

Corn Rotation Study: Third Year Summary

Andy Kleinschmidt, AGNR Extension Educator- Van Wert County
Gary Prill, Program Manager- Farm Focus Research

Objectives

This study is designed to evaluate different corn/soybean rotation programs over multiple years in soil similar to soil found throughout northwest Ohio. The study will evaluate the third year corn yield of three different corn/soybean rotation schedules.

Background

Soil Type:	Hoytville silty clay loam, Haskins loam	Herbicides (continued):
Drainage:	Non-systematic tile	POST(June 6): CORN- 22 oz/A Roundup WeatherMax + 17 lb/ 100 gallons AMS
Previous Crop:	Variable- See Methods	POST(June 26): SOYBEANS- 22 oz/A Roundup WeatherMax + 17 lb/ 100 gallons AMS
Tillage:	SOYBEANS- None CORN- Fall Disc/Ripper; Spring field cultivator (2x)	Insecticide: CORN- Poncho 250 on seed Corn Hybrid: Dekalb DKC 61-68YGRW Soybean Variety: Asgrow AG3101 RR Row Width: CORN- 30 inches SOYBEANS- 7.5 inches
Soil Test (2005):	pH 6.6, P 62 ppm K 159 ppm	Planting Rate: CORN- 31,200 seeds/A SOYBEANS- 220,000 seeds/A
Fertilizer (CORN):	95 lb/A 23-16-16 2x2 banded at planting; Sidedress (June 6): 28% UAN 170 lb nitrogen/A on corn/corn rotation; 140 lb nitrogen/A on soybean/corn rotation (SOYBEANS): No fertilizer	Planting Date: CORN-April 28, 2006 SOYBEANS-May 24, 2006 Harvest Date: CORN- October 25, 2006 SOYBEANS- October 9, 2006
Herbicides:	PRE (April 29): CORN- 2 qt/A Degree Extra EPP (April 20): SOYBEANS- 1.8 oz/A Gangster MP + 22 oz/A Roundup OriginalMax + 1 pt/A 2,4-D LVE + 17 lbs/100 gal AMS	

Methods

This multi-year on-farm study is set up as three different crop rotation schedules (treatments) replicated three times in a complete randomized block design. The rotation schedules are:

- 1) corn followed by soybeans
- 2) two (2) years of corn followed by soybeans
- 3) three (3) years of corn followed by soybeans

The field used for this trial had been planted entirely to corn in 2004, so the crops grown in 2006 represent the third year in the rotation schedules. Plot size is 90 feet wide by 1030 feet in length. Corn plots were planted with a six row John Deere 7000 Maxemerge planter. Soybeans were planted with a 15 foot John Deere 750 No-till drill. All seed used was Roundup Ready in order to minimize potential damage to the adjacent crops from glyphosate herbicide applications.

Harvest populations for soybeans (September 29) were estimated by counting the number of plants on each side of a measured 10 feet section at three different locations in each plot. The average of the number of plants counted per 10 feet was converted to plants per acre. Harvest populations for corn (September 27) were estimated by counting the number of plants on each side of a 17.5 foot section at three different locations in each plot. The average number of plants counted per 17.5 feet was converted to plants per acre. Yield information was collected for each plot by harvesting the whole plot with a John Deere 6620 combine equipped with a calibrated AgLeader PF3000 yield monitor. Individual plot wet weights and moistures were taken from the combine yield monitor. Yields reported in this study have been adjusted to a 13% moisture standard for soybeans and a 15% moisture standard for corn.

Results

Table 1. Year 3 crop rotation effects on harvest population, moisture and yield means.

Treatment	Harvest Population (plants/A)	Moisture (%)	Yield (bu/A)
Year 3 corn of corn/soybean/corn rotation	29,900	16.7	218.1
Year 3 corn of 3 year corn rotation	30,200	17.0	208.9
LSD (0.05)	NS	NS	NS
F-test	1.6	4.9	4.2
CV(%)	<1	<1	2.6

NS= not significant

Summary

This year (2006) represents the third year of this ongoing study looking at yield differences of these three different cropping rotations. The corn plot treatments in 2006 differ in that one has been continuous corn for 3 years and other is corn following soybeans. Results from this year indicate there were no significant differences between the two treatments for harvest population, moisture, or yield (Table 1). The two years of corn followed by soybeans plots were planted to soybeans in 2006. Because of trial design, it will not be possible to determine if soybean yields will be effected by these different rotation schedules until the 2007 growing season for soybeans following three years of corn, and the 2009 season for soybeans following two years of corn.

From an economic standpoint, the corn following corn rotation plots received an additional 30 pounds of nitrogen over the corn following soybeans based on Tri-State Fertility Guidelines (Extension bulletin E-2567). This additional nitrogen is because there is no nitrogen credit from a previous soybean crop. Another consideration in raising corn after corn is insect protection. Growers should give serious consideration to using insecticides, or insect resistant seed corn when raising corn after corn. Examination of the root systems in the corn plots in this trial indicated more root feeding in the corn/corn plots than in the soybean/corn plots. The amount of rootworm feeding did not reach the economic threshold in either plot since a rootworm resistant transgenic hybrid was used in this trial. Growers can expect to pay an additional \$14-16/acre for insecticide, or seed with insect resistance and a low dosage of seed insecticide treatment applied.

Acknowledgement

OSU Extension- Van Wert and Farm Focus express appreciation to Dekalb/Asgrow/Monsanto for supplying the seed and herbicides used in this trial.