Winter Cereal Forage Opportunities

Purpose:

Many producers are looking for ways to get more production out of their land base. Planting winter cereals as a forage crop following corn silage or soybeans harvest provides not only additional forage but also soil cover to help prevent erosion through the winter and early spring. Very little data exists to help guide producers trying to capitalize on this opportunity. This trial is designed to generate data to help producers choose the best winter cereal crop and accompanying management practices to produce a forage crop and still plant a field crop in the spring. Early harvest and minimal impact on the subsequent crop will be key factors in making this option viable.

Methods:

Small plot, 4 replicate trials were set up at 2 locations in 2012. Four different crops (fall rye, triticale, winter wheat and winter barley) were seeded at 140 lbs/acre. Sites were planted on Oct 3rd and Oct 6th, 2012. The seed was no-tilled corn silage and soybean stubble using a 1560 John Deere Drill. Five different nitrogen rates (0, 30, 60, 90, and 120 lbs of actual N) were applied across these strips, using urea as he source, in late April of 2013. Yields were measured at flag leaf and boot stage. Yields were measured using a Carter forage plot harvester that cut and weighed a 5 by 10 foot strip through each plot. The plants were cut at or near ground level. A sub sample was collected and chopped to determine moisture, phosphorus and potash tissue levels, along with several factors to calculate relative feed value across the treatments (ADF, NDF, protein, Mg, Ca, etc).

Results:

The yield results are summarized in Tables 1, 2, and 3. Table 1 contains the yield data from the first harvest date. The first harvest occurred on May 17 at Brantford and May 20 at the Bornholm location. The rye had already advanced past the first target harvest stage to the boot stage. The other 3 crops had still not matured to the flag leaf stage so only the rye was harvested. All yields are expressed as tonnes of Dry Matter (0% moisture) per acre. On average rye yields seemed to reach a maximum yield with 60 N but yield results were variable between the 2 locations.

Table 1: Yield Data From First Harvest Date

Crop	Crop Stage	Fertilizer N Rate (lbs/ac)				
		0 N	30 N	60 N	90 N	120 N
		Forage Yield (t DM 0%/ac)				
Rye	Boot	0.90	0.99	1.33	1.30	1.35

The second harvest occured when the other crops reached the flag leaf stage. This occurred 4 days later at the Brantford location (May 21) and 10 days later at Bornholm (May 30). The rapidity of crop development was surprising, particularly at Brantford. Yields of triticale, wheat, and barley all increased with the addition of N and all generally

increased up to 120 N. Wheat and triticale had very similar yields while the barley clearly lagged behind. The rye yields were also measured as the rye had started to head out. Again rye yields reached a maximum with 60 N.

Table 2: Yield Results From Second Harvest Date

Crop	Crop Stage	Fertilizer N Rate (lbs/ac)				
		0 N	30 N	60 N	90 N	120 N
		Forage Yield (t DM 0%/ac)				
Triticale	Flag Leaf	0.41	0.65	0.78	0.83	1.05
Wheat	Flag Leaf	0.46	0.76	0.73	0.84	0.91
Barley	Flag Leaf	0.29	0.35	0.43	0.50	0.77
Rye	Heading	1.46	1.38	1.91	1.86	1.91

The third harvest occurred at boot stage, May 27 at Brantford and June 3 at Bornholm. Triticale, wheat, and barley had all advanced to the boot stage. All yields for all 3 crops increased with each additional 30 N applied. Triticale yields were slightly higher than wheat, while barley yields still lagged behind. The rye had advanced well into maturity so yields were not measured.

Table 3: Yield Results From Third Harvest Date

Crop	Crop Stage	Fertilizer N Rate (lbs/ac)				
		0 N	30 N	60 N	90 N	120 N
		Forage Yield (t DM 0%/ac)				
Triticale	Boot	0.71	0.91	1.21	1.29	1.41
Wheat	Boot	0.68	0.85	1.06	1.24	1.31
Barley	Boot	0.46	0.59	0.72	0.81	0.89

Summary:

The yield data is only based on results from 2 locations in a single year so no major conclusions can be drawn. However, there are some very intriguing initial results. Based on this data, rye has shown very promising potential as an additional forage. Not only did rye clearly out yield the other 3 crops, it also matured more quickly. Rye reached the boot stage 10 days before the wheat, triticale, or barley. A 10 day delay in planting the subsequent corn or soybean crop would have huge ramifications on yield (~10 bu/ac corn, ~4 bu/ac soybean). Additionally, based on these limited results, rye only requires 60N to approach maximum yields. Both wheat and triticale appear to need higher N rates for optimum yield.

Triticale and wheat did show some potential in this scenario. Comparing the yields of triticale, wheat and rye all at the boot stage (Table 1 rye, Table 3 triticale/wheat), yields are essentially equal. The downfall is the delayed harvest, higher seed costs and higher N required. The delayed maturity of triticale may have been due to the planting date. The trials were planted in early October (not late by Ontario standards) but some reports

indicate that triticale has the highest potential when planted in early September. Triticale seems to respond/need the most N.

Barley yields were very poor. Something seemed wrong with the winter barley in this trial: many long term winter barley growers noted the same problems in other fields. Winter barley normally matures much quicker than wheat, but the barley was slow to mature and growth was extremely slow in 2013. This may be a result of the October planting date, or more likely is due to cold injury on the barley. Winter barley is the least cold tolerant of all the crops tested.

Forage analysis results will be summarized in subsequent reports.

Next Steps:

This trial will be continued again in 2014. Six sites were planted during the fall of 2013 and planting dates ranged from September 6 to October 15. Two of the sites contain a planting date comparison. At these two sites treatments were planted during early September and then again in late September. A wet fall prevented a third mid-October planting date at these sites. Two different varieties of triticale were also included to see if any differences exist.

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Project Contacts:

Peter Johnson, Provincial Cereal Specialist, peter.johnson@ontario.ca

Shane McClure, Research Lead, shane.mcclure@ontario.ca

Location of Project Final Report:

Peter Johnson