

# Medusahead Control with Milestone Herbicide

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Dow AgroSciences

Solutions for the Growing World



### WHAT'S NEW

1. Research update on Fall Pre and Spring post Medusahead control with Milestone
2. Milestone expanded label
3. Future plans



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Medusahead  
(*Taeniatherum caput-medusae*)

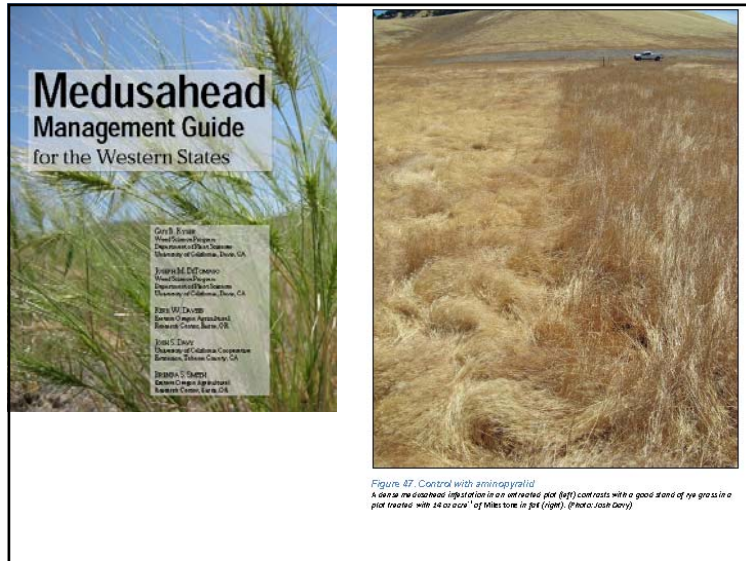


Distribution of medusahead in the U.S.



Burn it,  
eat it,  
spray it!!!

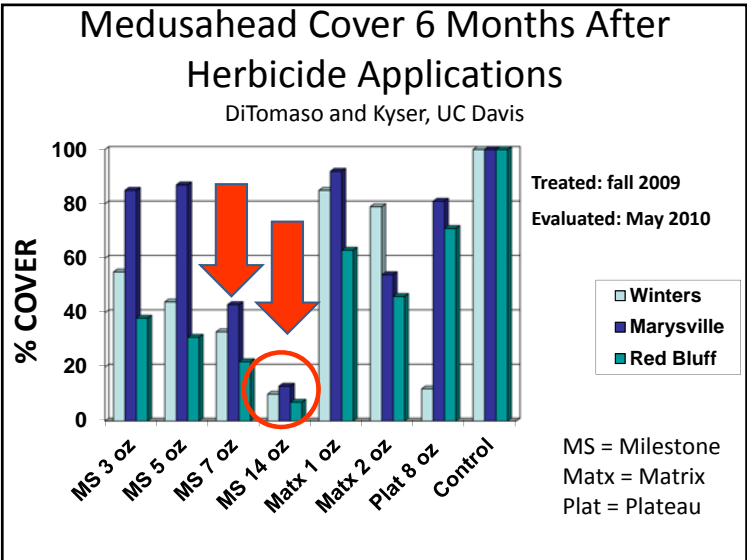


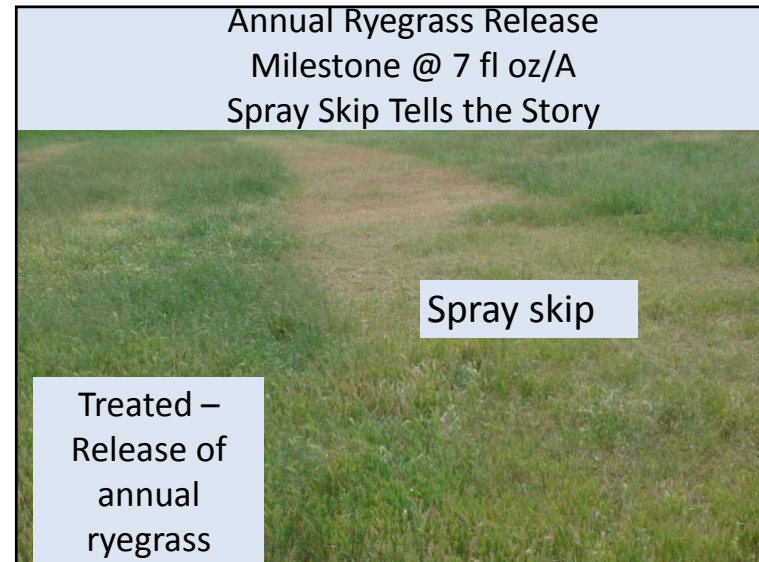


Previous medusahead research – all with excellent results

- 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)

**PREVIOUS WORK**

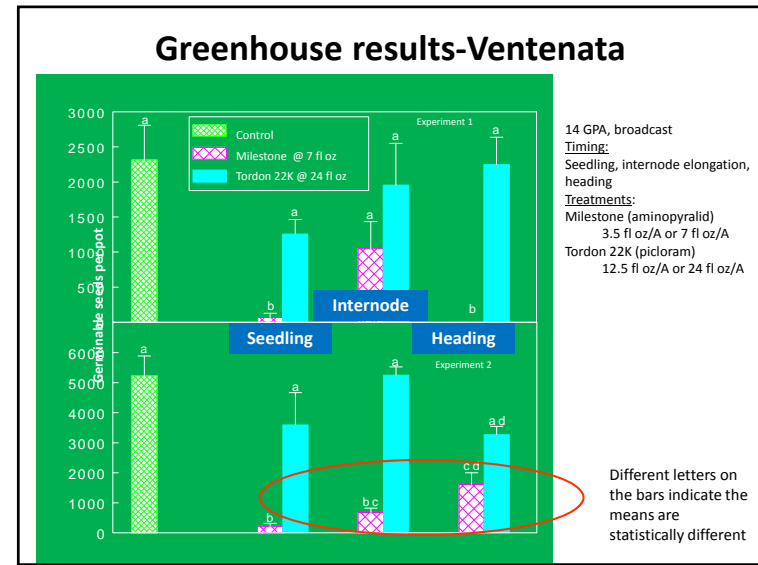
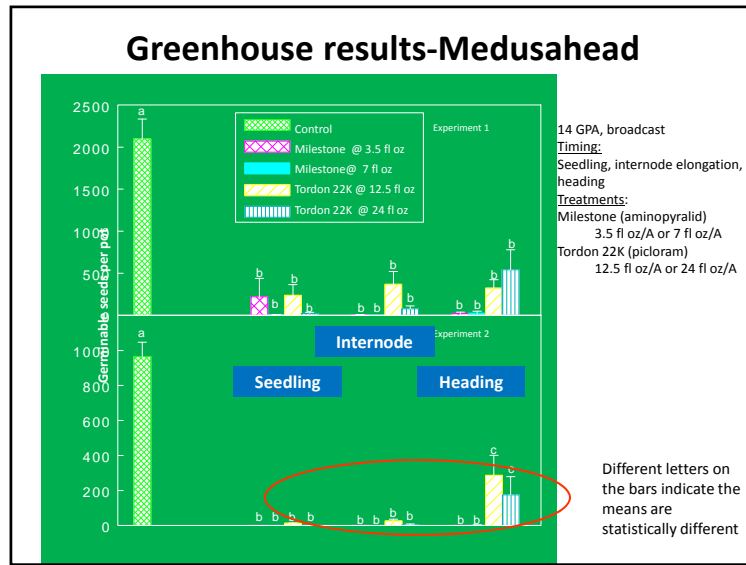




## SEED VIABILITY



### Research on Milestone® 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?




### 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

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### 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®**  
EPA Reg. No. 62719-519  
2(ee) Recommendation†

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® herbicide.

Refer to Milestone® herbicide product package label for further use directions including requirements for

### Latest Literature Piece 2013



**Medusahead control with Milestone® 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

### Program approach and why it will work

- Why it will 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 to reduce/eliminate seed viability
  - Follow-up with spot applications as needed

### 2014 and 2015 Research

- 2014 field trials in CA in partnership between Dr. Matt Rinella and the University of California where repeated in 2015 to observe seed viability
- Trials established in the Intermountain west (UT and ID) to test effectiveness of the pre and post emergent (fall and spring) applications
  - Data will be taken in 2016

### Preliminary Information CA 2015 Research Methods

- \* 4 treatment sites in California
- Milestone® applied at 3, 7 or 14 oz in the Spring or
- Milestone applied at 7 or 14 oz in the Fall
- \* Seeds were collected from medusahead, wild oats, soft chess and annual rye and tested for viability
- \* Percent cover of species of interest was estimated

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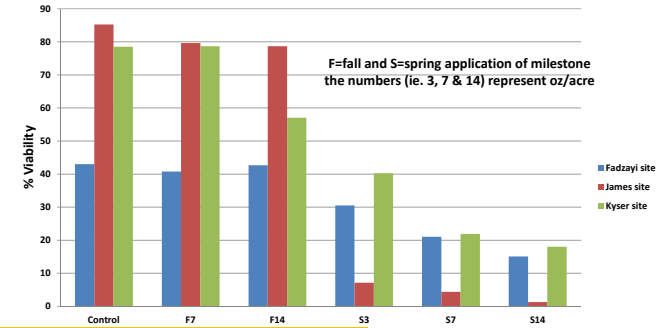
### Growth stage of grasses and timing of Fall application of Milestone

	Madera	SFREC	Bobcat	Red Bluff
application date	12/10/2013	10/15/2013	11/25/2013	9/27/2013
Species	<u>Growth Stage at time of application</u>			
Medusahead	pre-emergence	pre-emergence	pre-emergence	5%-10% germ
Soft Chess	pre-emergence	pre-emergence	pre-emergence	pre-emergence
Annual Rye	pre-emergence	pre-emergence	pre-emergence	n/a
Wild Oat	re-emergence	pre-emergence	pre-emergence	n/a

**Growth stage of grasses and timing of spring application of Milestone**

	Madera	SFREC	Bobcat	Red Bluff
application date	5/2/2014	4/18/2014	4/17/2014	4/14/2014
<b>Species</b>	<b>Growth Stage at time of application</b>			
Medusahead	late boot with few heading	10% headed/90% late-veg/early boot	late-veg/early boot	mid to late boot
Soft Chess	boot to heading	fully headed out	fully headed out	headed
Annual Rye	boot	fully headed out	fully headed out	n/a
Wild Oat	boot to heading	fully headed out	early heading	n/a

**Viability of medusahead seed in 2014 following application of Milestone at varying rates in the fall 2013 and spring 2014**

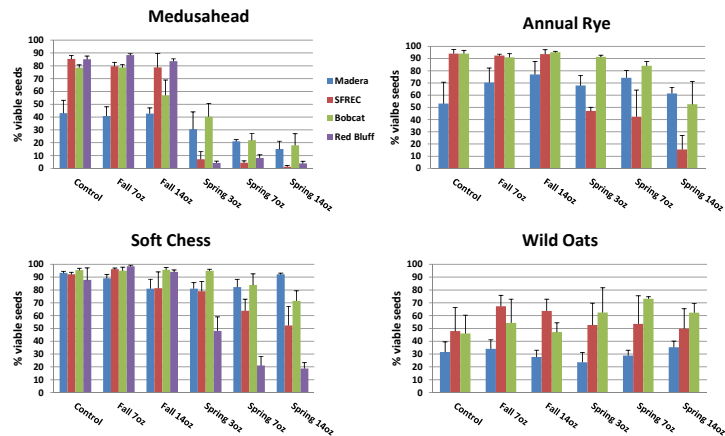


- At 14 fl oz Milestone seed viability reduction:
- 30% reduction at "Fadzayi site"
- 84% reduction at "James site"
- 60% reduction at "Kyser site"

NOTE: little to no rainfall at the "Fadzayi site"

Dr. Matt Rinella and University of California

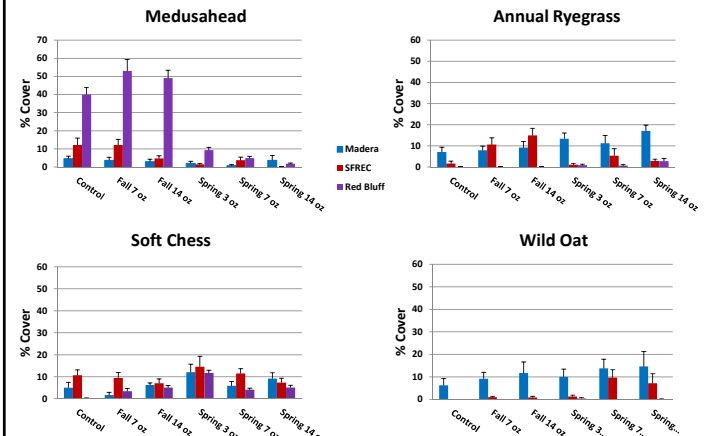
**Viable seed production following application of Milestone at varying rates in the fall and spring**



\*Note – Wild oats and Annual Rye did not occur at the Red Bluff site

Dr. Matt Rinella and University of California

**2015 cover estimates following application of Milestone at varying rates in the fall and spring**



\*Note – The Bobcat site was burned in the summer of 2014 so no cover data was collected

Dr. Matt Rinella and University of California

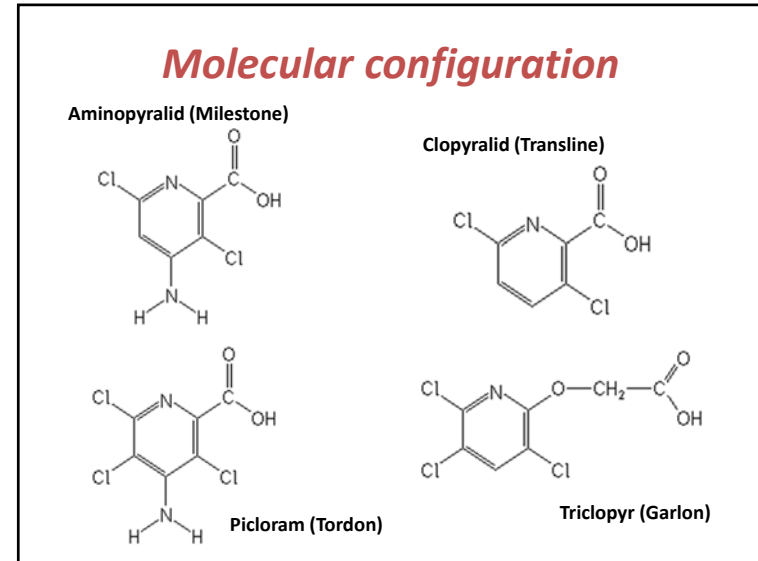
## Milestone™ Herbicide

**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!!!


Specialty Herbicide



### What's New?

#### Expanded Milestone Label is Here

- 75 broadleaf weeds now labeled
- 17 broadleaf families represented
- New Pre-emergent 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, restoration sites and trails)

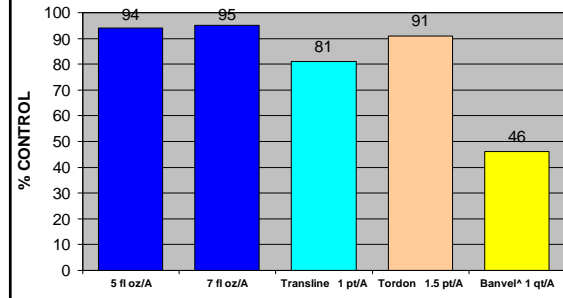


### Thistle Control plus 70 + other weeds



Milestone™ @ 7 fluid oz/acre 365 days

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

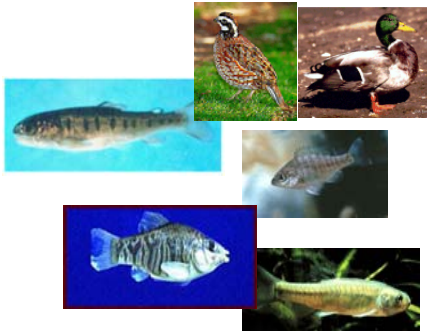


**Milestone**  
Evaluations at 1 year after treatment. Average of 22 trials in VA, ND, SD, NE, WY, CO, and WA  
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### Milestone Ecotoxicology Review

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*
- mysis shrimp
- eastern oyster (slight toxicity)
- midge (*Chironomus riparius*)

#### Terrestrial invertebrates

- honeybees and earthworms



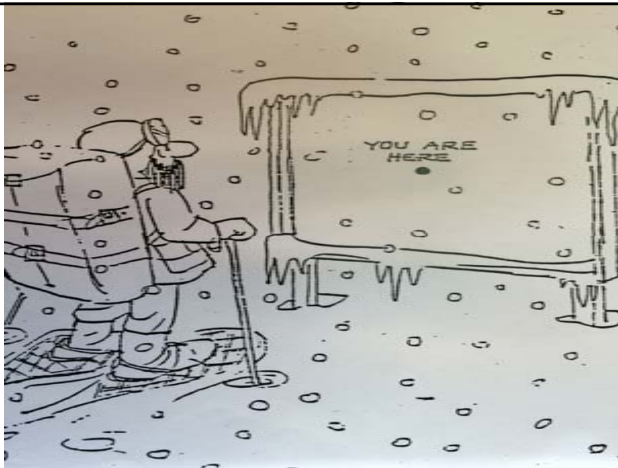
## Milestone Environmental Fate Summary

- **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**

## Where are we headed?

### Program approach and why it will work

- Why it will work?
  - Medusahead seed has a short viability – about 3 years
- Program:
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  - 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



*From Dow AgroSciences*

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

