1/8	36	538	262
0+100+100	100+50+50	579	39.7	66	1 1/8	34	579	303
0+400+400	100+0+0	543	39.9	65	1 1/8	30	543	267
0+400+400	100+50+50	502	38.7	61	1 1/8	32	502	226

The above experiment was initiated to determine the effect of large plow-down applications of phosphate and potash for continuous cotton. The experiment is also designed to determine whether the phosphate and potash should be plowed down or supplied as a starter.

The results from 1961 indicate that plowdown phosphate increased the yields of lint. The phosphate was not as important as the nitrogen applications. The high rates of phosphate did not depress the yields as much as anticipated.

SOIL FERTILITY EXPERIMENT - COTTON - 1961

COVER CROP

Portageville Experiment Field

Location: 7 miles east of Portageville

Soil Type: Sharkey Clay. Sand 20%; Silt 29%; Clay 51%.

Soil Test:	OM	P	K	Mg	Ca	pH	H	CEC	Salt pH
Topsoil:	2.4	189	455	940	6500	5.7	4.0	24.8	5.5
Subsoil:	1.0	170	455	940	5800	5.6	3.0	22.0	5.5

Rex Cotton planted May.

Soil Treatment* Plus Cover Crop	Lint 1st. Pick	% Lint Turn Out	Bolls Per Pound	Staple	Height of Plants Inches	Lbs. Lint Per Acre	Inc. Over Check
No Cover Crop	387	38.9	61	1 1/8	31	387	----
Rye	145	39.6	65	1 1/8	29	145	-242
Rye and Vetch	283	40.1	61	1 1/8	28	283	-104
Dixie Crimson Clover	284	38.5	59	1 5/32	29	284	-103
Austrian Winter Peas	246	39.8	60	1 1/8	35	246	-141
Alfalfa	245	38.5	66	1 1/8	30	245	-142
Burr Clover	376	38.1	56	1 5/32	29	376	- 11
Annual Rye Grass	65	39.2	62	1 1/8	32	65	-322
Annual Field Brome	67	38.8	62	1 3/32	32	67	-320

* All plots 50+50+50 plus 50 pounds nitrogen sidedressed. Cover crops were seeded in fall of 1960 and turned under before cotton planting. Burr Clover and Alfalfa stand was poor.

The soil was difficult to prepare and cotton did not germinate until late June. The soil in the Austrian winter peas plot was less difficult to prepare but the yield was no higher than in the cotton or other cover crop plots.

Soil Treatment and Land Grading

The grading of land will probably continue at a more rapid rate in the future for surface drainage and irrigation in Southeast Missouri. There is increased concern as to the effect of deep cuts and fills on crop production following grading. Previous experience indicates that separate soil tests should be made of cut, filled and undisturbed areas, not a composite test of the whole field.

Soil treatments should then be made to each area as needed and not to the entire field uniformly. Generally the cuts will be low in organic matter and results during the past 3 years indicate a need for higher rates of nitrogen. Applying these high rates of nitrogen to the filled area may result in lodging and excessive growth. This condition can be avoided if plowdown or broadcast treatments are applied on the portion of the field where needed.

The following table gives the average yields for the three year period 1959-61 from a clay loam field graded in 1958. The cut portion of the field did not yield as high as the filled area the first year. The average yield data indicates that with proper fertilizer, production from the cut areas may be restored and the loss not as severe as was anticipated.

SOIL FERTILITY EXPERIMENT

3-YEAR AVERAGE GRADED LAND

Cooperator: James Roth

Location: 2 miles northeast of Malden.

Soil Type: Sharkey Clay Loam. Sand 26%; Silt 53%; Clay 21%. Salt

Soil Test: OM P K Mg Ca pH H CEC pH

Topsoil: 1.5 300 250 830 2650 7.1 1.0 11.4 6.4

Subsoil: 1.4 226 220 900 2350 7.0 1.0 10.9 6.5

Soil Treatment	1959		1960		1961		3-yr. average	
	Filled	Cut	Filled	Cut	Filled	Cut	Filled	Cut
No Fertilizer	577	484	431	485	204	352	404	440
25+25+25	778	589	593	548	569	380	647	506
50+50+50	864	732	704	661	603	433	724	612
100+100+100	752	840	689	972	452	805	631	872
100+50+50	877	885	790	804	716	462	794	717
0+100+100	825	454	608	347	624	221	686	341
25+100+100	888	641	782	615	603	541	758	599
50+100+100	854	817	752	861	465	705	690	794
100+100+100	752	840	689	972	452	805	631	872
100+0+100	758	869	828	905	717	692	768	822
100+25+100	872	835	1021	991	614	725	836	850
100+50+100	986	881	1026	1003	570	664	861	849
100+100+100	752	840	689	972	452	805	631	654
100+100+0	811	618	580	449	559	377	650	481
100+100+25	849	730	528	546	579	426	652	567
100+100+50	780	847	696	834	762	547	746	743
100+100+100	752	840	689	972	452	805	631	872

The filled and cut areas responded to the application of starter fertilizers. The response to nitrogen applied to the cut area was proportional to the amount applied, whereas on the filled area the higher rates of nitrogen did not increase yields and in some instances caused yield decreases.

Phosphate applications over the three year period responded favorably at the 25 and 50 pound rate. The 100 pound application depressed the yields of lint cotton. Both areas responded to potash applications with the cut area responding to the 100 pound application. The 100 pound application of potash depressed the yield of lint on the filled area.

CORN SOIL FERTILITY EXPERIMENTS

Soil fertility experiments with corn were conducted at four locations in Southeast Missouri in 1961. One experiment at Portageville was one of several over the state in cooperation with the Agricultural Economics Department. This study included rate and time of nitrogen application with various plant populations.

Two experiments were located on a sandy soil near Malden where the soil nutrient level was low. By the application of fertilizer a yield of 124 bushels was obtained with irrigation or an increase in yield of 101 bushels over the no treatment plot.

The data show that the application of at least 150 pounds of nitrogen was required for maximum yields. The various sources of nitrogen used produced yields within a variance of 14 bushels. The data do not indicate the need of phosphate and potash at the locations where these experiments were conducted.

The experiment on the Waverly soil in Butler County was not harvested because of unsatisfactory stand.

SOIL FERTILITY EXPERIMENT - CORN - 1961

SOIL TEST CORRELATION - IRRIGATED

Cooperator: Joe Burge, Malden, Missouri.

Location: 3 miles south of Malden.

Soil Type: Dexter Sandy Loam. Sand 81%; Silt 9%; Clay 10%.

Soil Test:

	OM	P	K	Mg	Ca	pH		H	CEC
						Water	Salt		
Topsoil:	1.0	1.98	1.90	300	0	7.0	6.5	1.0	2.4
Subsoil:	0.6	1.08	1.80	240	250	6.7	6.1	1.0	2.9

U.S. 523W corn planted April.

<u>Soil Treatment</u>	<u>Stalks Per Acre</u>	<u>Ears per 100 Stalks</u>	<u>Bushels per Acre</u>
No Treatment	12,590	49	22.7
0+100+100	13,770	54	28.4
50+100+100	14,030	93	96.2
100+100+100	13,290	113	103.1
150+100+100	13,330	104	103.0
150+100+100+TM	12,550	104	95.3
200+100+100	14,110	97	112.5
150+0+100	13,810	108	118.4
150+50+100	14,070	102	110.0
150+100+50	14,110	97	115.2
150+100+0	14,070	104	118.3
100+50+50	15,420	99	105.2
100+50+50 (Liquid Fertilizer)	13,160	93	82.9
50+50+50	13,550	91	86.2
50+0+0	13,720	92	82.0
150+0+0	13,550	107	99.7

SOIL FERTILITY EXPERIMENT - CORN - 1961

SOURCE OF NITROGEN - IRRIGATED

Cooperator: Joe Burge, Malden, Missouri
 Location: 3 miles south of Malden.
 Soil Type: Dexter Sandy Loam. Sand 81%; Silt 9%; Clay 10%.
 Soil Test:

	pH								
	OM	P	K	Mg	Ca	Water	Salt	H	CEC
Topsoil:	1.0	198	190	300	0	7.0	6.5	1.0	2.4
Subsoil:	0.6	108	180	240	250	6.7	6.1	1.0	2.9

U.S. 523W Corn planted April.

Soil Treatment	Stalks Per Acre	Ears Per 100 Stalks	Bushels Per Acre
No Treatment	12,590	49	22.7
18+72+72	13,290	53	37.3
18+72+72+100#N (Ammonium Nitrate)	13,810	98	99.6
18+72+72+100#N (Sodium Nitrate)	13,630	101	102.8
18+72+72+100#N (Urea)	13,110	99	101.2
18+72+72+100#N (Ammonium Sulphate)	12,850	101	100.3
18+72+72+100#N (Anhydrous Ammonia)	13,330	103	110.9
18+72+72+100#N (Liquid 32% N)	13,940	97	114.5
18+72+72+150#N (Liquid 32% N)	14,330	96	124.0

SOIL FERTILITY EXPERIMENT - CORN - 1961

SOIL TEST CORRELATION - IRRIGATED

Sikeston Experiment Field
 Location: 1 mile south of Sikeston.
 Soil Type: Dexter Sandy Loam. Sand 37%; Silt 49%; Clay 14%.
 Soil Test:

	pH								
	OM	P	K	Mg	Ca	Water	Salt	H	CEC
Topsoil:	1.7	300	340	96	2085	6.0	5.5	2.0	8.0
Subsoil:	1.1	160	213	126	1490	5.9	5.5	2.1	6.7

523W Corn planted May. Harvested with picker-sheller.

Soil Treatment	Bushels Per Acre
No Treatment	41.0
0+100+100	32.5
50+100+100	78.6
100+100+100	98.1
150+100+100	101.2
150+100+100+TM	96.1
200+100+100	95.3
150+0+100	96.9
150+50+100	97.1
150+100+50	100.2
150+100+0	100.1
50+50+50	78.7
25+25+25	51.4
150+0+0	89.4

SOIL FERTILITY EXPERIMENT - CORN - 1961

Portageville Experiment Field.

Location: 7 miles east of Portageville.

Soil Type: Salix Silt Loam. Sand 54%; Silt 32%; Clay 14%.

Soil Test:

	OM	P	K	Mg	Ca	pH		H	CEC
						Water	Salt		
Topsoil:	2.4	378	300	320	3500	6.4	5.9	1.0	10.6
Subsoil:	1.8	272	215	380	3500	6.3	5.8	1.0	11.7

U.S. 523W Corn planted May 16.

Number Plants Per Acre	Bushels Per Acre					
	0	Pounds of Applied Nitrogen Per Acre				
		25	50	100	150*	200**
12,000	53	83	99	114	128	125
15,000	57	72	99	127	137	139
19,000	41	74	100	118	129	137
20,500	53	81	97	123	124	144

* 50 pounds nitrogen sidedressed.

**100 pounds nitrogen sidedressed.

The above results show that 150 pounds of nitrogen was ample with a planting rate of 15,000 plants per acre. The higher nitrogen application of 200 pounds per acre may require higher planting rates than the 20,500 plants per acre used above. This experiment was not irrigated in 1961, but in the future the test will be irrigated when needed.

SOYBEAN SOIL FERTILITY EXPERIMENTS

Soil fertility experiments with soybeans were included at three locations in 1961. The studies were concerned mainly with trace mineral applications. None of the treatments had much effect on yields.

Soybeans are included in the rotation experiment at the Portageville Experiment Field which was initiated in 1961. Previous experimental work has indicated that the soybean yields may be improved by fertilizing other crops in a rotation and not by applying fertilizers to land planted continuously to soybeans.

SOIL FERTILITY EXPERIMENTS - SOYBEANS - 1961

TRACE ELEMENTS

Sikeston Experiment Field

Location: 1 mile south of Sikeston

Soil Type: Dexter Sandy Loam. Sand 58%; Silt 32%; Clay 10%.

Soil Test:

	OM	P	K	Mg	Ca	pH		H	CEC
						Water	Salt		
Topsoil:	1.6	150	200	178	1840	7.0	6.4	1.0	6.8
Subsoil:	1.9	84	118	70	1180	6.9	6.3	.3	3.7

Hill soybeans planted in May.

<u>Soil Treatment</u>	<u>Bushels Per Acre</u>
No Treatment	21
50+50+50	24
300# Fine Lime	24
150# Trace Element Mixture	22
150# Trace Element Mixture (Less Iron)	21
150# Trace Element Mixture (Less Copper)	24
150# Trace Element Mixture (Less Zinc)	23
150# Trace Element Mixture (Less Manganese)	23
150# Trace Element Mixture (Less Boron)	25
150# Trace Element Mixture (Less Magnesium)	25
<u>Seed Treatment</u>	
Captan	23
Captan plus Molybdenum	24
Molybdenum	23

SOIL FERTILITY EXPERIMENTS - SOYBEANS - 1961

TRACE ELEMENTS

Portageville Experiment Field

Location: Seven miles east of Portageville

Soil Type: Salix Silt Loam. Sand 54%; Silt 32%; Clay 14%.

Soil Test:

	OM	P	K	Mg	Ca	pH		H	CEC
						Water	Salt		
Topsoil:	1.8	378	400	270	2700	5.8	5.4	2.0	10.4
Subsoil:	1.7	442	310	350	3100	5.3	5.0	2.0	11.7

Ogden soybeans planted in May.

Soil Treatment

Bushels Per Acre

No Treatment	37
50+50+50	38
300# Fine Limestone	37
150# Trace Element Mixture	38
150# Trace Element Mixture (Less Iron)	35
150# Trace Element Mixture (Less Copper)	37
150# Trace Element Mixture (Less Zinc)	36
150# Trace Element Mixture (Less Manganese)	35
150# Trace Element Mixture (Less Boron)	37
150# Trace Element Mixture (Less Magnesium)	36

Foliar Spray

Sodium Molybdate	40
Fine Sulfate	38
Manganese Sulfate	35
Iron	38

SOIL FERTILITY EXPERIMENTS - SOYBEANS - 1961

Cooperator: Hausner and Gee
 Location: 5 miles southeast of Bernie.
 Soil Test:

	OM	P	K	Mg	Ca	pH		H	CEC
						Water	Salt		
Topsoil:	2.3	176	50	50	600	4.7	4.1	5.5	7.3
Subsoil:	1.0	56	45	20	600	5.0	4.3	4.0	5.7

Soil Treatment Per Acre	Bushels Per Acre				Inc. Over Check
	1958	1959	1961	Avg.	
1958 Plowdown					
	1958 and 1959 Starter				
No Treatment	18	14	14	15	--
6 T. Dolomite Lime	18	12	15	15	0
6 T. Dolomite Lime	O+100+100 50# Trace Mineral Mixture				
	32	26	18	25	10
3 T. Fine Lime	21	16	18	18	3
3 T. Fine Lime					
400# Magnesium Sulphate	25	16	17	19	4
3 T. Fine Lime					
400# Magnesium Sulphate	O+100+0	22	15	18	3
3 T. Fine Lime					
400# Magnesium Sulphate	O+100+100	26	24	18	23
3 T. Fine Lime					
400# Magnesium Sulphate	100+100+100	27	28	17	24
3 T. Fine Lime					
400# Magnesium Sulphate	100+100+100+Traces	23	27	16	22
					7

The above results from 1961 are very difficult to explain unless the dry fall resulted in a moisture deficiency. Previous seasons indicate a response to potash with little or no response to limestone.

OTHER SOIL FERTILITY EXPERIMENTS

Alfalfa: A soil fertility experiment with alfalfa including various rates of fertilizer and limestone on Sharkey Clay, has been initiated at the Portageville Experiment Field on the clay soil. The first planting in the fall of 1960 was killed during the winter and was reseeded in the fall of 1961.

Sugar Beets: Sugar beets were included in a soil fertility experiment at the Portageville field in 1961. Nitrogen appears to be a very essential plant food in sugar beet production. Additional work with the crop will be included in the future to determine plant food requirements.

Rotation Experiment: The rotating of crops in Southeast Missouri has not been widely practiced. The continued practice of growing row crops may lead to unfavorable soil physical conditions.

The experiments on the Portageville Field were designed to measure the effect of continuous cotton as compared to various three-year rotations on cotton production. These rotations will include such crops as cotton, soybeans, milo, corn, wheat, fescue, and alfalfa. The results from such an experiment will not be available for several years.

PLANT TISSUE TESTS - COTTON

Detailed chemical analyses for nitrogen, phosphorus and potassium have been made on various portions of cotton plants which received different fertilizer treatments. These determinations have been made at intervals during the growing season. The results obtained during the past two seasons indicate that tissue analyses can be of value in determining the effect of fertilizer treatment on the level of nutrient elements in the various tissues. When the results are correlated with rate of growth and fruiting, a better understanding of growth processes in cotton can be obtained.

RATE OF TERMINAL LEAF GROWTH OF COTTON

Measurements have been made of the rate of terminal leaf growth of cotton under different soil moisture levels. The data obtained indicates that measurements of this type can indicate when a moisture deficiency develops. It has the possibility of quickly showing when the addition of irrigation water may be needed.

SMALL GRAIN SOIL FERTILITY EXPERIMENTS

Seven soil fertility experiments with wheat were conducted on five different soil types in Southeast Missouri in 1961. Two of the experiments were on graded land, one on the cut (subsoil), and the other on the filled end of the field. On the Portageville Experiment Field, one experiment was located on the clay soil and one on the silt loam soil.

The results indicate a slight increase in yield from the starter fertilizer (150# 6-24-24) but the highest increase was obtained from the plots on which starter and nitrogen (topdressed in March) were applied. Several of the plots responded to the 132 pound per acre rate of nitrogen with very little lodging in 1961.

Topdressing of nitrogen in March appeared to be the most favorable with the January application next in line.

The responses from the high phosphate applications, 400 pounds of phosphate per acre, were variable. Omitting the phosphate from the starter depressed the yields at six of the seven experiments.

The application of trace minerals appeared to increase yields at three locations, had no effect on yield at two locations, and slightly depressed yields at two locations.

The results on the graded land indicate very little response to fertilizer in 1961 on the filled portion of the field. On many plots the yield was actually reduced when nitrogen was applied. On the cut portion of the field (cuts as deep as 1.1 feet) which was actually subsoil, excellent response to nitrogen was obtained. The yield of wheat on the cut portion of the field continued to increase as the additional nitrogen was applied.

SUMMARY OF SOIL TESTS FOR SMALL GRAIN PLOTS

Location	Soil Type		%	Soil Test				pH		ME/100 gms.		Mech. Analysis		
				OM	Pounds Per Acre				H ₂ O	Salt	Hydro-	CEC	Percent	
				P ₂ O ₅	K	Mg	Ca			gen		Sand	Silt	Clay
Sikeston 1 mile south of Sikeston	Dexter sandy loam	Topsoil	2.4	350	475	93	1470	5.6	5.0	2.0	6.7	35	50	15
		Subsoil	1.5	182	431	106	1285	5.8	5.2	1.0	5.3	51	30	19
Burge-3 miles south of Malden	Dexter Sandy loam	Topsoil	1.1	117	325	290	1305	7.0	6.4	0	4.9	74	13	13
		Subsoil	0.7	48	295	260	1000	6.8	6.2	0	4.0	73	14	13
Portageville (Experiment Field) 7 miles east of Portageville	Salix Silt Loam	Topsoil	1.5	128	230	480	2175	5.7	5.0	3.0	10.7	45	40	15
		Subsoil	1.5	165	240	330	1550	5.0	4.5	3.0	8.1	40	40	20
Portageville (Experiment Field) 7 miles east of Portageville	Sharkey Clay Loam	Topsoil	2.4	189	455	940	6500	5.7	5.5	4.0	24.7	20	29	51
		Subsoil	1.0	170	455	940	5800	5.6	5.5	3.0	22.0	16	20	64
Roth-Filled Soil 2 miles northeast of Malden	Sharkey Clay Loam	Topsoil	2.0	110	420	1200	2810	6.5	6.0	0.5	13.1	39	37	24
		Subsoil	1.8	61	270	870	2810	6.2	5.8	1.0	11.9	40	32	28
Roth-Cut or Subsoil. 2 miles northeast of Malden	Sharkey Clay Loam	Topsoil	1.0	9	315	1200	3765	6.3	5.9	1.5	16.3	26	53	21
		Subsoil	0.9	5	305	1120	2810	6.5	6.1	1.0	12.9	21	50	29
Kalkbrenner 5 miles north- west of Quin	Waverly Silt Loam	Topsoil	1.8	44	290	620	1860	6.5	6.3	2.0	9.6	0	77	23
		Subsoil	1.2	10	220	650	1750	6.4	6.1	2.0	9.4	0	76	24

SOIL FERTILITY EXPERIMENT - WHEAT - 1961

Basic	Soil Treatment			Yield of Wheat - Bushels Per Acre					
	Plowdown	Starter	Topdress	Sikeston	Burge	Portageville Loam	Clay	Roth Fill	Subsoil

The Influence of Starter Fertilizers and Nitrogen Topdressed in Spring on Wheat Yields

No Treatment				23	11	49	28	52	33	20
	9+36+36			25	12	53	29	53	38	23
	None	33#N-March		33	25	70	48	52	44	28
	9+36+36	33#N-March		35	30	72	50	53	52	34
		66#N-March		40	31	67	52	51	49	37
	9+36+36	66#N-March		41	36	73	51	51	58	43
	9+36+36	100#N-March		42	38	69	62	47	61	49
	9+36+36	132#N-March		43	42	68	70	47	63	54

The Influence of Basic or Plowdown Application of Fertilizer on Wheat Yields

No Treatment				23	11	49	28	52	33	20
	9+36+36			25	12	53	29	53	38	23
0+400+0	9+36+36			27	12	--	28	50	39	26
	9+36+36	33#N-March		35	30	72	50	53	52	34
0+400+0	9+36+36	33#N-March		35	28	--	49	48	51	33
	9+36+36	66#N-March		41	36	73	51	51	58	43
0+400+0	9+36+36	66#N-March		42	37	--	58	50	62	43
	9+36+36	100#N-March		42	38	69	62	47	61	49
0+400+0	9+36+36	100#N-March		40	39	--	69	48	66	46
	9+36+36	132#N-March		43	42	68	70	47	63	54
0+400+0	9+36+36	132#N-March		38	40	--	64	51	69	53

The Influence of Nitrogen and Time of Application on Wheat Yields

No Treatment				23	11	49	28	52	33	20
	9+36+36			25	12	53	29	53	38	23
	9+36+36	66#N-At Seeding		38	19	67	68	51	52	45
	9+36+36	66#N-January		47	31	65	68	48	54	44
	9+36+36	66#N-March		46	38	66	80	51	54	48
	9+36+36	66#N-April		45	20	63	81	51	52	46

SOIL FERTILITY EXPERIMENT - WHEAT - 1961

<u>Soil Treatment</u>			<u>Yield of Wheat - Bushels Per Acre</u>							
<u>Basic</u>	<u>Plowdown</u>	<u>Starter</u>	<u>Topdress</u>	<u>Sikeston</u>	<u>Burge</u>	<u>Portageville</u>		<u>Roth</u>		<u>Kalk-</u>
						<u>Loam</u>	<u>Clay</u>	<u>Fill</u>	<u>Subsoil</u>	<u>brenner</u>

The Effect of Various Starter Fertilizers and Time of Application on Wheat Yields

No Treatment				23	11	49	28	52	33	20
	9+36+36			25	12	53	29	53	38	23
	9+36+36	66#N-March		46	36	71	67	56	58	49
		75+36+36-March		43	32	70	64	56	54	44
	9+0+36	66#N-March		43	31	67	75	55	54	44
	9+36+0	66#N-March		45	34	71	68	57	56	48
	6+24+24	69#N-March		42	35	70	76	55	57	48
	12+48+12	63#N-March		43	35	71	75	55	59	48

The Influence of Trace Element Mixture on Wheat Yields

No Treatment				23	11	49	28	52	33	20
	9+36+36	66#N-March		46	38	66	80	51	54	48
	9+36+36+TM	66#N-March		44	39	68	80	55	53	48