

Bioenergy Cropping Systems Study – 2016 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	5/6/2016	SY Soren	130 lb/ac	130 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/14/16
Spring Wheat W-P	5/6/2016	SY Soren	130 lb/ac	35 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/14/16
Spring Wheat W-P/CC	5/6/2016	SY Soren	130 lb/ac	35 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/14/16
Dry Pea W-P	5/4/2016	Nette	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/2/16
Dry Pea W-P/CC	5/4/2016	Nette	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/2/16
Dry Pea W-P-C	5/4/2016	Nette	139 lb/ac	0 lb/ac urea 50 lb/ac 11-52-0	JD 750	8/2/16
Corn W-P-C	5/18/2016	47J2823 GTCBLL Legend Seeds	24,300 seeds /ac	142 lb/ac urea 50 lb/ac 11-52-0 applied with JD 750	JD Max Emerge II	11/14/16
Cover Crop W-P/CC	8/9/2016	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.

All plots were sprayed Apr 22 with Cornerstone (25 oz./a) + Class Act (64 oz./100 gal). Pea plots were sprayed June 8 with Basagran (32 oz./a) and Pursuit (2 oz./a), on June 9 with Section (8 oz./a) + crop oil (32 oz./80 gal.), and on July 22 with Cornerstone 5 Plus (48 oz./a) + Class Act (2.5 gal./100 gal). Spring wheat was sprayed June 6 with PerfectMatch (16 oz./a) + Headline (8 oz./a). Corn was sprayed on June 13 with Cornerstone 5 Plus (25 oz./a) + Class Act (32 oz./100 gal.), and on June 27 with Cornerstone 5 Plus (20 oz./a) + Class Act (128 oz./100 gal). Non-grazed pea plots were sprayed after harvest with Cornerstone 5 Plus (25 oz./a) on August 28. Non-grazed wheat and pea plots (except cover crop plots) were sprayed after harvest with Cornerstone 5 Plus (48 oz./a) + Class Act (64 oz./100 gal.) on September 27. Grazed wheat and pea plots were sprayed with Cornerstone 5 Plus (625 oz./a) + Class Act (64 oz./a) after grazing.

Summary:

- Spring wheat yields were significantly higher for the W-P-C than for the W-P rotation, but were not significantly different between W-P/CC and either W-P-C or W-P (Figure 1). There were no significant differences in wheat yields between residue removal treatments.
- 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 every year (C) than for the no residue harvest or the grazed treatments (A and D) (Figure 3). This is the fourth year out of the seven years of the study where a significant residue harvest and removal effect has been noted. Although corn yield appeared to also be lower for where wheat residue had been baled and removed (B) it was not significantly different from the other residue removal treatments.
- The amount of grazing provided by the cover crop phase of the W-P/CC rotation was much higher in 2016 than in previous years due to conditions allowing for early establishment of the cover crops and to an extended fall growing season (Figure 4).

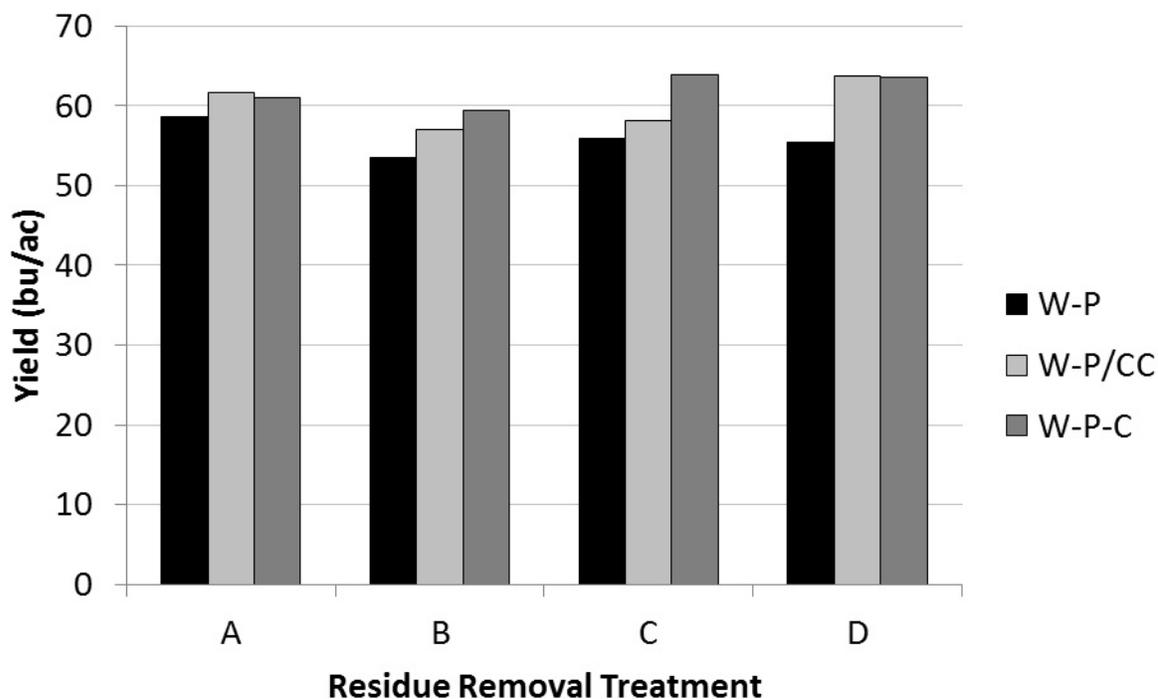


Figure 1. 2016 spring wheat seed yield as influence by crop rotation and residue removal treatments.

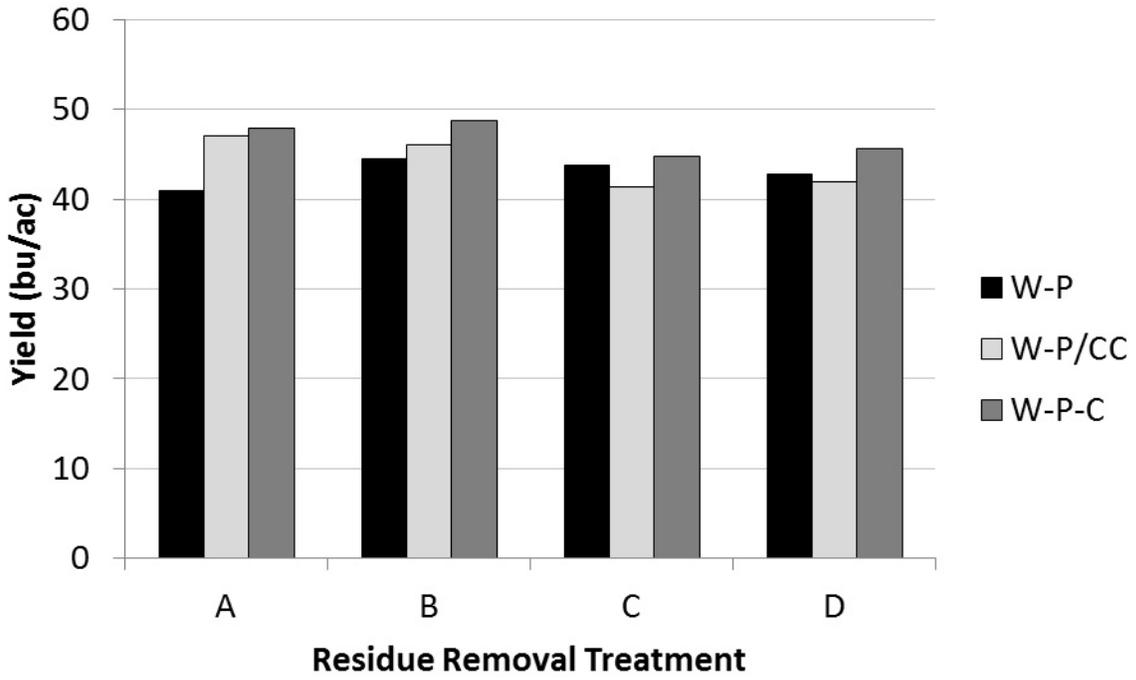


Figure 2. 2016 dry pea seed yield as influenced by crop rotation and residue removal treatments.

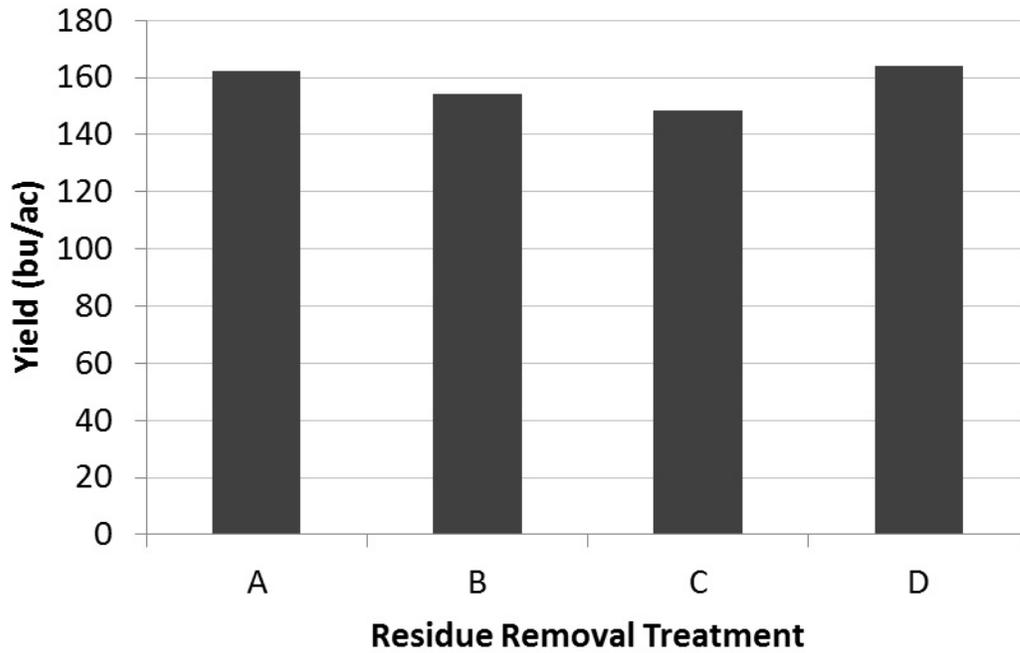


Figure 3. 2016 corn seed yield as influenced by residue removal treatments

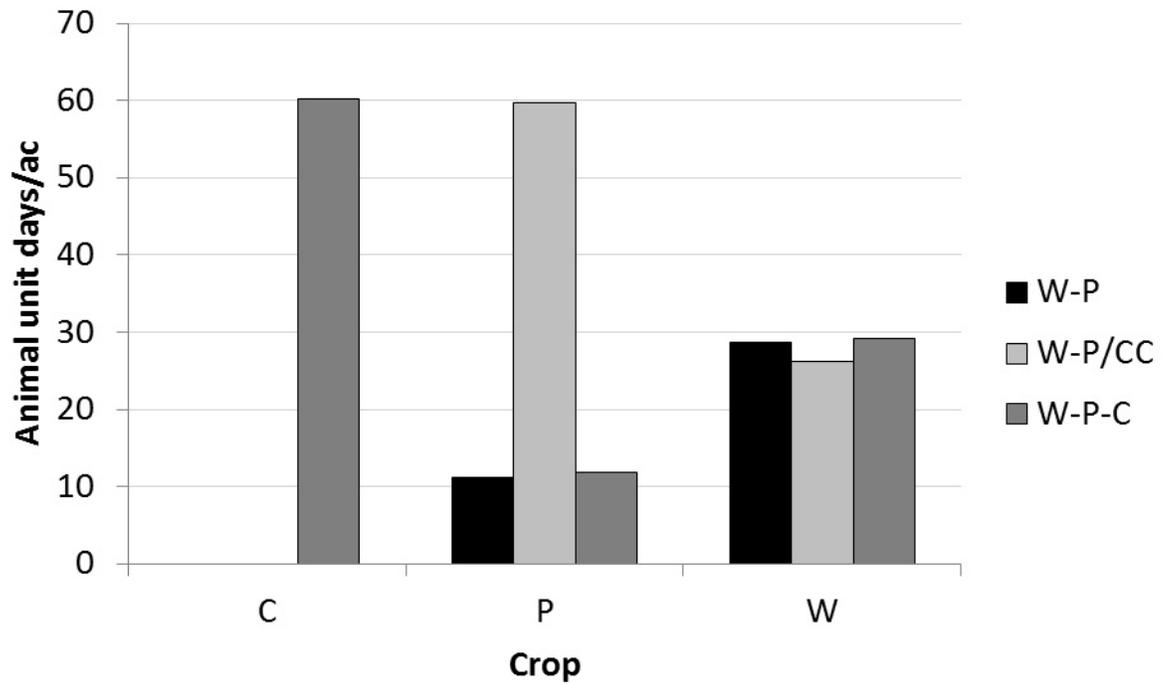


Figure 4. 2016 grazing amount by crop and rotation.

