

FIELD EXPERIMENT HISTORY

Title: Corn - Soybean Response to Tillage and Rotation - N source
Experiment: 09Rotation **Trial ID:** 3512 **Year:** 2012
Personnel: J.G. Lauer, S. Conley, K.D. Kohn, T. Diallo, M. Ruark
Location: Arlington, WI **County:** Columbia
Supported By: HATCH

Site Information

Field: 334 **Previous Crop:** See factors **Soil Type:** Silt Loam
Soil Test Date: 11/6 /12 **pH:** 6.3 **OM (%)** 3.8 **P (ppm)** 17 **K (ppm)** 118

Plot Management

Tillage Operations: Field Cultivator Soil Finisher

| | <u>Analysis:</u> | <u>Rate lbs/A:</u> | <u>Date:</u> |
|---|------------------|---|--------------|
| Fertilizer: Preplant : | N/A | N/A | N/A |
| Starter : | N/A | N/A | N/A |
| Post plant : | N/A | N/A | N/A |
| Manure: | N/A | N/A | N/A |
| Herbicide: 2,4-D 16 oz/A 4/6/12 | | Insecticide: Force 4.4 lbs/A 5/10/12 | |
| Roundup Pmax 42 oz/A 4/6/12 | | Dimethoate 400 1pt/A 7/29/12 | |
| Dual II-Magnum 24 oz/A 5-19-12 | | Hybrid: C: Pioneer 35F48AM1 | |
| Roundup PMax 22 oz/A 5-19-12 | | S: Pioneer 92Y30 | |
| Irrigation: None | | Row Width: 30" | |
| Planting Date: Corn: 5/10/12 | | Planting Depth: C: 1.5" | |
| Soybean: 5/4/12 | | S: 1" | |
| Target Plant Density: Corn: 32500 Plants/A | | Planting Method: Kinze 2000 Interplant planter | |
| Soybean: 150000 Plants/A | | Harvest Method: C: Kincaid plot combine | |
| Harvest Date: Corn: 10/2/12 | | S: Almaco plot combine #2 | |
| Notes: Soybean: 10/06/12 | | | |

Experimental Design

Design: RCB split-split-plot **Replications:** 4
Plot Size Seeded: MP: 30' x 70' **Experiment Size:** 2.7 A
Harvest Plot Size: 5' x 31'

Factors/Treatments:Tillage

- 1) NT
- 2) CT

Rotation:

- 1) CC- 1C
- 2) SS- 1S
- 3) CS- 1C
- 4) CS- 1S
- 5) CCCCCSSSSS- 1C
- 6) CCCCCSSSSS- 2C
- 7) CCCCCSSSSS- 3C
- 8) CCCCCSSSSS- 4C
- 9) CCCCCSSSSS- 5C
- 10) CCCCCSSSSS- 1S
- 11) CCCCCSSSSS- 2S
- 12) CCCCCSSSSS- 3S
- 13) CCCCCSSSSS- 4S
- 14) CCCCCSSSSS- 5S

N materials

Corn: (175 lb N/A): [(35*10)/43560]*(160/0.34)
 1) NH₄NO₃ (34%) = 4.1356 lb/plot = 1878 g/plot
 2) ESN (44%) = 3.1957 lb/plot = 1451 g/plot
 3) Super U (46%) = 3.0568 lb/plot = 1388 g/plot
 Soybean:
 UTC

Results: Table C-36 & C-37

**Table C-36. Corn/Soybean Rotation and Tillage Study - Corn.
Arlington, WI - 2012.**

| Tillage | Rotation | Fertilizer | Yield bu/A | Moisture % | Test weight lbs/bu | Return \$6.65/bu \$/A | Lodged | | | Plant Height Inches | Harvest density plants/A |
|---------|----------|------------|---------------|---------------|--------------------------|-----------------------------|------------|------------|-----------|---------------------------|--------------------------------|
| | | | | | | | Total % | Stalk % | Root % | | |
| | | ESN | 164 | 23.8 | 54.9 | 1030 | 5.3 | 3.4 | 1.9 | 67 | 31633 |
| | | NH4NO3 | 175 | 23.9 | 54.7 | 1098 | 7.2 | 4.7 | 2.5 | 69 | 31879 |
| | | SuperU | 177 | 22.9 | 55.0 | 1111 | 7.4 | 3.9 | 3.6 | 68 | 31295 |
| | 1C | | 207 | 20.7 | 56.9 | 1304 | 8.2 | 5.3 | 2.9 | 70 | 34208 |
| | 1CC | | 163 | 22.6 | 54.5 | 1023 | 8.4 | 6.6 | 1.7 | 68 | 31688 |
| | 1CS | | 198 | 21.2 | 55.8 | 1250 | 8.8 | 4.4 | 4.4 | 71 | 34167 |
| | 2C | | 161 | 22.1 | 55.2 | 1013 | 6.5 | 4.4 | 2.1 | 68 | 31250 |
| | 3C | | 159 | 27.1 | 54.0 | 987 | 4.8 | 2.4 | 2.4 | 67 | 29333 |
| | 4C | | 154 | 24.5 | 53.8 | 961 | 4.9 | 1.9 | 3.0 | 67 | 30500 |
| | 5C | | 164 | 26.5 | 53.8 | 1020 | 5.0 | 3.2 | 1.9 | 67 | 30072 |
| | 1C | ESN | 196 | 20.2 | 57.4 | 1239 | 11.3 | 7.8 | 3.6 | 68 | 33625 |
| | 1C | NH4NO3 | 210 | 21.6 | 56.2 | 1320 | 3.7 | 2.3 | 1.5 | 70 | 34875 |
| | 1C | SuperU | 214 | 20.4 | 57.1 | 1353 | 9.6 | 5.9 | 3.7 | 70 | 34125 |
| | 1CC | ESN | 161 | 22.1 | 54.8 | 1013 | 10.2 | 7.4 | 2.9 | 67 | 32783 |
| | 1CC | NH4NO3 | 167 | 23.4 | 54.1 | 1045 | 7.6 | 5.2 | 2.3 | 69 | 31530 |
| | 1CC | SuperU | 161 | 22.2 | 54.6 | 1012 | 7.3 | 7.3 | 0.0 | 68 | 30750 |
| | 1CS | ESN | 189 | 21.4 | 55.9 | 1191 | 4.3 | 2.5 | 1.8 | 70 | 34625 |
| | 1CS | NH4NO3 | 202 | 20.7 | 56.0 | 1276 | 12.8 | 7.4 | 5.5 | 72 | 35375 |
| | 1CS | SuperU | 204 | 21.5 | 55.3 | 1283 | 9.2 | 3.3 | 5.9 | 70 | 32500 |
| | 2C | ESN | 150 | 23.6 | 54.8 | 937 | 3.0 | 1.9 | 1.1 | 66 | 30875 |
| | 2C | NH4NO3 | 167 | 21.1 | 55.2 | 1052 | 7.1 | 6.0 | 1.1 | 70 | 30750 |
| | 2C | SuperU | 167 | 21.7 | 55.4 | 1050 | 9.4 | 5.3 | 4.1 | 68 | 32125 |
| | 3C | ESN | 155 | 25.6 | 54.2 | 962 | 3.2 | 2.8 | 0.4 | 65 | 29000 |
| | 3C | NH4NO3 | 158 | 29.8 | 53.4 | 970 | 5.5 | 3.9 | 1.7 | 68 | 29750 |
| | 3C | SuperU | 165 | 26.0 | 54.4 | 1028 | 5.5 | 0.4 | 5.2 | 66 | 29250 |
| | 4C | ESN | 147 | 25.3 | 53.5 | 919 | 4.3 | 0.8 | 3.5 | 67 | 30750 |
| | 4C | NH4NO3 | 157 | 25.0 | 53.6 | 979 | 2.4 | 2.4 | 0.0 | 66 | 30875 |
| | 4C | SuperU | 157 | 23.2 | 54.3 | 985 | 8.1 | 2.6 | 5.5 | 68 | 29875 |
| | 5C | ESN | 153 | 28.1 | 53.5 | 948 | 0.8 | 0.9 | 0.0 | 65 | 29774 |
| | 5C | NH4NO3 | 168 | 25.9 | 54.1 | 1045 | 11.3 | 6.2 | 5.1 | 68 | 30000 |
| | 5C | SuperU | 171 | 25.6 | 53.9 | 1067 | 3.0 | 2.5 | 0.6 | 68 | 30441 |
| Conv | | | 176 | 21.5 | 55.5 | 1109 | 11.7 | 7.3 | 4.4 | 68 | 32402 |
| Notill | | | 169 | 25.6 | 54.2 | 1051 | 1.6 | 0.8 | 0.8 | 68 | 30803 |
| Conv | | ESN | 169 | 22.0 | 55.6 | 1062 | 7.9 | 5.1 | 2.8 | 67 | 33132 |
| Conv | | NH4NO3 | 179 | 21.6 | 55.4 | 1126 | 14.0 | 9.3 | 4.7 | 69 | 32036 |
| Conv | | SuperU | 180 | 21.0 | 55.7 | 1138 | 13.3 | 7.5 | 5.8 | 68 | 32037 |
| Notill | | ESN | 160 | 25.6 | 54.2 | 998 | 2.8 | 1.8 | 1.0 | 67 | 30134 |
| Notill | | NH4NO3 | 172 | 26.3 | 54.0 | 1070 | 0.4 | 0.2 | 0.2 | 69 | 31723 |
| Notill | | SuperU | 174 | 24.9 | 54.3 | 1085 | 1.6 | 0.3 | 1.3 | 69 | 30553 |

continued

Table C-36. Corn/Soybean Rotation and Tillage Study - Corn.
(continue) Arlington, WI - 2012.

| Tillage | Rotation | Fertilizer | Yield bu/A | Moisture % | Test weight lbs/bu | Return \$6.65/bu \$/A | Lodged | | | Plant Height Inches | Harvest density plants/A |
|---------|----------|------------|---------------|---------------|--------------------------|-----------------------------|------------|------------|-----------|---------------------------|--------------------------------|
| | | | | | | | Total % | Stalk % | Root % | | |
| Conv | 1C | | 209 | 20.3 | 57.4 | 1324 | 11.7 | 6.6 | 5.1 | 70 | 33750 |
| Conv | 1CC | | 163 | 19.8 | 55.2 | 1033 | 16.5 | 13.0 | 3.5 | 68 | 32167 |
| Conv | 1CS | | 201 | 19.7 | 56.8 | 1273 | 16.1 | 8.5 | 7.5 | 71 | 34250 |
| Conv | 2C | | 165 | 21.3 | 55.6 | 1042 | 11.3 | 8.5 | 2.9 | 67 | 31333 |
| Conv | 3C | | 166 | 23.8 | 54.7 | 1038 | 9.5 | 4.7 | 4.8 | 65 | 31417 |
| Conv | 4C | | 162 | 22.0 | 54.5 | 1018 | 6.7 | 3.3 | 3.4 | 68 | 31583 |
| Conv | 5C | | 165 | 23.5 | 54.6 | 1034 | 10.0 | 6.4 | 3.8 | 66 | 32312 |
| Notill | 1C | | 204 | 21.1 | 56.4 | 1284 | 4.8 | 4.1 | 0.7 | 69 | 34667 |
| Notill | 1CC | | 163 | 25.3 | 53.8 | 1014 | 0.2 | 0.2 | 0.0 | 68 | 31209 |
| Notill | 1CS | | 196 | 22.7 | 54.7 | 1227 | 1.5 | 0.2 | 1.2 | 71 | 34083 |
| Notill | 2C | | 157 | 23.0 | 54.7 | 985 | 1.6 | 0.3 | 1.4 | 69 | 31167 |
| Notill | 3C | | 152 | 30.5 | 53.4 | 936 | 0.0 | 0.0 | 0.0 | 68 | 27250 |
| Notill | 4C | | 146 | 27.0 | 53.2 | 904 | 3.1 | 0.5 | 2.6 | 66 | 29417 |
| Notill | 5C | | 163 | 29.5 | 53.1 | 1005 | 0.0 | 0.0 | 0.0 | 68 | 27832 |
| Conv | 1C | ESN | 202 | 19.9 | 57.9 | 1280 | 12.1 | 5.7 | 6.4 | 69 | 34000 |
| Conv | 1C | NH4NO3 | 207 | 21.3 | 56.5 | 1306 | 6.1 | 4.5 | 1.6 | 72 | 32750 |
| Conv | 1C | SuperU | 219 | 19.9 | 57.7 | 1387 | 16.9 | 9.5 | 7.4 | 70 | 34500 |
| Conv | 1CC | ESN | 157 | 20.4 | 55.3 | 989 | 20.3 | 14.5 | 5.7 | 68 | 34500 |
| Conv | 1CC | NH4NO3 | 172 | 19.8 | 54.9 | 1086 | 14.7 | 10.0 | 4.7 | 69 | 31500 |
| Conv | 1CC | SuperU | 161 | 19.3 | 55.3 | 1023 | 14.6 | 14.6 | 0.0 | 68 | 30500 |
| Conv | 1CS | ESN | 196 | 19.6 | 57.1 | 1240 | 7.9 | 4.3 | 3.6 | 70 | 35000 |
| Conv | 1CS | NH4NO3 | 201 | 19.3 | 57.0 | 1275 | 25.6 | 14.7 | 10.9 | 72 | 33750 |
| Conv | 1CS | SuperU | 206 | 20.1 | 56.3 | 1303 | 14.8 | 6.6 | 8.1 | 70 | 34000 |
| Conv | 2C | ESN | 155 | 23.0 | 55.0 | 973 | 6.0 | 3.8 | 2.2 | 66 | 32500 |
| Conv | 2C | NH4NO3 | 168 | 20.1 | 56.0 | 1063 | 13.3 | 11.1 | 2.2 | 69 | 30000 |
| Conv | 2C | SuperU | 173 | 20.8 | 55.9 | 1089 | 14.7 | 10.5 | 4.2 | 66 | 31500 |
| Conv | 3C | ESN | 160 | 22.7 | 55.0 | 1003 | 6.5 | 5.6 | 0.9 | 64 | 31250 |
| Conv | 3C | NH4NO3 | 167 | 25.6 | 54.0 | 1041 | 11.1 | 7.7 | 3.3 | 67 | 31750 |
| Conv | 3C | SuperU | 171 | 23.2 | 55.1 | 1070 | 11.1 | 0.8 | 10.3 | 64 | 31250 |
| Conv | 4C | ESN | 155 | 23.5 | 53.9 | 969 | 0.8 | 0.0 | 0.8 | 68 | 31250 |
| Conv | 4C | NH4NO3 | 165 | 22.1 | 54.3 | 1036 | 4.7 | 4.7 | 0.0 | 68 | 32750 |
| Conv | 4C | SuperU | 166 | 20.4 | 55.2 | 1047 | 14.7 | 5.2 | 9.5 | 68 | 30750 |
| Conv | 5C | ESN | 157 | 24.6 | 54.6 | 981 | 1.5 | 1.8 | 0.0 | 65 | 33426 |
| Conv | 5C | NH4NO3 | 172 | 22.8 | 54.7 | 1079 | 22.6 | 12.3 | 10.3 | 66 | 31750 |
| Conv | 5C | SuperU | 167 | 23.2 | 54.4 | 1043 | 5.9 | 5.1 | 1.1 | 67 | 31759 |
| Notill | 1C | ESN | 190 | 20.4 | 56.8 | 1198 | 10.6 | 9.9 | 0.7 | 68 | 33250 |
| Notill | 1C | NH4NO3 | 212 | 21.9 | 55.9 | 1334 | 1.4 | 0.0 | 1.4 | 69 | 37000 |
| Notill | 1C | SuperU | 209 | 20.9 | 56.6 | 1319 | 2.3 | 2.3 | 0.0 | 70 | 33750 |
| Notill | 1CC | ESN | 166 | 23.9 | 54.3 | 1037 | 0.1 | 0.2 | 0.0 | 67 | 31066 |
| Notill | 1CC | NH4NO3 | 162 | 27.0 | 53.4 | 1004 | 0.5 | 0.5 | 0.0 | 69 | 31560 |
| Notill | 1CC | SuperU | 161 | 25.1 | 53.9 | 1001 | 0.0 | 0.0 | 0.0 | 68 | 31000 |

continued

**Table C-37. Corn/Soybean Rotation Study - Soybean
Expt. 1290 Arlington, WI**

| Tillage | Rotation | Yield bu/A | Moisture % | Return \$13.64/bu \$/A |
|-------------------------------|----------|---------------|---------------|------------------------------|
| | 1S | 57 | 8.2 | 759 |
| | 1SC | 51 | 8.1 | 686 |
| | 1SS | 39 | 8.0 | 517 |
| | 2S | 46 | 8.1 | 621 |
| | 3S | 44 | 8.3 | 586 |
| | 4S | 44 | 8.1 | 587 |
| | 5S | 41 | 8.0 | 556 |
| Conv | | 45 | 8.1 | 603 |
| Notill | | 47 | 8.1 | 629 |
| Conv | 1S | 53 | 8.1 | 717 |
| Conv | 1SC | 47 | 8.1 | 635 |
| Conv | 1SS | 42 | 8.0 | 566 |
| Conv | 2S | 47 | 8.1 | 624 |
| Conv | 3S | 40 | 8.1 | 537 |
| Conv | 4S | 46 | 8.2 | 616 |
| Conv | 5S | 39 | 7.9 | 525 |
| Notill | 1S | 60 | 8.3 | 801 |
| Notill | 1SC | 55 | 8.1 | 736 |
| Notill | 1SS | 35 | 8.0 | 469 |
| Notill | 2S | 46 | 8.1 | 617 |
| Notill | 3S | 47 | 8.4 | 636 |
| Notill | 4S | 42 | 8.1 | 558 |
| Notill | 5S | 44 | 8.0 | 588 |
| Mean | | 46 | 8.1 | 616 |
| <u>Probability (%)</u> | | | | |
| Tillage (T) | | 18.1 | 27.1 | 18.1 |
| Rotation (R) | | 0.0 | 57.5 | 0.0 |
| T x R | | 0.0 | 23.4 | 0.0 |
| <u>LSD (0.10)</u> | | | | |
| Tillage (T) | | NS | NS | NS |
| Rotation (R) | | 5 | NS | 66.0 |
| T x R | | 5 | NS | 72.2 |