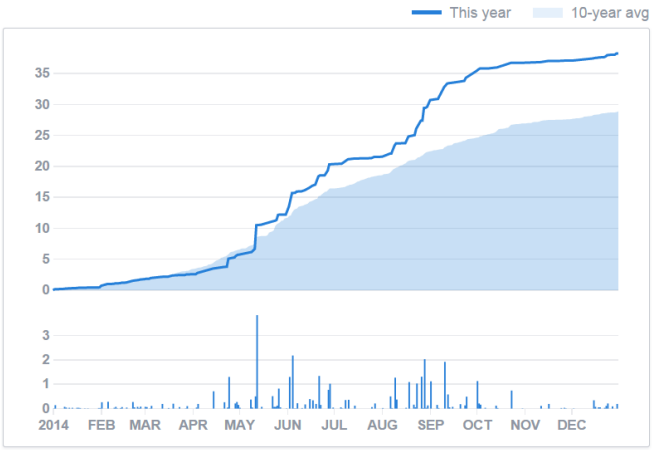
Nebraska On-Farm Research Network

Micronutrient Application on Corn

Study ID: 034023201401
County: Butler
Soil Type: Hastings Silt Loam
Planting Date: 4/28/2014
Harvest Date: 11/6/2014
Population: 32,000 seeds/acre
Row Spacing: 36”
Hybrid: G12H71 3000 GT
Reps: 6
Previous Crop: Soybeans
Tillage: Ridge Till
Herbicides: Pre: 0.7 qt/ac Bicep II Magnum FC and 1 oz/ac Balance Flexx on 4/28/14.
Post: 26 oz/ac Roundup PowerMAX on 5/26/14
Insecticides/Fungicides: Avicta Complete Corn Seed Treatment
Fertilizer: 180 lbs/acre anhydrous ammonia on 3/2014
100 lbs/acre ammonium sulfate topdress on 5/24/14 **Irrigation:** Furrow 9”
Rainfall:



Sample ID / Lab No.	Soil pH 1:1	Modified WDRF BpH	Soluble Salts 1:1 mmho/cm	Excess Lime Rating	Organic Matter LOI-%	FIA Nitrate ppm N	Depth Nitrate Lbs N/A	Method Phosphorus ppm P	-Ammonium Acetate- K ppm	Ca ppm	Mg ppm	Na ppm	Ca-P Sulfate ppm S	----------DTPA---------- Zn ppm	Fe ppm	Mn ppm	Cu ppm	Sum of Cations me/100g	% Base -----Saturation----- H	K	Ca	Mg	Na
CNP1							0 - 8 in	M-P3															
47347	6.6		0.29	NONE	2.6	6.2	15	59	448	2631	275	30	13	4.84	30	8.6	0.88	16.7	0	7	78	14	1

Soil Test Values:

Figure 1: Composite sample of entire 40 acres pre-plant.

Introduction: The objective of this study was to look at the effect of a “Kitchen Sink” treatment on yield and economics. The Kitchen Sink treatment consisted of 150 lbs of a mix containing 15% gypsum, 55% Micro-Pack (guaranteed analysis on next page), and 30% MAP. Average soil test pH for the field including the plot was 6.6 and phosphorus was 59 ppm which is considered very high according to UNL soil test recommendations (Figure 1). The cost of the treatment was $60/acre. 180lbs of anhydrous ammonia was applied in March of 2014. Shortly after, the kitchen sink treatment was applied. The treatments were separated physically; the anhydrous knife runs in between the rows and the dry applicator is into the side of the ridge so there would normally be 12-15 inches separating the bands. Soil samples were taken between planting and harvest in both the check and Kitchen Sink treatments (Figure 2).

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Guaranteed Analysis

Nitrogen (N) 5%
Phosphate (P_2O_5).....5%
Potash (K_2O).....5%
Calcium (Ca).....4%
Magnesium (Mg).....2.5%
Sulfur (S).....12%
Boron (B).....1.5%
Copper (Cu).....1%
Iron (Fe).....1%
Manganese (Mn).....1.5%
Zinc (Zn).....2%

Figure 2: Soil sample corresponding to treatment strips in the field. Odd numbers are where "Kitchen Sink" treatment strips are located and even numbers are the check. The "A" and "B" delineate each end of the field-length strip.

SOIL ANALYSIS REPORT

INFO SHEET: 543476

SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. percent	RATE	PHOSPHORUS P_1 (WEAK BRAY) 1:7 ppm	RATE	PHOSPHORUS P_2 (STRONG BRAY) 1:7 ppm	RATE	OLSEN BICARBONATE P ppm	RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm	RATE	MAGNESIUM Mg ppm	RATE	CALCIUM Ca ppm	RATE	SODIUM Na ppm	RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
MTS 1A	3.0	M	62	VH	79	VH			414	VH	240	H	2232	H	49		6.4	6.8	15.8	6.7	12.7	70.6	8.7	1.3
MTS 1B	2.7	M	41	VH	85	VH			458	VH	374	VH	2723	H	46		6.5	6.8	19.6	6.0	15.9	69.5	7.6	1.0
MTS 2A	2.8	M	39	VH	44	H			395	VH	321	VH	2799	H	51		6.7		17.9	5.7	14.9	78.2	0.0	1.2
MTS 2B	2.3	L	46	VH	91	VH			455	VH	356	VH	2763	H	40		6.6	6.8	19.3	6.0	15.4	71.6	6.1	0.9
MTS 3A	2.5	L	32	VH	45	H			345	VH	377	VH	3053	H	52		6.8		19.5	4.5	16.1	78.2	0.0	1.2
MTS 3B	2.7	M	34	VH	49	H			411	VH	355	VH	2648	H	35		6.4	6.7	19.1	5.5	15.5	69.3	8.9	0.8
MTS 4B	2.6	M	35	VH	47	H			373	VH	330	VH	2380	M	36		6.0	6.6	18.6	5.1	14.8	64.0	15.3	0.8
MTS 5B	2.7	M	29	H	43	H			408	VH	381	VH	2884	H	40		6.3	6.7	21.0	5.0	15.1	68.7	10.4	0.8
MTS 6B	2.6	M	39	VH	52	H			459	VH	300	VH	2513	H	59		6.3	6.7	18.4	6.4	13.6	68.3	10.3	1.4

NITRATE-N (FIA) SURFACE ppm	SURFACE lbs/A	SURFACE depth (in)	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (in)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (in)	Total lbs/A	SULFUR S ICAP ppm	RATE	ZINC Zn DTPA ppm	RATE	MANGANESE Mn DTPA ppm	RATE	IRON Fe DTPA ppm	RATE	COPPER Cu DTPA ppm	RATE	BORON B SORB. DTPA ppm	RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	RATE
24	43	0-6							43	21	H	5.6	H	7	L	32	VH	0.8	L	0.6	L	L	0.4	L
17	31	0-6							31	15	M	3.4	H	6	L	34	VH	0.9	M	0.6	L	L	0.4	L
23	41	0-6							41	19	H	3.0	M	6	L	33	VH	0.8	L	0.7	L	L	0.4	L
15	27	0-6							27	16	M	3.1	H	6	L	29	VH	0.8	L	0.6	L	L	0.3	L
18	32	0-6							32	13	M	2.5	M	4	VL	29	VH	0.8	L	0.6	L	L	0.4	L
15	27	0-6							27	16	M	2.6	M	7	L	49	VH	0.9	M	0.6	L	L	0.3	L
18	32	0-6							32	18	M	3.2	H	9	M	42	VH	0.8	L	1.2	M	L	0.3	L
19	34	0-6							34	19	H	3.3	H	8	L	39	VH	0.9	M	0.7	L	L	0.4	L
25	45	0-6							45	32	VH	4.0	H	8	L	31	VH	0.7	L	0.6	L	L	0.4	L

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Results:

	Yield† (bu/acre)	Moisture (%)	Test Weight (lb/bu)	Harvest Pop (plants/ac)	Stalk Rot (%)	Net Return ‡
Check	239 B*	14.7% B	58.5 A	30,417 A	20.5% B	$836.50
'Kitchen Sink' Micronutrients	245 A	15.1% A	58.4 A	31,000 A	37.3% A	$797.50
P-Value	*0.0039*	*0.0058*	*0.6320*	*0.3522*	*0.0103*	--

†Bushels per acre corrected to 15.5% moisture.

*Values with the same letter are not significantly different at a 90% confidence level.

‡Net return based on $3.50/bu corn price and "Kitchen Sink" treatment cost $60/ac.

Summary: Results showed a statistically significant yield increase due to the Kitchen Sink treatment compared to the check, a significant difference in percent moisture at harvest (+0.5%), and a significant increase in stalk rot compared to the check. There were no statistical differences in stand count or test weight. Despite the increase in yield, the application of the "Kitchen Sink" treatment did not result in an increase in net return due to the cost of the products.

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