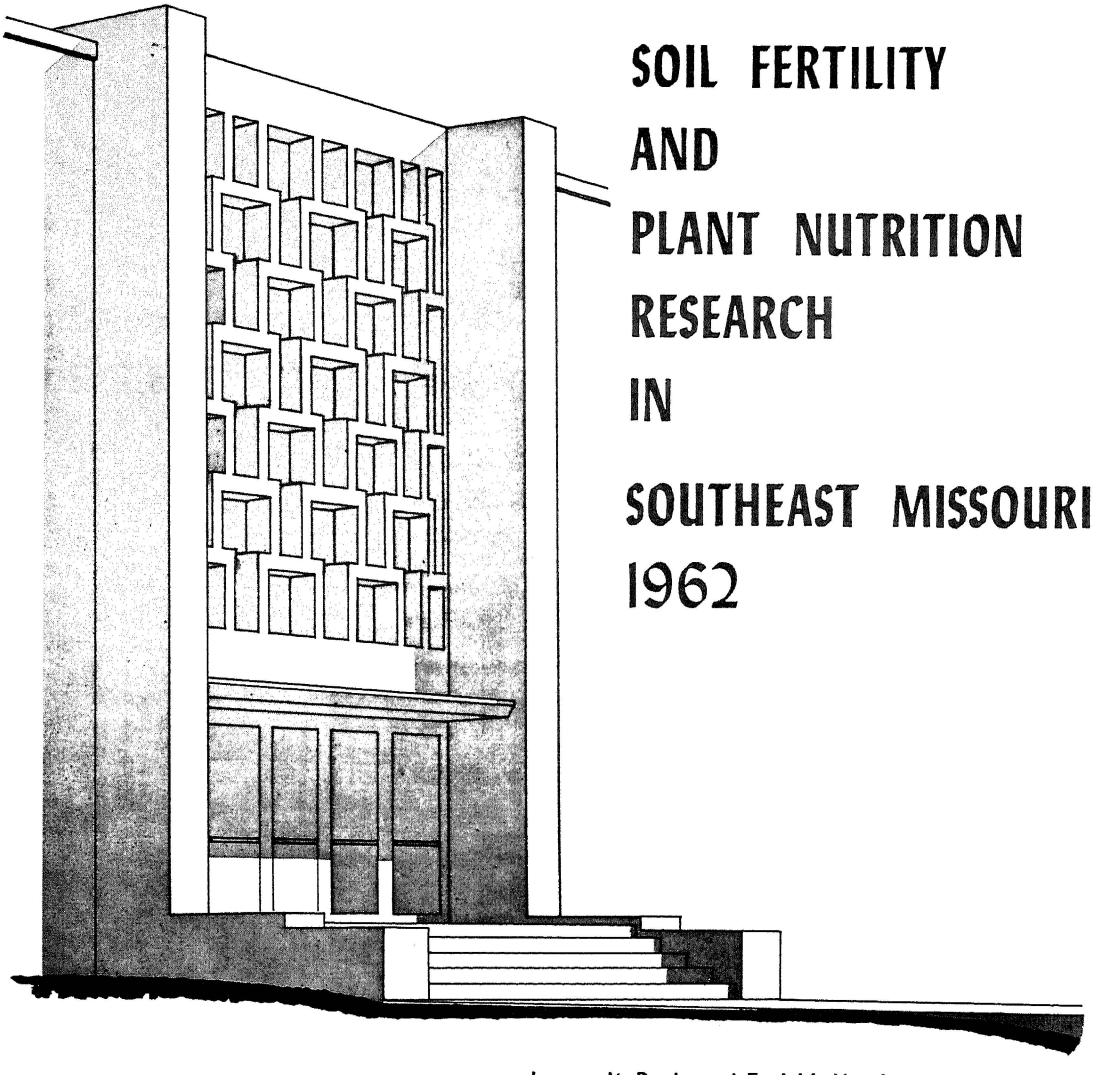

SOIL FERTILITY AND PLANT NUTRITION RESEARCH IN SOUTHEAST MISSOURI 1962

James A. Roth and Earl M. Kroth

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SOIL FERTILITY AND PLANT NUTRITION RESEARCH IN SOUTHWEST MISSOURI- 1962

James A. Roth and Earl M. Kroth

This report presents the results of fertility experiments in the production of cotton, soybeans, wheat, and corn in Southeast Missouri. These experiments included application of different rates of nitrogen, phosphorus, potash, minor elements, and limestone on several of the major soil types.

The 1962 growing season was nearly ideal but intermittent rains and showers during the harvest season resulted in poor quality of the early cotton. Farm yields were in general slightly better than in 1961.

Studies with corn were conducted at the Sikeston and Clarkton experimental fields. Wheat experiments were located at the Portageville, Clarkton, and Sikeston experimental fields, and on land of three farmer cooperators. Experiments with cotton were placed on two soil types at Portageville, the sand of the Clarkton field, fine sandy loam at Sikeston, and on fields of six farmer cooperators.

Some data were obtained from the newly established rotation studies, including alfalfa, Sudan grass, and grain sorghum, but these figures will not be reported as some changes in these rotations are advisable.

Experiments to determine the effect of nitrogen on yield of sugar beets were also conducted at the Sikeston farm.

Experiments with soybeans were completed on the Clarkton, Sikeston and Portageville Experiment Fields and on fields of seven farmer cooperators.

SUMMARY OF SOIL TEST VALUES FOR COTTON 1962

Location	Soil Type	Soil Tests - Topsoil										
		%	Pounds per Acre				pH	Me/100 gm		Mechanical Analysis		
		OM	P_2O_5	K	Mg	Ca	Salt	H+	CEC	Sand	Silt	Clay
Clarkton	Sand	0.9	192	220	40	400	4.0	2.5	4.0	87	6	7
Sikeston	Silt loam	1.7	200	356	160	1100	4.9	4.0	7.9	29	52	19
Portageville	Sandy loam	1.8	300	380	380	3600	5.9	2.0	13.1	49	35	16
Portageville	Sharkey clay	2.4	189	455	940	6500	5.5	4.0	24.8	20	29	51
J. R. Blades 4 miles west of Parma	Sharkey clay	2.2	185	290	840	4000	4.8	3.5	17.5	27	36	37
J. A. Roth 2 miles N. E. Malden	Sharkey clay loam	1.4	179	200	800	4000	5.8	1.5	15.0	26	53	21
French & Maddox 5 miles south Malden	Sharkey clay loam	2.1	176	160	670	4580	5.7	2.0	15.5	48	32	20

SOIL FERTILITY EXPERIMENTS - COTTON - 1962

BASIC SOIL TREATMENTS

Yields of Seed Cotton
(Pounds per acre)

Soil Treatment		Clarkton Exp. Field		Portageville Exp. Field	
** Plowdown	Annual Starter	First Picking	Total Yield	First Picking	Total Yield
None	None	1192	1487	276	453
None	50+50+50	1487	1903	806	1354
None	100+50+50	911	1379	1226	1921
None	100+0+0	1097	1490	1228	1872
None	100+100+100	1277	1791	924	1619
None	150+100+100	1303	1664	1074	1752
0+200+0	100+0+0	1523	1929	1202	1899
0+200+0	100+50+50	1647	1999	1144	1911
0+0+200	100+0+0	1094	1644	1069	1684
0+0+200	100+50+50	812	1540	985	1689
0+100+200	100+0+0	1199	1746	1071	1655
0+100+200	100+50+50	1268	1903	859	1503
0+200+200	100+0+0	1088	1650	1011	1650
0+200+200	100+50+50	1280	1801	1165	1875
0+400+200	100+0+0	554	1183	1067	1759
0+400+200	100+50+50	884	1480	1011	1734
0+1000+200	100+0+0	1271	1828	533	1107
0+1000+200	100+50+50	1533	2076	789	1440
0+200+100	100+0+0	1163	1605	806	1361
0+200+100	100+50+50	1221	1722	816	1443
0+200+400	100+0+0	622	1277	1681	2353
0+200+400	100+50+50	825	1421	1578	2253
0+100+100	100+0+0	891	1340	1206	1831
0+100+100	100+50+50	1146	1759	1070	1805
0+400+400	100+0+0	403	825	953	1672
0+400+400	100+50+50	799	1208	951	1684
0+200+200 Sul-Po-Mag	None	1297	1749	----	----
0+200+200 Sul-Po-Mag	100+50+50	1307	1818	----	----
Cotton Variety		Auburn M		Rex	

**Plowdown 1961 at Portageville.
Plowdown 1962 at Clarkton plus 2 Ton dolomitic limestone.

At the Clarkton field 50+50+50 gave the most economical yield of seed cotton. Additional amounts of nitrogen, phosphorus, or potash did not increase yields, but often caused yield decreases of Auburn M. cotton. At Portageville on the Sharkey clay soil 100+50+50 was the most effective treatment, producing 1921 lbs. of seed cotton, compared with 453 lbs. for no treatment. A plow down treatment of 0+200+400 in 1961 did give a 432 lb. increase with 100 lbs. N at planting time. This same trend was observed for this treatment in 1961.

SOIL FERTILITY EXPERIMENTS - COTTON - 1962

LIMESTONE AND NITROGEN

Yield of Seed Cotton
(Pounds per acre)

Soil Treatment		Clarkton Exp. Field		Portageville Exp. Field	
* Limestone	Annual Fertilizer	First Picking	Total Yield	First Picking	Total Yield
None	25+50+50	943	1451	720	928
None	50+50+50	803	1244	1130	1519
None	100+50+50	1029	1438	1329	1820
2 T Dolomitic	25+50+50	1107	1565	----	----
2 T Dolomitic	50+50+50	1235	1693	----	----
2 T Dolomitic	100+50+50	1192	1638	----	----
2 T Calcium Carbonate	25+50+50	1195	1621	843	1089
2 T Calcium Carbonate	50+50+50	1176	1618	1270	1723
2 T Calcium Carbonate	100+50+50	1415	1998	1415	1911
4 T Dolomitic	25+50+50	1208	1615	----	----
4 T Dolomitic	50+50+50	1389	1791	----	----
4 T Dolomitic	100+50+50	1376	1759	----	----
4 T Calcium Carbonate	25+50+50	1212	1752	961	1270
4 T Calcium Carbonate	50+50+50	1146	1726	1549	2003
4 T Calcium Carbonate	100+50+50	1189	1700	1549	2058
8 T Dolomitic	25+50+50	1683	2050	----	----
8 T Dolomitic	50+50+50	1549	2129	----	----
8 T Dolomitic	100+50+50	1493	2011	----	----
8 T Calcium Carbonate	25+50+50	1366	1765	1094	1438
8 T Calcium Carbonate	50+50+50	1382	1814	1619	2046
8 T Calcium Carbonate	100+50+50	1405	1805	1704	2234
12 T Dolomitic	25+50+50	1608	2123	----	----
12 T Dolomitic	50+50+50	1703	2224	----	----
12 T Dolomitic	100+50+50	1765	2198	----	----
12 T Calcium Carbonate	25+50+50	----	----	981	1261
12 T Calcium Carbonate	50+50+50	----	----	1299	1740
12 T Calcium Carbonate	100+50+50	----	----	1465	1949
24 T Calcium Carbonate	25+50+50	----	----	1157	1424
24 T Calcium Carbonate	50+50+50	----	----	1511	1933
24 T Calcium Carbonate	100+50+50	----	----	1636	2053
500 # Fine Lime Annually	25+50+50	442	874	860	1128
500 # Fine Lime Annually	50+50+50	508	937	1109	1526
500 # Fine Lime Annually	100+50+50	544	1028	1340	1889
Cotton Variety		Auburn M.		Rex	

*Limestone plowed down Portageville 1961; Clarkton 1962.

At Clarkton both dolomitic and calcium limestone gave yield increases at rates ranging from 2T to 8T per acre with 25+50+50 as the starter fertilizer. In some cases 50+50+50 and 100+50+50 out yielded 25+50+50. The Sharkey clay at Portageville gave consistent responses from 2T/A to 8T/A of calcium limestone for each of the three starter fertilizers, the top yield being with 100+50+50 on the 8T/A limestone rate.

SOIL FERTILITY EXPERIMENT - COTTON - 1962

RATES OF NITROGEN AND STARTER FERTILIZERS

Yields of Seed Cotton
(Pounds per Acre)

Soil Treatment	J. R. Blades Parma		French - Maddox Gideon	Portageville Exp. Field (Clay)		Sikeston Exp. Field	Clarkton Exp. Field		Portageville Exp. Field (Loam)	
	First Picking	Total Yield	Total* Yield	First Picking	Total Yield	Total* Yield	First Picking	Total Yield	First Picking	Total Yield
No Treatment	730	1022	1927	----	----	1714	984	1551	1252	1426
0+50+50	631	911	2358	655	827	1838	1046	1473	1188	1470
25+50+50	1156	1407	2560	----	----	1912	1157	1550	1562	1926
50+50+50	1343	1693	3021	1304	1703	1858	1154	1601	1508	1921
100+50+50	1291	1892	2835	1374	2107	1756	1059	1583	1454	1855
150+50+50	1314	1851	2991	1410	2077	1760	1118	1593	1538	1914
50+0+0	1156	1570	2433	----	----	1892	822	1334	1520	1864
100+0+0	1215	1635	3400	----	----	1627	1150	1657	1630	2033
25+25+25	923	1273	2775	----	----	1581	1193	1734	1696	1951
50+50+50 (15-15-15)	1075	1455	3073	----	----	1809	1072	1737	1509	1921
50+50+50+Fine Lime	1092	1501	2983	----	----	1889	1238	1745	1348	1724
50+50+50+Trace Minerals	1209	1653	2641	----	----	1700	1310	1866	1713	2038
100+100+100 (15-15-15)	1349	1822	----	----	----	----	----	----	1445	1912
100+100+100 (16-16-16)	1139	1618	----	----	----	1598	915	1439	----	----
50+50+50 (16-16-16)	----	----	----	----	----	1881	1182	1804	----	----
Cotton Variety	DPL-SL		Rex	Rex		Rex	Auburn M		Rex	

*Only one picking.

A starter fertilizer of 25+50+50 gave nearly optimum yields at two locations and 50+50+50 was optimum at one location. The response to nitrogen at Portageville showed only 112 pounds increase in seed cotton for 75 # N. The data from the Clarkton field gave indication of benefit from application of trace minerals.

SOIL FERTILITY EXPERIMENT - COTTON - 1962

SOURCE OF NITROGEN

Yields of Seed Cotton

Soil Treatment	J. R. Blades* 4 Mi. west Parma First Picking	Total	Roth Farm*** 2 Mi. N. E. Malden First Picking	Total	Delta Center**** Portageville First Picking	Total
No Nitrogen	2534	2759	885	1090	954	1174
100 # N (Ammonium Nitrate)	2207	2860	1331	1860	1153	1646
100 # N (Ammonium Sulphate)	2418	2883	1245	1792	1011	1423
100 # N (Sodium Nitrate)	2149	2766	1231	1660	1114	1591
100 # N (Anhydrous)	2025	2482	684	976	1220	1584
100 # N (Agua Ammonia)	2323	2744	----	----	----	----
25 # N (Urea)	2505	2766	1199	1527	1073	1472
50 # N (Urea)	2541	2868	1213	1555	1275	1642
100 # N (Urea)	2468	2889	1094	1477	1282	1651
100 # N (32% Solution)	2381	2831	1167	1641	995	1412
200 # N (32% Solution)	1982	2519	----	----	----	----
100+34+0 (30-10-0)	2511	2954	1176	1655	1094	1582
**50 # N - Before squaring	2476	2817	----	----	----	----
**50 # N - At first bloom	2418	2766	----	----	----	----
**50 # N - At first ½" boll	2360	2767	----	----	----	----
**100 # N - At first ½" boll	----	----	1154	1496	990	1311
**100 # N - At first bloom	----	----	----	----	1284	1765

*All plots starter of 12+48+48 at planting.
**Ammonium Nitrate - Nitrogen sidedressed June 12 unless indicated.
***18+72+72 starter to all plots. Nitrogen sidedressed at first bloom.
****0+50+50 starter to all plots. Nitrogen sidedressed July 2.

Ammonium nitrate at 100 # N/A gave the most consistent yield increases at the three locations. Urea at 100 lbs. N/A equaled ammonium nitrate at two locations. On the Blades farm 50 # N/A as urea equaled the 100 # N/A. The data from Portageville indicate that a stage of growth may be more important than calendar date for the time of sidedressing with nitrogen.

SOIL FERTILITY EXPERIMENT - COTTON - 1962

INFLUENCE OF FERTILITY TREATMENT ON VARIETIES

Yields of Seed Cotton

Soil Treatment		Clarkton Field		Portageville	
Starter	Sidedress	First Picking	Total	First Picking	Total
Auburn M					
50+50+50	0	1060	1462	1097	1489
100+100+100	0	1223	1583	997	1335
100+100+100	50 # N	1007	1420	1078	1513
100+100+100	100 # N	1003	1395	----	----
Rex					
50+50+50	0	822	1169	1077	1469
100+100+100	0	868	1266	949	1492
100+100+100	50 # N	668	1061	958	1304
100+100+100	100 # N	642	1002	----	----
Dixie King					
50+50+50	0	1150	1612	1015	1345
100+100+100	0	973	1372	1069	1486
100+100+100	50 # N	1071	1497	880	1373
100+100+100	100 # N	862	1320	----	----
Delfos 9169					
50+50+50	0	932	1250	1052	1561
100+100+100	0	778	1171	1082	1605
100+100+100	50 # N	1038	1464	867	1385
100+100+100	100 # N	648	1008	----	----
DPL Smooth Leaf					
50+50+50	0	1155	1662	----	----
100+100+100	0	1150	1575	----	----
100+100+100	50 # N	1166	1559	----	----
100+100+100	100 # N	1172	1631	----	----

The above data indicate that 50+50+50 fertilizer was nearest optimum for the varieties tested at the two locations. In several cases high rates of nitrogen depressed the yields.

SOIL FERTILITY EXPERIMENTS - COTTON - 1962

PORTAGEVILLE FIELD - CLAY SOIL

Yields of Seed Cotton
(Pounds per Acre)

			First Picking	Total Yield
Cover Crop Experiment				
*Cotton - No cover crop			2254	2254
*Cotton - Rye			1910	1910
*Cotton - Rye and Vetch			1917	1917
*Cotton - Dixie Crimson Clover			2190	2190
*Cotton - Austrian Winter Peas			2068	2068
*Cotton - Alfalfa			1969	1969
*Cotton - Field Brome			2187	2187
*Cotton - Rye Grass			2002	2002
Rotation Experiment				
1962	1963	1964		
*Cotton	Cotton	Cotton	1989	1989
*Cotton	Soybeans	Corn-grain	2107	2107
*Cotton	Soybeans	Corn-Silage	2187	2187
*Cotton	Soybeans to Wheat	Wheat to Sudan	2046	2046
*Cotton	Soybeans to Wheat	Wheat to Soybeans	2200	2200
*Cotton	Soybeans to Wheat	Wheat to Milo	1947	1947
*Cotton	Soybeans	Soybeans	1827	1827
*Cotton	Fescue	Fescue	1209	1209
*Cotton	Alfalfa	Alfalfa	1942	1942
Trace Element Experiment				
Soil Treatment				
**No Trace Elements			1685	2025
**150 # Trace Element Mix			1731	2062
**150 # Trace Element Mix (Less Iron)			1800	2139
**150 # Trace Element Mix (Less Copper)			1912	2286
**150 # Trace Element Mix (Less Zinc)			1939	2274
**150 # Trace Element Mix (Less Manganese)			1816	2247
**150 # Trace Element Mix (Less Boron)			1694	2103
**150 # Trace Element Mix (Less Magnesium)			1880	2274

*Starter 50+50+50 plus 50 # N
Sidedressed all cotton plots.
**Starter 100+83+50

Stands of the cover crops were poor due to a very dry fall in 1961. Yields on all plots where cover crops were planted were less than that of the no-cover crop plots.

Yields of cotton on the rotation study were about the same for all rotations excepting for the one containing fescue which was 800 pounds of seed cotton less than continuous cotton. These second year data can only indicate trends and need, perhaps, for additional nitrogen on the fescue plots and plowing the fescue in the fall.

Yields on trace element treated plots showed no benefit from the treatments.

SOIL FERTILITY EXPERIMENT - COTTON - 1962

SOIL TEST CORRELATION - POUNDS OF SEED COTTON HARVESTED

Soil Treatment	Potash Experiment 100+50+0	100+50+50	Increase	Soil Test**	Phosphate Experiment 100+0+50	100+50+50	Increase	Soil Type
Harvey Lee (South) Qulin	2731	2705	-26	1100	2876	2994	118*	Clay Loam
Portageville Exp. Field (Loam)	1590	2289	699	380	1935	2129	194*	Silt Loam
Sikeston Exp. Field	1714	1685	-29	300	1534	1639	105*	Sandy Loam
Portageville Exp. Field (Clay)	1298	1315	17	250	1427	1363	-64*	Clay
Clarkton Exp. Field	828	974	146	230	1297	1196	-101	Sand
Sikeston Exp. Field-Pasture	1392	1397	5	180	1380	1383	3	Sandy Loam
J. R. Blades-Parma	1680	1886	206*	130	1540	1738	198*	Clay
W. D. Maddox-Gideon	2671	2711	40	130	2828	2764	-64	Clay
Harvey Lee (North)	1708	1964	256*	115	2458	2588	130*	Clay Loam
Geo. Hausner-Bernie	2054	2273	219*	90	2124	2127	3	Silt Loam
Louis Kalkbrenner-Poplar Bluff	1035	2088	1053*	80	1936	2067	131*	Silt Loam

*Significant increase or decrease.
**Micro-moles per liter (μM/L).

See discussion at end of following table.

SOIL FERTILITY EXPERIMENT - SOYBEANS - 1962

SOIL TEST CORRELATION - YIELDS IN BUSHELS PER ACRE

Location	Potash Experiment				Phosphate Experiment			Soil Type
	11+48+0	12+48+48	Increase	Soil Test**	12+0+48	12+48+48	Increase	
Portageville Exp. Field-Loam	36	36	0	260	36	35	-1	Silt Loam
Sikeston Exp. Field-Rn 85	40	41	1	240	40	40	0	Sandy Loam
J. R. Blades, Parma	46	46	0	220	47	45	-2	Clay
Portageville Exp. Field-Gumbo	37	38	1	220	33	38	5*	Clay
Sikeston Exp. Field-Pasture	37	35	-2	185	36	35	-1	Sandy Loam
Clarkton Exp. Field	14	14	0	130	40	40	0	Sand
Roth-Graded Field-Fill Area	40	39	-1	115	39	37	-2*	Clay Loam
Maddox & French-Gideon (South)	34	34	0	115	28	32	4*	Clay
Maddox & French-Gideon (North)	29	38	9*	90	30	35	5*	Clay
Geo. Hausner, Bernie (North)	34	40	6*	74	37	40	3*	Silt Loam
Roth-Graded Field-Cut Area	36	37	1	51	38	37	-1	Clay Loam
Geo. Hausner, Bernie (South)	31	34	3*	46	32	34	2*	Silt Loam
L. Kalkbrenner, Poplar Bluff	18	27	9*	44	26	26	0	Silt Loam
Geo. Hausner, Bernie (Late Beans)	21	29	8*	41	23	26	3*	Silt Loam

SOIL FERTILITY EXPERIMENT - SOYBEANS - 1962 (CONTINUED)

	No Treatment	100 # Potash	Potash Soil Value**	0+50+50
Miller-Hunterville-(Early Soybeans)	16	17	36	--
Miller-Hunterville-(Late Soybeans)	21	32*	36	--
Flannigan-Hunterville	21	--	38	25

*Significant

**Micro-moles per liter (μM/L).

Developing chemical soil tests, results of which will provide reliable guides for the use of fertilizer on different kinds of soils, is one objective of soil fertility investigations. During 1962, chemical tests of soils for phosphorus and potassium were investigated using both cotton and soybeans as test crops. The test for potassium was a new one. In most cases significant increases in yields as a consequence of adding potassium fertilizer occured when the soil test values for potassium were below 100 to 130 μM/L and no responses were obtained when the test values were higher.

Soil tests for phosphorus have not been completed. However, there was a favorable response to phosphorus fertilizer banded near the row for both cotton and soybeans at most of the locations.

SOIL FERTILITY EXPERIMENT - SOYBEANS - 1962

TRACE ELEMENTS

Soil Treatment	Clarkton Exp. Field Sandy Soil (1) Bu. per Acre	Portageville Exp. Field Silt Loam Soil (2) Bu. per Acre
No Trace Elements	17	40
150 # Traces Less Iron	20	38
150 # Traces Less Copper	18	40
150 # Traces Less Zinc	18	38
150 # Traces Less Manganese	23	40
150 # Traces Less Boron	16	40
150 # Traces Less Magnesium	20	37
150 # Complete Traces	17	40
No Fertilizer		39

(1) 13+50+50 all plots.

(2) 0+50+50 all plots except no fertilizer.

	Geo. Hausner Bernie Clay Loam Soil Bu. per Acre
No Treatment	22
12+50+50	30
12+50+50+300 # Fine Lime	29
48+48+48+ Trace Minerals	29
100 # Es-Min-el	23
300 # Fine Lime	24

No benefit from application of trace minerals on yield of soybeans was noted in 1962, with the possible exception on the sand of the Clarkton Field. Absence of manganese may have increased the yield 6 bu./A over no treatment at this location.

SOIL FERTILITY EXPERIMENT - CORN - IRRIGATED 1962

Sikeston Experiment Field
Soil Type: Dexter Very Fine Sandy Loam

	OM	P	K	Mg	Ca	Ph	H	CEC
Topsoil	1.5	230	405	100	1750	5.4	2.5	7.8
Subsoil	1.2	115	340	90	1900	5.5	2.0	7.5

U.S. 523W Corn planted April 28, 1962.

Number of Plants Per Acre	Bushels Per Acre Pounds of Applied Nitrogen Per Acre						
	0	25	50	75	100	150*	200**
12,000	74	74	100	105	99	93	98
15,000	54	74	94	114	116	105	106
19,000	53	54	83	99	110	113	118
21,000	52	60	81	107	97	94	104

* 50 pounds nitrogen sidedressed.
**100 pounds nitrogen sidedressed.

These results show that 75 pounds of nitrogen on the 15,000 planting rate produced the most economical yields on this soil. This is in contrast with 150 pounds of nitrogen producing 137 bu./A. on an unirrigated site at Portageville in 1961.

SUMMARY OF SOIL TESTS FOR WHEAT PLOTS 1962

Location	Soil Type		% OM	Soil Test Pounds per Acre P_2O_5	K	Mg	Ca	pH Salt	ME/100 gms H+	CEC	Mech. Analysis Percent Sand	Silt	Clay
Sikeston	Dexter	Topsoil	2.4	350	475	93	1470	5.0	2.0	6.7	35	50	15
	Sandy loam	Subsoil	1.5	182	431	106	1285	5.2	1.0	5.3	51	30	19
Clarkton	Dexter	Topsoil	1.0	240	135	30	0	4.4	3.5	----	85	7	8
	Sand	Subsoil	1.0	98	135	44	0	4.4	4.0	----	82	8	10
Kalkbrenner	Waverly	Topsoil	1.8	44	290	620	1860	6.3	2.0	9.6	0	77	23
5 mi. N. W. Qulin	Silt Loam	Subsoil	1.2	10	220	650	1750	6.1	2.0	9.4	0	76	24
Roth-Filled Soil	Sharkey	Topsoil	2.0	110	420	1200	2810	6.0	0.5	13.1	39	37	24
2 mi. N. E. Malden	Clay Loam	Subsoil	1.8	61	270	870	2810	5.8	1.0	11.9	40	32	28
Roth-Cutsoil	Sharkey	Topsoil	1.0	9	315	1200	3765	5.9	1.5	16.3	26	53	21
2 mi. N. E. Malden	Clay Loam	Subsoil	0.9	5	305	1120	2810	6.1	1.0	12.9	21	50	29
Portageville Exp. Field	Sharkey Clay	Topsoil	2.4	189	455	940	6500	5.5	4.0	24.7	20	29	51
7 mi. east of Portageville		Subsoil	1.0	170	455	940	5800	5.5	3.0	22.0	16	20	64

SOIL FERTILITY EXPERIMENT - SMALL GRAIN - 1962

TOPDRESSING NITROGEN

Portageville Experiment Field - Clay Soil

		Bushel per Acre
Wheat Experiment		
No Treatment		39
33 # N Ammonium Nitrate	March	46
66 # N Ammonium Nitrate	March	50
100 # N Ammonium Nitrate	March	51
132 # N Ammonium Nitrate	March	49
66 # N Urea	March	49
66 # N Ammonium Sulphate	March	50
66 # N Sodium Nitrate	March	47
33 # N Ammonium Nitrate	April	42
66 # N Ammonium Nitrate	April	49
Barley Experiment		
No Treatment		32
33 # N Ammonium Nitrate	March	46
66 # N Ammonium Nitrate	March	53
100 # N Ammonium Nitrate	March	53
132 # N Ammonium Nitrate	March	57
66 # N Urea	March	52
66 # N Ammonium Sulphate	March	59
66 # N Sodium Nitrate	March	53
33 # N Ammonium Nitrate	April	43
66 # N Ammonium Nitrate	April	47

These results show (1) that there were no differences between the sources of nitrogen used in this experiment as regards yields per acre; (2) that March may be the best time for topdressing nitrogen; and (3) that 66 lbs. of nitrogen per acre produced only four more bushels per acre than 33 lbs. nitrogen.

Soil Treatment							
Basic Plowdown	Starter	Top Dress	Sikeston	Clarkton	Kalkbrenner	Roth Fill	Roth Cut
		Influence of Starter Fertilizers and Nitrogen Topdressed in Spring on Wheat Yield					
No Treatment			29	4	20	25	9
	9+36+36		29	6	25	28	20
	None	33 # N March	40	13	34	36	11
	9+36+36	33 # N March	36	8	37	36	31
	None	66 # N March	43	7	36	36	13
	9+36+36	66 # N March	41	9	42	38	33
	9+36+36	100 # N March	40	8	42	37	31
	9+36+36	132 # N March	39	12	43	34	33
		Influence of Basic or Plowdown Application of Fertilizer on Wheat Yield					
No Treatment			29	4	20	25	9
0+400+0	9+36+36	None	31	9	28	30	17
0+400+0	9+36+36	33 # N March	42	14	39	37	33
0+400+0	9+36+36	66 # N March	42	16	45	39	40
0+400+0	9+36+36	100 # N March	37	18	39	36	42
0+400+0	9+36+36	132 # N March	39	16	42	37	44
		Influence of Time of Nitrogen Applications on Yield of Wheat					
No Treatment			29	4	20	25	9
	9+36+36	66 # N at Seeding	39	9	39	33	33
	9+36+36	66 # N January	43	8	39	33	31
	9+36+36	66 # N March	42	9	45	32	32
	9+36+36	66 # N April	42	9	39	29	30
	9+36+36	66 # N March	40	8	44	30	29
	100 # Traces						

Soil Treatment						Roth	
Basic Plowdown	Starter	Top Dress	Sikeston	Clarkton	Kalkbrenner	Fill	Cut
		Influence of Starter Fertilizer Ratios on Yield of Wheat					
No Treatment			29	4	20	25	9
	9+36+36	66 # N March	43	21	43	29	33
		75+36+36 March	45	17	39	28	16
	9+0+36	66 # N March	42	11	38	25	10
	9+36+0	66 # N March	44	24	44	29	32
	6+24+24	69 # N March	43	20	39	28	24
	12+48+12	63 # N March	45	24	42	29	32

These data show that where phosphorus has a low soil test value (cut area, Roth farm), applications of phosphorus and potash increased yields in combination with a topdressing of nitrogen. Except for the cut area, 33 lbs. of nitrogen topdressed in March gave the most economical yield increases of wheat regardless of location. Heavier application of phosphorus than that in a starter is indicated where soil test values are quite low as illustrated in the cut area on the Roth farm. These data show that where cuts are made in land-forming, soil tests should be made on the cut area and fertilizer applied accordingly.

Fertility Studies on Sugar Beets

Sikeston was one of five locations in Missouri where rates of nitrogen on the production of sugar beets were studied in 1962.

Phosphorus and potash levels were at an optimum. 100 lbs. nitrogen/A produced 12.1 T/A vs. 0.7 T/A produced by 50 lbs./A preplant. Both these yields were better than that produced by 100 lbs./A at time of blocking the beets. Percent sucrose was also highest (13.1%) at the 100 lb./A level of nitrogen spread as a preplant application. Percent sucrose at Sikeston compared favorably with that at most of the other locations but the yield of beets was considerably lower than at the other sites; e.g. at the Northwest Missouri Research Center at Spickard, the yield was 19.3 T/A. The percent sucrose of these beets was 15.7%.

Fertilizer Experiment With Corn on Dexter Sand

An experiment to determine the effect of different rates of nitrogen, phorsphous, and potash on yields of corn was made on the Clarkton field, using US 523W as the variety. Application of 100+50+50 produced the highest yield of 76 bushels/A. Although the experiment was irrigated, higher application rates of the nutrient elements and other proportions were not effective in increasing yields. The planting rate was 16,500 stalks per acre.