Subsurface Irrigation Project- Marsh Foundation/Farm Focus Site

Objectives

The objective of this subsurface irrigation project is threefold: 1) to provide water to the crop to increase production, 2) to retain potential water pollutants on site, and 3) to provide a wetlands habitat for wildlife. This report only addresses the potential increase in production aspect of the project. Information on pollutants and wetlands habitat are still being collected and analyzed.

Background- Corn

Soil Type:	Hoytville clay	Herbicide:	4 qt./A Fieldmaster + 0.55 lb./A
Drainage:	Tile- systematic	PRE(April 20):	Atrazine 90DF + 22 oz./A Roundup
Previous Crop:	Soybeans		WeatherMax + 17 lb./100 gal.
Tillage:	Variable (See methods)		AMS
Fertilizer:	235 lb./A 6-26-30 2X2	Variety:	Beck's 5322 CB
	banded at planting	Planting Rate:	29,680 seeds/A; 30 inch rows
	190 lb./A nitrogen sidedressed	Planting Date:	April 19, 2004
	as 28% UAN (May 28)	Harvest Date:	October 12, 2004

Background- Soybeans

Soil Type:	Hoytville clay	Herbicide:	EPOST (May 27) 22 oz./A
Drainage:	Tile- systematic		Roundup WeatherMax +
Previous Crop:	Corn		17 lb./100 gal. AMS
Tillage:	Fall disk/ripper; spring		LPOST (June 23) 22 oz./A
	culitivate (2x)		Roundup OriginalMax +
Fertilizer:	Zone 3 West- 275 lb./A		17 lb./100 gal. AMS
	2-11-48 surface applied	Variety:	Wellman W3228RR
	(November 7)	Planting Rate:	275,000 seeds/A; 7.5 inch rows
	Zone 2- 185 lb./A 0-0-60	Planting Date:	May 5, 2004
	surface applied (November 7)	Harvest Date:	September 23, 2004

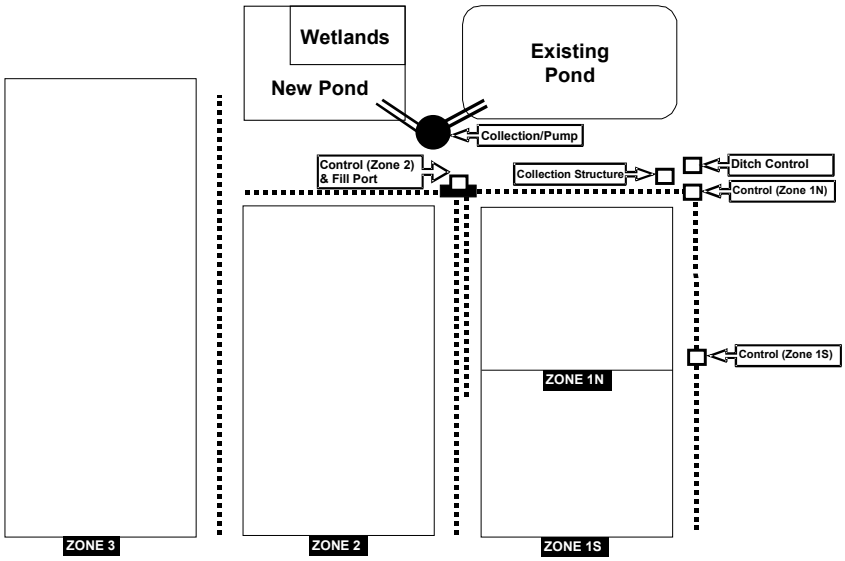
Methods

This subsurface irrigation project was set up to run on both corn and soybean fields in 2004. Control structure boards were lowered on June 11th to begin raising the water tables in both fields. Irrigation pumps for both fields were started on June 24th. The pumps were temporarily shutdown on July 4th for heavy rainfall. Irrigation was shutdown again on July 21st for heavy rainfall. Because of continued heavy rains throughout August and September, irrigation was not required so total irrigation time for the season was limited to just a couple weeks.

The subsurface irrigation test field for corn was also used as a test site for a tillage trial. Corn plots were planted, using a John Deere 7000 Maxemerge 6 row no-till planter, into different tillage practices in both the irrigated (Zone 1) and non-irrigated (Zone 3- east half) fields. The different tillage methods were no-till, fall strip-till, fall shallow tillage with a disk, and fall deep

tillage with a disk/ripper followed by spring field cultivation. Plot yields and moistures were determined at harvest based on moistures and wet grain weights collected using a John Deere 6620 combine equipped with a calibrated AgLeader PF3000 yield monitor. Final corn yields are adjusted to a 15% moisture standard for comparison purposes.

Subsurface Irrigation Project Diagram



The soybean fields (Zone 2 and Zone 3-west half) were tilled in the spring with 2 passes of a field cultivator, then planted with a John Deere 750 drill. Yields were calculated based on wet grain weight and moisture data collected by a John Deere 6620 combine equipped with a calibrated AgLeader PF3000 yield monitor. All yields are adjusted to a 13% moisture standard.

Results

The following results are from non-replicated plots, so this data has not been statistically analyzed.

Table 1. Corn moisture, yield, and irrigated yield increase by tillage method.

Treatment	Moisture (%)	Yield (bu./A)	Irrigated Yield Increase (bu./A)	Irrigated Yield Increase (%)
Irrigated No-till	16.0	192.5	17.9	10.3
Non-irrigated No-till	15.4	174.6		
Irrigated Strip-till	15.9	196.7	10.3	5.5
Non-irrigated Strip-till	15.2	186.4		
Irrigated Fall Shallow Till	15.9	192.8	21.0	12.2
Non-irrigated Fall Shallow Till	15.3	171.8		
Irrigated Fall Deep Tillage	15.9	185.9	16.2	9.5
Non-irrigated Fall Deep Tillage	15.2	169.7		

Table 2. Soybean moisture, yield, and irrigated yield increase.

Treatment	Moisture (%)	Yield (bu./A)	Irrigated Yield Increase (bu./A)	Irrigated Yield Increase (%)
Irrigated Soybeans	9.3	49.9	(- 4.1)	(- 7.6)
Non-irrigated Soybeans	8.7	54.0		

Summary

The data above shows a positive yield increase in the irrigated corn plots for all the different tillage methods. The average increase for all the corn plots over all tillage methods was 16.4 bu./A (9.4 %). The data shows a negative response this year in the irrigated soybean field. Because of the unusually wet growing season, the irrigation system was operated for only a short period of time and thus most likely had minimal impact on yields. Certain areas of all the fields in the trial had problems with standing water for extended periods of time. This problem along with wildlife (geese)feeding in areas of the fields around the wetlands may account for the yield loss experienced in the irrigated soybeans.

Acknowledgement

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