Nitrogen and Fungicides
Oat Yield and Quality

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Background

1) Oat growers in western Canada are searching for ways to increase oat yields.
2) Increased nitrogen rates can increase yield but usually result in a lower test weight.
3) Growers wonder if fungicides can be used to do more than protect yield. Can fungicides help to increase yield (increased plant health or stress tolerance)?
Grain Yield (bus/acre)

~Optimum N Rate @ 60 kg N/ha
Test weight (g/0.5 L)

~Optimum N Rate @ 60 kg N/ha
Fungicides

1) At sites with high crown rust severity, fungicide application improved yield and quality in susceptible cultivars. The poorer the cultivar resistance to crown rust, the larger the response to a fungicide.

2) When crown rust infection was low AC Morgan a cultivar very susceptible to leaf disease responded to a fungicide
Objective

To determine if a combination of nitrogen fertilizer and fungicides could be used to increase the yield and quality of oat
Materials and Methods

1) Cultivar – Triactor
2) Nitrogen Rates – 5, 20, 40, 60, 80, 100, 120, 140
3) Fungicides - None, Headline, Stratego
4) Locations – Indian Head and Melfort
5) Years – 2012 and 2013
Leaf Disease

N Rate (kg N/ha)

(% area of flag-1)
Panicle Density

![Graph showing the relationship between panicle density and N rate. The graph plots panicle density (panicles m⁻²) against N rate (kg N/ha). Three different treatments are shown: No Fungicide, Headline, and Stratego. The graph indicates a positive correlation between N rate and panicle density.](image-url)
Lodging

N Rate (kg N/ha)

Lodging (1-10)
Maturity

Maturity (Days)

N Rate (kg N/ha)

0 20 40 60 80 100 120 140 160

104 105 106 107

104 105 106 107
Grain Yield
Fungicides

<table>
<thead>
<tr>
<th>N Rate (kg N/ha)</th>
<th>IH 2012</th>
<th>IH 2013</th>
<th>Mel 2012</th>
<th>Mel 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td><img src="Green" alt="Green Bar" /></td>
<td><img src="Green" alt="Green Bar" /></td>
<td><img src="Green" alt="Green Bar" /></td>
<td><img src="Green" alt="Green Bar" /></td>
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<tr>
<td>Headline</td>
<td><img src="Purple" alt="Purple Bar" /></td>
<td><img src="Purple" alt="Purple Bar" /></td>
<td><img src="Purple" alt="Purple Bar" /></td>
<td><img src="Purple" alt="Purple Bar" /></td>
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<tr>
<td>Stratego</td>
<td><img src="Red" alt="Red Bar" /></td>
<td><img src="Red" alt="Red Bar" /></td>
<td><img src="Red" alt="Red Bar" /></td>
<td><img src="Red" alt="Red Bar" /></td>
</tr>
</tbody>
</table>

Yield (Bushels acre⁻¹)

- IH 2012: b, a, ab
- IH 2013: a, b, ab
- Mel 2012: a, b, ab
- Mel 2013: a, b, ab

- Green Bar: Check
- Purple Bar: Headline
- Red Bar: Stratego
Plump Seed

N Rate (kg N/ha)

Plump Seed (%)

IH 2012
Thin Seed

![Graph showing the relationship between Thin Seed (%) and N Rate (kg N/ha) for IH 2012, Mel 2012, IH 2013, and Mel 2013.]
Thin Seed
Fungicides

Check  Headline  Stratego

Thin Seed (%)

0  1  2  3  4  5  6  7  8  9  10

a  b  b
Groat Yield

N Rate (kg N/ha)
# B-Glucan Content

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Mid-May</th>
<th>Early June</th>
<th>Fungicide</th>
<th>LSD</th>
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<tbody>
<tr>
<td>AC Morgan</td>
<td>4.18</td>
<td>3.94</td>
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<td>CDC Boyer</td>
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<td>4.22</td>
<td>Yes</td>
<td>4.33</td>
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<td>CDC Orrin</td>
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<td>No</td>
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<td>Leggett</td>
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<tr>
<td>LSD</td>
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<td>0.32</td>
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</table>
Conclusions

Nitrogen and Fungicide did not interact.
Fungicides did not have a major impact on yield or quality (disease levels were low).
Triactor responded to Nitrogen rates up to 100 kg ha$^{-1}$ with only a limited impact on oat quality.
Test weight was affected by lodging at the milk stage.
Conclusions

Further research is required to determine if any cultivars have a more stable test weight as the nitrogen rate is increased
Nitrogen Rate and Cultivars

![Graph showing the relationship between Nitrogen Rate (kg/ha) and Test Weight (g/0.5L) for AC Assinaboia and CDC Pacer cultivars. The graph illustrates a decrease in Test Weight as the Nitrogen Rate increases. AC Assinaboia shows a slight increase in Test Weight at higher Nitrogen Rates, while CDC Pacer shows a more consistent decrease.](image-url)