

Tillage & Drainage Effect on Soybean Production

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Objective

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

Background

Cooperator:	O.A.R.D.C. NW Branch	Fertilizer:	fall 2010, 200 lb/ac 10-26-26
County:	Wood	Planting Date:	6-6-11
Nearest Town:	Hoytville	Planting Rate:	180,000 seed/ac
Drainage:	see below	Row Width:	see below
Soil type:	Hoytville, clay	Herbicides:	Envive, 2,4-D ester, Honcho, Roundup weathermax, choice, AMS
Tillage:	see below	Harvest Date:	10-17-11
Previous Crop:	corn		
Variety:	Pioneer 92M91		
Soil test:			

Methods

The entries were replicated six times in a randomized complete block design. Entries were on drained and undrained ranges. Plot size- 10 feet x 60 feet each entry. Harvest data collected from center 13 feet of 20 feet entries. The same crop was planted on all treatments on the same day, using the same variety, fertility, and herbicide. This plot has been in the same tillage treatments for over 20 years in a corn / soybean rotation. Tillage treatments remain in the same location throughout this time.

Drained plots have subsurface tile drainage spaced 20 feet apart compared to undrained plots which do not have subsurface drainage

Both sets of drainage plots contain three identical tillage treatments which were conducted during fall 2010 in corn residue.

1. No-till (Continuous no-till)
2. Chisel Plow (followed by fall power harrow finish tool)
3. Zone Tillage – a 12 to 18 inch deep straight shank subsoiler

Rainfall at this location:

	2011	long term average (29 year)
June	1.40 in	3.6 in
July	4.29 in	3.8 in
August	3.74 in	3.0 in
Total	9.43 in	10.4 in

RESULTS

2011 Soybean Yields - bushels / acre

Drainage	Tillage	Yield	Significance P = (.05)
Drained	No-till	65.8	
Undrained	No-till	65.6	NS
Drained	Chisel Plow	60.3	
Undrained	Chisel Plow	57.3	NS
Drained	Zone Tillage	65.4	
Undrained	Zone Tillage	68.6	NS

Summary

In 2011 soybean yield as influenced by drainage was not significantly different when comparing the same tillage system.

Because of an extremely wet May, soybeans were planted later than usual (June 6) and the soil moisture was essentially at field capacity below planting depth. Then rainfall during June was 2.2 inches below normal. A drier growing season tends to negate the usual yield advantage resulting from good subsurface drainage.

Historically, subsurface drainage increased soybean yields about 5%, far less than for corn.

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