

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:	sidedress 28% N @ 66 Gal/ac
County:	Wood	Planting Date:	April 25, 2017
Nearest Town:	Hoytville	Planting Rate:	34,000
Drainage:	see below	Row Width:	30 in
Soil type:	Hoytville, clay	Herbicides:	Cinch, Instigate, 2,4-D, Roundup
Tillage:	see below	Harvest Date:	October 31, 2017
Previous Crop:	Corn		
Variety:	Dekalb 57-97		

Methods

This research compared drained vs undrained with chisel plow tillage compared to no-till. Treatments were replicated six times in a randomized complete block design. Plot size- 10 feet x 60 feet each entry. Harvest data was collected from center 2 rows with a calibrated research combine yield monitor. Treatments were planted with the same variety and fertility: 28% nitrogen at sidedress, rate 66 gal./ac, herbicide at planting was glyphosate, 2,4-D, Instigate, and carrier.

Drained plots (main treatment is drainage) have subsurface tile drainage spaced 20 feet apart compared to undrained plots which do not have subsurface drainage. Both sets of drainage plots contain identical tillage treatments (sub treatments).

The field history was a corn/soybean rotation with a comparison of continuous no-till vs fall chisel plow – followed by fall rotterra finish tillage.

Rainfall at this location:

	2017	long term average
May	5.23 in	3.4 in
June	5.12 in	3.6 in
July	5.91 in	3.8 in
August	4.36 in	3.0 in
September	1.86 in	2.7 in



Results

2017 Corn Yields (bu/acre)

Drainage	Tillage	Yield	Significance	LSD (.05)
Drained	No-till	156.3	A	
Undrained	No-Till	90.5	C	
Drained	Chisel Plow	164.1	A	
Undrained	Chisel Plow	115.3	B	(24.0)

Summary

Corn yields showed significant yield differences between drained and undrained treatments. In 2017, growing season rainfall was 6 inches above the long term average. Under saturated soil conditions, drainage in no-till improved yields 65.8 bushels per acre and in chisel plow drainage improved yields 48.8 bushels per acre compared to undrained treatments. Undrained chisel plow improved yields 24.8 bushels per acre compared to undrained no-till.

This research illustrates the value of soil drainage when excess rainfall occurs during the growing season.

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