

# Medusahead Control with Milestone Herbicide

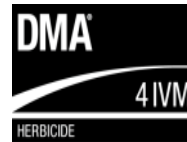
**BEAU MILLER**  
**DOW AGROSCIENCES**  
**BJMILLER@DOW.COM**



**Dow AgroSciences**

*Solutions for the Growing World*

# Vegetation Management Herbicide Solutions



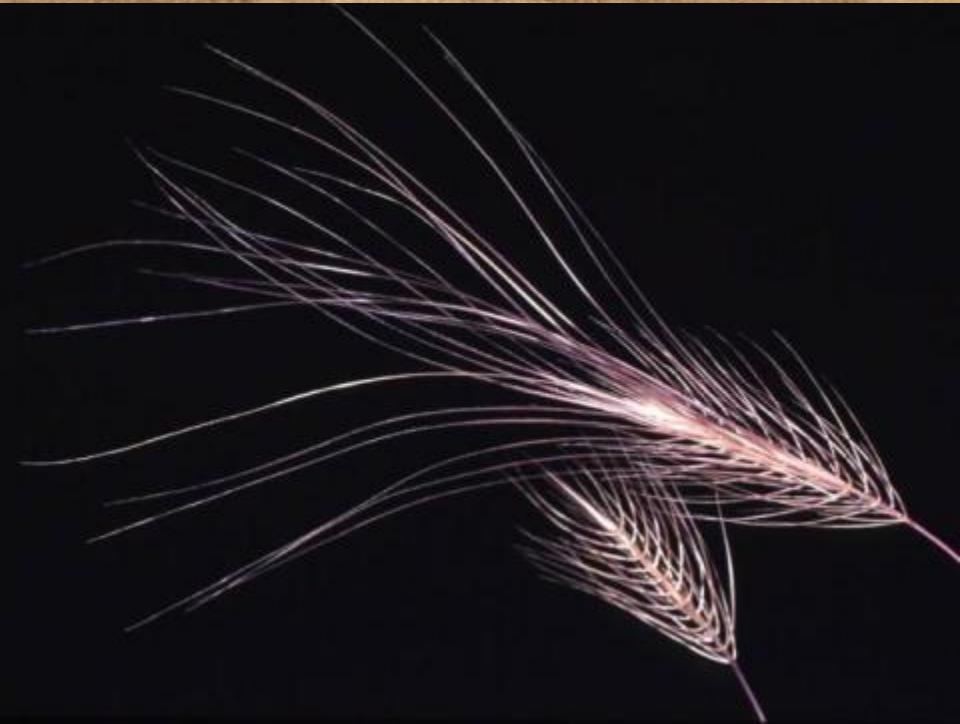
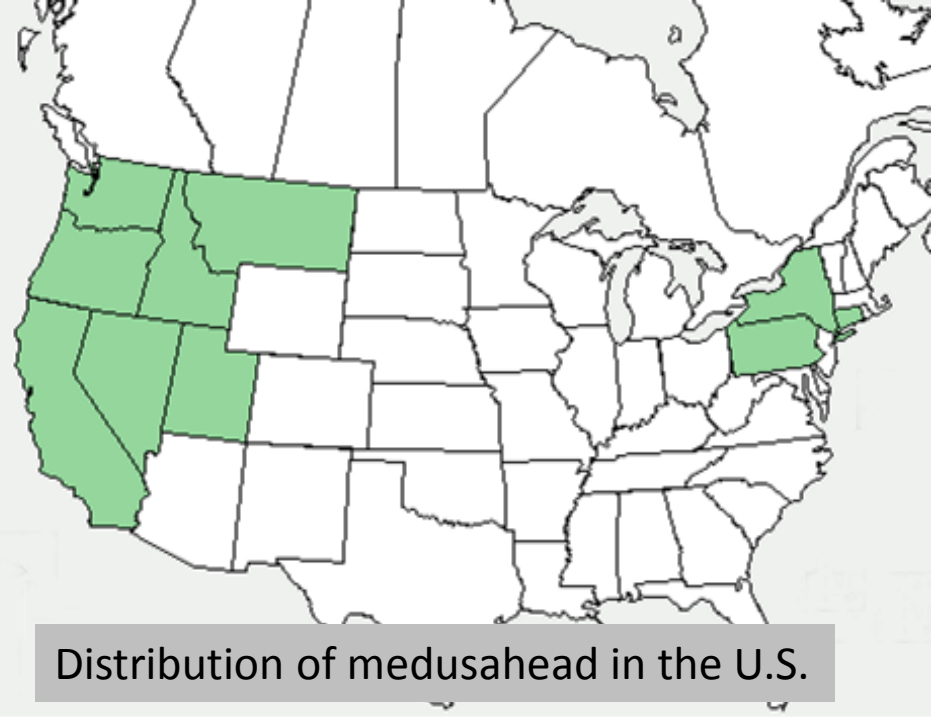
**Turf & Ornamental**



**Veg Mgt & R&P**

# Medusahead

(*Taeniatherum caput-medusae*)



Burn it, eat it,  
spray it with *Plateau*



# Medusahead Management Guide for the Western States

GUY B. KYSER  
Weed Science Program  
Department of Plant Sciences  
University of California, Davis, CA

JOSEPH M. DITOMASO  
Weed Science Program  
Department of Plant Sciences  
University of California, Davis, CA

KIRK W. DAVIES  
Eastern Oregon Agricultural  
Research Center, Burns, OR

JOSH S. DAVY  
University of California Cooperative  
Extension, Tehama County, CA

BRENDA S. SMITH  
Eastern Oregon Agricultural  
Research Center, Burns, OR



*Figure 47. Control with aminopyralid*

*A dense medusahead infestation in an untreated plot (left) contrasts with a good stand of eye grass in a plot treated with 14 oz/acre<sup>1</sup> of Milestone in fall (right). (Photo: Josh Davy)*

# Previous medusahead research – all with excellent results

- Greenhouse trial at UC Davis with pre and post emergent applications
- Field research (3 sites) with UC Davis on pre emergent applications
- Larger scale applications in CA
- USDA-ARS study on seed viability after applications at 3 post emergent stages
  - Follow-up study with 2014 and 2015 studies in the field in CA (4 locations)



Nontreated



Preemergence  
3.5 oz *Milestone*

Results from  
UC Davis  
greenhouse  
study on  
medusahead



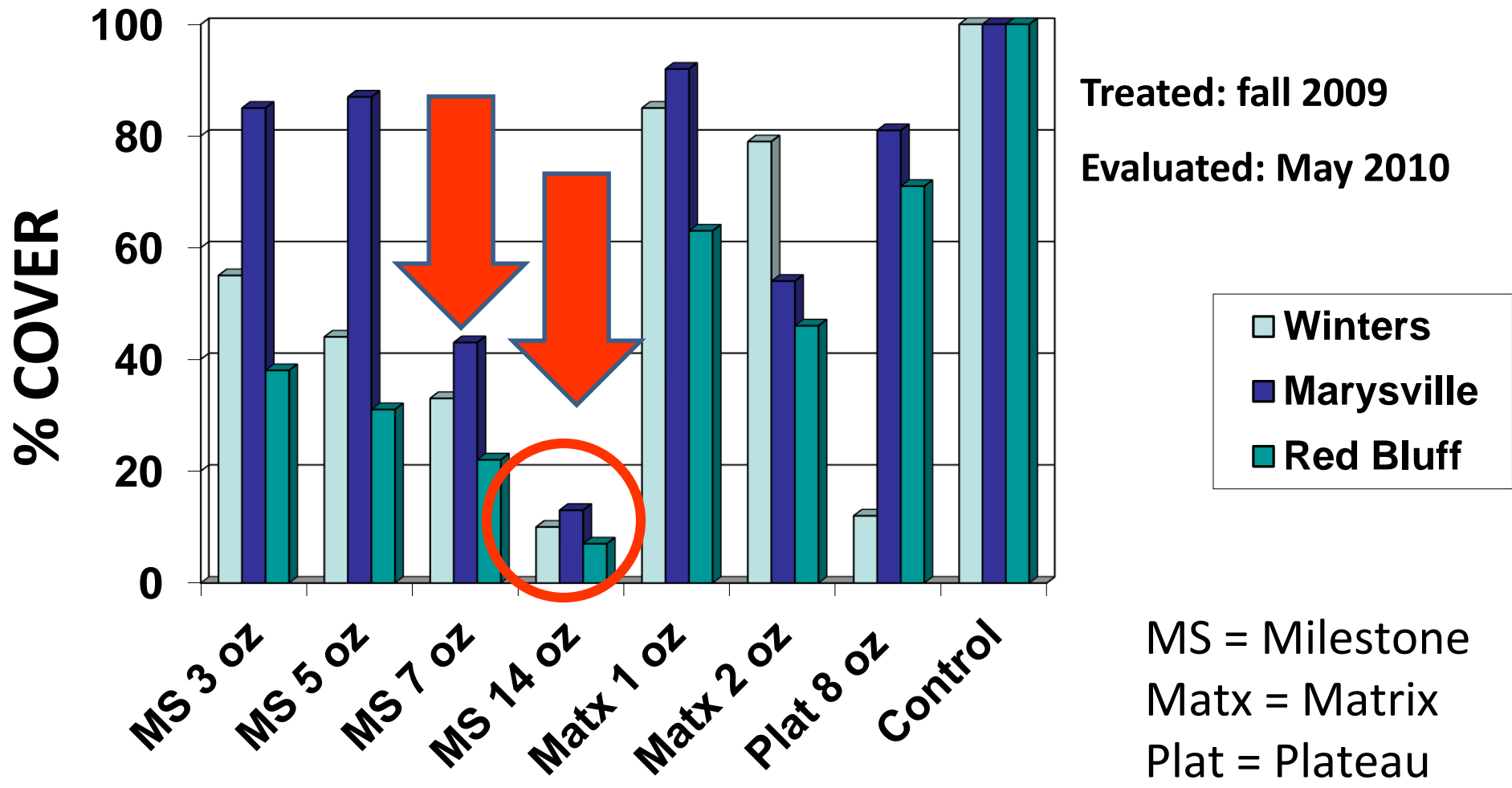
Preemergence  
7 oz *Milestone*



Preemergence  
14 oz *Milestone*

# Medusahead Cover 6 Months After Herbicide Applications

DiTomaso and Kyser, UC Davis



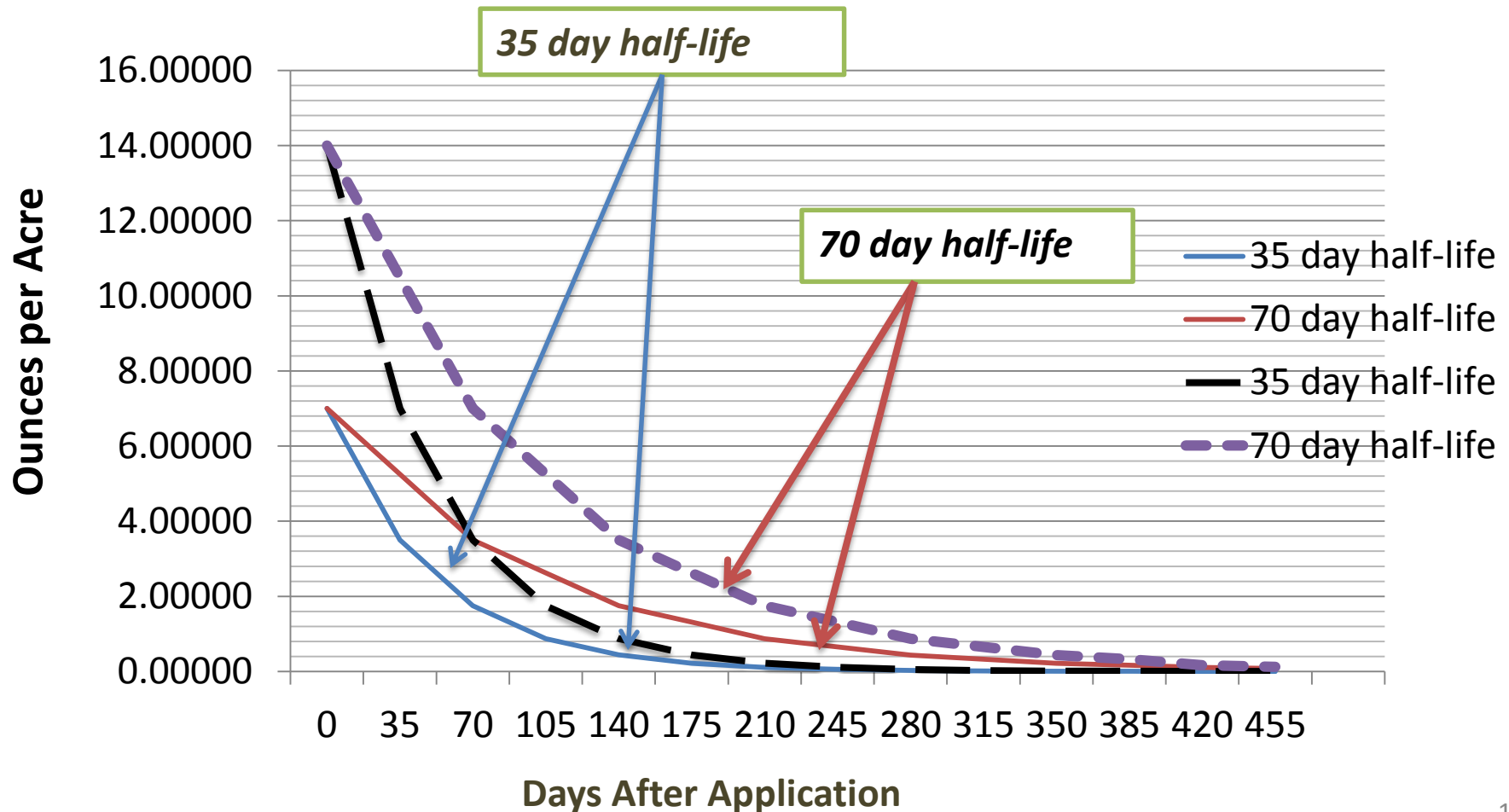


# *Weed Seed in Chemical Zone*



# Milestone Residual Activity Depends upon Initial Dose, Soil Moisture & Temperature

Degradation will be slower in dry or cool soils





Note: release of annual ryegrass

Red Bluff, CA

**Milestone at 7 fl oz vs. Non-treated  
Treated Oct 2009 - Photo May 2010**

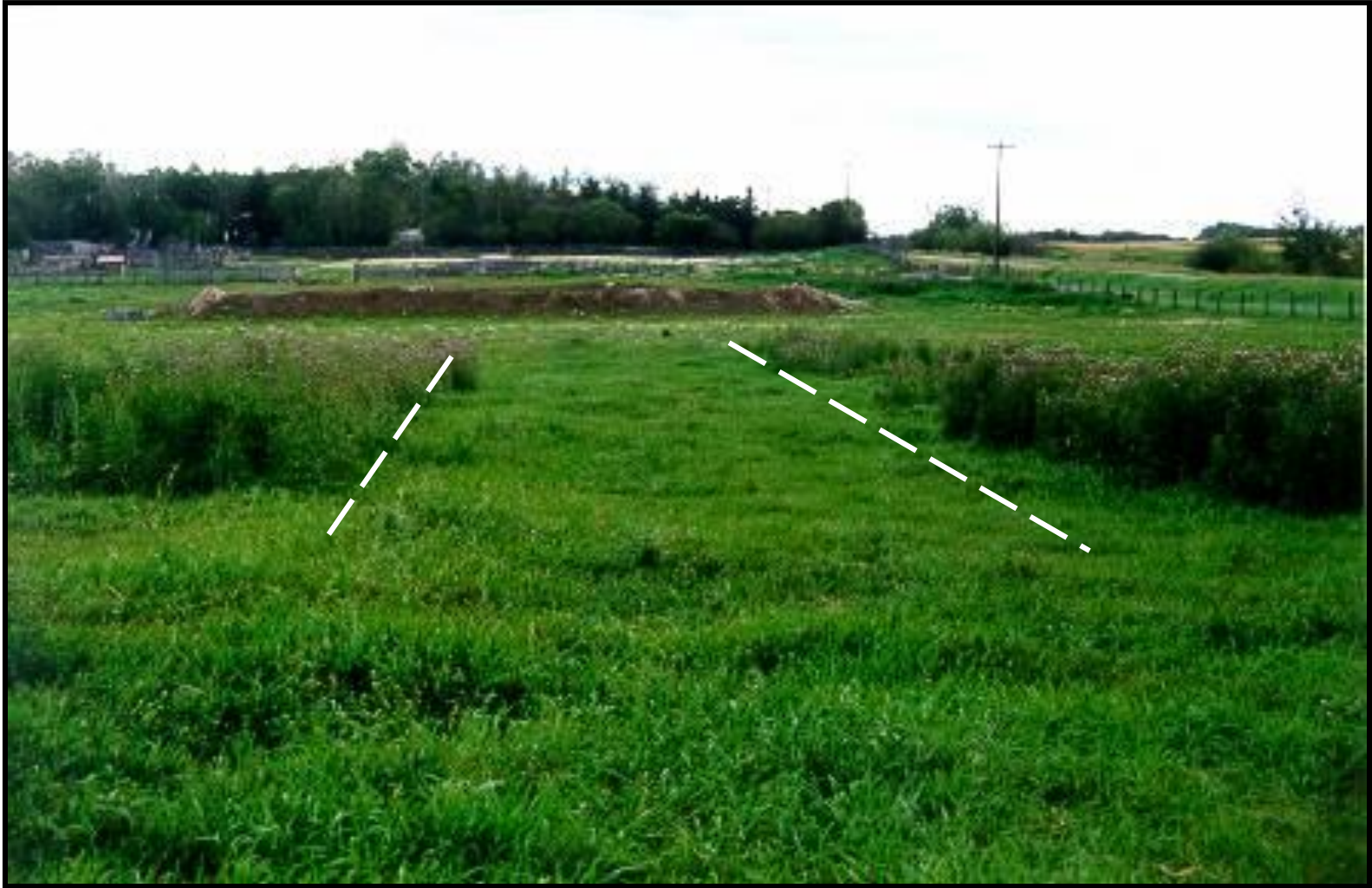


**Plateau at 8 fl oz**

**Treated Oct 2009 - Photo May 2010**

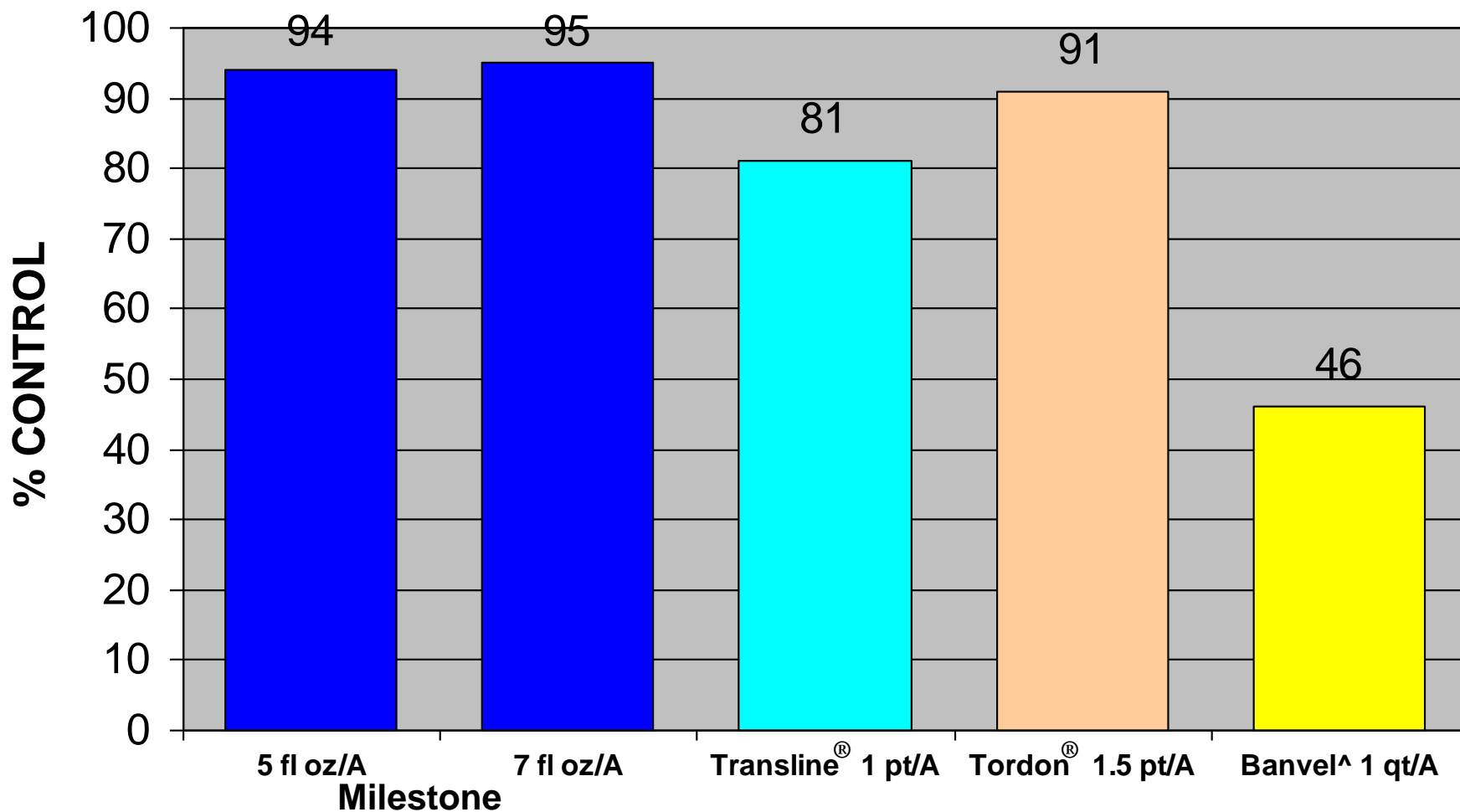
**Milestone moves through the thatch where Plateau ties up and picks up 70+ noxious weeds**

# Thistle Control plus 70 + other weeds



Milestone™ @ 7 fluid oz/acre 365 days

# Control of Canada Thistle with Fall Applications of Milestone<sup>®</sup> Compared to Standards at 1 Year after Application



Evaluations at 1 year after treatment. Average of 22 trials in VA, ND, SD, NE, WY, CO, and WA

# Medusahead Control at the Vineyard Mountain Ranch

Treated by Nathan Sanders, Ranch Manager  
with 7 oz/acre Milestone, October 2012  
at early post-emergence on medusahead

# Annual Ryegrass Release Milestone @ 7 fl oz/A Spray Skip Tells the Story

Spray skip

Treated –  
Release of  
annual  
ryegrass

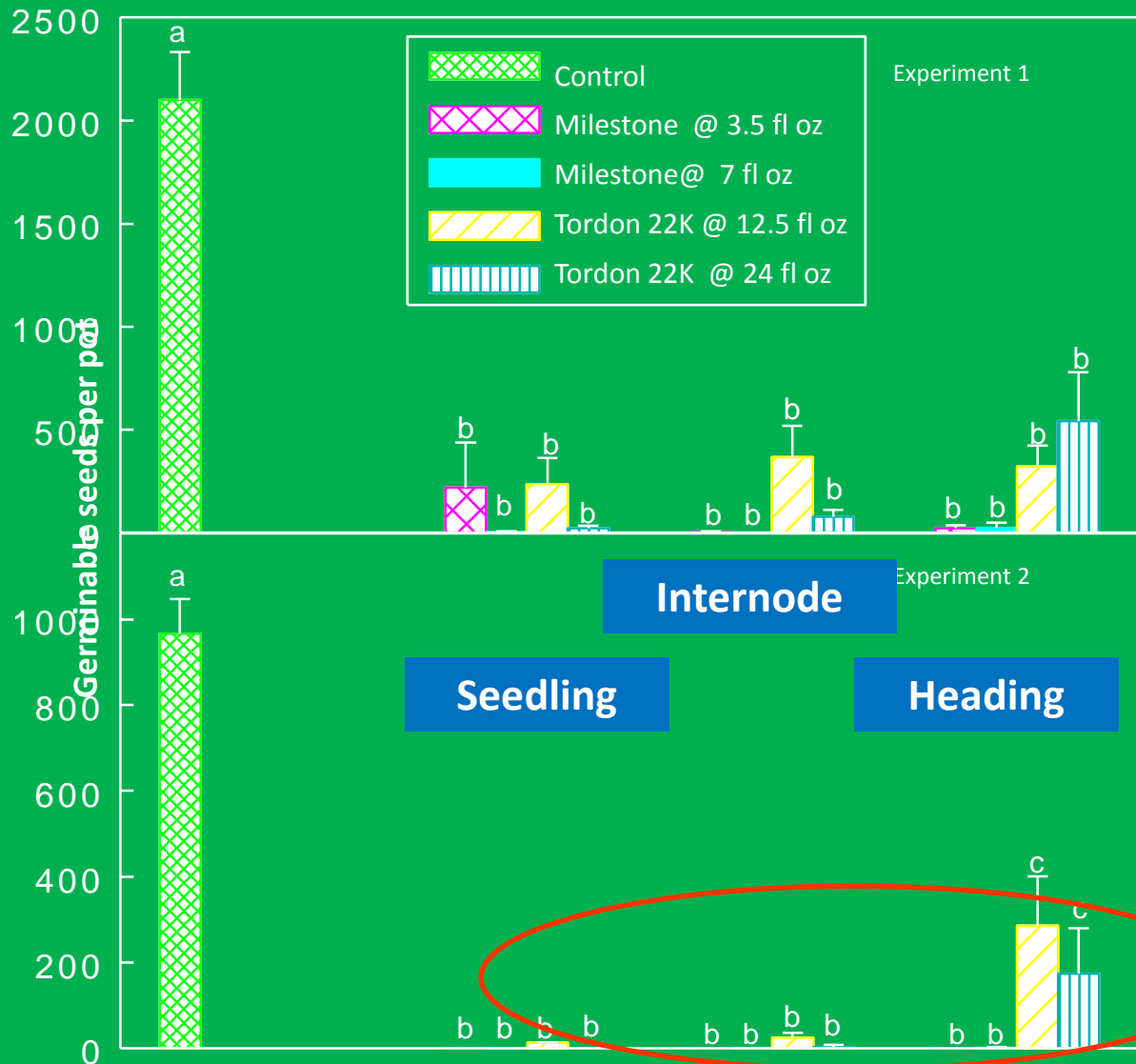




# Research on Milestone<sup>®</sup> Effects on Medusahead and Ventenata Seed Production

- Dr. Rinella, USDA-ARS Rangeland Ecologist, showed that Milestone, Tordon 22K and some other growth regulator herbicides applied post emergence on Japanese brome and cheatgrass (downy brome) had an effect on seed development
  - Does Milestone have an effect on seed development of medusahead similar to that of growth regulators on Japanese brome?

# Greenhouse results-Medusahead



14 GPA, broadcast

Timing:

Seedling, internode elongation, heading

Treatments:

Milestone (aminopyralid)

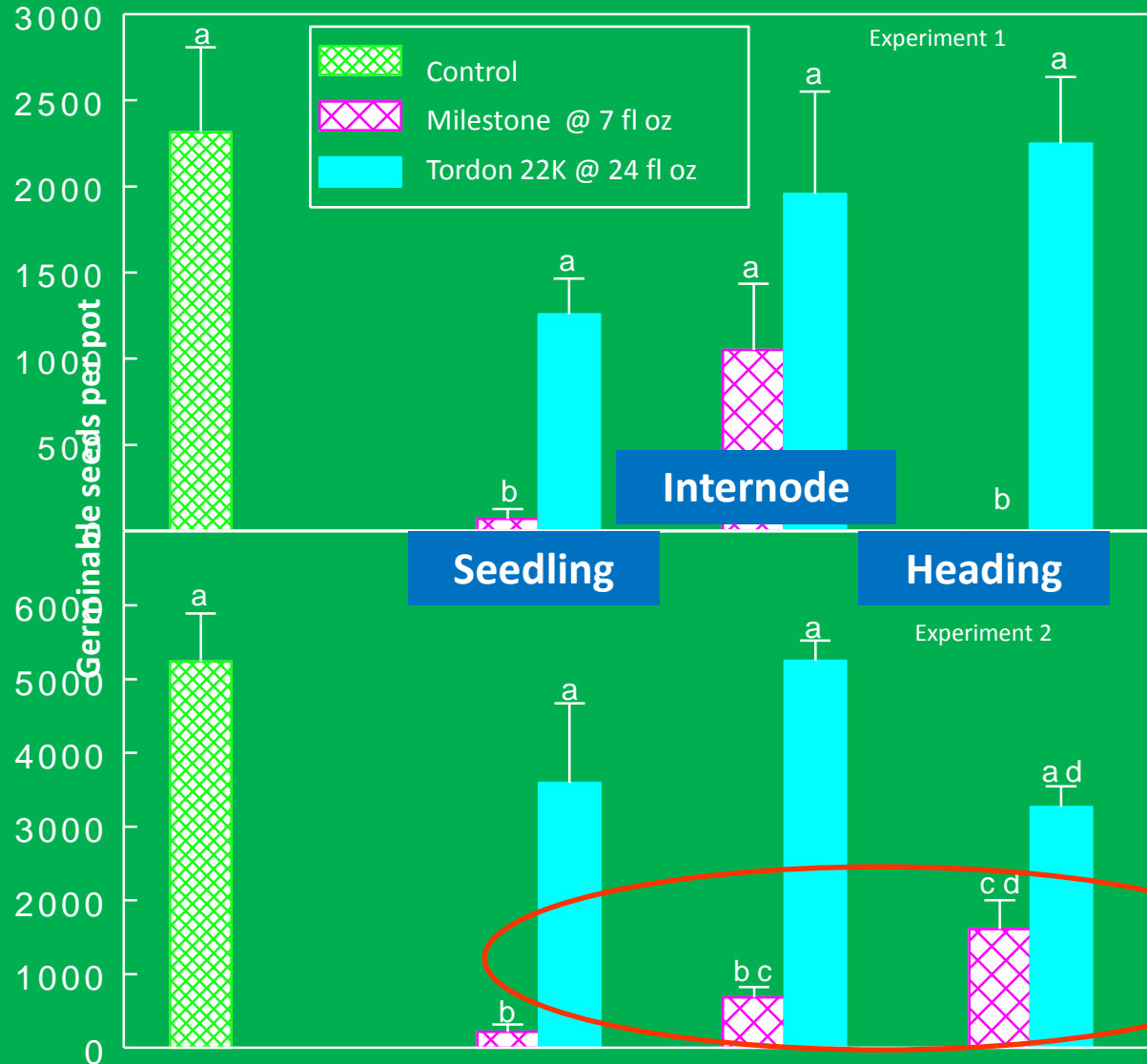
3.5 fl oz/A or 7 fl oz/A

Tordon 22K (picloram)

12.5 fl oz/A or 24 fl oz/A

Different letters on the bars indicate the means are statistically different

# Greenhouse results-Ventenata



14 GPA, broadcast

Timing:

Seedling, internode elongation,  
heading

Treatments:

Milestone (aminopyralid)  
3.5 fl oz/A or 7 fl oz/A

Tordon 22K (picloram)  
12.5 fl oz/A or 24 fl oz/A

Different letters on the bars indicate the means are statistically different

# Herbicide Effects on Seed Development

These are Japanese brome hulls\* but the same lack of seed development occurs with medusahead and ventenata

Normal Seeds



Milestone treated plants



\* see research data on previous slide

# Conclusions

- These results suggest Milestone, could be used to control a wide range of invasive annual grass species by depleting their short-lived seedbanks
- Milestone<sup>®</sup>
  - **Reduced medusahead seed production to nearly zero** at all growth stages (seedling, internode elongation, heading) and at both rates
  - **Reduced Ventenata seed production 95-99%** when applied at the seedling stage
- Tordon<sup>®</sup> 22K
  - Reduced medusahead seed production, but responses varied
  - Appears to have **low activity against Ventenata** seed production



# Milestone and Opensight herbicides

- 2(ee) Label Recommendations and now on the section 3 Milestone label
  - For Control or Suppression of Medusahead Rye and Other Winter Annual Grasses
    - »Cheatgrass (downy brome)
    - »medusahead rye
    - »Ventenata

# *Supplemental Label for Medusahead Control Issued in 2011*

## **Product Bulletin**



**Dow AgroSciences LLC**

**9330 Zionsville Road**

**Indianapolis, IN 46268-1054 USA**

**Milestone<sup>®</sup>**

EPA Reg. No. 62719-519

**2(ee) Recommendation<sup>†</sup>**

**For Distribution and Use in the States of Arizona, California, Colorado, Idaho,  
Oregon, Nevada, Utah, Wyoming**

**For Control or Suppression of Medusahead Rye and Other Winter Annual Grasses**

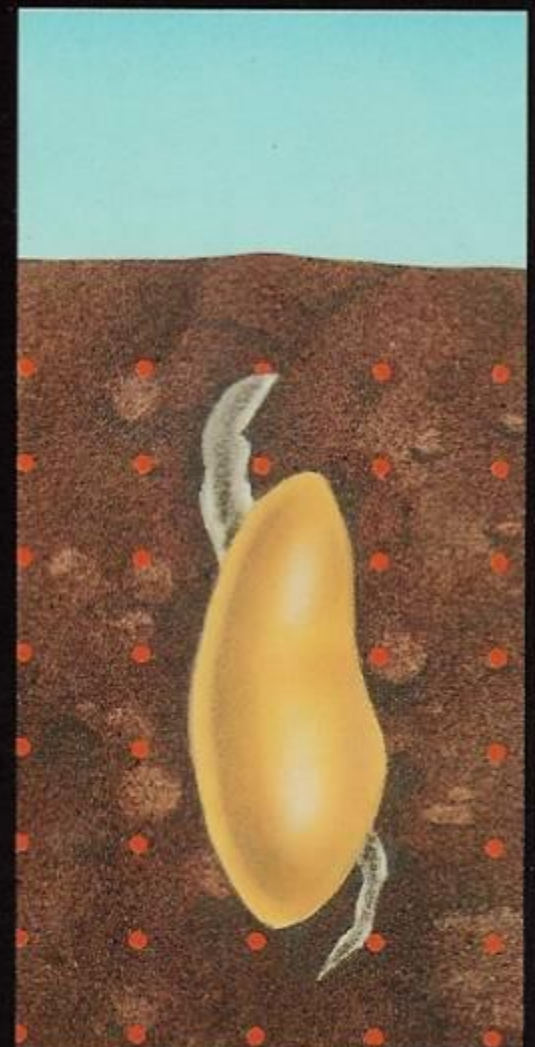
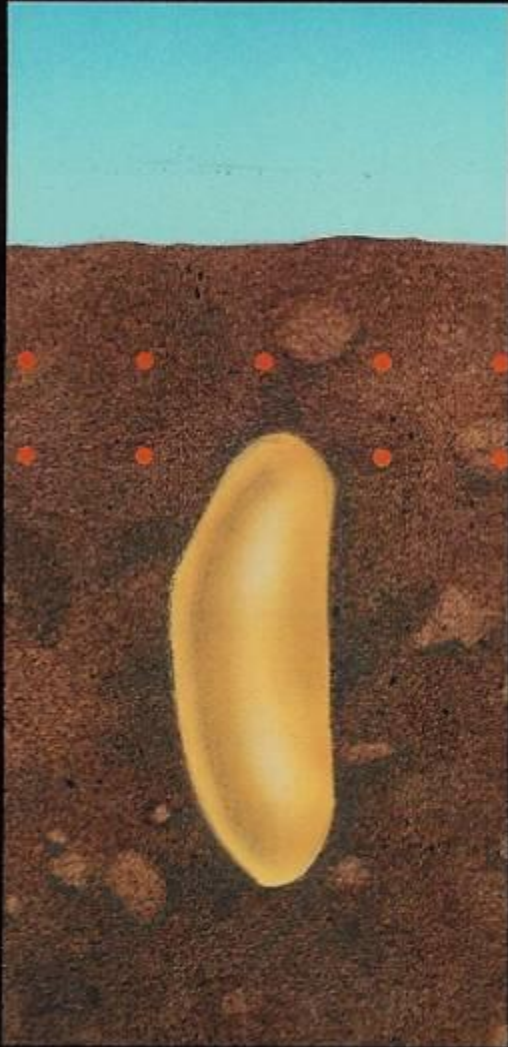
### **ATTENTION**

**† This recommendation is permitted under FIFRA 2(ee) and has not been submitted to or approved by the EPA.**

- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- Read and follow all applicable directions for use, precautions and limitations on the product label attached to the container for Milestone<sup>®</sup> herbicide.

Refer to Milestone<sup>®</sup> herbicide product package label for further use directions including requirements for

# *Weed Seed in Chemical Zone*





# Latest Literature Piece 2013



## **Medusahead control with Milestone<sup>®</sup> herbicide**

Rick Miller<sup>1</sup>, Beau Miller<sup>1</sup>, Vanelle Peterson<sup>1</sup>, Scott Oneto<sup>2</sup>, Guy Kyser<sup>3</sup>, and Joe DiTomaso<sup>3</sup>

1/Dow AgroSciences, 2/UC Cooperative Extension Central Sierra, and 3/University of California Cooperative Extension, Davis

# Milestone<sup>TM</sup> Herbicide

## New Reduced Risk Herbicide

For Control of Invasive and Noxious Broadleaf Weeds in Rangeland, Pastures, Riparian Areas, Industrial Vegetation Management Sites, and coming Aquatic sites in 2015!!!



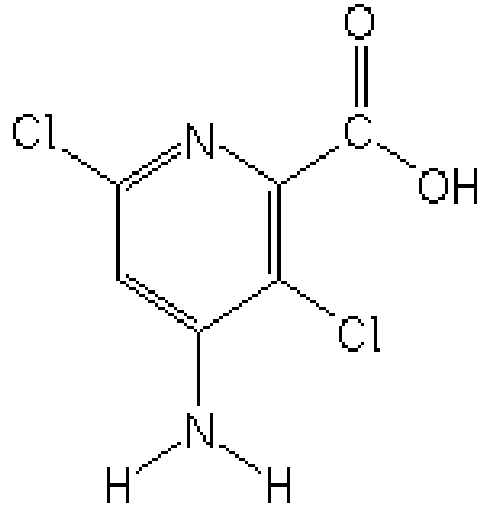
**Milestone<sup>TM</sup>**

**Specialty Herbicide**

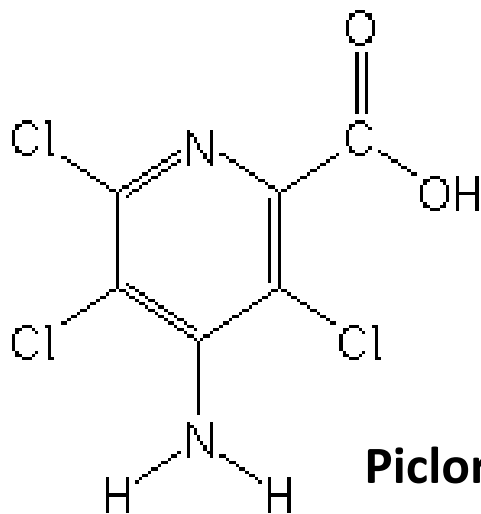
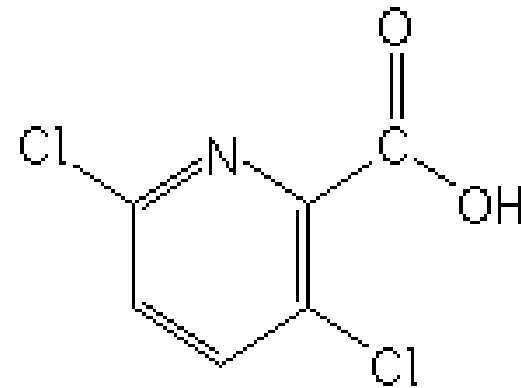
TMTrademark of Dow AgroSciences LLC

# Molecular configuration

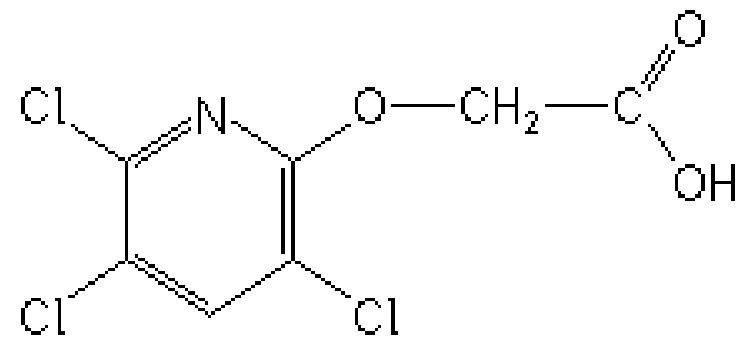
**Aminopyralid (Milestone)**



**Clopyralid (Transline)**



**Picloram (Tordon)**



**Triclopyr (Garlon)**

# What's New?

## Expanded Milestone Label is Here

- 75 broadleaf weeds now labeled
- 17 broadleaf families represented
- New updated spot treatment section
- Medusahead on sec 3 label

1 quart tip n' pour

- Treats 5-10 acres

2 ½ gallon jug

- Treats 50 – 100 acres



# Registered Use Sites Milestone

- **Rangeland & pastures** no grazing restrictions
- Conservation Reserve Program acres
- Non-cropland areas (such as roadsides)
- Non-irrigation ditch banks
- Irrigation ditch tops and outer banks
- Natural areas (such as wildlife management areas, wildlife habitats, campgrounds, trailheads and trails)
- **Aquatic coming soon!!!**

# Milestone Ecotoxicology Review

**Based on laboratory studies Milestone is practically non-toxic**

**Birds** - bobwhite quail  
mallard ducks

**Fish** - rainbow trout  
bluegill sunfish  
sheepshead minnow  
fathead minnow



# *Milestone is Practically Non-toxic*

## Milestone Ecotoxicology Review

### **Aquatic invertebrates**

*Daphnia magna*

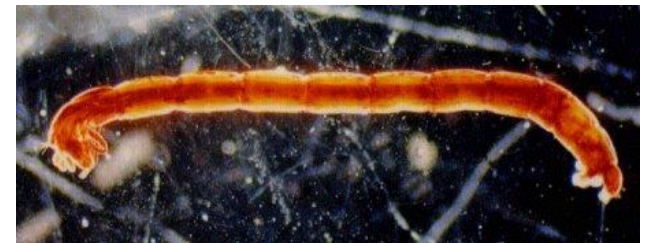
mysid shrimp

eastern oyster (slight toxicity)

midge (*Chironomus riparius*)

### **Terrestrial invertebrates**

honeybees and earthworms



# Milestone

## Environmental Fate Summary

- **NO** significant metabolites (only CO<sub>2</sub> and NH<sub>3</sub>)
- **Moderate degradation rates in soil**
  - Soil half life = 34.5 days (average of 4 studies)
- **Limited Soil Mobility**
  - Low leaching potential
- **Aquatic degradation**
  - Degraded by sunlight in surface water
- **Low groundwater contamination potential**
  - Low application rate and moderate field degradation
- **Low vapor pressure reduces volatility**



# Milestone Herbicide Aminopyralid Spot Treatment Q&A



A black and white photograph of a person wearing a cap and a backpack, walking through a field of tall grass and brush. The person is positioned in the middle ground, slightly to the left. The background shows a valley with some buildings and a power line tower under a clear sky.

## Milestone Herbicide Aminopyralid Spot Treatment Q&A

### **What is a Spot Application?**

The EPA has not established a standardized definition for Spot Treatment, but instead, manages application of Spot Treatment by product, within the product's label.

# Milestone Spot Treatment Label

***“Spot treatments may be applied at an equivalent broadcast rate of up to 0.22 lb acid equivalent (14 fl oz of Milestone) per acre per annual growing season; however, not more than 50% of an acre may be treated at that rate. “***

***-Milestone label Pgs 3, 5, 8.***

***-Capstone label pg 4***

# Where are we headed?

## Program approach and why it might work

- Why it might work?
  - Medusahead seed has a short viability – about 3 years
- Program:
  - Preemergent applications in the fall with Milestone at either 7 or 14 fl oz/A
  - Follow-up post emergent application in the spring of Milestone at 5 – 7 oz rate to reduce/eliminate seed viability
  - Follow-up with spot applications as needed

# 2014 and 2015 Research

- Field trials in CA in 2014 and repeated in 2015 on the seed viability reduction
- Trials in the Intermountain west (UT and ID) to test effectiveness of the pre and post emergent applications – NA15L1B032
  - UT trial started in spring 2015 -VFP1537
  - ID trial started in fall 2015 – VFP1533

*From Dow AgroSciences*

**Thank you for your business and for  
all of your support!**

