Bioenergy Cropping Systems Study - 2015 summary

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Treatments (all combinations of the following crop rotation and residue removal treatments, all no-till)
Rotations:

1. Spring Wheat – Dry Pea (W-P)
2. Spring Wheat – Dry Pea/ Cover Crop mix (W-P/CC)
3. Spring Wheat – Dry Pea - Corn (W-P-C)

Residue Removal:

A. No residue removed
B. Wheat straw baled and removed
C. Wheat straw, corn stover, and pea residue baled and removed
D. Wheat straw, corn stover, and peas residue grazed

Crop/Rotation	Planting	Cultivar/type	Planting rate	Fertilizer (lb material)	Drill/ Planter	Harvest
Spring Wheat W-P-C	5/5/15	SY Soren	130 lb/ac	130 lb/ac urea 50 lb/ac 11-52-0	JD 750	9/7/11
Spring Wheat W-P	5/5/15	SY Soren	130 lb/ac	35 lb/ac urea 50 lb/ac 11-52-0	JD 750	9/7/11
Spring Wheat W-P/CC	5/5/15	SY Soren	130 lb/ac	35 lb/ac urea 50 lb/ac 11-52-0	JD 750	9/7/11
Dry Pea W-P	5/1/15	Vegas	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/24/15
Dry Pea W-P/CC	5/1/15	Vegas peas	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/24/11
Dry Pea W-P-C	5/1/15	Vegas	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/24/11
Corn W-P-C	5/27/15	TS8002 GT Terning Seeds	24,300 seeds /ac	142 lb/ac urea 50 lb/ac 11-52-0	JD Max Emerge II	10/20/15
Cover Crop W-P/CC	8/27/15	(see below for CC mix)	34 lb/ac mix	no fertilizer	JD 750	

Fertilizer rates based on soil test and NDSU fertilizer recommendations. Cover crop mix: 4.7 lb/a soybean, 11.2 lb/a spring triticale, 10.4 lb/a Arvika pea, 6 lb/a Rosetown lentil, 1.6 lb/a red clover, and 0.13 lb/a purple top turnip. Note: Cover crop mix was changed this year to accommodate herbicide program.

All plots were sprayed Apr 24 with Cornerstone (32 oz./a) + Class Act (32 oz./100 gal). Pea plots were sprayed June 5 with Basagran (20 oz./a) and Pursuit (2 oz./a), on June 8 with Section (8 oz./a) + Preference (32 oz./100 gal.), and on June 12 with Basagran (25 oz./a). Spring wheat was sprayed June 5 with Tacoma (8 oz./a) + Widematch (16 oz./a) + Headline (8 oz./a). Corn was sprayed on June 16 with Cornerstone (20 oz./a) + Widematch (20 oz./a) + Class Act (32 oz./100 gal.), and on June 29 with Cornerstone (20 oz./a) + Class Act (32 oz./100 gal). Non-grazed pea plots were sprayed after harvest with Cornerstone (25 oz./a) on August 28. Non-grazed wheat plots were sprayed after harvest with Barbarian Max (25 oz./a) on September 22. One replicate of grazed pea and wheat plots were sprayed on September 16 with Cornerstone (25 oz./a) to suppress Canada thistle.

Summary

- Spring wheat yields were significantly higher for the W-P rotation than for the W-P-C rotation (Figure 1). Wheat yields in the W-P/CC treatment were not significantly different from the W-P rotation or the W-P-C rotation. Wheat yields appeared to be lower in the grazed treatment (D) for the W-P and W-P/CC rotations, but the differences were not statistically significant.
- Pea yields varied widely across the plots. As a result, no statistically significant differences in pea yields were detected among crop rotation or residue removal treatments (Figure 2).
- Corn yields were significantly lower when crop residue had been harvested and removed (B and C) than for the no residue harvest treatment (A) (Figure 3). This is the third year out of the six years of the study where this effect has been noted. Corn yield where residue had been grazed (D) was not significantly different from the other residue removal treatments.

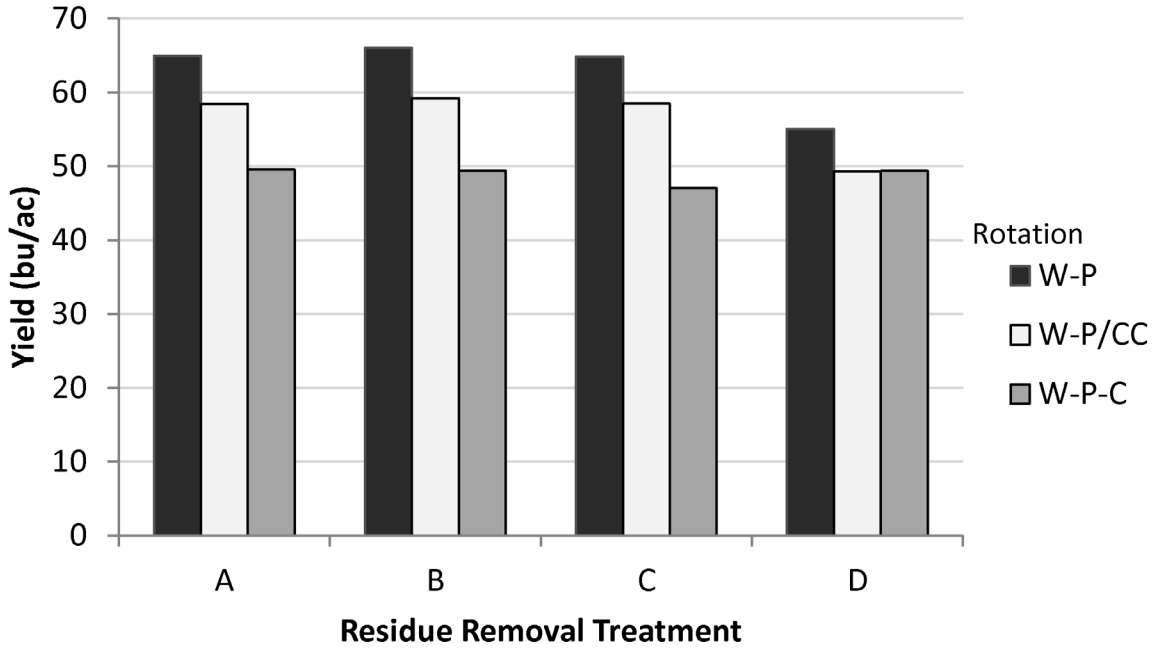

Figure 1. 2015 spring wheat seed yield as influence by crop rotation and residue removal treatments.

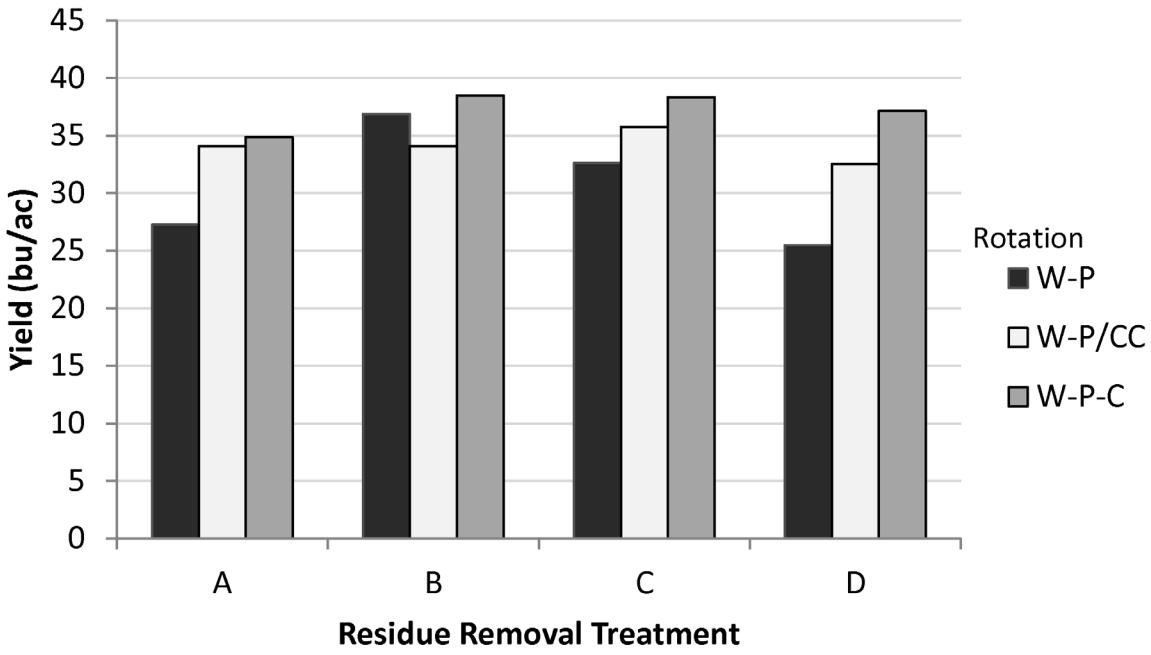

Figure 2. 2015 dry pea seed yield as influenced by crop rotation and residue removal treatments.

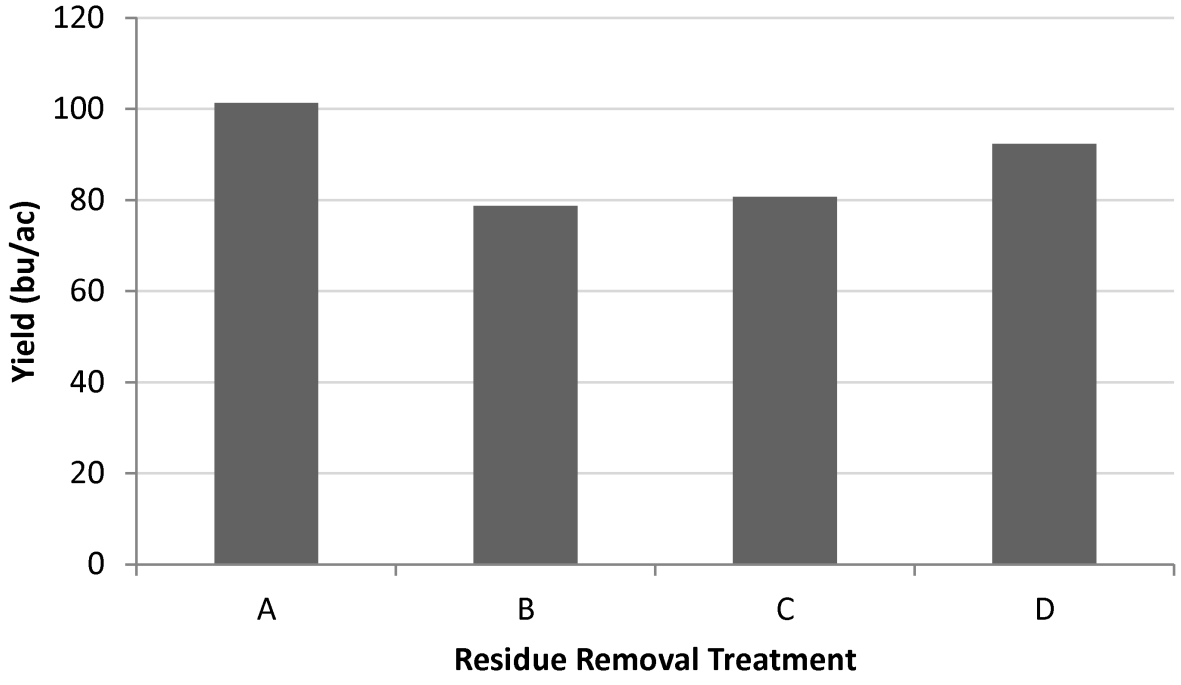

Figure 3. 2015 corn seed yield as influenced by residue removal treatments.