Mesotrione for Weed Control in Warm- and Cool-Season Turf

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Introduction

- **Mesotrione**
  - New turf active ingredient
  - Naturally occurring phytotoxin
  - Has pre- and postemergent activity
    - Grass and broadleaf weeds
Introduction

Mesotrione

- Inhibits a precursor to plastoquinone
- Results in decreased carotenoid production
  - Visual symptoms including bleaching followed by plant necrosis
Introduction

- Reported to have activity on
  - Large crabgrass (*Digitaria sanguinalis*)
  - Smooth crabgrass (*Digitaria ischaemum*)
  - Henbit (*Lamium amplexicaule*)
  - Broadleaf plantain (*Plantago major*)
  - Yellow woodsorrel (*Oxalis stricta*)
  - Nimblewill (*Muhlenbergia schreberi*)

- Has applications in cool- and warm-season turfgrass
Research trials were initiated to determine:

- Annual grass control
  - Smooth crabgrass (*Digitaria ischaemum*)
  - Goosegrass (*Eleusine indica*)

- Turfgrass tolerance
  - Established tall fescue (*Festuca arundinacea*)
  - At spring or fall seeding
Rates are lb ai per acre. PRE trts were applied 4-3 while POST trts were applied 7-30 and included NIS. When POST trts were applied, crabgrass averaged 2 tillers.
Postemergent Smooth Crabgrass Control

<table>
<thead>
<tr>
<th>% Control</th>
<th>Late August</th>
<th>Late September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesotrione 0.33</td>
<td>73bc</td>
<td>60d</td>
</tr>
<tr>
<td>Mesotrione 0.5</td>
<td>90a</td>
<td>83ab</td>
</tr>
</tbody>
</table>

Rates are lb ai per acre. Treatments were applied 7-30 and included NIS. Crabgrass averaged 2 tillers.
Smooth Crabgrass Control
with Pre- and Postemergent Applications

<table>
<thead>
<tr>
<th></th>
<th>Late August</th>
<th>Late September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesotrione .31 fb .31</td>
<td>94a</td>
<td>89ab</td>
</tr>
<tr>
<td>Mesotrione .31 fb .62</td>
<td>94a</td>
<td>86ab</td>
</tr>
<tr>
<td>Mesotrione .62 fb .62</td>
<td>78a</td>
<td>76ab</td>
</tr>
</tbody>
</table>

Rates are lb ai per acre. PRE trts were applied 4-3 while POST trts were applied 7-30 and included NIS. When POST trts were applied, crabgrass averaged 2 tillers.
Mesotrione 0.25 lb ai applied May 1 (1-3 If crabgrass), photo taken June 14
Mesotrione 0.375 lb ai applied May 1 (1-3 If crabgrass), photo taken June 14
Mesotrione 0.25 lb ai applied June 6 (5-7 If crabgrass), photo taken June 14
Mesotrione 0.375 lb ai applied June 6 (5-7 lf crabgrass), photo taken June 14
Summary

- Applied preemergent, mesotrione (0.31 or 0.62 lb ai/a) did not offer season long smooth crabgrass control.

- Applied postemergent, 0.31 or 0.62 lb ai provided 71 and 86% smooth crabgrass control, respectively, late September.

- Additionally, 0.33 or 0.5 lb ai mesotrione applied postemergent provided 60 and 83% smooth crabgrass control, respectively, late September.
With pre- and postemergent combinations, mesotrione .31 fb .31 provided 78 and 76% crabgrass control, respectively, late August and late September. .31 fb .62 provided 94 and 86% control, respectively, late August and late September.
Goosegrass Control
Late September

Rates are lb ai per acre. Initial trts were PRE and were applied 3-26 while sequential trts were POST and were applied 7-23 and included NIS. When POST trts were applied, goosegrass averaged 3 tillers.
Postemergent Goosegrass Control

Rates are lb ai per acre. Trts were applied 7-23 and included NIS. Goosegrass averaged 3 tillers.
Summary

Single preemergent applications of mesotrione did not offer season long goosegrass control. However, .31 (preemergence) fb .31 (postemergence) provided 83 and 56% goosegrass control, late August and late September, respectively. Similarly .31 fb .62 provided 84 and 69% goosegrass control, late August and late September, respectively.
Single postemergent applications of mesotrione (0.33 or 0.5 lb ai) provided 96 and 91% goosegrass control late August, respectively while control declined to 78 and 80% by late September.
Postemergent Goosegrass Control
Mid-September

Rates are lb ai per acre. 2 leaf trts were applied 6-8, 5 leaf trts were applied 6-22, and 2 tiller trts were applied 7-6. All trts included NIS.
Summary

Mesotrione (0.19 or 0.25 lb ai/a) applied early postemergent (2 leaf goosegrass) provided fair goosegrass control mid-September while it was not effective in controlling mature goosegrass (5 leaf & 2 tiller).
Tolerance Trials

Research trials were initiated to determine the effect of mesotrione applications:

At spring and fall seeding of tall fescue
- 0.15 – 0.5 lb ai/a mesotrione
  - applied at seeding and six weeks after seeding

Established bermudagrass, centipedegrass, St. Augustinegrass, tall fescue
- 0.25 – 0.5 lb ai/a mesotrione
  - one or two applications with sequential applied three weeks after initial treatment
Tolerance Trials

Mesotrione applied at spring or fall seeding, reductions in tall fescue establishment, phytotoxicity, or turf quality were not objectionable at any time throughout the trial.
Tolerance Trials

Mesotrione applied to established turfgrass, phytotoxicity peaked at the following (one or two applications):

<table>
<thead>
<tr>
<th>Type of Grass</th>
<th>0.25 lb ai/a</th>
<th>0.5 lb ai/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Tifsport’ bermudagrass</td>
<td>10 – 15%</td>
<td>15 – 25%</td>
</tr>
<tr>
<td>Common centipedegrass</td>
<td>&lt;5%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>‘Raleigh’ St. Augustinegrass</td>
<td>5 – 15%</td>
<td>20 – 30%</td>
</tr>
<tr>
<td>‘Confederate’ Tall Fescue</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Conclusions

Single preemergent applications of mesotrione did not provide season long smooth crabgrass or goosegrass control, although postemergent applications (0.31 lb ai/a) provided fair to good smooth crabgrass or goosegrass control.

Additionally, with pre- and postemergent combinations, mesotrione provided fair to good smooth crabgrass or goosegrass control.
Conclusions

- Mesotrione was not effective in controlling mature goosegrass.
- Established tall fescue and centipedegrass exhibited tolerance to mesotrione while St. Augustinegrass and bermudagrass exhibited significant phytotoxicity.
Questions?