



2013

# Global Maize and Soy Study

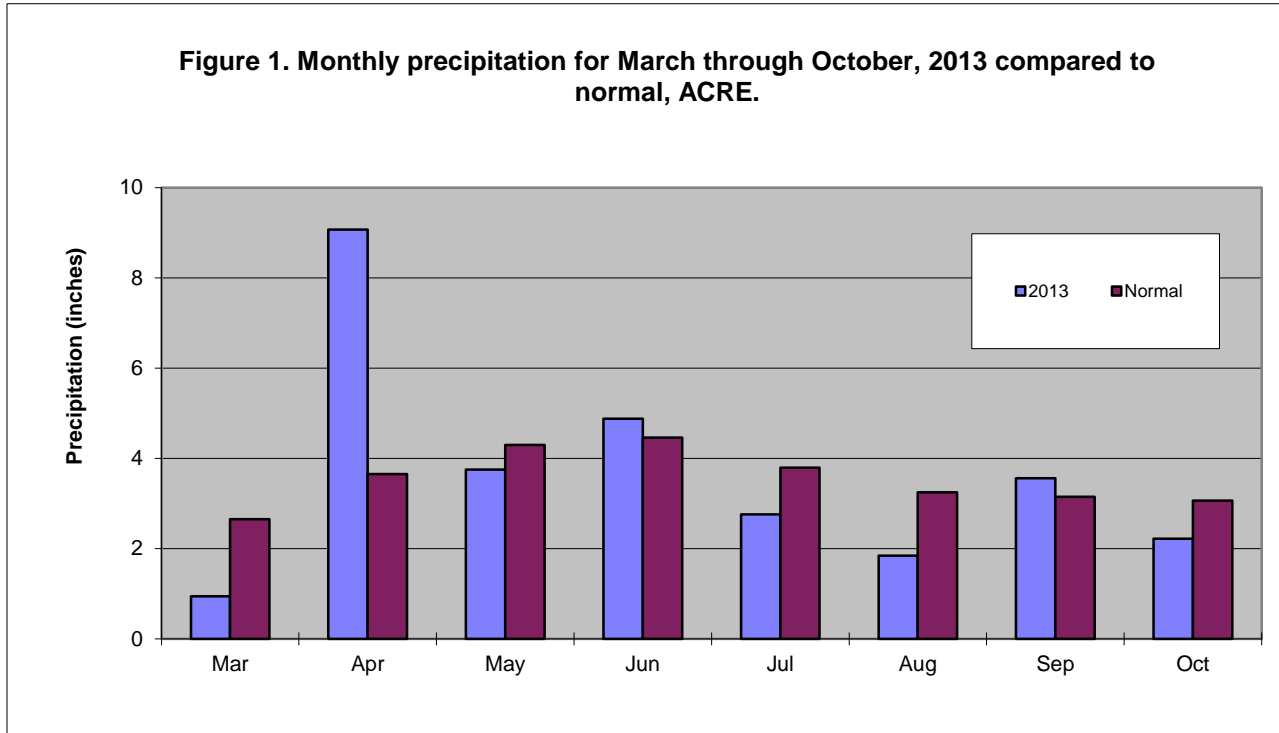


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# Global Maize and Soy Study, ACRE, 2013



## Corn

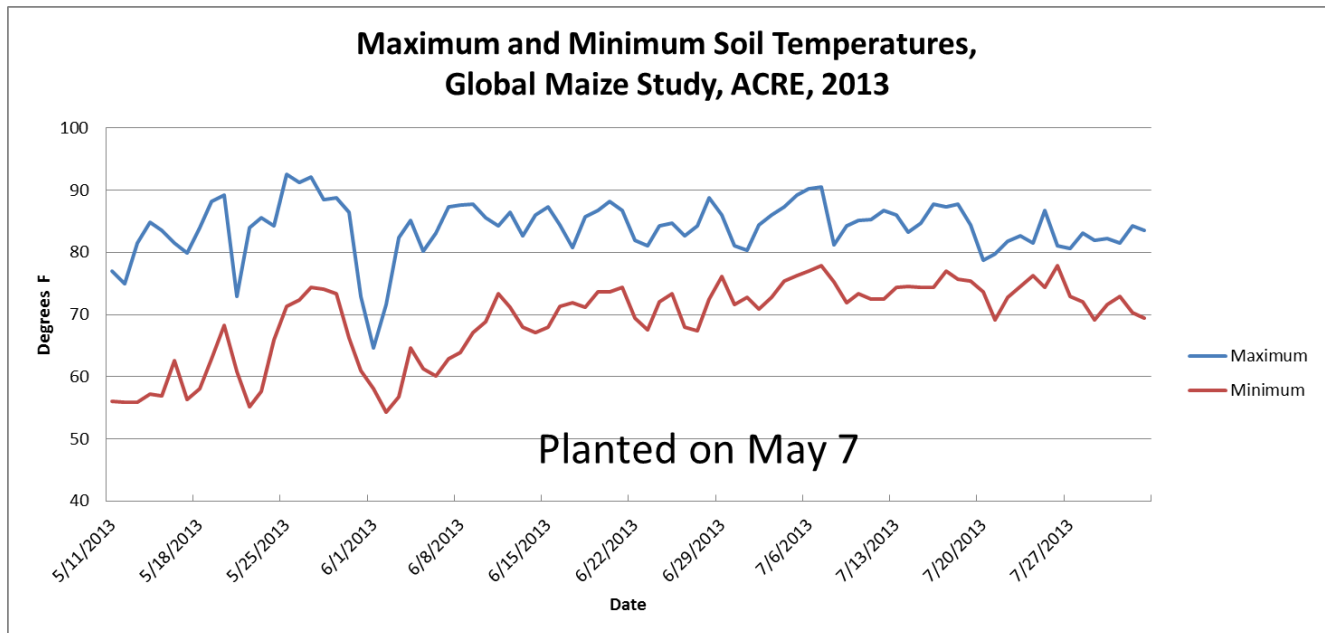


Table 1. Corn Cultural Practices Used, Field 131, ACRE, 2013

Field Operation	Date	Application Details
Tillage		No-till
Plot size		12-30' rows, 75-feet long
Replications		6
Trial plan		Included at end of this report
Planted	5/7	Planted with Vyn's 6-row planter
Hybrid		Pioneer P1498CHR
Seeding rate		30,000 and 37,500 seeds/acre
Weed Control	5/6	<u>Early Pre-plant:</u> Roundup WeatherMax @ 25 oz/ac ammonium sulfate @ 8 lbs/100 gallons water 2,4-D ester @ 1 pt/ac
	5/8	Pre-emergence: BicepII Mag 4 pt/ac
	6/14	Post-emergence: Callisto @ 3 oz/ac with COC and AMS
Nitrogen	6/5	First application as per treatment
	6/11	Second application as per treatment.
Harvest	10/1	Harvest with Kincaid combine.
Harvest area		Four 30-inch rows, 75-feet

Table 2. Corn plant response to treatments, 2013.†

Trmt #	Treatment	Plant Population June 4	Plant Height June 7	Plant Height July 15	Days to 50% Silking	Grain Moist	Grain Yield @ 15%
		ppa	in	in	days	%M	bu/a
1	FP Control N, 30000 ppa	31250b	21.3ab	79.3b	71.5a	19.8	105.2c
2	FP Intermediate N, 30000 ppa	30708b	20.6ab	93.9a	70.0b	20.3	220.0b
3	FP Normal N, 30000 pa	31125b	20.3b	93.2a	70.0b	20.3	237.9a
4	EI Control N, 37500 ppa	38875a	21.8a	78.6b	71.8a	20.0	106.6c
5	EI Intermediate N, 37500 ppa	38417a	20.6ab	91.1a	70.7b	20.7	240.2a
6	EI Normal N, 37500 ppa	38875a	20.4b	91.6a	70.5b	20.5	239.5a
	LSD @ 5%	1397	1.3	5.0	0.8	1.0	6.5

† Average of 6 replications

Table 3. Corn leaf SPAD and stalk diameter response to treatments, 2013.†

Trmt #	Treatment	Spad July 15	Spad Aug. 5	Stalk July 15	Stalk Aug. 5*
				mm	mm
1	FP Control N, 30000 ppa	45.2b	37.8c	22.7cd	20.9c
2	FP Intermediate N, 30000 ppa	58.7a	58.4ab	24.6b	21.8b
3	FP Normal N, 30000 pa	59.5a	61.6a	26.7a	22.8a
4	EI Control N, 37500 ppa	41.9c	38.2c	21.5d	19.4e
5	EI Intermediate N, 37500 ppa	57.5a	57.5b	22.3cd	20.1d
6	EI Normal N, 37500 ppa	57.2a	60.0ab	23.3bc	20.5cd
	LSD @ 5%	2.8	3.6	1.4	0.6

† Average of 6 replications.

\*Average of 3 replications.

Table 4. Corn plant biomass and N responses to treatments at R6, sample size of 10 plants per plot, 2013.†

Trmt #	Treatment	Shoot DM	Shoot N	Cob DM	Cob N	Grain DM	Grain N	Total DM
		kg/h	%	kg/h	%	kg/h	%	kg/h
1	FP Control N, 30000 ppa	6805b	0.54cd	779d	0.61	5641d	1.07b	13225c
2	FP Intermediate N, 30000 ppa	8194a	0.63bc	1270c	0.56	11416c	1.08b	20879b
3	FP Normal N, 30000 pa	8109a	0.67ab	1563a	0.54	13494a	1.12ab	23166a
4	EI Control N, 37500 ppa	6948b	0.52d	778d	0.60	5691d	1.02b	13416c
5	EI Intermediate N, 37500 ppa	8524a	0.65ab	1420b	0.57	12116bc	1.04b	22060ab
6	EI Normal N, 37500 ppa	8743a	0.73a	1484ab	0.57	13028ab	1.22a	23256a
	LSD @ 5%	1052	0.09	116	0.09	921	0.10	1740

† Average of 6 replications

Table 5. Corn plant grain component response to treatments at R6, sample size of 20 plants, 2013.†

Trmt #	Treatment	Kernel Wt (200 kernels)	Kernels per plant	Harvest Index
		g	#	
1	FP Control N, 30000 ppa	42.7c	376.5d	0.43c
2	FP Intermediate N, 30000 ppa	51.4ab	604.8b	0.55b
3	FP Normal N, 30000 pa	54.6a	664.3a	0.58a
4	EI Control N, 37500 ppa	43.3c	308.0e	0.42c
5	EI Intermediate N, 37500 ppa	50.8b	525.7c	0.55b
6	EI Normal N, 37500 ppa	52.7ab	553.7c	0.56ab
	LSD @ 5%	3.7	33.5	0.03

† Average of 6 replications

Table 6. Soil analysis, 2013.†

Trmt	Treatment	pH	OM	P	K	Mg	Ca	CEC	Nitrate	Ammonium
		(1:1)	%	ppm	ppm	ppm	ppm		ppm	ppm
1	FP Control N, 30000 ppa	6.3	4.4	27.5	116ab	659	2555	21.4	8.8	4.7
2	FP Intermediate N, 30000 ppa	6.1	4.3	25.6	108ab	603	2313	20.5	---	---
3	FP Normal N, 30000 pa	6.1	4.3	24.5	109ab	632	2419	21.1	---	---
4	EI Control N, 37500 ppa	6.1	4.4	24.8	118a	654	2506	21.7	8.5	4.0
5	EI Intermediate N, 37500 ppa	6.2	4.4	21.7	99b	643	2340	20.1	---	---
6	EI Normal N, 37500 ppa	6.2	4.3	25.5	110ab	634	2409	20.9	---	---
	LSD @ 5%	0.3	0.4	8.6	17	62	264	2.1	2.4	2.1

† Average of 6 replications

Table 7. Corn ear leaf nutrient concentration response to treatments, 2013.†

Trmt	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	1.69c	0.23c	1.80	0.35b	0.25c	0.13b	16.5b	25.9c	58.9c	6.32b	3.32bc	4.2
2	FP Intermediate N, 30000 ppa	2.65b	0.30b	1.91	0.48a	0.33ab	0.20a	22.6a	48.8b	87.8b	9.00a	3.47abc	7.2
3	FP Normal N, 30000 pa	3.0a	0.32ab	1.94	0.51a	0.31ab	0.21a	24.0a	62.3a	92.7ab	9.44a	4.29a	9.3
4	EI Control N, 37500 ppa	1.72c	0.22c	1.86	0.36b	0.25c	0.13b	15.5b	20.1c	90.7c	5.28b	3.06c	8.7
5	EI Intermediate N, 37500 ppa	2.90a	0.31ab	1.82	0.49a	0.35a	0.20a	23.4a	46.6b	98.1a	9.58a	4.00ab	9.3
6	EI Normal N, 37500 ppa	3.08a	0.32a	1.91	0.50a	0.33ab	0.21a	23.2a	47.2b	97.5a	10.75a	4.29a	9.3
	LSD @ 5%	0.24	0.02	0.15	0.04	0.04	0.02	2.3	12.3	7.6	2.59	0.87	8.6

† Average of 6 replications

Table 8. Corn grain nutrient concentration response to treatments at maturity, 2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.34ab	0.56ab	0.01	0.13ab	0.09	23.76ab	5.60	16.59	1.34	1.00	1.67
2	FP Intermediate N, 30000 ppa	0.29b	0.50abc	0.01	0.11ab	0.09	20.40ab	4.44	16.65	1.55	1.00	3.83
3	FP Normal N, 30000 pa	0.26b	0.46bc	0.01	0.11ab	0.10	18.33b	4.37	16.63	1.44	1.00	1.00
4	EI Control N, 37500 ppa	0.39a	0.59a	0.01	0.14a	0.10	26.19a	4.79	16.74	1.40	1.00	3.67
5	EI Intermediate N, 37500 ppa	0.26b	0.45c	0.01	0.10b	0.10	18.47b	4.32	17.59	1.59	1.00	2.17
6	EI Normal N, 37500 ppa	0.25b	0.44c	0.01	0.11ab	0.10	18.91b	4.61	17.75	1.49	1.00	1.00
	LSD @ 5%	0.10	0.10	0.00	0.04	0.01	6.24	1.46	4.68	0.44	0.0	3.60

† Average of 6 replications

Table 9. Corn shoot (stem plus leaves and husk) nutrient concentration response to treatments at maturity, 2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.11a	0.85ab	0.30bc	0.24	0.048c	19.54b	32.32	198.10a	3.02b	2.37	155.5a
2	FP Intermediate N, 30000 ppa	0.05b	0.75ab	0.35ab	0.23	0.061a	14.74c	28.90	130.44bc	4.10a	2.39	99.33c
3	FP Normal N, 30000 pa	0.04b	0.89a	0.37a	0.22	0.057ab	13.57c	35.35	149.02abc	4.46a	2.33	110.33bc
4	EI Control N, 37500 ppa	0.12a	0.85ab	0.30c	0.23	0.053bc	26.18a	28.22	189.98ab	2.67b	2.53	153.83ab
5	EI Intermediate N, 37500 ppa	0.04b	0.85ab	0.36a	0.23	0.061a	13.68c	31.44	113.90c	4.50a	2.09	82.00c
6	EI Normal N, 37500 ppa	0.04b	0.86ab	0.37a	0.22	0.057ab	11.34c	29.09	116.87c	4.58a	3.67	90.67c
	LSD @ 5%	0.03	0.15	0.05	0.04	0.007	4.20	9.53	61.41	0.86	1.74	44.30

† Average of 6 replications

Table 10. Corn cob nutrient concentration response to treatments at maturity, 2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.05a	1.08	0.016a	0.029a	0.043ab	29.65a	5.79a	7.85ab	1.42cd	1.00	14.17bc
2	FP Intermediate N, 30000 ppa	0.03b	0.99	0.010b	0.015b	0.038bc	15.97b	3.69b	8.93a	1.80bc	1.00	21.17ab
3	FP Normal N, 30000 pa	0.02c	0.99	0.011b	0.012b	0.032c	9.87c	3.10b	6.81b	1.99ab	1.00	23.00a
4	EI Control N, 37500 ppa	0.05a	0.97	0.017a	0.033a	0.048a	31.63a	5.85a	7.63ab	1.38d	1.00	24.17a
5	EI Intermediate N, 37500 ppa	0.03bc	0.99	0.011b	0.016b	0.038bc	13.33bc	2.92b	8.37ab	2.28a	1.00	10.83c
6	EI Normal N, 37500 ppa	0.03b	1.09	0.016b	0.020b	0.039b	11.38c	3.52b	7.91ab	2.10ab	1.00	12.17c
	LSD @ 5%	0.01	0.12	0.003	0.007	0.007	4.52	1.45	2.03	0.38	0.0	8.71

† Average of 6 replications

Table 11. Corn grain nutrient uptake response to treatments at maturity, 2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	60.34c	19.00b	31.33b	0.58d	7.08b	5.26c	0.13b	0.03b	0.09b	0.01b	0.006d	0.01
2	FP Intermediate N, 30000 ppa	122.44b	32.42a	56.62a	1.14c	12.19a	10.63b	0.23a	0.05a	0.19a	0.02a	0.011c	0.04
3	FP Normal N, 30000 pa	150.47a	35.34a	61.76a	1.35a	14.77a	13.29a	0.25a	0.06a	0.22a	0.02a	0.013a	0.01
4	EI Control N, 37500 ppa	57.93c	21.84b	33.24b	0.57d	8.08b	5.33c	0.15b	0.03b	0.10b	0.01b	0.006d	0.02
5	EI Intermediate N, 37500 ppa	125.48b	31.91a	54.54a	1.21bc	12.34a	12.21a	0.22a	0.05a	0.21a	0.02a	0.012bc	0.03
6	EI Normal N, 37500 ppa	158.36a	32.54a	56.87a	1.30ab	14.50a	13.20a	0.25a	0.06a	0.23a	0.02a	0.013ab	0.01
	LSD @ 5%	13.26	7.59	8.49	0.10	3.14	1.14	0.05	0.02	0.04	0.004	0.001	0.04

† Average of 6 replications

Table 12. Corn shoot (stem plus leaves and husk) nutrient uptake response to treatments at maturity, 2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	37.42c	6.94a	57.68b	20.54b	16.31	3.34b	0.13b	0.22ab	1.35	0.02b	0.015b	1.06a
2	FP Intermediate N, 30000 ppa	51.61	4.01b	61.65ab	28.66a	18.87	5.02a	0.12bc	0.24ab	1.08	0.03a	0.020ab	0.82ab
3	FP Normal N, 30000 pa	55.81ab	3.41b	72.14ab	30.22a	17.96	4.66a	0.11bc	0.30a	1.23	0.04a	0.019ab	0.90ab
4	EI Control N, 37500 ppa	36.32c	8.11a	58.93b	20.57b	16.31	3.67b	0.18a	0.20b	1.32	0.02b	0.018b	1.07a
5	EI Intermediate N, 37500 ppa	55.45ab	3.27b	62.40ab	30.76a	19.75	5.16a	0.12bc	0.27ab	0.97	0.04a	0.018ab	0.70b
6	EI Normal N, 37500 ppa	64.03a	3.22b	74.77a	32.34a	19.54	5.00a	0.10c	0.25ab	0.99	0.04a	0.033a	0.77ab
	LSD @ 5%	11.81	2.10	14.55	6.72	3.97	0.96	0.03	0.09	0.50	0.01	0.015	0.35

† Average of 6 replications

Table 13. Corn cob nutrient uptake response to treatments, 2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	4.83c	0.37b	8.41d	0.12b	0.23ab	0.33c	0.023ab	0.004	0.006b	0.001c	0.0008d	0.011c
2	FP Intermediate N, 30000 ppa	7.15b	0.40ab	12.55c	0.13ab	0.19b	0.49b	0.020abc	0.005	0.011a	0.002b	0.0013c	0.027ab
3	FP Normal N, 30000 pa	8.40ab	0.36b	15.45ab	0.16a	0.19b	0.49ab	0.015d	0.005	0.011a	0.003a	0.0016a	0.036a
4	EI Control N, 37500 ppa	4.66c	0.41ab	7.55d	0.14ab	0.26ab	0.37c	0.025a	0.005	0.006b	0.001c	0.0008d	0.019bc
5	EI Intermediate N, 37500 ppa	8.17ab	0.41ab	13.99bc	0.15ab	0.23ab	0.55ab	0.019bcd	0.004	0.012a	0.003a	0.0014b	0.016bc
6	EI Normal N, 37500 ppa	8.56a	0.50a	16.12a	0.17a	0.29a	0.59a	0.017cd	0.005	0.012a	0.003a	0.0015ab	0.018bc
	LSD @ 5%	1.32	0.13	1.72	0.03	0.10	0.10	0.005	0.002	0.003	0.0006	0.0001	0.012

† Average of 6 replications

Table 14. Corn total plant nutrient uptake response to treatments, 2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	102.59c	26.32c	97.41c	21.25b	23.61b	8.93c	0.29b	0.26bc	1.45	0.030b	0.022b	1.08ab
2	FP Intermediate N, 30000 ppa	181.20b	36.83ab	130.82b	29.94a	31.24a	16.13b	0.37a	0.30abc	1.28	0.054a	0.032ab	0.89ab
3	FP Normal N, 30000 pa	214.68a	39.09a	149.35a	31.73a	32.91a	18.45a	0.37a	0.36a	1.46	0.059a	0.034ab	0.95ab
4	EI Control N, 37500 ppa	98.90c	30.36bc	99.72c	21.27b	24.65b	9.37c	0.35a	0.23c	1.42	0.028b	0.024b	1.11a
5	EI Intermediate N, 37500 ppa	189.10b	35.59ab	130.93b	32.12a	32.32a	17.92a	0.36a	0.33ab	1.19	0.061a	0.032b	0.74b
6	EI Normal N, 37500 ppa	230.95a	36.26ab	147.76ab	33.81a	34.33a	18.78a	0.36a	0.32abc	1.23	0.063a	0.047a	0.80ab
	LSD @ 5%	20.84	7.85	18.20	6.77	5.34	1.699	0.05	0.09	0.49	0.010	0.015	0.36

† Average of 6 replications



## Soybean

Table 15. Soybean Cultural Practices Used, Field 131, ACRE, 2013

Tillage		No-till
Plot size		24-15" rows, 75-feet long
Replications		6
Trial plan		Included at end of this report
Planted	5/7	Planted with Vyn's 6/11-row planter
Variety		Pioneer P93Y60
Seeding rate		150,000 seeds/acre
Weed Control	5/25	<u>Pre-emergence:</u> Dual II Magnum 1.5 pt/ac Sceptor 2.8 oz/ac
	7/5	<u>Post-emergence:</u> Roundup WeatherMax @ 24 oz/ac ammonium sulfate @ 8 lbs/100 gallons water
Harvest	10/30	Harvest with Kincaid combine.
Harvest area		Eight 15-inch rows, 75-feet
Fall tillage	11/13	Strip-till for 2014 corn crop. Used Remlinger toolbar set for 8-inches.

Table 16. Soybean plant response to previous year corn treatments, 2013.†

Trmt #	Previous Year Corn Treatment	Plant		
		Population June 21	Grain Moisture %M	Grain Yield @ 13% bu/a
1	FP Control N, 30000 ppa	127460	13.5	59.5ab
2	FP Intermediate N, 30000 ppa	122149	13.4	58.9ab
3	FP Normal N, 30000 pa	122149	13.4	60.1ab
4	EI Control N, 37500 ppa	132771	13.4	57.2b
5	EI Intermediate N, 37500 ppa	134541	13.2	59.9ab
6	EI Normal N, 37500 ppa	136312	13.4	60.7a
LSD @ 5%		21334	0.2	2.9

† Average of 6 replications

Table 17. Soybean trifoliolate leaf nutrient concentration response to previous year corn treatments, 2013.†

Trmt #	Previous Year Corn Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	5.39	0.42ab	2.23	1.16	0.56	0.330ab	40.6b	45.8	97.1	12.2	66.63b	27.2
2	FP Intermediate N, 30000 ppa	5.45	0.42ab	2.04	1.17	0.56	0.338ab	43.4a	43.8	101.5	12.6	70.47a	18.2
3	FP Normal N, 30000 pa	5.23	0.41b	2.15	1.21	0.59	0.328b	42.1ab	42.8	96.3	12.3	70.19a	24.2
4	EI Control N, 37500 ppa	5.41	0.41b	2.06	1.20	0.62	0.340a	42.0ab	45.7	100.9	12.4	69.33ab	23.0
5	EI Intermediate N, 37500 ppa	5.27	0.40b	1.99	1.19	0.62	0.331ab	41.0ab	41.7	96.2	12.4	69.89ab	21.3
6	EI Normal N, 37500 ppa	5.39	0.43a	2.12	1.17	0.58	0.340a	42.5ab	44.3	97.9	12.4	69.76ab	17.7
LSD @ 5%		0.27	0.02	0.25	0.08	0.07	0.011	2.6	6.6	6.3	0.5	3.34	12.6

† Average of 6 replications

Table 18. Soybean seed nutrient concentration response to previous year corn treatments (at maturity), 2013.†

Trmt #	Previous Year Corn Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	5.81	0.57ab	1.92	0.24ab	0.26	0.33b	39.15ab	23.14	72.21ab	14.68a	45.15	6.00
2	FP Intermediate N, 30000 ppa	5.91	0.54b	1.88	0.24ab	0.26	0.34ab	36.97c	22.94	68.78b	13.26b	46.05	5.17
3	FP Normal N, 30000 pa	5.95	0.55ab	1.89	0.25a	0.26	0.33b	37.64bc	22.60	71.19ab	14.13a	45.81	4.00
4	EI Control N, 37500 ppa	5.91	0.56ab	1.91	0.24a	0.26	0.34ab	38.77abc	22.71	71.15ab	14.40a	45.55	6.33
5	EI Intermediate N, 37500 ppa	5.96	0.56ab	1.89	0.23b	0.26	0.34ab	37.23bc	22.44	71.15ab	14.21a	46.40	8.33
6	EI Normal N, 37500 ppa	5.89	0.59a	1.93	0.23ab	0.26	0.35a	40.38a	23.42	73.74a	14.25a	47.74	8.00
LSD @ 5%		0.17	0.04	0.09	0.02	0.01	0.01	1.92	2.11	3.49	0.80	3.24	7.53

† Average of 6 replications

Table 19. Corn plant response to treatments, 2012-2013.†

Trmt #	Treatment	Plant Population	Plant Height 1	Plant Height 2	Days to 50% Silking	Grain Moist	Grain Yield @ 15%
		ppa	In	in	days	%M	bu/a
1	FP Control N, 30000 ppa	30944b	47.0ab	40.1b	73.1a	18.7c	105.5c
2	FP Intermediate N, 30000 ppa	30660b	49.0a	47.4a	71.3b	19.4ab	179.8b
3	FP Normal N, 30000 pa	31076b	49.5a	47.1a	71.3b	19.7a	191.3a
4	EI Control N, 37500 ppa	38299a	45.4b	39.8b	73.8a	19.0bc	99.1c
5	EI Intermediate N, 37500 ppa	37972a	48.4a	46.1a	71.9b	19.9a	193.9a
6	EI Normal N, 37500 ppa	38244a	46.9ab	46.3a	72.1b	20.0a	190.7a
	LSD @ 5%	851	2.5	2.5	0.9	0.6	8.2

† Average of 6 replications

Table 20. Corn plant response to treatments, 2012-2013.†

Trmt #	Treatment	Spad 1	Spad 2	Stalk 1	Stalk 2*
				mm	mm
1	FP Control N, 30000 ppa	41.2d	38.4c	21.9c	20.9b
2	FP Intermediate N, 30000 ppa	51.6ab	54.1ab	23.4b	21.8a
3	FP Normal N, 30000 pa	52.2a	56.2a	24.3a	22.0a
4	EI Control N, 37500 ppa	37.2e	37.4c	20.4d	19.3d
5	EI Intermediate N, 37500 ppa	49.5c	52.3b	21.6c	20.1c
6	EI Normal N, 37500 ppa	49.8bc	54.5ab	22.0c	20.2c
	LSD @ 5%	1.8	3.1	0.8	0.3

† Average of 6 replications.

\*Average of 6 replications in 2012 and 3 replications in 2013.

Table 21. Corn plant response to treatments, sample size of 10 plants per plot, 2012-2013.†

Trmt #	Treatment	Shoot DM	Shoot N	Cob DM	Cob N	Grain DM	Grain N	Total DM
		kg/h	%	kg/h	%	kg/h	%	kg/h
1	FP Control N, 30000 ppa	6864b	0.59c	812c	0.68ab	5428b	1.10b	13104b
2	FP Intermediate N, 30000 ppa	8483a	0.73b	1233b	0.62b	9948a	1.06b	19664a
3	FP Normal N, 30000 pa	8246a	0.76b	1379a	0.62b	10940a	1.18ab	20566a
4	EI Control N, 37500 ppa	6936b	0.59c	753c	0.75a	4820b	1.13b	12509b
5	EI Intermediate N, 37500 ppa	8629a	0.74b	1317ab	0.70ab	10770a	1.16b	20716a
6	EI Normal N, 37500 ppa	8690a	0.81a	1279ab	0.63b	10570a	1.26a	20540a
	LSD @ 5%	651	0.05	118	0.10	1150	0.09	1648

† Average of 6 replications

Table 22. Corn plant response to treatments, sample size of 20 plants, 2012-2013.†

Trmt #	Treatment	Kernel Wt (200 kernels)	Kernels per plant	Harvest Index
		g	#	
1	FP Control N, 30000 ppa	48.21b	332c	0.41b
2	FP Intermediate N, 30000 ppa	54.91a	519a	0.50a
3	FP Normal N, 30000 pa	55.81a	537a	0.52a
4	EI Control N, 37500 ppa	46.02b	244d	0.37c
5	EI Intermediate N, 37500 ppa	53.29a	440b	0.51a
6	EI Normal N, 37500 ppa	54.50a	437b	0.51a
	LSD @ 5%	3.68	39	0.03

† Average of 6 replications



Table 23. Soil analysis, 2012-2013.†

Trmt	Treatment	pH	OM	P	K	Mg	Ca	CEC	Nitrate	Ammonium
		(1:1)	%	ppm	ppm	ppm	ppm		ppm	ppm
1	FP Control N, 30000 ppa	6.2	4.8	29	133	680ab	2636ab	22.5	8.42	3.58
2	FP Intermediate N, 30000 ppa	6.2	4.4	27	136	672ab	2598ab	22.7	---	---
3	FP Normal N, 30000 pa	6.0	4.3	29	134	638b	2493b	22.1	---	---
4	EI Control N, 37500 ppa	6.2	4.4	26	138	709a	2706a	23.3	7.83	3.33
5	EI Intermediate N, 37500 ppa	6.2	4.3	25	129	678ab	2632ab	22.6	---	---
6	EI Normal N, 37500 ppa	6.1	4.4	30	138	683ab	2642ab	22.9	---	---
	LSD @ 5%	0.2	0.3	6	18	44.3	191	1.5	1.47	1.17

† Average of 6 replications

Table 24. Corn ear leaf nutrient concentration response to treatments, 2012-2013.†

Trmt	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	1.82c	0.22b	1.83	0.42b	0.28b	0.14b	19.1b	25.3c	59.4b	6.59bc	6.88	6.17
2	FP Intermediate N, 30000 ppa	2.36b	0.26a	1.89	0.49a	0.34a	0.18a	22.4a	37.5ab	76.5a	8.21a	7.25	8.00
3	FP Normal N, 30000 pa	2.52b	0.26a	1.85	0.49a	0.33a	0.18a	22.5a	42.2a	76.1a	8.07ab	7.52	8.33
4	EI Control N, 37500 ppa	1.86c	0.22b	1.87	0.42b	0.29b	0.14b	18.2b	21.0c	61.3b	5.87c	6.69	7.67
5	EI Intermediate N, 37500 ppa	2.49b	0.26a	1.81	0.50a	0.36a	0.18a	23.3a	33.7b	83.0a	8.30a	7.10	7.42
6	EI Normal N, 37500 ppa	2.71a	0.27a	1.80	0.49a	0.35a	0.18a	23.2a	36.3ab	82.2a	9.27a	6.52	8.92
	LSD @ 5%	0.19	0.01	0.11	0.04	0.04	0.01	2.3	7.4	7.2	1.55	1.00	5.9

† Average of 6 replications

Table 25. Corn grain nutrient concentration response to treatments, 2012-2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.30ab	0.46ab	0.01	0.11ab	0.093b	20.98ab	4.29	14.70	1.21	1.17	3.00
2	FP Intermediate N, 30000 ppa	0.27bc	0.43abc	0.01	0.11ab	0.096ab	19.02abc	4.02	15.51	1.31	1.16	5.17
3	FP Normal N, 30000 pa	0.23c	0.39bc	0.01	0.10ab	0.098ab	16.73bc	4.10	15.00	1.29	1.19	7.50
4	EI Control N, 37500 ppa	0.31a	0.47a	0.01	0.12a	0.093b	22.08a	3.95	15.72	1.20	1.18	3.50
5	EI Intermediate N, 37500 ppa	0.23c	0.39c	0.01	0.09b	0.098ab	16.32c	3.27	14.90	1.37	1.07	7.83
6	EI Normal N, 37500 ppa	0.24bc	0.40abc	0.01	0.11ab	0.103a	18.64abc	3.74	16.15	1.32	1.14	6.00
	LSD @ 5%	0.06	0.07	0.00	0.03	0.008	4.36	1.29	3.56	0.27	0.25	5.57

† Average of 6 replications

Table 26. Corn shoot nutrient concentration response to treatments, 2012-2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.10a	0.81ab	0.33b	0.26	0.058b	21.07b	30.54b	226ab	3.00b	3.58ab	160a
2	FP Intermediate N, 30000 ppa	0.07b	0.81ab	0.38a	0.26	0.069a	17.40c	28.63b	164c	4.37a	3.68ab	112b
3	FP Normal N, 30000 pa	0.06b	0.87a	0.39a	0.26	0.067a	16.06c	39.08a	183bc	4.83a	3.50b	120b
4	EI Control N, 37500 ppa	0.16a	0.80ab	0.32b	0.25	0.060b	24.90a	26.48b	253a	2.74b	3.52b	189a
5	EI Intermediate N, 37500 ppa	0.06b	0.76b	0.38a	0.27	0.068a	16.19c	30.18b	168c	4.63a	3.57ab	110b
6	EI Normal N, 37500 ppa	0.06b	0.86ab	0.39a	0.26	0.070a	15.33c	29.20b	169c	4.84a	4.62a	117b
	LSD @ 5%	0.02	0.10	0.03	0.02	0.005	2.48	5.94	51	0.62	1.07	34

† Average of 6 replications

Table 27. Corn cob nutrient concentration response to treatments, 2012-2013.†

Trmt #	Treatment	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1	FP Control N, 30000 ppa	0.049b	0.95a	0.022b	0.051b	0.040bc	32.09b	6.96a	7.20c	1.55c	1.06bc	10.25bc
2	FP Intermediate N, 30000 ppa	0.035c	0.88ab	0.014c	0.032c	0.036c	19.46c	4.55b	7.85bc	1.74bc	1.11bc	14.25ab
3	FP Normal N, 30000 pa	0.029c	0.85b	0.016c	0.033c	0.035c	15.60c	4.41b	6.98c	2.08ab	1.20abc	13.67ab
4	EI Control N, 37500 ppa	0.066a	0.93ab	0.029a	0.069a	0.051a	42.62a	7.96a	9.30a	1.60c	1.33ab	16.42a
5	EI Intermediate N, 37500 ppa	0.040bc	0.89ab	0.018bc	0.037c	0.043b	18.32c	4.77b	8.65ab	2.26a	1.42a	7.83c
6	EI Normal N, 37500 ppa	0.039bc	0.93ab	0.017bc	0.383bc	0.040bc	17.86c	4.97b	7.51bc	1.99ab	1.01c	8.00c
	LSD @ 5%	0.012	0.09	0.005	0.014	0.006	5.79	1.75	1.32	0.39	0.30	5.10

† Average of 6 replications

Table 28. Corn grain nutrient uptake response to treatments, 2012-2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	58.9c	15.7b	25.1b	0.55b	5.99b	4.98c	0.11b	0.02b	0.08b	0.006b	0.006b	0.019b
2	FP Intermediate N, 30000 ppa	112.5b	26.1a	43.7a	0.99a	10.28a	9.42b	0.19a	0.04a	0.15a	0.013a	0.011a	0.046ab
3	FP Normal N, 30000 pa	127.2ab	25.6a	44.6a	1.09a	10.89a	10.72a	0.19a	0.05a	0.17a	0.015a	0.013a	0.069a
4	EI Control N, 37500 ppa	52.3c	15.4b	23.4b	0.49b	5.51b	4.45c	0.11b	0.02b	0.08b	0.006b	0.005b	0.018b
5	EI Intermediate N, 37500 ppa	122.2ab	25.0a	42.7a	1.08a	9.92a	10.40ab	0.18a	0.03a	0.16a	0.015a	0.011a	0.074a
6	EI Normal N, 37500 ppa	131.3a	25.3a	42.8a	1.06a	11.16a	10.83a	0.20a	0.04a	0.17a	0.014a	0.012a	0.056ab
	LSD @ 5%	15.1	5.0	5.9	0.11	2.04	1.09	0.03	0.01	0.03	0.003	0.002	0.048

† Average of 6 replications

Table 29. Corn shoot nutrient uptake response to treatments, 2012-2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	40.6c	6.67	55.1	22.8b	17.6b	3.95b	0.14b	0.21bc	1.55	0.021b	0.024b	1.096ab
2	FP Intermediate N, 30000 ppa	61.9b	5.76b	68.5ab	32.5a	22.3a	5.88a	0.15b	0.24b	1.39	0.037a	0.032b	0.948b
3	FP Normal N, 30000 pa	62.9b	5.27b	71.5ab	32.7a	21.6a	5.58a	0.13b	0.32a	1.52	0.040a	0.029b	0.986b
4	EI Control N, 37500 ppa	41.0c	7.94a	55.5c	22.3b	17.6b	4.15b	0.17a	0.18c	1.72	0.019b	0.024b	1.292a
5	EI Intermediate N, 37500 ppa	63.5ab	5.26b	65.5b	33.1a	22.9a	5.89a	0.14b	0.26b	1.45	0.040a	0.031b	0.946b
6	EI Normal N, 37500 ppa	70.5a	5.42b	74.6a	33.7a	22.2a	5.85a	0.13b	0.26b	1.45	0.042a	0.040a	1.001b
	LSD @ 5%	7.3	1.51	8.5	4.3	2.9	0.64	0.02	0.06	0.36	0.006	0.009	0.250

† Average of 6 replications

Table 30. Corn cob nutrient uptake response to treatments, 2012-2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	5.52c	0.39c	7.66c	0.17b	0.40	0.32c	0.026ab	0.006	0.006b	0.001c	0.00086d	0.008c
2	FP Intermediate N, 30000 ppa	7.62b	0.42abc	10.89b	0.17b	0.38	0.45b	0.024bc	0.005	0.010a	0.002b	0.0014b	0.018ab
3	FP Normal N, 30000 pa	8.38ab	0.38c	12.01ab	0.21a	0.41	0.47b	0.020c	0.006	0.010a	0.003a	0.0016ab	0.021a
4	EI Control N, 37500 ppa	5.56c	0.46abc	6.92c	0.20ab	0.47	0.37c	0.030a	0.005	0.007b	0.001c	0.0010cd	0.012bc
5	EI Intermediate N, 37500 ppa	9.07a	0.50a	11.86ab	0.22a	0.45	0.56a	0.023bc	0.006	0.011a	0.003a	0.0018a	0.011c
6	EI Normal N, 37500 ppa	7.94ab	0.48ab	12.22a	0.21a	0.45	0.51ab	0.022bc	0.006	0.010a	0.003ab	0.0013bc	0.011c
	LSD @ 5%	1.30	0.10	1.32	0.03	0.10	0.07	0.005	0.002	0.002	0.001	0.0004	0.006

† Average of 6 replications

Table 31. Corn total nutrient uptake response to treatments, 2012-2013.†

Trmt #	Treatment	N	P	K	Ca	Mg	S	Zn	Mn	Fe	Cu	B	Al
		kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h	kg/h
1	FP Control N, 30000 ppa	105.0c	22.7b	87.8b	23.6b	24.0b	9.2b	0.28c	0.24cd	1.64	0.029b	0.032c	1.238ab
2	FP Intermediate N, 30000 ppa	182.0b	32.3a	123.0a	33.6a	33.0a	15.7a	0.36a	0.29bc	1.56	0.053a	0.044b	1.011b
3	FP Normal N, 30000 pa	198.5ab	31.3a	128.1a	34.1a	32.9a	16.8a	0.34ab	0.37a	1.70	0.058a	0.043b	1.076ab
4	EI Control N, 37500 ppa	98.8c	23.8b	85.8b	23.0b	23.9b	9.0b	0.31bc	0.21d	1.80	0.026b	0.031c	1.322a
5	EI Intermediate N, 37500 ppa	194.8ab	30.7a	120.1a	34.4a	33.3a	16.8a	0.34ab	0.30b	1.62	0.058a	0.044b	1.031b
6	EI Normal N, 37500 ppa	209.8a	31.2a	129.7a	35.0a	33.8a	17.2a	0.35ab	0.30b	1.63	0.059a	0.053a	1.069ab
	LSD @ 5%	19.4	5.3	11.2	4.4	3.7	1.4	0.05	0.06	0.35	0.008	0.009	0.258

