Dry Beans
Weed Management Research

Sandea (POST)

Sandea (PPI)

Frontier + Pursuit (PPI)

Sandea + Basagran + Reflex (POST)

Treflan + Pursuit (PPI)

Dr. Peter H. Sikkema
Field Crop Weed Management

UNIVERSITY OF GUELPH
## Minor Use Registrations

<table>
<thead>
<tr>
<th><strong>URMULE Number</strong></th>
<th><strong>Herbicide</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-1524</td>
<td>Roundup + Valtera</td>
<td>Desiccant</td>
</tr>
<tr>
<td>2010-1169</td>
<td>Roundup + Valtera + MSO</td>
<td>Desiccant</td>
</tr>
<tr>
<td>2010-1385</td>
<td>Prowl</td>
<td>Adzuki beans - PPI</td>
</tr>
<tr>
<td>2009-1277</td>
<td>Frontier + Pursuit</td>
<td>All market classes - PPI</td>
</tr>
<tr>
<td>2009-1278</td>
<td>Frontier + Pursuit</td>
<td>All market classes - PRE</td>
</tr>
<tr>
<td>2008-1140</td>
<td>Dual + Pursuit</td>
<td>All market classes - PPI</td>
</tr>
<tr>
<td>2008-3057</td>
<td>Dual + Pursuit</td>
<td>All market classes - PRE</td>
</tr>
<tr>
<td>2008-0710</td>
<td>Select</td>
<td>All market classes - POST</td>
</tr>
<tr>
<td>2007-2784</td>
<td>Pursuit</td>
<td>All market classes - PPI</td>
</tr>
<tr>
<td>2007-2497</td>
<td>Excel Super</td>
<td>All market classes - POST</td>
</tr>
<tr>
<td>2006-1497</td>
<td>Frontier</td>
<td>All market classes - PPI &amp; PRE</td>
</tr>
<tr>
<td>2006-2900</td>
<td>Basagran</td>
<td>All market classes - POST</td>
</tr>
<tr>
<td>2006-0432</td>
<td>Poast Ultra</td>
<td>All market classes - POST</td>
</tr>
<tr>
<td>2006-0433</td>
<td>Assure II</td>
<td>All market classes - POST</td>
</tr>
<tr>
<td>2005-0521</td>
<td>Dual</td>
<td>All market classes - PPI &amp; PRE</td>
</tr>
<tr>
<td>2005-0386</td>
<td>Basagran</td>
<td>Add Otebo beans</td>
</tr>
<tr>
<td>2004-0525</td>
<td>Pursuit</td>
<td>Add adzuki beans</td>
</tr>
</tbody>
</table>
1. Is there a difference in tolerance of dry beans when Sandea is applied PPI, PRE or POST?
Sandea – PPI, PRE or POST
Black, White, Otebo, SRM, Pinto, Pink, Cranberry and Kidney

Crop Injury (%)

1X Rate
2X Rate

0 2 4 6 8

PPI  PRE  POST
Sandea – PPI, PRE or POST
Black, White, Otebo, SRM, Pinto, Pink, Cranberry and Kidney
Summary

1. There was minimal visual crop injury 7, 14 and 28 DAE in 8 market classes of dry beans with Sandea applied PPI and PRE
   a. Up to 6% injury 7 DAA when applied POST
2. There was no decrease in dry bean yield when Sandea was applied PPI, PRE and POST
Crop Tolerance in Dry Beans

Question # 2

1. What is the tolerance of adzuki bean to Sandea applied POST?
Sandea – POST
Black, White, Otebo, SRM, Pinto, Adzuki, Cranberry and Kidney

Crop Injury – Mean of 4 Studies

- Black: 10
- White: 13
- Otebo: 16
- SRM: 14
- Pinto: 14
- Adzuki: 59
- Cranberry: 18
- Kidney: 16

Crop Injury (%) - 7 DAA - 2X Rate
Sandea – POST
Black, White, Otebo, SRM, Pinto, Adzuki, Cranberry and Kidney

Yield – Mean of 4 Studies

- Black: 96%
- White: 93%
- Otebo: 98%
- SRM: 97%
- Pinto: 100%
- Adzuki: 31%
- Cranberry: 96%
- Kidney: 100%

Sikkema, UG

Yield (% of check - 2X Rate)
Summary

1. Sandea POST results in unacceptable crop injury and a decrease in dry weight, height and yield in adzuki bean.
2. There was transient visible crop injury (up to 22%) in other market classes of edible bean.
3. The yield of dry beans was +/- 2% of the untreated control at the 2X rate.
Question # 3

1. What is the safest application timing for Prowl in edible beans?
Prowl – PPI or PRE
Black, White, Cranberry and Kidney

Crop Injury (%)

1X Rate
- PPI: 0.1
- PRE: 2.1

2X Rate
- PPI: 0.4
- PRE: 5.9
Summary

1. There was minimal crop injury 7, 14 and 28 DAE in 4 market classes of dry bean with Prowl applied PPI and PRE
   a. Up to 5.9% injury 14 DAE when applied PRE
2. There was no decrease in dry bean yield when Prowl was applied either PPI or PRE
   a. However, overall there appears to be a slightly larger margin of crop safety when Prowl is applied PPI
Question # 4

Should I add Pursuit to my soil applied grass herbicide?

If yes, what rate should I use?

Pursuit (125 mL/ac)
Pursuit (125 mL/ac)

General Comments

1. Apply PPI or PRE
2. Registered on all market classes
   1. Dry beans have fair crop tolerance
   2. Adzuki beans have excellent tolerance
3. Tankmixes
   a. Dual & Frontier
      i. PPI & PRE - all dry beans
   b. Treflan
      i. PPI - white beans
Pursuit

General Comments

1. Excellent broadleaf weed control
   a. Inconsistent on common ragweed and lamb’s-quarters
   b. No control of Group 2 resistant weeds
2. Good annual grass control
   a. Poor control of tufted love and stink grass
3. Excellent residual weed control
   a. 100 days to plant winter wheat
   b. Severe re-cropping restrictions
4. Possibility for crop injury

Sikkema, UG

Weed control in white bean with Pursuit
Pursuit

Disadvantages

1. Narrow margin of crop safety
   a. Red to purple veins on lower side of leaf
   b. Yellow leaf margin
   c. Crinkled leaves
   d. Stunting
   e. Delay in maturity
   f. Reduced yield

Stunting of white beans due to Pursuit
Pursuit

Increased potential for injury …

1. Cold, wet conditions
2. Coarse textured soils that are low in organic matter
3. When the beans have begun to emerge
4. Small seeded market classes of dry beans
   a. Black, otebo, pinto, white
      i. Adjust Pursuit rate depending on market class

Sikkema, UG

Pursuit injury in white beans applied at cracking
Pursuit Rate

13% decrease in white bean root dry weight at 1X rate

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Root Dry Weight (g - 28 DAE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>3.8</td>
</tr>
<tr>
<td>Pursuit (42 mL/ac)</td>
<td>3.7</td>
</tr>
<tr>
<td>Pursuit (84 mL/ac)</td>
<td>3.5</td>
</tr>
<tr>
<td>Pursuit (126 mL/ac)</td>
<td>3.3</td>
</tr>
<tr>
<td>Pursuit (252 mL/ac)</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Average of 12 studies

Sikkema, UG
Gillard, UG
Swanton, UG
Pursuit Rate

7% decrease in white bean yield at 1X rate

- Check: 25.1 cwt/ac
- Pursuit (42 mL/ac): 25.3 cwt/ac
- Pursuit (84 mL/ac): 24.9 cwt/ac
- Pursuit (126 mL/ac): 23.4 cwt/ac
- Pursuit (252 mL/ac): 22.1 cwt/ac

Average of 12 experiments

Sikkema, UG
Gillard, UG
Swanton, UG
Question # 4

Should I add Pursuit to my soil applied grass herbicide?

Yes

Pursuit (125 mL/ac)
Crop Tolerance in Dry Beans

Question # 4

What rate should I apply?

Depends on the market class …

Small seeded - 75 mL/ac
Large seeded - 100 mL/ac
Adzuki beans - 125 mL/ac

Pursuit (125 mL/ac)
Crop Tolerance in Dry Beans

Current & Future Research

1. What is the safest time to apply Pursuit in dry beans – PPI, PRE or POST?
2. What is the effect of POST application timing on the tolerance of dry beans to Sandea applied POST?
   a. 1-2 tri, 3-4 tri, 5-6 tri, 1\textsuperscript{st} flower or 1\textsuperscript{st} pod
3. What is the tolerance of mung beans to POST herbicides?
4. What is the tolerance of dry beans to Integrity applied PRE?
5. What is the tolerance of adzuki beans to PRE herbicides?
Weed Management in Dry Beans

Question # 1

1. What are the differences among the 5 soil applied grass herbicides in respect to weed control?
Grass Herbicides

Green Foxtail Control (%)

Foxtail

Weed Control (%)

Sikkema, UG
Grass Herbicides

Broadleaf Weed Control (%)
Summary

1. Which soil applied grass herbicide should I use?

<table>
<thead>
<tr>
<th>Weed</th>
<th>Recommended Herbicide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb’s-quarters</td>
<td>Treflan, Prowl, Eptam</td>
</tr>
<tr>
<td>Wild mustard</td>
<td>Frontier, Dual, Eptam</td>
</tr>
<tr>
<td>Redroot pigweed</td>
<td>Treflan, Frontier, Dual, Prowl</td>
</tr>
<tr>
<td>Common ragweed</td>
<td>Eptam, Frontier</td>
</tr>
</tbody>
</table>
2. What is the effect of application timing (PPI, PRE or POST) on herbicide efficacy with Sandea?
Sandea – Application Timing

Wild Mustard
Lamb's-quarters
Redroot Pigweed
Green Smartweed

Weed control (%)

Sikkema, UG
## Sandea – Application Timing

### Summary

2. When should I apply Sandea in edible beans?

<table>
<thead>
<tr>
<th>Weed</th>
<th>Recommended Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild mustard</td>
<td>PPI = PRE = POST</td>
</tr>
<tr>
<td>Lamb’s-quarters</td>
<td>PPI = PRE &gt; POST</td>
</tr>
<tr>
<td>Redroot pigweed</td>
<td>PPI = PRE &gt; POST</td>
</tr>
<tr>
<td>Green smartweed</td>
<td>PPI = PRE &gt; POST</td>
</tr>
</tbody>
</table>
Weed Management in Dry Beans

Question # 3

3. Is there a benefit in respect to weed control to adding Treflan or Pursuit to Sandea applied PPI?
Sandea – Tankmixes

Lamb’s-quarters
Wild Mustard
Redroot Pigweed
Green Foxtail

Weed control (%)

0 20 40 60 80 100

Sandea  Sandea + Treflan  Sandea + Treflan + Pursuit
3. Is there a benefit in respect to weed control to adding Treflan or Pursuit to Sandea applied PPI?

   a. No improvement in the control of lamb’s-quarters, wild mustard and redroot pigweed
   b. A dramatic improvement in green foxtail control
Weed Management in Dry Beans

Current & Future Research

Weed Management

1. Weed control with Sandea applied PPI, PRE and POST.
2. Weed control with Sandea tankmixes applied PPI.
3. Weed control in kidney beans with Lorox tankmixes.
Future Research

1. Evaluate new herbicides as they become available
   a. Sandea
   b. Authority
   c. Integrity
2. Develop precision weed management systems by market class
   a. Lorox in kidney and cranberry beans
3. Increased tolerance of edible beans to Pursuit
Dry Beans
Weed Management Research

Sandea (POST)

Sandea (PPI)

Frontier + Pursuit (PPI)

Sandea + Basagran + Reflex (POST)

Treflan + Pursuit (PPI)

Dr. Peter H. Sikkema
Field Crop Weed Management