BAS 762ACH for Postemergence Weed Control in Dry Beans

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Top US dry bean producers

- North Dakota
- Michigan
- Nebraska
- Minnesota
- Colorado
- California
- Idaho
- Wyoming
- Washington
- Texas
- New York

Four states produced 69% of the total US dry bean in 2010

(Source: ERS 2010)
Dry bean Production in Montana-2010

Hectare Planted (000 Ha): 8.4
Total Production (000 Kg): 7.378

NASS, USDA 2010
# Problem Weeds in the Northwestern US Dry Bean Fields

<table>
<thead>
<tr>
<th>Grassy Weeds</th>
<th>Broadleaf Weeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green and yellow foxtail</td>
<td>Common lambsquarters</td>
</tr>
<tr>
<td>Barnyardgrass</td>
<td>Common mallow</td>
</tr>
<tr>
<td>Wild oat</td>
<td>Kochia</td>
</tr>
<tr>
<td>Wild proso millet</td>
<td>Prickly lettuce</td>
</tr>
<tr>
<td>Witchgrass</td>
<td>Redroot pigweed</td>
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<tr>
<td></td>
<td>Common cocklebur</td>
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<tr>
<td></td>
<td>Prostrate knotweed</td>
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<td></td>
<td>Common purslane</td>
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<tr>
<td></td>
<td>Common sunflower</td>
</tr>
<tr>
<td></td>
<td>Hairy nightshade</td>
</tr>
</tbody>
</table>

Waters and Morishita (2001); Wilson (2009)
## Significance of Research

<table>
<thead>
<tr>
<th>WEEDS</th>
<th>Percent yield loss @ 32 plants/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common sunflower (<em>Helianthus annuus</em>)</td>
<td>66</td>
</tr>
<tr>
<td>Common cocklebur (<em>Xanthium strumarium</em>)</td>
<td>50</td>
</tr>
<tr>
<td>Redroot pigweed (<em>Amaranthus retroflexus</em>)</td>
<td>24</td>
</tr>
<tr>
<td>Barnyard grass (<em>Echinochloa crus-galli</em>)</td>
<td>24</td>
</tr>
<tr>
<td>Hairy nightshade (<em>Solanum sarrachoides</em>)</td>
<td>22</td>
</tr>
<tr>
<td>Green foxtail (<em>Setaria viridis</em>)</td>
<td>12</td>
</tr>
</tbody>
</table>

Waters and Morishita (2001); Wilson (2009)
Dry Bean Herbicides

- **Preplant (PPI) or Preemergence (PRE)**
  - Alachlor
  - Dimethenamid (Outlook)
  - Metolachlor
  - Pendimethalin (Prowl H₂O)
  - EPTC
  - Ethalfluralin
  - Trifluralin

- **Postemergence (POST)**
  - Bentazon (Basagran)
  - Imazamox (Raptor)
  - Sethoxydim (Poast)
  - Clethodim (Select)

Waters and Morishita (2001)
**BAS 762ACH**

**Composition**
- Bentazon (w/w): <45%
- Imazamox (w/w): <=2%

**Physical and Chemical Properties**
- Form: Liquid
- Colour: Red brown
- Odor: Odorless
- pH Value: approx. 5.6
- Solubility in water: Soluble

Source: Product MSDS, BASF
Objectives

- Evaluate crop tolerance and weed control efficacy of BAS 762ACH in comparison to Bentazon (Basagran®) and Imazamox (Raptor®) alone or tank-mix

- Evaluate current weed management programs in dry beans
Materials and Methods

- **Location**: Southern Ag Research Center, Huntley, MT and Central Ag Research Center, Moccassin, MT

- **Class of dry bean planted**: Pinto

- **Planting Date**: May 17, 2010

- **Seeding Rate**: 67 kg/ha

- **Row Width**: 61 cm

- **Plot Size**: 3 x 7.6 m²
Materials and Methods

Weed Species at the Test Site:

- Buffalobur (*Solanum rostratum*)
- Wild buckwheat (*Polygonum convolvulus*)
- Common lambsquarters (*Chenopodium album*)
- Common mallow (*Malva neglecta*)
- Kochia (*Kochia scoparia*)
- Redroot pigweed (*Amaranthus retroflexus*)
- Wild proso millet (*Panicum miliaceum*)
Materials and Methods

Treatments:

- BAS 762ACH (0.945 kg ai/ha) **POST**
- Imazamox alone (0.035 kg ai/ha) **POST**
- Bentazon alone at 0.84 kg ai/ha **POST**
- Bentazon plus Imazamox (0.035 kg ai/ha) with Bentazon rates of 0.56, 0.75, 0.84, or 0.98 kg ai/ha **POST**
- Dimethenamid (0.84 kg ai/ha) + Pendimethalin (0.96 kg ai/ha) **PPI**
- Dimethenamid + Pendimethalin **PPI** fb Bentazon (0.56 kg ai/ha) plus Imazamox (0.035 kg ai/ha) **POST**

**POST** at 1st tri-foliate leaf stage of dry beans
Materials and Methods

Weedy Check
Materials and Methods

Data Collected:

- Percent crop injury at 7, 14, 28, and 42 days after application (DAA) of POST
- Percent weed control at 7, 14, 28, and 42 DAA of POST
- Dry bean seed yield at harvest
Statistical Analyses

- **Experimental Design:** Randomized Complete Block
- **Number of Replications:** 4
- Data subjected to ANOVA
- Means separated using Fisher’s Protected LSD test at alpha level of 0.05
Results and Discussion
Dry Bean Injury 5-7 DAA

- Imazamox alone
- Imazamox plus Bentazon @ 0.56 kg ai/ha
- Imazamox plus Bentazon @ 0.84 kg ai/ha
Dry Bean Injury 42 DAA

% Injury

- Imazamox
- Bentazon (0.84 kg ai/ha)
- Imazamox+Bentazon (0.56 kg ai/ha)
- Imazamox+Bentazon (0.75 kg ai/ha)
- Imazamox+Bentazon (0.84 kg ai/ha)
- Imazamox+Bentazon (0.98 kg ai/ha)
- BAS 762 ACH (0.94 kg ai/ha)
- Dimethenamid-P + Pendimethalin (PPI)
- Dimethenamid-P + Pendimethalin (PPI) fb Imazamox + Bentazon (0.56 kg ai/ha)

Injury levels are indicated with different letters (a, b) to show significant differences.
Weed Control 21 DAA

BAS 762ACH

Dimethenamid+pendimethalin PPI fb
Imazamox + Bentazon (0.56 kg ai/ha) POST

Untreated Check

Dimethenamid+pendimethalin PPI
Weed Control 21 DAA

BAS 762ACH

Imazamox (0.035 kg ai/ha)

Untreated Check

Imazamox + Bentazon (0.75 kg ai/ha)
Imazamox applied at 0.035 kg ai/ha; All treatments include 1.0 % v/v COC and 2.0 % v/v UAN
Common Lambsquarters and Mallow Control 42 DAA

Imazamox applied at 0.035 kg ai/ha; All treatments include 1.0 % v/v COC and 2.0 % v/v UAN
Kochia and Wild Proso Millet Control 42 DAA

Imazamox applied at 0.035 kg ai/ha; All treatments include 1.0 % v/v COC and 2.0 % v/v UAN
Dry Bean Yield

Yield (kg/ha)

- Check
- Imazamox
- Bentazon (0.56 kg ai/ha)
- Imazamox + Bentazon (0.75 kg ai/ha)
- Imazamox + Bentazon (0.84 kg ai/ha)
- Imazamox + Bentazon (0.98 kg ai/ha)
- BAS 762 ACH (0.94 kg ai/ha)
- Dimethenamid-P + Pendimethalin (PPI)
- Dimethenamid-P + Pendimethalin (PPI) fb Imazamox + Bentazon (0.56 kg ai/ha)

Legend:
- e
- de
- cde
- bcd
- bc
- ab
- a
- ab
- bcd
- bc
Conclusions

- None of the herbicides (alone or tank mix) caused significant injury to dry beans
- Bentazon (0.75 kg ai/ha) or imazamox (0.035 kg ai/ha) alone caused dry bean yield reductions due to inadequate weed control
- Weed control and dry bean yield with BAS 762ACH was comparable to bentazon (0.75 kg ai/ha) plus imazamox (0.035 kg ai/ha) applied POST or pendimethalin plus demethanamid applied PPI
Acknowledgement

- Funding provided by BASF for conducting this research is greatly appreciated
QUESTIONS ?