

Drainage and Tillage Effect on Corn Production

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Objective

To evaluate the effect of soil drainage and tillage on corn production.

Background

| | | | |
|----------------|----------------------|----------------|---------------------------------------------------|
| Cooperator: | O.A.R.D.C. NW Branch | Fertilizer: | 150 # 18-46-0, sidedress 28% N @ 50 Gal/ac |
| County: | Wood | Planting Date: | 5-11-09 |
| Nearest Town: | Hoytville | Planting Rate: | 30,000 |
| Drainage: | see below | Row Width: | 30 in |
| Soil type: | Hoytville, clay | Herbicides: | Lexar, Showdown, 2,4-D, Simazine 4L, post Roundup |
| Tillage: | see below | | Weathermax, AMS |
| Previous Crop: | soybean | Harvest Date: | 10-29-09 |
| Variety: | Pioneer 35F44 | | |

Methods

The entries were replicated eight times in a randomized complete block design. Plot size was 10 feet x 60 feet for each entry. Harvest data collected from center rows. The same crop was planted on all treatments on the same day, using the same variety, fertility, and herbicide.

Drained plots have subsurface tile drainage compared to undrained plots which do not have subsurface drainage. Both sets of drainage plots contain four identical tillage treatments.

1. Continuous no-till
2. Fall Strip Tillage – a 6 in deep mole knife with mounding coulters
3. Fall Zone Tillage – a 12 to 18 inch deep straight shank subsoiler, no further tillage
4. Fall moldboard plow – followed by fall rotterra finish tillage

Results

2009 Corn Yields

| Drainage System | Tillage | Yield (bu/ac) | LSD (0.05) |
|-----------------|------------|---------------|------------|
| Drainage | No-till | 175.7 | NS |
| Undrained | No-till | 167.0 | |
| Drainage | Strip-till | 172.7 A | 14.1 |
| Undrained | Strip-till | 156.0 B | |
| Drainage | Zone-till | 175.0 A | 5.0 |
| Undrained | Zone-till | 158.1 B | |
| Drainage | Plow | 168.3 | NS |
| Undrained | Plow | 166.3 | |

Summary

This experiment has been conducted for over 20 years. In 2009 corn yield was significantly better with drainage in the Strip-till and Zone-till treatments compared to undrained. After long-term no-till, soil structure may have allowed soil drainage to be nearly equal regardless of tile drainage. The undrained plow treatments allowed the top 8 inches of soil to also have a loose soil structure which enhances drainage.

Within the same drainage plot, tillage was not a significant factor.

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