

LONG-TERM CROPPING SYSTEMS TRIAL EVALUATING ROTATIONS, TILLAGE AND FERTILITY

Ezra Aberle

Barley

Table 1. Rep

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lb.	Straw wt.	Bu	Stand
1	822	341	8.3	329.8	11.0	9.9	2772.6	480.9	57.8	127.3
2	764	294	8.7	332.9	11.0	10.1	2392.9	469.4	49.9	130.1
3	991	367	8.3	328.2	11.2	10.7	2979.2	623.6	62.1	135.7
Average	859	334	8.4	330.3	11.1	10.2	2714.9	524.6	56.6	131.0
C.V.	26	25	6.0	3.8	1.9	6.9	24.5	35.7	24.5	27.1
LSD 0.05	190	69	NS	2.1	0.2	0.6	562.5	NS	11.7	NS

Table 1. Tillage

	Biomass	Grain wt.	KWT	TW	Moist	Protein	lbs	Straw wt.	Bu	Stand
M	945	381	8.6	327.2	11.1	10.4	3096.3	563.3	64.5	154.6
N	703	260	8.0	329.5	11.0	9.7	2115.4	442.9	44.1	121.7
T	929	361	8.6	334.3	11.1	10.6	2933.1	567.7	61.1	116.8
Average	859	334	8.4	330.3	11.1	10.2	2714.9	524.6	56.6	131.0
C.V.	26	25	6.0	3.8	1.9	6.9	24.5	35.7	24.5	27.1
LSD 0.05	190	69	NS	2.1	NS	0.6	562.5	NS	11.7	30.1

Table 1. Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	lbs	Straw wt.	Bu	Stand
0	624	227	8.6	332.1	11.2	8.6	1839.0	396.6	38.3	128.4
40	913	353	8.4	327.4	11.0	11.0	2874.6	559.3	59.9	121.7
80	1001	400	7.9	326.6	11.1	11.7	3247.8	600.7	67.7	136.2
M	899	357	8.7	335.0	11.1	9.5	2898.0	541.8	60.4	137.8
Average	937	370	8.3	329.7	11.0	10.8	3006.8	567.3	62.6	131.9
C.V.	26	25	6.0	3.8	1.9	6.9	24.5	35.7	24.5	27.1
LSD 0.05	220	80	0.5	2.1	0.2	0.7	649.5	183.3	13.5	NS

Table 1. Tillage by Fertility

		Biomass	Grain wt.	KWT	TW	Moist	Protein	lbs	Straw wt.	Bu	Stand
M	0	710	258	9.3	340.7	11.2	8.9	2093.3	451.8	43.6	159.0
M	40	982	395	8.4	313.1	10.9	11.3	3209.5	587.1	66.9	148.8
M	80	1048	494	7.8	322.1	11.2	11.6	4010.2	553.1	83.5	152.3
M	M	1039	378	9.1	332.7	11.1	10.0	3072.1	661.0	64.0	158.3
N	0	414	129	7.4	318.6	11.1	8.1	1046.9	285.3	21.8	119.2
N	40	846	305	8.2	332.2	11.0	10.8	2482.8	540.6	51.7	115.7
N	80	870	319	8.1	333.0	11.0	10.9	2594.2	550.8	54.0	127.7
N	M	683	288	8.3	333.5	11.0	8.9	2337.5	395.0	48.7	124.3
T	0	746	294	9.2	336.4	11.3	8.9	2376.9	452.7	49.5	107.2
T	40	911	361	8.5	337.0	11.0	10.9	2931.5	550.3	61.1	100.5
T	80	1084	386	7.9	324.8	11.0	12.8	3139.1	698.2	65.4	128.7
T	M	974	405	8.6	338.9	11.1	9.6	3284.7	569.5	68.4	130.8
Average		990	384	8.4	333.6	11.0	11.1	3118.4	606.0	65.0	120.0
C.V.		26	25	6.0	3.8	1.9	6.9	24.5	35.7	24.5	27.1
LSD 0.05		381	139	0.9	21.9	0.4	1.2	1125.0	317.5	23.5	60.2

Canola**Table 1. Rep**

	Biomass	Grain wt.	KWT	Oil	lbs	Straw wt.	Stand
1	662	79	0.6	45.5	719.3	583.7	25.3
2	724	80	0.6	44.6	733.0	643.7	32.3
3	662	60	0.5	44.1	544.7	602.5	32.9
Average	683	73	0.6	44.7	665.7	610.0	30.1
C.V.	26	44	9.3	2.8	44.4	24.6	55.6
LSD 0.05	NS	NS	0.0	1.1	NS	NS	NS

Table 1. Tillage

	Biomass	Grain wt.	KWT	Oil	lbs	Straw wt.	Stand
M	689	74	0.6	45.0	675.4	615.6	16.9
N	753	75	0.6	44.9	685.9	677.7	30.5
T	606	70	0.5	44.3	635.8	536.7	43.0
Average	683	73	0.6	44.7	665.7	610.0	30.1
C.V.	26	44	9.3	2.8	44.4	24.6	55.6
LSD 0.05	NS	NS	0.0	NS	NS	127.2	14.2

Table 1. Fertility

	Biomass	Grain wt.	KWT	Oil	lbs	Straw wt.	Stand
0	576	49	0.6	47.2	452.0	526.7	31.5
40	685	72	0.5	44.4	656.6	613.4	31.7
80	787	93	0.6	41.5	848.8	694.2	28.2
M	683	77	0.6	45.8	705.2	605.6	29.1
Average	718	81	0.6	43.9	736.9	637.7	29.7
C.V.	26	44	9.3	2.8	44.4	24.6	55.6
LSD 0.05	172	32	0.1	1.3	288.9	146.9	NS

Table 1. Tillage by Fertility

		Biomass	Grain wt.	KWT	Oil	lbs	Straw wt.	Stand
M	0	582	47.4	0.6	47.4	432.7	534.3	21.2
M	40	774	85.1	0.5	45.2	777.4	688.9	18.7
M	80	677	77.3	0.6	41.4	706.1	600.1	15.0
M	M	725	86.0	0.7	46.0	785.3	638.9	12.8
N	0	620	56.9	0.6	48.1	519.9	562.8	25.2
N	40	683	66.6	0.6	45.0	608.1	616.5	31.7
N	80	891	73.0	0.6	41.4	666.9	817.9	30.3
N	M	817	103.9	0.6	45.0	948.7	713.5	34.8
T	0	527	44.2	0.6	46.2	403.5	483.1	48.2
T	40	599	64.0	0.5	43.0	584.3	534.8	44.8
T	80	793	128.5	0.5	41.6	1173.6	664.8	39.3
T	M	506	41.8	0.5	46.2	381.7	464.3	39.7
Average		633	78.1	0.5	43.6	713.2	554.6	41.3
C.V.		26	44.4	9.3	2.8	44.4	24.6	55.6
LSD 0.05		298	54.8	0.1	2.2	500.3	254.4	28.4

Corn**Table 1. Rep**

	Biomass	Grain wt.	TW	Moist	lbs	Straw wt.	Bu	Stand
1	5214	2175	407.9	12.3	6676.4	3039.0	119.2	15.8
2	4822	2122	403.0	12.2	6511.5	2700.1	116.3	10.5
3	4337	1912	399.7	12.3	5869.6	2424.8	104.8	10.4
Average	4791	2070	403.5	12.3	6352.5	2721.3	113.4	12.2
C.V.	14	18	2.0	3.6	18.0	14.7	18.0	27.2
LSD 0.05	563	NS	6.8	NS	NS	338.8	NS	2.8

Table 1. Tillage

	Biomass	Grain wt.	TW	Moist	lbs	Straw wt.	Bu	Stand
M	4858	2088	400.4	12.1	6415.9	2770.6	114.6	13.2
N	4510	1948	408.4	12.8	5948.0	2562.4	106.2	10.2
T	5004	2173	401.8	12.0	6693.5	2830.9	119.5	13.3
Average	4791	2070	403.5	12.3	6352.5	2721.3	113.4	12.2
C.V.	14	18	2.0	3.6	18.0	14.7	18.0	27.2
LSD 0.05	563	NS	6.8	NS	NS	NS	NS	2.8

Table 1. Fertility

	Biomass	Grain wt.	TW	Moist	lbs	Straw wt.	Bu	Stand
0	4067	1667	397.3	12.4	5113.2	2399.5	91.3	11.1
40	4973	2293	404.4	12.1	7048.1	2680.3	125.9	12.9
80	4592	2074	400.9	12.0	6382.7	2518.7	114.0	12.3
M	5531	2244	411.5	12.6	6865.9	3286.6	122.6	12.7
Average	5032	2204	405.6	12.2	6765.6	2828.5	120.8	12.6
C.V.	14	18	2.0	3.6	18.0	14.7	18.0	27.2
LSD 0.05	650	360	7.8	0.4	1119.4	391.2	20.0	NS

Table 1. Tillage by Fertility

		Biomass	Grain wt.	TW	Moist	lbs	Straw wt.	Bu	Stand
M	0	4393	1838.0	396.3	12.5	5631.0	2555.4	100.6	11.3
M	40	4967	2174.9	403.3	12.1	6686.8	2791.7	119.4	13.5
M	80	4513	2005.5	392.5	11.6	6197.3	2507.8	110.7	13.5
M	M	5560	2332.5	409.4	12.4	7148.5	3227.5	127.6	14.5
N	0	3560	1370.0	402.2	12.9	4179.9	2190.0	74.6	9.0
N	40	4953	2331.1	407.3	12.4	7143.2	2622.2	127.6	11.3
N	80	4500	1997.8	408.6	12.4	6125.0	2502.2	109.4	10.0
N	M	5027	2091.5	415.4	13.3	6344.1	2935.2	113.3	10.3
T	0	4247	1793.6	393.4	11.9	5528.8	2453.1	98.7	13.0
T	40	5000	2373.1	402.5	11.9	7314.4	2626.9	130.6	13.8
T	80	4763	2217.2	401.7	12.0	6825.7	2546.1	121.9	13.3
T	M	6007	2309.4	409.8	12.0	7105.2	3697.3	126.9	13.2
Average		5257	2299.9	404.6	12.0	7081.8	2956.8	126.5	13.4
C.V.		14	17.8	2.0	3.6	18.0	14.7	18.0	27.2
LSD 0.05		1126	623.8	13.5	0.7	1938.8	677.5	34.6	5.6

Field Pea**Table 1. Rep**

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
1	1278	545	52.2	455.3	10.6	22.8	2577.6	732.6	43.0	130.3
2	1209	479	52.7	458.1	10.7	22.4	2263.0	730.2	37.7	121.6
3	1286	518	54.2	460.1	10.6	22.4	2445.1	768.3	40.8	113.5
Average	1258	514	53.0	457.8	10.6	22.5	2428.5	743.7	40.5	121.8
C.V.	21	25	6.0	1.3	1.2	3.8	24.9	22.7	24.9	13.1
LSD 0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	13.5

Table 1. Tillage

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
M	1255	523	52.5	459.8	10.7	22.4	2469.0	731.8	41.2	156.5
N	1179	480	55.0	456.0	10.7	22.6	2268.0	699.1	37.8	80.8
T	1339	539	51.6	457.8	10.6	22.5	2548.6	800.3	42.5	128.2
Average	1258	514	53.0	457.8	10.6	22.5	2428.5	743.7	40.5	121.8
C.V.	21	25	6.0	1.3	1.2	3.8	24.9	22.7	24.9	13.1
LSD 0.05	NS	NS	2.7	NS	NS	NS	NS	NS	NS	13.5

Table 1. Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
0	1289	517	54.7	458.9	10.7	22.3	2442.9	771.8	40.7	128.7
40	1225	506	54.1	460.5	10.6	22.6	2390.0	719.4	39.8	117.5
80	1255	507	52.3	458.4	10.6	23.1	2397.2	748.1	40.0	116.2
M	1261	526	50.9	453.7	10.6	22.0	2484.0	735.6	41.4	124.9
Average	1247	513	52.4	457.5	10.6	22.6	2423.7	734.4	40.4	119.6
C.V.	21	25	6.0	1.3	1.2	3.8	24.9	22.7	24.9	13.1
LSD 0.05	NS	NS	3.1	5.8	NS	0.8	NS	NS	NS	NS

Table 1. Tillage by Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	
M 0	1330	561.2	54.1	459.9	10.7	22.2	2650.3	769.1	44.2	
M 40	1318	533.3	53.7	461.7	10.7	22.0	2517.8	784.9	41.9	
M 80	1128	431.5	52.1	460.1	10.6	23.2	2038.8	696.2	34.0	
M M	1242	565.3	50.1	457.6	10.7	22.0	2669.1	677.1	44.5	
N 0	1233	463.8	57.6	459.2	10.7	22.2	2190.7	768.8	36.5	
N 40	1149	498.1	57.6	458.2	10.7	23.0	2352.7	650.8	39.2	
N 80	1237	500.4	49.9	457.3	10.6	23.4	2364.0	736.8	39.4	
N M	1098	458.2	54.7	449.1	10.6	21.9	2164.7	639.8	36.1	
T 0	1304	526.6	52.5	457.6	10.6	22.4	2487.8	777.4	41.5	
T 40	1209	486.4	51.1	461.5	10.6	22.6	2299.4	722.6	38.3	
T 80	1401	590.1	54.8	457.7	10.6	22.7	2788.7	811.4	46.5	
T M	1443	553.5	47.9	454.4	10.5	22.3	2618.3	889.9	43.6	
Average	1351	543.3	51.3	457.8	10.6	22.6	2568.8	807.9	42.8	
C.V.	21	24.9	6.0	1.3	1.2	3.8	24.9	22.7	24.9	
LSD 0.05		NS	NS	5.4	10.1	NS	NS	NS	NS	NS

Soybean**Table 1. Rep**

	Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.	Bu
1	795	275	31.5	418.1	8.7	17.8	35.4	2288.3	520.3	38.1
2	700	245	31.4	416.3	8.5	18.1	34.8	2045.4	454.9	34.1
3	663	231	31.0	417.9	8.5	17.8	35.8	1927.2	432.6	32.1
Average	719	250	31.3	417.4	8.6	17.9	35.3	2087.0	469.3	34.8
C.V.	14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1	16.6
LSD 0.05	46	20	NS	NS	0.1	0.2	0.8	163.3	31.2	2.7

Table 1. Tillage

	Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.	Bu
M	707	250	31.8	415.7	8.6	17.8	35.8	2088.6	456.7	34.8
N	754	265	31.0	418.0	8.6	18.1	34.7	2209.8	489.2	36.8
T	697	235	31.2	418.5	8.6	17.7	35.5	1962.5	461.9	32.7
Average	719	250	31.3	417.4	8.6	17.9	35.3	2087.0	469.3	34.8
C.V.	14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1	16.6
LSD 0.05	46	20	0.7	2.0	0.1	0.2	0.8	163.3	31.2	2.7

Table 1. Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.	Bu
0	708	252	30.8	417.4	8.6	18.2	34.4	2108.0	455.1	35.1
40	725	250	31.2	417.5	8.6	17.8	35.1	2084.8	475.3	34.8
80	719	258	31.5	418.4	8.6	17.9	35.8	2152.3	461.6	35.9
M	725	240	31.8	418.4	8.6	17.6	36.0	2002.9	485.1	33.4
Average	723	249	31.5	418.1	8.6	17.8	35.6	2080.0	474.0	34.7
C.V.	14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1	16.6
LSD 0.05	NS	NS	0.6	NS	NS	0.3	0.9	NS	NS	NS

Table 1. Tillage by Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.	
M 0	745	262.4	31.1	413.9	8.6	18.1	34.8	2189.5	482.8	
M 40	691	235.4	32.0	413.7	8.6	17.7	36.1	1964.4	455.3	
M 80	732	282.4	32.6	418.1	8.6	18.0	36.2	2357.3	449.8	
M M	660	220.9	31.5	417.1	8.6	17.6	36.6	1843.3	439.1	
N 0	728	270.6	30.6	417.8	8.5	18.4	34.0	2260.7	457.8	
N 40	776	270.4	30.5	417.9	8.6	18.2	34.5	2258.8	505.5	
N 80	711	243.4	30.4	418.6	8.6	17.9	35.2	2031.0	467.7	
N M	800	274.0	32.6	417.9	8.6	18.0	35.4	2288.7	525.5	
T 0	649	224.4	30.6	417.3	8.6	18.1	34.5	1873.8	424.7	
T 40	708	243.3	31.1	418.4	8.6	17.6	35.1	2031.2	465.0	
T 80	715	247.7	31.6	417.8	8.6	17.8	35.8	2068.6	467.3	
T M	715	224.7	31.3	420.3	8.6	17.4	36.9	1876.5	490.7	
Average	713	238.5	31.3	418.8	8.6	17.6	35.9	1992.1	474.3	
C.V.	14	16.6	4.6	1.0	1.4	2.6	3.6	16.6	14.1	
LSD 0.05		92	39.1	1.3	4.3	0.1	1.5	0.4	326.5	62.3

Table 1. Previous Crop

	Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.	Bu
barley 1	748	257	31.3	418.5	8.6	17.9	34.9	2148.7	490.7	35.8
corn 3	721	249	31.6	417.2	8.6	17.9	35.2	2081.1	472.1	34.7
wheat 2	688	243	31.1	416.5	8.6	17.8	35.7	2031.2	445.1	33.8
Average	719	250	31.3	417.4	8.6	17.9	35.3	2087.0	469.3	34.8
C.V.	14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1	16.6
LSD 0.05	46	20	NS	NS	0.1	NS	0.8	NS	31.2	NS

Soybean (cont.)**Table 1. Previous Crop by Tillage**

		Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.
barley 1	M	737	269	31.8	417.8	8.7	17.8	36.0	2244.5	467.9
barley 1	N	758	264	30.7	418.2	8.6	18.4	33.6	2205.5	493.2
barley 1	T	750	239	31.6	419.5	8.6	17.5	35.4	1996.1	511.0
corn 3	M	667	222	32.2	415.5	8.6	18.0	35.4	1856.5	444.4
corn 3	N	798	281	31.1	417.9	8.6	18.0	35.0	2350.1	517.0
corn 3	T	699	244	31.5	417.4	8.6	17.9	35.7	2036.6	454.8
wheat 2	M	717	259	31.4	413.8	8.6	17.8	35.8	2164.9	458.0
wheat 2	N	705	248	31.3	418.0	8.5	17.9	35.8	2073.8	457.2
wheat 2	T	642	222	30.5	418.3	8.6	17.8	35.5	1854.8	419.9
Average		719	250	31.3	417.4	8.6	17.9	35.3	2087.0	469.3
C.V.		14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1
LSD 0.05		79	34	1.3	3.7	0.1	1.3	0.4	282.8	54.0

Table 1. Previous Crop by Fertility

		Biomass	Grain wt.	KWT	TW	Moist	Oil	Protein	Lbs.	Straw wt.
barley 1	0	727	269	30.6	416.0	8.6	18.3	34.0	2246.0	457.8
barley 1	40	765	252	31.5	420.7	8.6	17.7	34.9	2105.6	512.4
barley 1	80	779	286	32.3	418.8	8.6	17.8	36.2	2387.9	493.2
barley 1	M	722	222	31.1	419.1	8.7	17.8	34.4	1855.4	499.4
corn 3	0	737	258	30.7	417.5	8.5	18.1	34.4	2155.3	479.4
corn 3	40	685	236	31.8	415.4	8.6	18.0	34.8	1969.9	448.8
corn 3	80	721	253	31.9	417.7	8.6	18.0	35.3	2108.2	468.5
corn 3	M	742	250	32.1	417.7	8.6	17.7	36.4	2090.8	491.6
wheat 2	0	658	230	31.0	415.5	8.6	18.2	34.9	1922.7	428.2
wheat 2	40	726	261	30.5	414.5	8.6	17.8	35.4	2178.9	464.6
wheat 2	80	658	235	30.4	417.9	8.5	17.9	35.8	1960.7	423.1
wheat 2	M	711	247	32.4	418.7	8.6	17.5	36.7	2062.4	464.3
Average		698	248	31.1	417.0	8.6	17.7	36.0	2067.3	450.7
C.V.		14	17	4.6	1.0	1.4	2.6	3.6	16.6	14.1
LSD 0.05		92	39	1.3	4.3	0.1	1.5	0.4	326.5	62.3

Sunflower**Table 1. Rep**

	Biomass	Grain wt.	TW	Moist	Oil	Lbs.	Straw wt.	Stand
1	2541	404	205.2	9.2	30.1	3858.4	2136.6	18.3
2	2128	344	200.5	8.6	29.0	1101.1	1784.1	12.3
3	2513	379	200.3	8.9	26.8	1238.5	2134.5	14.7
Average	2394	376	202.0	8.9	28.6	2066.0	2018.4	15.1
C.V.	19	20	3.2	3.9	9.6	25.5	19.0	14.3
LSD 0.05	442	76	6.4	0.3	2.7	403.3	380.6	2.0

Table 1. Tillage

	Biomass	Grain wt.	TW	Moist	Oil	Lbs.	Straw wt.	Stand
M	2758	472	206.6	8.8	30.4	2358.7	2286.1	12.3
N	1751	212	194.4	9.1	25.3	1572.5	1538.9	17.9
T	2673	443	204.9	8.8	30.2	2266.8	2230.2	15.2
Average	2394	376	202.0	8.9	28.6	2066.0	2018.4	15.1
C.V.	19	20	3.2	3.9	9.6	25.5	19.0	14.3
LSD 0.05	442	76	6.4	NS	2.7	403.3	380.6	2.0

Table 1. Fertility

	Biomass	Grain wt.	TW	Moist	Oil	Lbs.	Straw wt.	Stand
0	2017	325	199.6	8.8	30.4	1869.3	1692.0	15.9
40	2363	404	199.9	8.8	29.3	2146.1	1959.2	14.4
80	2534	374	205.1	9.1	28.1	2041.6	2160.1	14.2
M	2662	400	203.2	8.9	26.6	2207.0	2262.2	16.0
Average	2520	393	202.8	8.9	28.0	2131.5	2127.2	14.9
C.V.	19	20	3.2	3.9	9.6	25.5	19.0	14.3
LSD 0.05	510	NS	NS	NS	3.1	NS	439.5	NS

Table 1. Tillage by Fertility

		Biomass	Grain wt.	TW	Moist	Oil	lbs	Straw wt.	Stand
M	0	2493	466.5	205.0	9.2	31.7	2279.9	2026.9	12.5
M	40	2793	503.6	206.0	8.8	30.9	2468.3	2289.7	12.7
M	80	2647	412.7	206.7	8.6	30.4	1978.6	2234.0	11.2
M	M	3100	506.1	208.8	8.8	28.5	2707.9	2593.9	12.8
N	0	1363	142.7	193.3	9.0	27.2	1306.0	1220.6	19.6
N	40	1513	204.5	191.7	9.0	26.7	1503.1	1308.8	13.6
N	80	2433	312.6	200.0	9.4	24.9	2030.8	2120.7	18.4
N	M	1693	187.9	192.5	9.0	22.5	1450.0	1505.4	19.9
T	0	2193	364.7	200.5	8.3	32.3	2022.0	1828.6	15.6
T	40	2783	504.2	202.0	8.5	30.5	2466.8	2279.1	16.9
T	80	2523	397.7	208.7	9.3	29.1	2115.2	2125.6	13.1
T	M	3193	506.0	208.4	9.1	28.8	2462.9	2687.3	15.4
Average		2833	469.3	206.4	9.0	29.5	2348.3	2364.0	15.1
C.V.		19	20.0	3.2	3.9	9.6	25.5	19.0	14.3
LSD 0.05		884	151.6	12.9	0.7	5.4	806.5	761.3	3.9

Wheat

Table 1. Rep

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
1	792	222	7.6	426.0	11.2	14.2	1803.7	569.5	30.1	133.4
2	980	287	7.2	424.3	11.1	14.2	2332.6	692.5	38.9	141.3
3	1015	307	7.6	426.9	11.2	14.3	2491.7	707.3	41.5	147.4
Average	929	272	7.5	425.7	11.2	14.2	2209.3	656.4	36.8	140.7
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1	32.3
LSD 0.05	84	24	0.2	3.8	0.1	NS	195.1	66.6	3.3	21.1

Table 1. Tillage

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
M	959	288	7.5	424.3	11.1	14.4	2340.6	670.5	39.0	136.9
N	876	237	7.3	419.6	11.3	13.9	1922.8	638.6	32.1	141.9
T	928	282	7.6	432.1	11.1	14.3	2287.6	646.3	38.1	136.6
Average	921	269	7.5	425.3	11.2	14.2	2183.7	651.8	36.4	138.5
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1	32.3
LSD 0.05	84	24	0.2	3.4	0.1	0.4	195.1	NS	3.3	NS

Table 1. Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
0	754	211	7.3	425.1	11.2	13.2	1715.1	542.7	28.6	139.3
40	939	275	7.3	421.7	11.1	14.5	2233.7	664.3	37.2	139.5
80	976	269	7.1	418.8	11.1	15.4	2186.0	706.6	36.4	138.8
M	1015	321	8.1	436.1	11.3	13.7	2599.8	693.5	43.3	136.3
Average	977	288	7.5	425.5	11.2	14.5	2339.8	688.1	39.0	138.2
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1	32.3
LSD 0.05	97	28	0.2	4.4	0.1	0.5	225.3	76.9	3.8	NS

Table 1. Tillage by Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	
M	0	820	232.9	7.4	424.1	11.1	13.7	1890.9	587.1	31.5
M	40	912	285.0	7.2	422.8	11.0	14.6	2316.3	627.1	38.6
M	80	1033	294.9	7.1	421.2	11.0	15.4	2397.5	738.6	39.9
M	M	1069	340.3	8.1	437.2	11.3	14.0	2757.7	729.2	46.0
N	0	695	180.6	7.1	424.0	11.3	12.4	1463.5	514.6	24.4
N	40	930	246.9	7.3	420.1	11.2	14.2	2002.8	682.6	33.4
N	80	911	233.9	6.9	413.3	11.2	15.5	1897.0	677.2	31.6
N	M	968	287.8	7.9	436.4	11.4	13.4	2328.0	680.0	38.8
T	0	747	220.9	7.4	427.0	11.2	13.6	1791.0	526.4	29.8
T	40	976	293.1	7.5	422.0	11.1	14.8	2382.0	683.3	39.7
T	80	982	278.4	7.3	420.1	11.0	15.3	2263.6	703.9	37.7
T	M	1006	334.9	8.2	434.5	11.3	13.7	2713.6	671.5	45.2
Average		988	302.1	7.7	425.6	11.1	14.6	2453.1	686.2	40.9
C.V.		22	21.1	6.4	1.9	2.5	7.0	21.1	24.1	21.1
LSD 0.05		169	48.1	0.4	7.6	0.2	0.8	390.2	133.2	6.5

Wheat (cont.)**Table 1. Previous Crop**

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu	Stand
canola 3	935	284	7.7	427.3	11.3	13.6	2299.1	651.1	38.3	148.7
fallow 1	1018	292	7.3	422.6	11.2	14.9	2372.6	725.8	39.5	134.4
fpea 2	906	264	7.4	426.7	11.3	14.1	2138.7	642.4	35.6	139.1
wheat 3	776	220	7.4	427.4	10.9	14.4	1794.5	555.9	29.9	131.5
Average	909	265	7.4	426.0	11.2	14.2	2151.2	643.8	35.9	138.4
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1	32.3
LSD 0.05	97	28	0.2	4.4	0.1	0.5	225.3	76.9	3.8	NS

Table 1. Previous Crop by Tillage

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu
M canola 3	891	280	7.8	428.8	11.3	13.6	2269.5	611.4	37.8
M fallow 1	1013	300	7.4	423.6	11.1	15.3	2437.1	712.5	40.6
M fpea 2	992	289	7.3	427.8	11.2	14.2	2345.3	702.4	39.1
M wheat 3	930	281	7.4	425.8	10.7	14.6	2295.6	648.3	38.3
N canola 3	949	253	7.4	422.6	11.2	13.6	2052.2	696.0	34.2
N fallow 1	1007	258	7.1	421.9	11.2	14.1	2092.4	749.3	34.9
N fpea 2	857	255	7.6	427.8	11.4	13.9	2064.7	602.1	34.4
N wheat 3	597	156	7.1		11.2	14.2	1261.5	441.2	21.0
T canola 3	964	318	8.0	430.2	11.3	13.5	2575.4	645.9	42.9
T fallow 1	1034	319	7.5	422.2	11.1	15.3	2588.4	715.5	43.1
T fpea 2	870	248	7.4	423.9	11.3	14.2	2006.2	622.7	33.5
T wheat 3	802	224	7.6	430.2	10.8	14.3	1826.6	578.3	30.5
Average	909	265	7.4	425.9	11.2	14.2	2151.2	643.8	35.9
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1
LSD 0.05	169	48	0.4	7.6	0.2	0.8	390.2	133.2	6.5

Table 1. Previous Crop by Fertility

	Biomass	Grain wt.	KWT	TW	Moist	Protein	Lbs.	Straw wt.	Bu
0.0 canola 3	720	219	7.7	427.5	11.3	12.9	1772.8	500.9	29.5
0.0 fallow 1	882	249	7.2	422.4	11.1	14.2	2017.9	633.9	33.6
0.0 fpea 2	734	200	7.1	425.0	11.2	12.9	1618.7	534.4	27.0
0.0 wheat 3	644	163	7.3	429.0	11.2	12.7	1319.3	481.1	22.0
40.0 canola 3	1031	294	7.5	421.3	11.1	13.8	2388.2	736.6	39.8
40.0 fallow 1	1033	296	7.3	421.5	11.2	15.2	2401.3	737.0	40.0
40.0 fpea 2	901	255	7.4	421.1	11.2	14.5	2063.7	646.3	34.4
40.0 wheat 3	720	246	7.1	425.6	10.8	14.6	2005.5	473.8	33.4
80.0 canola 3	992	284	7.2	416.8	11.2	14.5	2307.4	707.5	38.5
80.0 fallow 1	1064	289	6.9	419.2	11.1	15.8	2348.7	774.9	39.1
80.0 fpea 2	951	268	7.1	420.3	11.1	15.7	2175.6	682.5	36.3
80.0 wheat 3	856	217	7.2	419.2	10.7	15.7	1775.7	638.8	29.6
M canola 3	997	337	8.4	442.5	11.5	13.1	2727.9	659.3	45.5
M fallow 1	1093	336	7.9	427.2	11.2	14.3	2722.5	757.4	45.4
M fpea 2	1040	334	8.1	438.4	11.6	13.2	2696.9	706.4	45.0
M wheat 3	885	255	7.8	436.3	10.9	14.2	2077.8	629.9	34.6
Average	963	294	7.9	437.3	11.2	13.7	2387.3	668.2	39.8
C.V.	22	21	6.4	1.9	2.5	7.0	21.1	24.1	21.1
LSD 0.05	195	55.5	0.5	8.8	0.3	1.0	450.5	153.8	7.5

Soil**Table 1. Rep**

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH
1	13.8	5.1	12.0	34.7	65.6	3.1	14.5	6.6
2	11.5	3.9	11.3	36.0	62.7	3.0	13.7	6.7
3	12.0	4.4	11.9	37.6	65.9	3.2	13.6	6.6
Average	12.4	4.5	11.7	36.1	64.8	3.1	14.0	6.6
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05	1.7	NS	NS	NS	11.2	0.1	NS	NS

Table 1. Tillage

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH
M	12.7	5.0	13.2	45.0	75.9	3.0	12.6	6.7
N	12.0	3.4	5.0	20.9	41.3	3.3	16.5	6.5
T	12.6	5.0	17.0	42.4	77.0	3.0	12.8	6.7
Average	12.4	4.5	11.7	36.1	64.8	3.1	14.0	6.6
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05	NS	1.0	3.7	9.1	11.2	0.1	1.8	0.1

Table 1. Fertility

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH
0	10.3	3.7	5.5	14.2	33.7	3.0	11.2	6.6
40	12.7	4.1	10.3	30.3	57.4	3.1	9.3	6.5
80	14.2	6.0	24.9	79.0	124.0	3.0	8.9	6.4
M	12.6	4.1	6.3	21.0	43.9	3.2	26.4	7.0
Average	13.2	4.7	13.8	43.4	75.1	3.1	14.9	6.6
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05	2.0	1.2	4.3	10.5	10.5	0.1	2.0	0.1

Table 1. Rep by Fertility

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH	
1	0.0	11.7	5.3	7.4	16.3	40.7	3.0	13.0	6.7
1	40.0	14.2	5.0	8.9	32.9	60.9	3.1	11.7	6.5
1	80.0	14.5	5.7	24.2	66.4	110.7	3.0	9.4	6.4
1	M	14.8	4.4	7.5	23.3	50.0	3.2	24.0	6.9
2	0.0	7.7	2.1	3.6	9.5	22.8	2.8	9.1	6.7
2	40.0	11.7	3.2	8.4	26.1	49.4	3.1	8.1	6.5
2	80.0	14.6	6.6	27.7	93.4	142.4	3.0	8.9	6.4
2	M	12.2	3.7	5.5	15.1	36.4	3.2	28.9	7.1
3	0.0	11.4	3.8	5.7	16.7	37.6	3.3	11.5	6.5
3	40.0	12.0	4.2	13.6	32.1	61.9	3.2	8.0	6.6
3	80.0	13.5	5.6	22.6	77.3	118.9	3.1	8.5	6.4
3	M	11.0	4.2	5.7	24.5	45.4	3.2	26.3	7.0
Average		12.0	4.4	11.9	37.6	65.9	3.2	13.6	6.6
C.V.		59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05		3.5	2.0	7.4	18.1	22.3	0.2	3.5	NS

Soil (cont.)

Table 1. Tillage by Fertility

		N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH
M	0.0	10.9	3.7	6.5	17.3	38.4	2.9	9.9	6.7
M	40.0	13.3	4.4	10.5	34.3	62.5	3.1	9.0	6.5
M	80.0	14.3	7.3	28.4	106.2	156.2	2.9	8.3	6.5
M	M	12.3	4.6	7.4	22.2	46.6	3.1	23.3	7.0
N	0.0	8.9	2.2	3.0	10.7	24.8	3.2	13.4	6.5
N	40.0	12.5	3.5	4.6	19.2	39.6	3.3	10.5	6.4
N	80.0	13.8	4.2	7.9	36.5	62.3	3.2	10.3	6.2
N	M	13.0	3.6	4.6	17.3	38.5	3.5	31.7	6.9
T	0.0	10.9	5.3	7.2	14.5	37.9	2.9	10.3	6.7
T	40.0	12.2	4.6	15.8	37.5	70.1	2.9	8.3	6.6
T	80.0	14.5	6.4	38.2	94.3	153.5	3.0	8.2	6.4
T	M	12.7	3.9	6.8	23.4	46.7	3.1	24.3	7.1
Average		13.1	5.0	20.3	51.7	90.1	3.0	13.6	6.7
C.V.		59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05		NS	NS	7.4	NS	22.3	0.2	NS	NS

Table 1. Rotation

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH
1	11.9	4.6	11.8	39.2	67.5	3.1	15.3	6.6
2	14.0	5.0	12.5	33.3	64.8	3.0	12.8	6.7
3	11.4	3.9	10.9	35.8	61.9	3.2	13.8	6.6
Average	12.4	4.5	11.7	36.1	64.8	3.1	14.0	6.6
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3
LSD 0.05	NS	NS	NS	9.1	11.2	0.1	1.8	NS

Table 1. Rep by Rotation

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH	
1	1.0	15.3	6.9	13.3	37.7	73.1	3.0	17.6	6.7
1	2.0	14.1	4.3	10.0	32.1	60.5	3.1	13.5	6.5
1	3.0	12.0	4.1	12.7	34.4	63.2	3.1	12.5	6.7
2	1.0	9.2	3.1	11.6	40.0	63.9	2.9	14.4	6.7
2	2.0	14.0	4.6	12.5	32.0	63.0	3.0	12.9	6.8
2	3.0	11.5	4.0	9.8	36.1	61.3	3.2	14.0	6.6
3	1.0	11.3	3.8	10.5	40.1	65.6	3.3	14.0	6.5
3	2.0	14.0	6.0	15.0	35.8	70.9	3.0	11.9	6.7
3	3.0	10.6	3.5	10.2	37.0	61.3	3.3	14.9	6.6
Average	12.0	4.4	11.9	37.6	65.9	3.2	13.6	6.6	
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3	
LSD 0.05	NS	1.8	NS	NS	19.3	NS	NS	0.2	

Table 1. Rotation by Fertility

	N 0-6	N 6-12	N 12-24	N 24-48	N 0-48	% OM	P ppm	pH	
1	0.0	10.5	4.5	6.6	16.7	38.3	3.0	16.9	6.7
1	40.0	13.3	4.4	12.7	36.3	66.7	3.3	10.8	6.4
1	80.0	12.7	6.0	22.1	83.8	124.7	3.0	8.7	6.4
1	M	11.2	3.4	5.8	20.2	40.6	3.1	25.0	6.9
2	0.0	12.2	4.5	7.2	17.8	41.7	2.9	7.8	6.6
2	40.0	14.3	4.5	10.0	26.7	55.5	3.0	8.8	6.6
2	80.0	14.5	5.8	24.4	61.6	106.2	2.9	8.2	6.5
2	M	15.1	5.1	8.4	27.0	55.7	3.2	26.3	7.0
3	0.0	8.2	2.1	2.8	7.9	21.0	3.2	8.9	6.6
3	40.0	10.3	3.5	8.2	28.0	50.1	3.1	8.3	6.6
3	80.0	15.3	6.1	28.0	91.7	141.1	3.1	9.9	6.3
3	M	11.6	3.7	4.5	15.6	35.5	3.3	28.0	7.0
Average	11.4	3.9	10.9	35.8	61.9	3.2	13.8	6.6	
C.V.	59.9	99.2	135.0	108.3	74.3	16.7	55.2	7.3	
LSD 0.05	3.5	2.0	7.4	18.1	22.3	0.2	3.5	NS	