UTILIZATION OF WINTER CANOLA FOR GRAIN AND SILAGE

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Integrated two-year study

1. Agronomic production
2. Animal end use
   - Canola silage
     - Dairy producers
     - Beef producers
- Fundamental questions
  - Is it possible to make quality silage from low DM Canola?
  - Does harvesting Canola forage effect grain yield the next year?
- Measures of success:

  Winter spring feed for livestock; recommendations
  Silage quality information; ration balancing
  Potential to increase oilseed acreage

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Project Methods

- Seeded RR winter Canola in research plots as WSU IAREC (4 replications)
  - Baseline soil samples complete analysis for 1, 2, 3, and 4 foot depths by rep
  - 8 lbs. PLS/acre; 8 soil N:S treatments (52 lbs. P_2O_5 in fall; no additional K)
    - 100-0 200-0
    - 100-20 200-20 *not included in silage treatments
    - 100-40 200-40
    - *100-20+Agrotain® *200-40+Agrotain®
    - Fall and Spring Stand Counts
    - Silage harvest October 13-14, 2014; October 12-13, 2015
    - Fall and Spring soil samples for N and S; whole plant samples at pod set stage
    - Grain harvest July 7, 2015

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Canola forage

- Limited information on Canola fall growth for forage
- Low DM
  - Difficult to dry for hay
- Potential for ensiling
- Low DM = high effluent
- Effluent = high BOD

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2014 Preliminary Forage Results

- Field results
  - No differences between stand count for forage vs grain (15.8 and 16.7 plants/0.5 m^2, respectively)
  - No differences in whole plant dry matter when harvested for silage in October. Mean DM at 10.9%.
  - No differences in whole plant yield per acre among the eight fertilizer treatments.

Table 1. Dry matter (DM) yield (tons/acre) and sulfur (S; mg/kg tissue) of winter Canola harvested October 13 and 14, 2015.

Nutrient Treatment (lbs/acre)	DM Yield (tons/acre)	S (mg S/kg tissue)
100 N : 0 S	0.95	1682.0
100 N : 20 S	0.98	3152.0
100 N : 40 S	0.99	4156.8
100 N : 20 S + Agrotain	0.60	3835.8
200 N : 0 S	0.98	1746.8
200 N : 20 S	0.94	2777.8
200 N : 40 S	1.07	3503.6
200 N : 40 S + Agrotain	0.83	3167.2
LSD $_{0.05}$	NS	652.1

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2014 Silage DM Results

Treatment	With Cubes	Without Cubes
100N:0S	34.38	14.53
100N:20S	34.23	14.53
100N:40S	32.10	14.33
200N:0S	35.15	14.85
200N:20S	30.65	13.58
200N:40S	29.18	13.58

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2014 Silage pH Results

Treatment	With Cubes	Without Cubes
100N:0S	4.40	4.26
100N:20S	4.50	4.29
100N:40S	4.55	4.33
200N:0S	4.54	4.22
200N:20S	4.51	4.26
200N:40S	4.52	4.35

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2014 Total VFA's

Treatment	With Cubes	Without Cubes
100N:0S	7.16	14.55
100N:20S	6.26	14.83
100N:40S	8.06	14.52
200N:0S	6.85	11.90
200N:20S	7.71	12.96
200N:40S	6.77	13.64

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2014 Silage Lactic Acid

Treatment	With Cubes	Without Cubes
100N:0S	5.53	11.93
100N:20S	4.45	12.53
100N:40S	5.57	12.45
200N:0S	4.58	9.38
200N:20S	5.55	9.93
200N:40S	4.75	10.15

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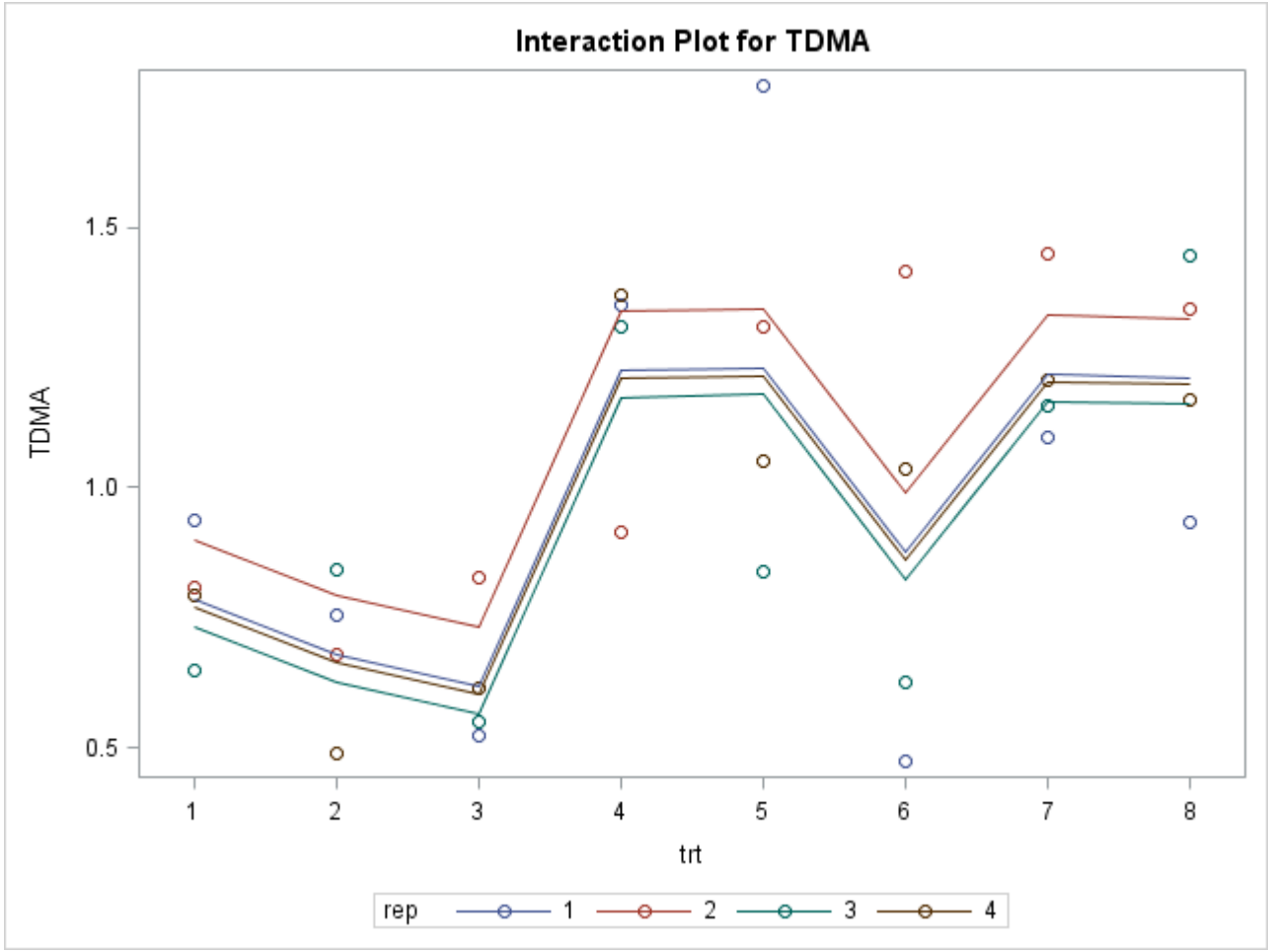
2015 Preliminary Forage Yields



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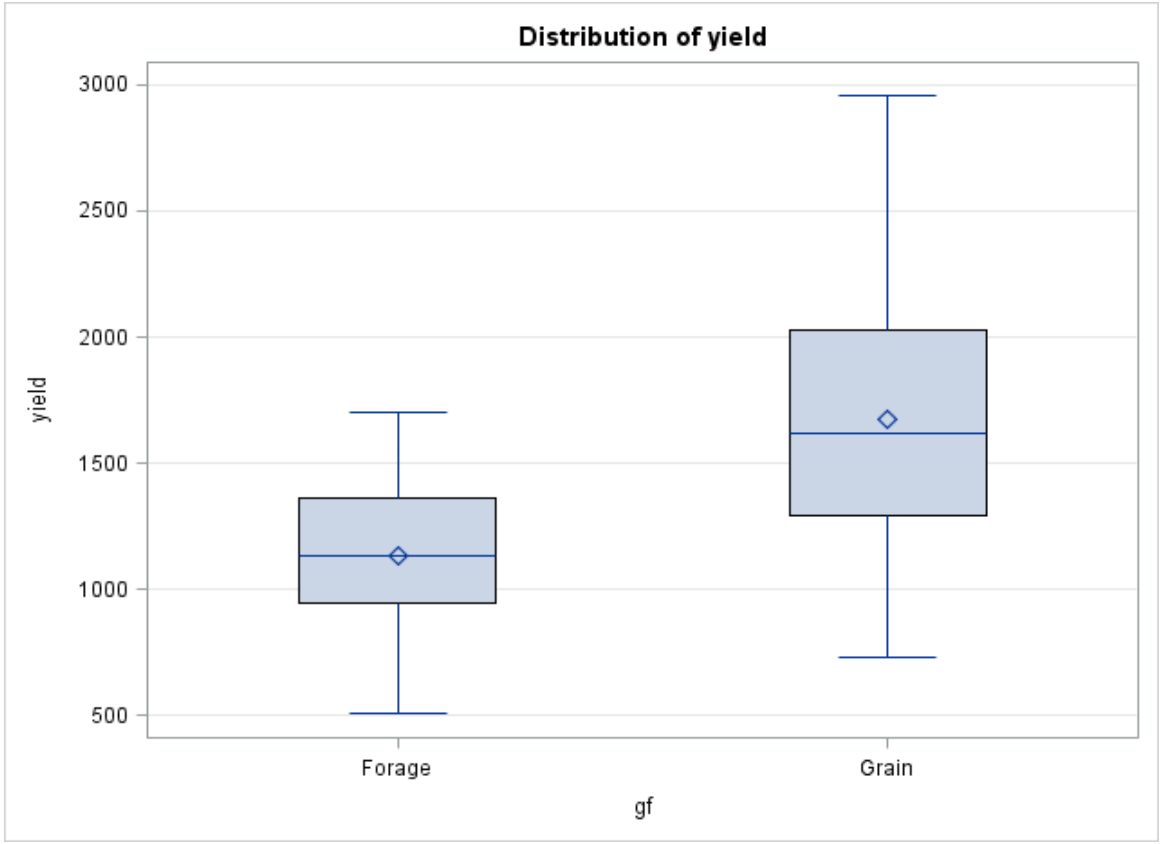
2014-2015 Preliminary Grain Yields



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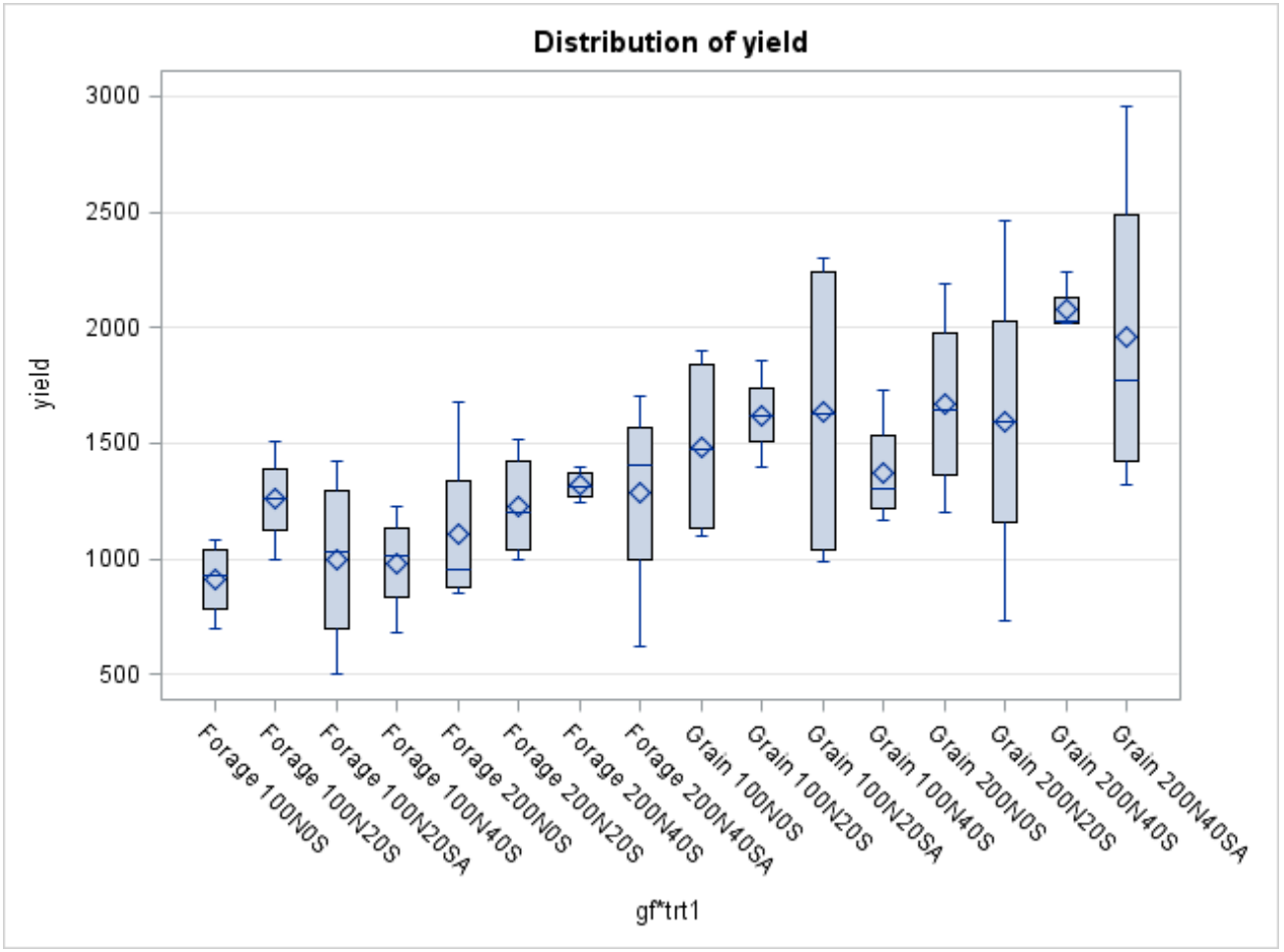
2014-2015 Preliminary Grain Yields



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2014-2015 Preliminary Grain Yields

Orthogonal Contrasts based on fall management for summer grain production:

- Grain 100 N vs 200 N = ns
- Grain w/ Agrotain vs without = ***
- Grain w/ S vs without = ***
- Forage 100 N vs 200 N = *
- Forage w/ Agrotain vs without = ***
- Forage w/ S vs without = **

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2015-2016 Winter Survival Study

Plants dug on November 2nd at Othello and November 6th at Prosser:

- No Significant differences for Wet, Dry, Percent Dry Matter for canola roots by feet and fertilizer at both locations from the fall sampling.
- Spring sample collection will occur in March, 2016
- Grain harvest will occur in late June, 2016

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To complete studies in 2016-2017

- **Fertility Study To Complete:** complete nutrients on all stratified soil samples; one foot soil samples from each plot for N and S in October
- Apply remaining nutrient treatments in early April; weed control as needed
- Bolting whole plant samples; pod set whole plant samples for minerals
- Grain harvest in late June; NIRS prediction of grain quality; fatty acids, N:S
- NIRS prediction of pre and post-silage quality with validation wet lab
- Silage wet lab analysis for pH, lactic acid and VFA's
- Data analysis, talks, write bulletins and manuscripts
- **Survival Study to Complete:** dig 256 (4/plot X 8 trt X 4 reps X 2 sites) sets of canola root samples in March at Othello and Prosser, oven dry, grind and lab for starch and free sugar analysis
- Pod set collect 256 sets of whole plants for mineral analysis, oven dry, grind for ICP
- Grain harvest 256 sets in late June; NIRS prediction of grain quality
- Data analysis, report and replant in August 2016 for 2017 final crop year

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