Oat Nitrogen Response Curve

Purpose:

This trial will be used to update the nitrogen (N) response curve for oats. From the nitrogen response curves we will be able to determine the Maximum Economical Rate of Nitrogen (MER-N). This information will be used to support or adjust current N recommendations in the Agronomy Guide, Publication 811. Due to the lack of genetic resistance to crown rust in any currently available varieties, these tests will be conducted only under a fungicide spry regime.

Methods:

Two field scale trials were put in place across southwestern Ontario. More sites were planned, but were not able to be established due to the extremely late planting season. Plot design was field scale, two replicate, randomized N rates at each site. Post-harvest soil nitrate tests were collected to evaluate soil residual N, and potential environmental impact from higher N rates.

Other than the nitrogen rate all variables at both field locations were consistent across all treatments, following the normal production practices based on the producer. Fungicides were used at both sites.

1. Check (No nitrogen applied)
2. 30lbs Nitrogen (30N)
3. 60lbs Nitrogen (60N)
4. 90lbs Nitrogen (90N)

Data collected from these sites included yield, moisture, test weight, 1000 kernel weights, protein and lodging. Post-harvest soil nitrate samples were collected to observe environmental impact with increased nitrogen application.

Results:

The average yield results are summarized in Table 1. At both locations yields increased quickly up to 60N but seem to be starting to reach a maximum yield with 90N.

Table 1: Breakdown of Yields (bu/ac)

Site	0 N	30 N	60 N	90 N
Winterbourne	77.3	118.6	136.0	139.2
Paisley	-	100.9	112.6	113.7
Average	-	**109.8**	**124.3**	**126.5**

Economic Analysis: Using urea at $586/tonne ($0.58/lb of actual N), and oats at $3.92/bushel (current values at time of writing), 4.4 bushels of oats are required to equal the cost of 30lbs of N ($0.58/lb*30lbs= $17.40/$3.92/bu= 4.4 bushels). Based on the

above data, 60 N has the highest economic return of all the treatments. This is based on very limited data so more research will need to be done before any recommendations can be made from this study. MER-N curve calculations will be undertaken when more data is available.

The protein results are summarized in table 2.

Table 2: Breakdown of Protein

Site	0 N	30 N	60 N	90 N
Winterborne	11.4	11.3	11.8	12.1
Paisley		10.9	11.0	11.0

No difference in test weight or 1000 Kernel weight is evident. Post harvest nitrate results will be available after the samples are analyzed.

Summary:

Preliminary results suggest that 60 N is the most economic treatment. More data is needed before any conclusions on nitrogen rate are drawn. We had great growing conditions for spring cereals in 2014: it will be interesting to see if we get similar results in the next two years.

Next Steps:

This is the first year for this project. Research will be gathered and continued for another 2 years (2014-2016). Anyone who is having interested in participating in this trial is encouraged to contact Peter Johnson at peter.johnson@bell.net, or Shane McClure at shane.mcclure@ontario.ca. Data collected from this trial will be used in multiple articles, as well as presentations.

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Location of Project Final Report:

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