Efficacy of three aquatic herbicides for the control of Swamp Smartweed 
(Polygonum hydropiperoides Michx.)

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Objective

• Compare the efficacy of 3 herbicides on the control of Swamp Smartweed
Polygonum hydropiperoides Michx.

- Erect to sprawling perennial dicot.
- Native to N. America.
- Alternately arranged leaves, up to 10 cm long.
- Stems are jointed.
- Greenish red, typically swollen at the base of each leaf stalk, similar to bamboo.
Polygonum hydropiperoides Michx.

• Each flower 4-5 mm long.

• Flowers are clustered to form oblong spikes at the tips of flower stalks.

• Greenish, pinkish, or white flowers form loose, elongated spikes, 6-10 cm long, 2-5 mm wide.
Polygonum hydropiperoides Michx.

Distribution of *P. hydropiperoides* in the USA - USACE
Treatment Area Information

• The pond is 0.22 acres and has a mean depth of 4 ft.
Methodology

• 21 $1m^2$ quad were placed throughout the population of smartweed.

• Each quad randomly assigned a number (101-307) and broken down into 3 groups: 100 block, 200 block, 300 block.
Methodology

- Herbicides used:
  - Garlon 3A ® (triclopyr)
  - Rodeo ® (glyphosate)
  - Habitat ® (imazapyr)
  - Dyne-Amic ® (non-ionic surfactant) (NIS)

- Two rates used:
  - Maximum label rate (MLR)
  - 0.5 MLR
Methodology

• Randomized complete block design with 3 replications.

• Plots were rated on a scale of 0-100 % Control, using 5% increments

• ≥ 90% was considered acceptable control.

• Data analyzed using an ANOVA within SAS.

• Means separated by Fisher’s Protected LSD @ p = 0.05.
Methodology

Application Rate of the 3 herbicides used

<table>
<thead>
<tr>
<th>Product</th>
<th>Lbs. a.e.</th>
<th>Rate (fl oz/gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat (MLR)</td>
<td>0.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Habitat (0.5 MLR)</td>
<td>0.04</td>
<td>3.25</td>
</tr>
<tr>
<td>Rodeo (MLR)</td>
<td>0.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Rodeo (0.5 MLR)</td>
<td>0.2</td>
<td>5.13</td>
</tr>
<tr>
<td>Garlon 3A (MLR)</td>
<td>6</td>
<td>64</td>
</tr>
<tr>
<td>Garlon 3A (0.5 MLR)</td>
<td>3</td>
<td>32</td>
</tr>
</tbody>
</table>
Methodology

• Dyne-Amic (NIS) at 1% v/v added to each chemical.

• A 2 gallon backpack sprayer was used to deliver 26 GPA of spray solution.
# Results

## Average % control for Imazapyr

<table>
<thead>
<tr>
<th>Product</th>
<th>1 WAT</th>
<th>2 WAT</th>
<th>3 WAT</th>
<th>4 WAT</th>
<th>5 WAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat (MLR)</td>
<td>58.3 cd</td>
<td>65.0 a</td>
<td>71.7 a</td>
<td>93.3 a</td>
<td>93.3 a</td>
</tr>
<tr>
<td>Habitat (0.5 MLR)</td>
<td>93.3 ab</td>
<td>96.7 a</td>
<td>96.7 a</td>
<td>98.3 a</td>
<td>98.3 a</td>
</tr>
</tbody>
</table>
Results

Plot # 304 – MLR Imazapyr 9-14-05

Plot # 203 – 0.5 MLR Imazapyr 9-14-05
## Results

### Average % control for Glyphosate

<table>
<thead>
<tr>
<th>Product</th>
<th>1 WAT</th>
<th>2 WAT</th>
<th>3 WAT</th>
<th>4 WAT</th>
<th>5 WAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodeo (MLR)</td>
<td>96.7 a</td>
<td>98.3 a</td>
<td>96.7 a</td>
<td>96.7 a</td>
<td>96.7 a</td>
</tr>
<tr>
<td>Rodeo (0.5 MLR)</td>
<td>61.7 b-c</td>
<td>66.7 a</td>
<td>71.7 a</td>
<td>91.7 a</td>
<td>91.7 a</td>
</tr>
</tbody>
</table>
Results

Plot # 105 – MLR Glyphosate
9-14-05

Plot # 206 – 0.5 MLR Glyphosate
9-14-05
## Results

### Average % control for Triclopyr

<table>
<thead>
<tr>
<th>Product</th>
<th>1 WAT</th>
<th>2 WAT</th>
<th>3 WAT</th>
<th>4 WAT</th>
<th>5 WAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garlon 3A (MLR)</td>
<td>76.7 a-c</td>
<td>78.3 a</td>
<td>73.3 a</td>
<td>73.3 a</td>
<td>70.0 a</td>
</tr>
<tr>
<td>Garlon 3A (0.5 MLR)</td>
<td>30.0 de</td>
<td>26.7 b</td>
<td>20.0 b</td>
<td>26.7 b</td>
<td>23.3 b</td>
</tr>
</tbody>
</table>
Results

Plot # 202 – 0.5 MLR Triclopyr
9-14-05

Plot # 203 – MLR Triclopyr
9-14-05
## Results

% Control of Smartweed at 1, 3, 5 weeks after treatment

<table>
<thead>
<tr>
<th>Product</th>
<th>1 WAT</th>
<th>3 WAT</th>
<th>5 WAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat (MLR)</td>
<td>58 dc</td>
<td>72 a</td>
<td>93 a</td>
</tr>
<tr>
<td>Habitat (0.5 MLR)</td>
<td>93 ab</td>
<td>97 a</td>
<td>98 a</td>
</tr>
<tr>
<td>Rodeo (MLR)</td>
<td>97 a</td>
<td>97 a</td>
<td>97 a</td>
</tr>
<tr>
<td>Rodeo (0.5 MLR)</td>
<td>62 b-d</td>
<td>72 a</td>
<td>92 a</td>
</tr>
<tr>
<td>Garlon 3A (MLR)</td>
<td>77 a-c</td>
<td>73 a</td>
<td>70 a</td>
</tr>
<tr>
<td>Garlon 3A (0.5 MLR)</td>
<td>30 de</td>
<td>20 b</td>
<td>23 b</td>
</tr>
<tr>
<td>LSD = 0.05</td>
<td>34</td>
<td>40</td>
<td>29</td>
</tr>
</tbody>
</table>
Conclusion

• Glyphosate and Imazapyr showed the best results in controlling Swamp Smartweed.

• The 0.5 MLR of Imazapyr was as affective as the MLR of Glyphosate at 3-5 WAT.

• Triclopyr was the least affective chemistry for controlling smartweed.
Acknowledgements

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• Dr. John Byrd
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Any Questions???