RR ALFALFA RESEARCH - NY
- First experiment established 2002
- Confirmed yield, quality, and herbicidal tolerance of RR alfalfa.
- Application of 22 oz/A of RU WeatherMax at 3-4 leaf stage to remove nulls indicated few nulls and excellent safety for RR trait.

Roundup Ready Alfalfa

| NEW STAND ESTABLISHMENT (Seeding Year)  |
| Application Rates                     |
| Prior to First Cutting                |
| Emergence to 4 trifoliate leaves      | - 22 to 44 fl oz/A                 |
| 5 trifoliate leaves up to 5 days      | - Up to 44 fl oz/A                 |
| before first cutting                  |                                 |
**WEED LIFE CYCLES**

**SPRING SEEDINGS**

<table>
<thead>
<tr>
<th>LIFE CYCLE</th>
<th>EXAMPLE</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>Pigweed Footail</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TIMING OF ROUNDUP**

**SPRING SEEDINGS**

**Annuals**

- Summer - Seedlings in spring or summer

**RR ALFALFA**

AALF0211

<table>
<thead>
<tr>
<th>Variety</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planted</td>
<td>May 13, 2011</td>
</tr>
<tr>
<td>EPOST</td>
<td>June 10</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>3 inches</td>
</tr>
<tr>
<td>Weeds</td>
<td>2 – 4 inches</td>
</tr>
</tbody>
</table>

**RR ALFALFA**

AALF0211

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>“Alfalfa”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Roundup PM*</td>
<td>22 fl oz</td>
<td>32.5</td>
</tr>
<tr>
<td>Raptor* Select Max MSO</td>
<td>5 fl oz</td>
<td>9 fl oz</td>
</tr>
<tr>
<td>Butyrac 200 Select Max COC</td>
<td>2 qt</td>
<td>9 fl oz</td>
</tr>
</tbody>
</table>

*Applied with 3.4 lb/A AMS.

**RR ALFALFA**

AALF0211

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>Fox</th>
<th>Rag</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>-</td>
<td>25.5</td>
<td>4.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Roundup PM*</td>
<td>22 fl oz</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Raptor* Select Max MSO</td>
<td>5 fl oz</td>
<td>9 fl oz</td>
<td>1%</td>
<td>4.8</td>
</tr>
<tr>
<td>Butyrac 200 Select Max COC</td>
<td>2 qt</td>
<td>9 fl oz</td>
<td>1%</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*Applied with 3.4 lb/A AMS.
**Roundup Ready Alfalfa**

**NEW STAND ESTABLISHMENT (Seeding Year)**

**Application Rates**

- **Prior to First Cutting**
  - Emergence to 4 trifoliate leaves: 22 to 44 fl oz/A
  - 5 trifoliate leaves up to 5 days before first cutting: Up to 44 fl oz/A
- **After first cutting**
  - In-crop application, per cutting, up to 5 days before cutting: Up to 44 fl oz/A

---

**WEED LIFE CYCLES**

**SUMMER SEEDINGS**

<table>
<thead>
<tr>
<th>LIFE CYCLE</th>
<th>EXAMPLE</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Growing Season</td>
<td>Growing Season</td>
<td>Growing Season</td>
</tr>
<tr>
<td>Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>Ragweed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>Chickweed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TIMING OF ROUNDUP SUMMER SEEDINGS**

**Annuals**

- **Summer**: Seedlings in late summer
- **Winter**: Seedlings or rosettes in late summer or fall

---

**WHEN DO YOU APPLY ROUNDUP IN ESTABLISHED STANDS?**

**ESTABLISHED STANDS (Non-seeding Year)**

**Application Rates**

- In-crop application, per cutting, up to 5 days before cutting: Up to 44 fl oz/A

---

**WEED LIFE CYCLES**

**ESTABLISHED STANDS**

<table>
<thead>
<tr>
<th>LIFE CYCLE</th>
<th>EXAMPLE</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Winter</td>
<td>Chickweed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Common Chickweed

Purple Deadnettle

Henbit

TIMING OF ROUNDUP
ESTABLISHED STANDS

- Annuals
  - Summer: Seedlings in spring or summer
  - Winter: Seedlings or rosettes in fall or early spring

WEED LIFE CYCLES
ESTABLISHED STANDS

<table>
<thead>
<tr>
<th>LIFE CYCLE</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>Pigweed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>Chickweed Henbit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biennial</td>
<td>Burdock</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TIMING OF ROUNDFUP ESTABLISHED STANDS

**Annuals**
- Summer: Seedlings in spring or summer
- Winter: Seedlings or rosettes in fall or early spring

**Biennials**
- Rosettes or other growth in fall or early spring

### WEED LIFE CYCLES ESTABLISHED STANDS

<table>
<thead>
<tr>
<th>LIFE CYCLE</th>
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</tr>
<tr>
<td>Summer</td>
<td>Pigweed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foxtail</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Winter</td>
<td>Chickweed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Henbit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perennial</td>
<td>Dandelion</td>
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<td></td>
</tr>
</tbody>
</table>

### TIMING OF ROUNDFUP ESTABLISHED STANDS

**Annuals**
- Summer: Seedlings in spring or summer
- Winter: Seedlings or rosettes in fall or early spring

**Biennials**
- Rosettes or other growth in fall or early spring

**Perennials**
- Seedlings between cuttings or on vigorous fall growth

### RESEARCH – RR ALFALFA

Results show RR alfalfa stands can be maintained weed free with one or two applications per growing season though timing may vary depending on target weeds.

### ROUNDFUP READY ALFALFA IN THE NORTHEAST?
WHY ALFALFA – GRASS MIXTURES?
- Persist on moderately to poorly drained soils better than alfalfa
- Provide similar or higher yields than clear alfalfa
- Provide a more desirable nutrient balance than either alone
- Prevent weeds from encroaching

ROUGHSTALK BLUEGRASS SUPPRESSION IN ALFALFA/GRASS SEEDINGS
ROUGHSTALK BLUEGRASS PROCEDURES
- Established April 30, 2001
- Varieties used
  - Alfalfa – Pioneer 5347 LH
  - Timothy – Mariposa
  - Orchard – Shawnee
- RCB with 4 replications

ROUGHSTALK BLUEGRASS TREATMENTS
- Alfalfa - 12 lb/A as untreated check
- Alfalfa - 12 lb/A w/ 12 fl oz/A Select
- Alfalfa - 12 lb/A + timothy - 5 lb/A
- Alfalfa - 12 lb/A + orchard - 5 lb/A

Alfalfa - Untreated Check

Alfalfa w/ 12 fl oz/A Select

ROUGHSTALK BLUEGRASS DATA COLLECTED
- Harvested:
  - 2 cuttings in 2001
  - 4 cuttings in 2002
  - 3 cuttings in 2003
- Yield in tons dry matter/acre - T DM/A
- Botanical separation to determine
  - % Alfalfa
  - % Timothy or Orchardgrass
  - % Bluegrass
  - % Weeds
FIRST CUTTING FORAGE YIELDS 2002-2003

FIRST CUTTING COMPOSITION 2002

FIRST CUTTING COMPOSITION 2003

CONCLUSIONS
- Perennial forage grasses suppress bluegrass in alfalfa grass seedings.
- “Recommended” seeding rate of 5 lb/A appears more than adequate.
- Orchardgrass was more effective than timothy for suppressing roughstalk bluegrass.

ESTABLISHING RR ALFALFA-GRASS MIXTURES
- Delayed orchardgrass seeding during Roundup Ready alfalfa establishment at Penn State
- Current efforts to establish forage grasses in Roundup Ready alfalfa
ORCHARDGRASS SEEDING INTO RR ALFALFA
Dillehay, Curran, and Hall
• Main plots – grass seeding dates
  • With alfalfa in late April
  • 4 weeks after planting alfalfa
  • 5 weeks after planting alfalfa
• Sub-plots – herbicide treatments
  • No herbicide
  • Roundup 4 weeks after planting

ORCHARDGRASS SUCCESS
• 1st cutting of 2nd year
Orchardgrass yield from seeding 4 WAPA after Roundup application was same as yield from seeding with alfalfa in late April with no Roundup application

ORCHARDGRASS SUCCESS
• 1st cutting of 3rd year
Orchardgrass yield was same for all treatments except when seeded with alfalfa and over-sprayed with Roundup 4 WAPA

CURRENT EFFORTS IN NY, PA, AND WI
• Main plots – timing of planting treatments
  • Alfalfa and grasses planted together, no herbicides applied
  • Alfalfa and grasses planted together, with 1.5 pt/A Buctril postemergence
  • Alfalfa planted, Roundup 4 weeks later fb planting grasses within days
  • Alfalfa planted, Roundup as needed fb planting grasses after Aug. harvest

CURRENT EFFORTS IN NY, PA, AND WI
• Sub-plots – grass treatments
  • No grass
  • Orchardgrass
  • Tall fescue
  • Meadow fescue
  • Timothy in NY only

QUESTIONS?