Impact of weed management timing on frost-seeded clover survival, weed control, and winter wheat yield

Final report

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Weed management in winter wheat

- Traditionally, spring herbicide applications
- Thought that fall herbicide applications may help in weed management
- Data presented from the south has implied that fall applications would increase yield
Frost-seeded clover in winter wheat

- Potential benefits:
  - Contribute to soil N
  - Decrease soil erosion
  - Increase soil O.M., tilth, water holding capacity
  - May reduce weed pressure

- Issues:
  - Clover tolerance to herbicide applications
  - Few herbicide choices
Questions

- What impact does fall and spring herbicide applications have on:
  - Winter wheat injury?
  - Yield?
  - Weed control?
  - Frost-seeded clover survival?
Site description

‘Jupiter’ soft white wheat
Planted: Oct. 12, 2013
Seeding rate: ~2.2 m seeds/A

Frost-seeded red clover
Planted: April 3, 2014
Seeding rate: ~10 lbs/A

‘Sunburst’ soft red wheat
Planted: Sept. 26, 2014
Seeding rate: ~1.8 m seeds/A

Frost-seeded red clover
Planted: March 18, 2015
Seeding rate: ~12 lbs/A
## Application timing

<table>
<thead>
<tr>
<th>Season</th>
<th>Date</th>
<th>Stage</th>
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<tbody>
<tr>
<td>Fall</td>
<td>Oct. 23</td>
<td>Feeke’s 1.3</td>
</tr>
<tr>
<td>Spring</td>
<td>April 28</td>
<td>Feeke’s 5</td>
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## Herbicide treatments

<table>
<thead>
<tr>
<th>Herbicide treatments</th>
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<tbody>
<tr>
<td>Affinity BroadSpec (0.75 oz) + NIS + AMS</td>
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<tr>
<td>Huskie (13 fl oz) + NIS + AMS</td>
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<tr>
<td>Osprey (4.75 oz) + NIS + AMS</td>
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<tr>
<td>PowerFlex HL (2 oz) + NIS + AMS</td>
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<tr>
<td>Clarity (0.25 pt)</td>
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<tr>
<td>2,4-D ester (1 pt)*</td>
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<tr>
<td>MCPA (0.38 pt/A)</td>
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<tr>
<td>Affinity BroadSpec (Fall) fb. MCPA (Spring)</td>
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<tr>
<td>Huskie (Fall) fb. MCPA (Spring)</td>
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</tbody>
</table>

* Not labeled for fall apps.
Wheat injury

Some discoloration and stunting from spring-applied Affinity BroadSpec, Osprey and PowerFlex HL (7 DAT) – gone by 14 DAT

Significant injury throughout the season from fall-applied 2,4-D
Wheat yields were similar among all treatments - *one exception*

Fall-applied 2,4-D ester resulted in 28% reduction in yield (70.7 vs. 98.7 bu/A)
Common lambsquarters control
Common lambsquarters control – *10 days after harvest*

Fall-applied Affinity BroadSpec or Huskie fb. MCPA resulted in 97% control
Clover injury, counts & dry weights
Frost-seeded clover injury – 
after harvest

Fall-applied Affinity BroadSpec or Huskie fb. MCPA ~15% clover injury
Affinity Broadspec

Fall

Spring
Osprey

Fall

Spring
PowerFlex HL

Fall

Spring
Clover counts – after harvest

* Different from the untreated

![Bar chart showing clover counts after harvest for various treatments.](chart.png)
Summary

- Fall applications of Affinity BroadSpec & Huskie, relatively safe for frost-seeded clover survival
  - In 1 or 2 yrs. fall-applied Osprey and PowerFlex slight injury (overall decent stands)
- Spring applications of all herbicides reduced or eliminated frost-seeded clover, with the exception of MCPA
- Spring applications of Affinity BroadSpec, Huskie, PowerFlex, 2,4-D, Clarity, MCPA were needed for c. lambsquarter control
  - Fall applied Affinity BroadSpec also looked promising
- Fall-applied 2,4-D reduced wheat yield >25%
Impacts

- Have helped develop recommendations on fall and spring herbicide applications for Michigan winter wheat, especially wheat with frost-seeded clover.

- Currently, working on a 1-page factsheet to be available to wheat growers (www.msuweeds.com)