Does Overseeding Improve Alfalfa Stand Persistence and Yield?

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University of Wisconsin
Overseeding Definitions

1) Higher initial seeding rate

2) Seeding into existing alfalfa fields
Alfalfa stand at several seeding rates
Appleton, alfalfa seeded 1989
Effect of seeding rate on alfalfa stand 3 to 4 years after establishment – South Dakota

Data from Kephart et al., Agron. J. 84:827-831 (1992)
Alfalfa plant mortality during first year at various seeding rates - Pennsylvania

Alfalfa Stand Trends - principles

Principle:
- At higher seeding rates more plants emerge
- More seedlings die in seeding year.
- Same stand density at end of seeding year
Effect of grass seeding rate on final stand growth

**Meadow Fescue**

- 30 day: 60 plants per sq ft
- 180 day: 20 plants per sq ft

**Orchardgrass**

- 30 day: 15 plants per sq ft
- 180 day: 5 plants per sq ft

**Tall Fescue**

- 30 day: 60 plants per sq ft
- 180 day: 20 plants per sq ft
Effect of seeding rate on seeding year yield

Fig. 1. Responses of alfalfa dry matter (DM) yield for the total growing season to seeding rate (kg pure live seed (PLS))

Data from Kephart et al., Agron. J. 84:827-831 (1992)
Alfalfa yield at several seeding rates
Appleton, alfalfa seeded 1989

Yield, tons DM/a

<table>
<thead>
<tr>
<th>Year</th>
<th>6</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>20</th>
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<tbody>
<tr>
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<td>3</td>
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<tr>
<td>1991</td>
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<td>6</td>
<td>7</td>
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</table>
Alfalfa Stand Trends - principles

Principle:

✓ At higher seeding rates more plants emerge

✓ Same stand density at end of seeding year

✓ Same stand and yield in production years
Alfalfa Stand Trends - principles

Number of stems

- planted
- year 2 spring
- year 3 spring
- year 4 spring
- year 5 spring

Stems per plant
Alfalfa Stand Trends

Plants per square foot over time

Stems per plant and ft²
Alfalfa Stand Trends

Does higher seeding rate increase seeding year yield?

Is it economical?

<table>
<thead>
<tr>
<th>Seeding rate</th>
<th>Additional seed cost</th>
<th>Additional yield needed to cover cost ($200/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/a</td>
<td>$5/lb</td>
<td>$7/lb</td>
</tr>
<tr>
<td>12</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>18</td>
<td>$30</td>
<td>$42</td>
</tr>
<tr>
<td>24</td>
<td>$60</td>
<td>$84</td>
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</table>
Seeding Year Yield of 5 Seeding Rates of Grass Mixed with Alfalfa (average of 5 site/years)
Alfalfa seeding rate and first cut yield, 2014

<table>
<thead>
<tr>
<th>Seeding rate (Lb/a)</th>
<th>Connell, WA (Yield, DM t/a)</th>
<th>Arlington, WI (Yield, DM t/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>13</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>18</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>23</td>
<td>2.4</td>
<td>2.5</td>
</tr>
</tbody>
</table>

55VR06 planted
Data from Pioneer Hybrid Intl,
## Alfalfa seeding rate and first cut yield, 2014

<table>
<thead>
<tr>
<th>Seeding rate</th>
<th>Yield, DM t/a</th>
<th>$ return*</th>
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</thead>
<tbody>
<tr>
<td>Lb/a</td>
<td>Connell, WA</td>
<td>Arlington, WI</td>
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<tr>
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<td>2.1</td>
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</tbody>
</table>

* = value of additional hay – additional seed cost

55VR06 planted
Data from Pioneer Hybrid Intl.
Seeding rate and stand health

Alfalfa is synthetic population – each plant genetically different
Overseeding to Thicken Stand Survival of Over Seeded Alfalfa
Interseeding into thin alfalfa stands – Seldom improves yield

Yield (t/a)
Interseeding into thin alfalfa stands - Seldom improves yield

- Interseeding grasses into alfalfa
  - Ryegrass responds quickly but does not grow well in summer heat or drought
  - Orchardgrass and tall fescue take 60 to 90 days to begin producing yield
Overseeding Alfalfa to Thicken Stand
Survival of Overseeded Alfalfa plants

Source: Rachael Long, Univ of CA
Crop Rotation

- When turning over alfalfa need to wait 1 to 2 years before reseeding due to autotoxicity
- Alfalfa will provide adequate nitrogen for corn for 1 year and barley or canola for 1 to 2 years
- Barley, canola, corn will yield more following alfalfa than barley following barley or canola following canola
Prior Rotation
Prior Rotation

Alfalfa 2011
Corn 2012

Continuous Corn
Calibrate Seeder
- alfalfa seeding rate varies with seed lot

Two seeders, no change in setting, 6 different varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Brillion seeder lb seed per acre</th>
<th>John Deere Drill lb seed per acre</th>
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</thead>
<tbody>
<tr>
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<td>18.3</td>
<td>21.4</td>
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<tr>
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</tr>
<tr>
<td>6</td>
<td>20.3</td>
<td>16.8</td>
</tr>
</tbody>
</table>
Summary

- Alfalfa seeding rates above 12 lb/a
  - Do not increase stand or yield in seeding year
  - Do not increase yield in production years
- Interseeding crop into thin alfalfa stands does not increase yield
- Alfalfa autotoxicity can reduce new alfalfa stand growth for up to 2 years on medium to heavy soils