

# Weed Management on Rangelands



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Agriculture and Natural Resources



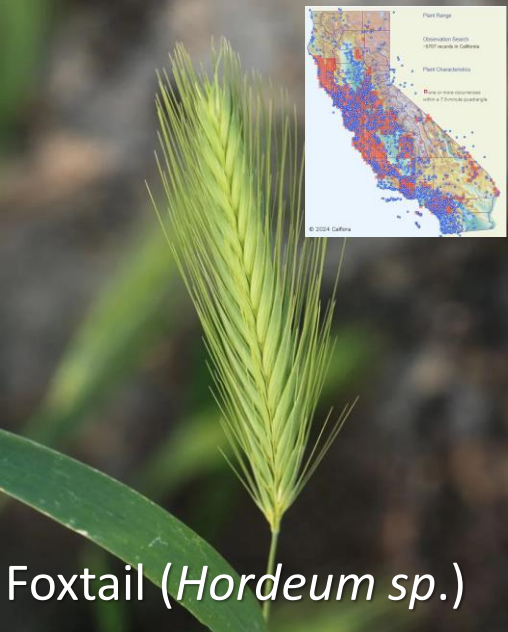
# Medusahead

(*Elymus caput-medusae*)

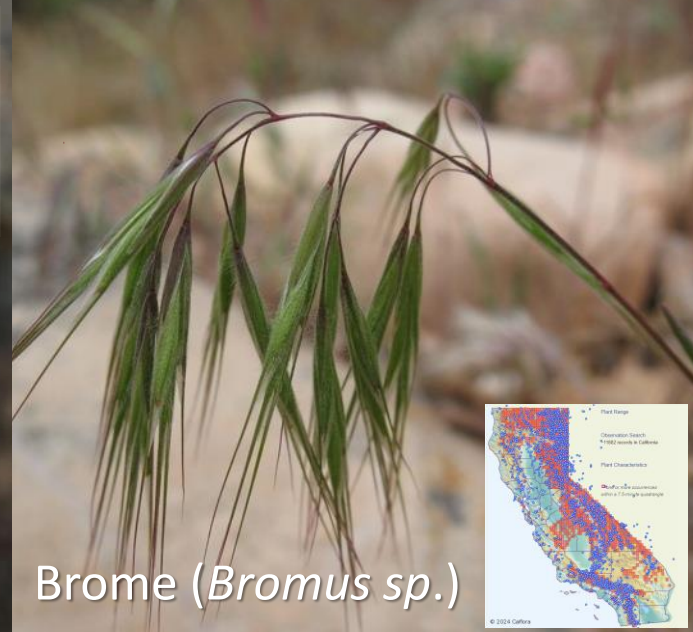


# Barb goatgrass

(*Aegilops triuncialis*)



Foxtail (*Hordeum sp.*)



Brome (*Bromus sp.*)



# Yellow starthistle

(*Centaurea solstitialis*)



# Stinkwort

(*Dittrichia graveolens*)



# Rush skeletonweed

(*Chondrilla juncea*)



# Italian thistle

(*Carduus pycnocephalus*)



# Impacts

- Transformer species – create monocultures
- Poor forage or unpalatable during certain periods
  - Can reduce carrying capacity
  - Nasty awns/spines can cause injury to animals
- Medusahead is high in silica
- Produces a thick thatch
  - Prevents other plant seeds from contacting soil surface
  - Ties up nutrients











# Why are these weeds invading?

- Weather
- Highly competitive
- Low palatability
- Low grazing pressure
- Grazing timing
- Grazing desirables and leaving the junk?



# Life Cycle

- Most are winter annuals
  - Exceptions
    - Bull thistle –biennial
    - Milk thistle – annual or biennial
    - skeletonweed- perennial
- Rely on seed production for survival
- *Winter weeds* - germinate with first fall rain and can continue to germinate through spring



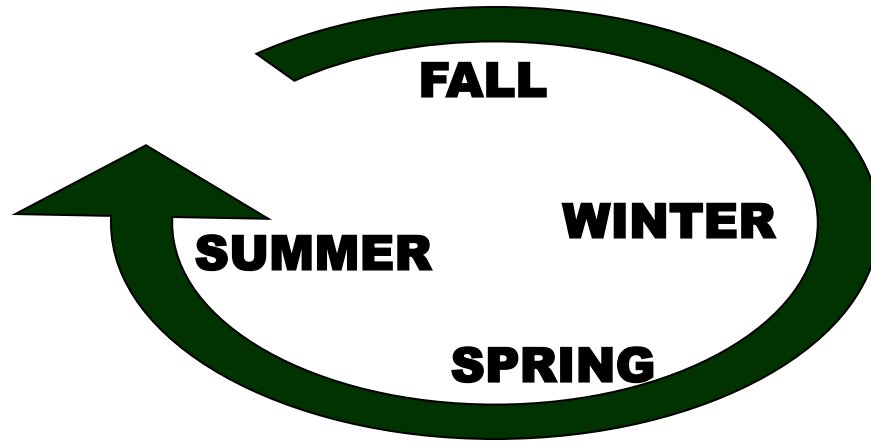




**Seedling**



**Rosette**



**Flowering**



**Bolting**

***Annual life cycle***



# Control Strategies

## Cultural Control

- Grazing
- Burning

## Mechanical Control

- Mowing
- Hand pulling and hoeing

## Biological Control

- Insects
- Diseases

## Chemical Control

- Herbicides





# Grazing Strategies

- Grazing can be effective against yellow starthistle and many grasses
- High intensity – short duration grazing
  - 3-4 week window (April – May)
  - For Mh and Bgg, graze when awns are just starting to appear
  - For YST graze during the bolting stage
- Multiple grazing treatments may be required to prevent flowering
- Grazing too early can increase weed population
- DON'T graze yellow starthistle or other *Centaurea* species with horses!!!!





# Grazing







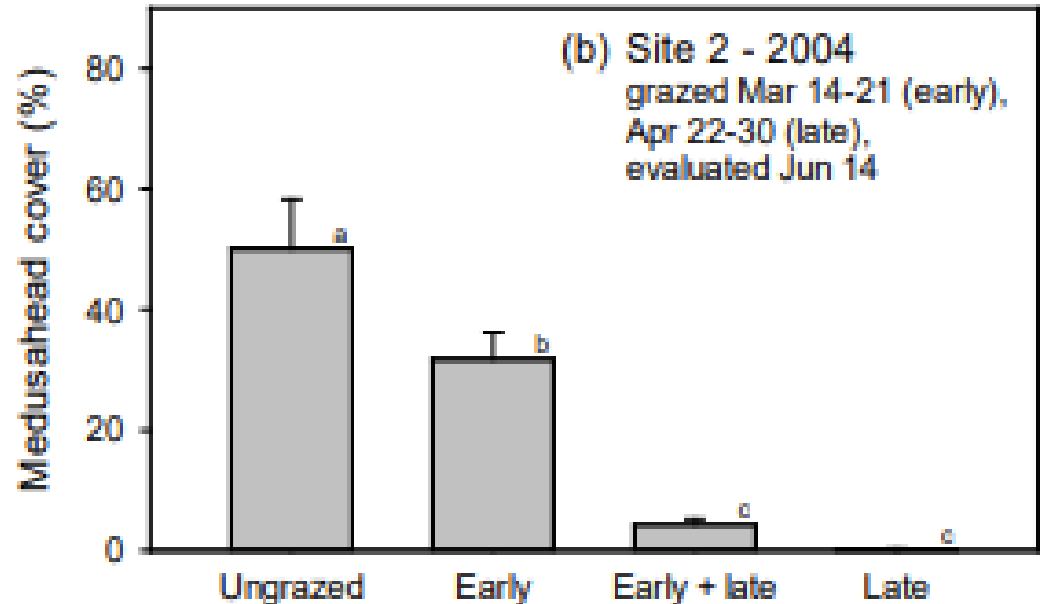
**End of May grazing**



# The effects of timing on medusahead control

4 treatments:

- Ungrazed
- Early spring
- Early spring & late spring
- Late spring





# Grazing Hurdles

- California rangelands are not setup for intensive grazing
  - Consider cross fencing  
(funding might be available through NRCS – EQIP Program)
  - Increase utilization using supplement tubs
  - Portable electric fence
  - Virtual fencing





The background of the slide is a close-up photograph of a weathered wooden fence post. Several strands of rusty, twisted barbed wire are wrapped around the post. The lighting is dramatic, with strong shadows and highlights, suggesting a bright, sunny day.

# Introducing Virtual Fence Technology



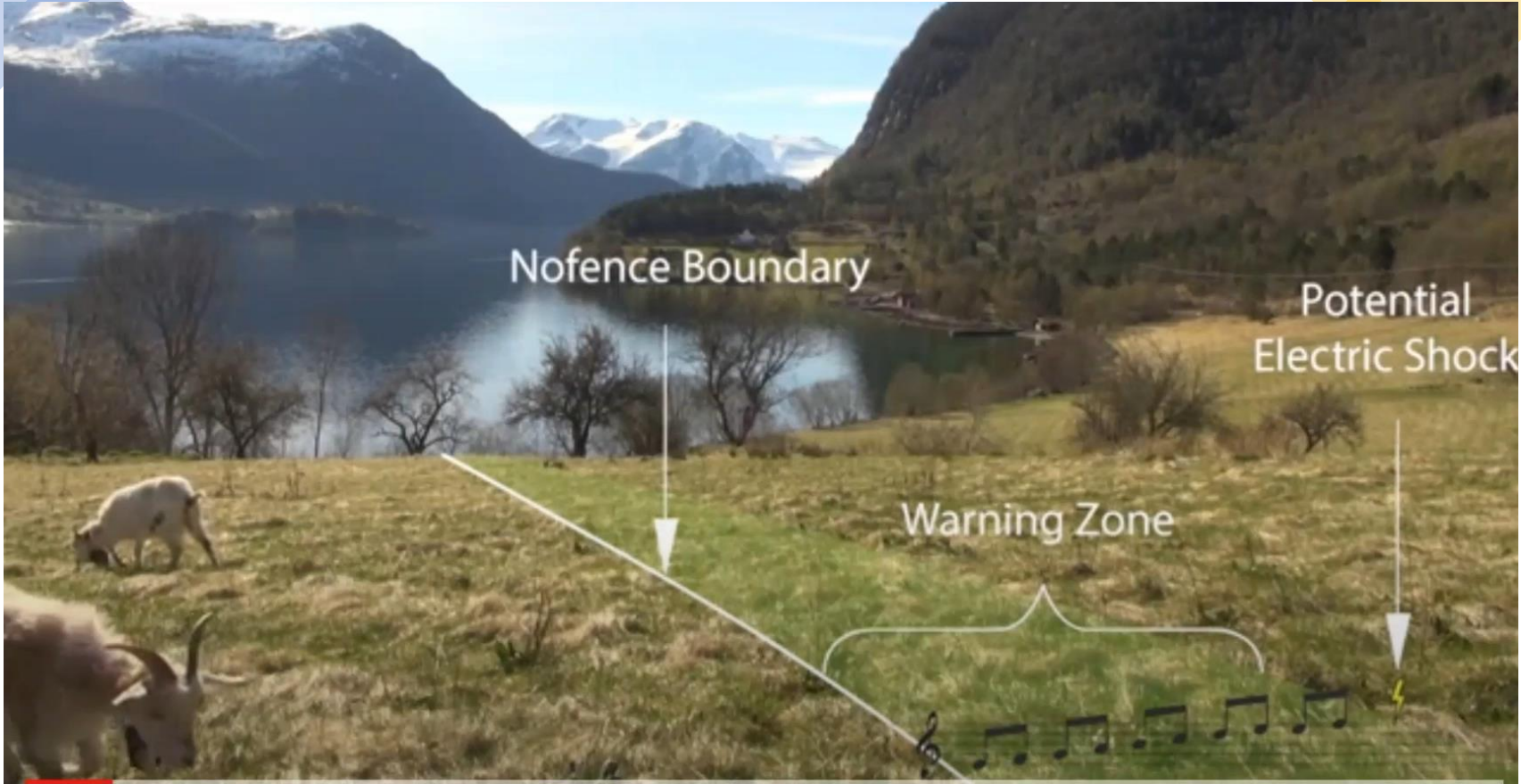




## Virtual Fencing

- VF technology uses collars and GPS to create an invisible pasture to contain livestock.
- Pastures are delineated on a user interface
- Animals are fitted with collar that transmits data to/from the user interface
- System keeps precise location of animals and tracks movement





Nofence Boundary

Potential  
Electric Shock

Warning Zone





May 7, 2024



May 17, 2024



# Burning

## Late spring – early summer burn

- Kill plants before seed production
- Timing: late April – early June
- Need adequate dry fuel to carry fire
  - If adequate fuel isn't present – patchy burn...poor control
- If fire is late, seeds that have dropped are protected on soil surface
- CalFIRE – VMP Vegetation Management Program



# Burning





# Burning

## Fall burn

- Kill newly germinated seedlings
- Timing: during a dry period after fall green-up
- Need to have adequate dry fuel
  - If adequate fuel isn't present – patchy burn...poor control
- Very short treatment window

# Burning Considerations

- Burning leaves bare ground
- Burning releases nutrients on the site
- Reseeding is often required
- YST and Bgg are released after a burn – must follow up following year with another control strategy
- Often difficult to burn two years in a row



# Mowing



*Goal: Prevent seed production*

- Timing – early flowering
- Mow as low as possible 1-2”
- Short window (April - May)

## CAUTION

- Don't mow too early!
- Don't mow late!
- Beware of **FIRE!**









# *Examining the Potential Benefits of Dusting Rangelands with Compost for Weed Suppression*





# Site Selection



- 5 ranches across Amador County
- Different soil types
- Similar grazing management
- Sites with noxious weeds
  - Yellow starthistle, medusahead, barbed goatgrass

## Treatments

1. No treatment (control)
2. Seeded with clover cover crop
3. Compost
4. Compost applied & Seeded with clover mix



# Setting up the Trial - Spring 2019

Each ranch has four treatments with each treatment replicated 3 times.

Each treatment measures 0.5 acre with a block of all four treatments measuring 2 acres.





## Compost Applications and Seeding - Fall 2019



*200 yards of compost was delivered to each ranch.*

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*Clover cover crop was applied to two treatments;  
seed only, and seed plus compost –  
broadcast at 20 lbs/acre*

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# COVER CROP

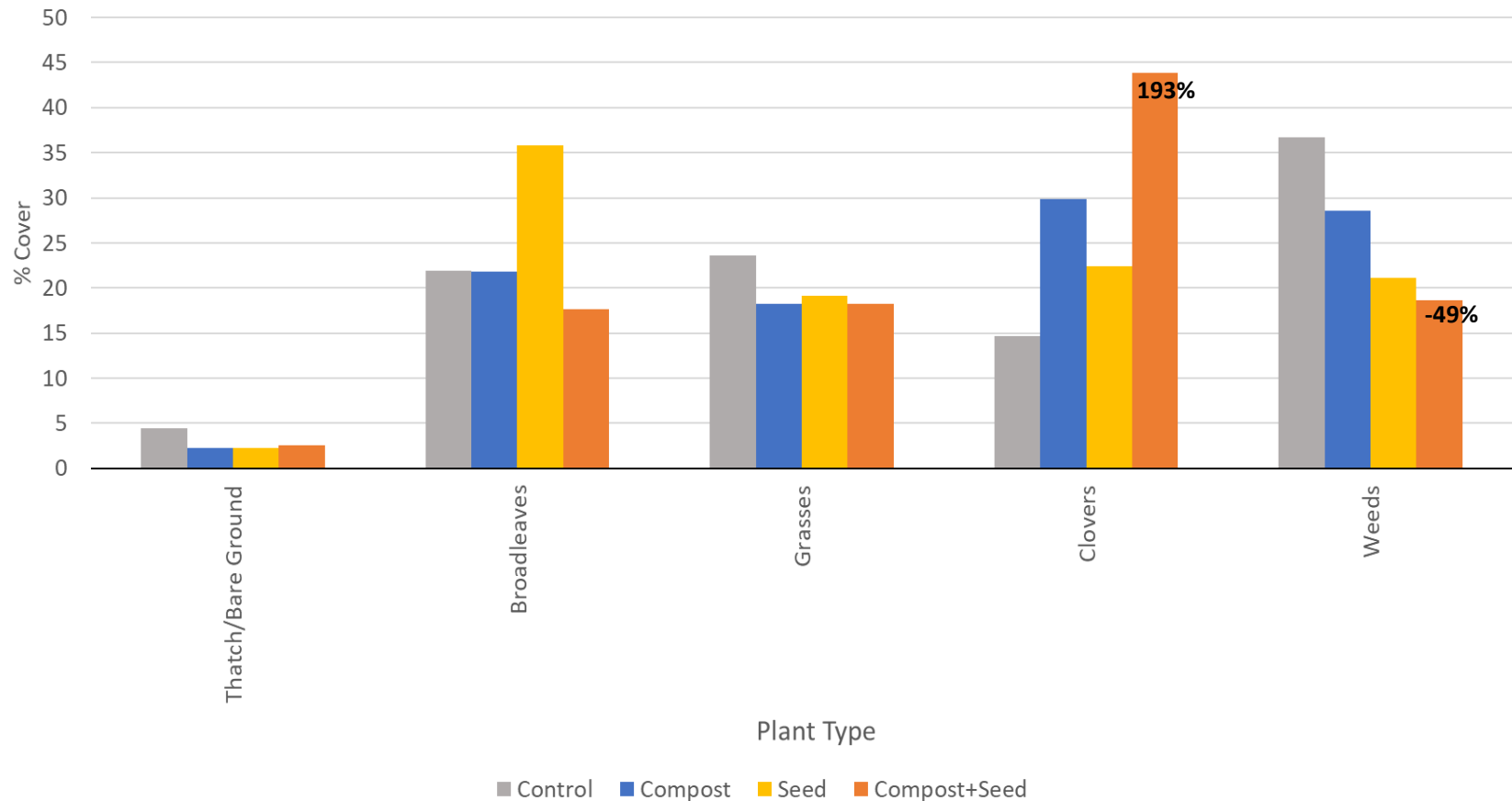
PRODUCT NAME	LOT NUMBER	NET WT				
PURE PRODUCT		50 LBS.				
		GERM	HARD	EMERAL	TEST	
3.34% *PK JESTER MEDIC		90%	6%	96%	7-19	
6.52% *PK SUNRISE BALANSA CLOVER		32%	65%	97%	3-19	
6.56% *PK ROSE CLOVER		92%	3%	95%	4-19	
6.57% *PK LOSA SUBCLOVER		92%	4%	96%	9-19	
6.58% *PK SEATON PARK SUBCLOVER		88%	4%	92%	9-19	
6.59% *PK NITRO PERSIAN CLOVER		92%	5%	97%	9-19	
9.87% *PK CAMPEDA SUBCLOVER		86%	9%	95%	2-19	
9.87% *PK ANTAS SUBCLOVER		86%		86%	7-19	
9.89% *PK MONTI SUBCLOVER CLOVER		70%	3%	73%	4-19	
OTHER CROP	.00%	INERT MATTER	34	21%	WEED SEED	.00%
ORIGIN AUS. OR						NO NOXIOUS WEEDS



# Plant Diversity

## The Effects of Compost and/or Seeding on Annual Rangelands

% Cover by Plant Type  
All Years





# Dollars and Cents

- Compost
  - \$20 / ton (not delivered)
  - At 30 tons/acre = \$600
- Delivery
  - Can vary depending on distance from facility (\$10/ton)
- Application
  - Can also vary depending on application method (owner operator versus hired)
  - If buying direct and having it delivered by compost facility, many will include spreading as part of total rate.



# Chemical Control

- Herbicides used for rangeland weed control
  - Glyphosate
  - Chlorsulfuron
  - 2,4–D
  - Triclopyr
  - Clopyralid
  - Aminopyralid



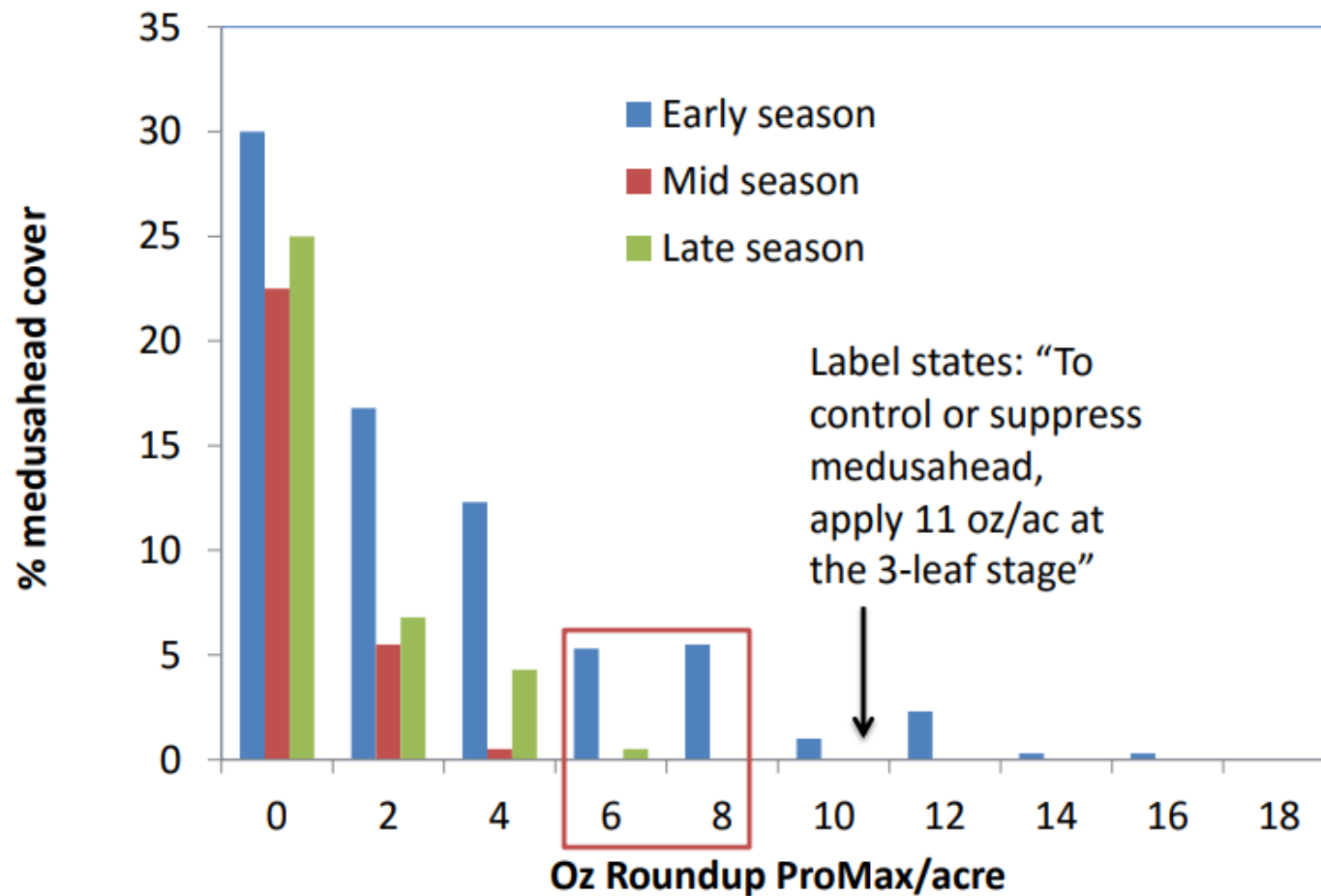


# Glyphosate

- Post emergent
- Non-selective
- Applications
  - Spot treatment (1-4% solution)
  - Broadcast treatment
    - Apply mid to late spring (6 – 12 oz/ac)
  - Must be applied before seed set



# Medusahead control with low rates of glyphosate



# Aminopyralid

- “Selective” – Broadleaf herbicide
- Typically used as a selective herbicide for yellow starthistle and other thistles
- One application provides entire season of control
- Also effective against medusahead and cheatgrass (timing and rate are important)
  - Fall application 14 oz/acre
  - Late Spring 5 oz/acre (doesn't kill plant but aborts seed)
- No control of Bgg



# 6 Step Program

## 1. Know your enemy

- Learn to identify your weeds
- Learn about their biology

## 2. Develop a prescription for each pasture every year

## 3. Use all your tools

## 4. Prevent weed seed production

- Annuals

## 5. Deplete seed bank

- Yst: 3 – 5 years
- Mh: usually one year
- Bgg: 2 - 3 years

## 6. Monitor



University of California  
Division of Agriculture and Natural Resources  
<http://anrcatalog.ucdavis.edu>  
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### Barb Goatgrass

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Barb goatgrass (*Aegilops triuncialis* L.; see Fig. 1) is a winter annual that is native to Mediterranean Europe and western Asia. Although barb goatgrass was first identified in California in the early 1900s, its rapid spread is relatively recent. Its first introduction into California was associated with the importation of Mexican cattle to El Dorado and Sacramento Counties.

This species is expanding throughout Northern California and the Central and South Coast in areas below 1,800 meters (5,900 feet) in elevation. Barb goatgrass populations quickly create a devastating monoculture (Fig. 2) that displaces species diversity, forage quality and quantity, and wildlife habitat or rangeland areas. It primarily inhabits dryland fields, meadows, annual rangelands, and oak woodlands in both disturbed and undisturbed areas. Infestations generally do not occur in irrigated areas. A distinguishing feature of barb goatgrass is its ability to germinate in varying types of conditions, including summer conditions, including summer annual grasses with which many annual grasses have not prospered.

Barb goatgrass is one of three goatgrass species prevalent in California. The others are jointed goatgrass (*Aegilops cylindrica* Host) and creole goatgrass (*Aegilops creola* L.). All three goatgrass species can hybridize with wheat (*Triticum aestivum* L.) and are currently B-rated noxious weeds in California by the California Department of Food and Agriculture. A rating of B indicates goatgrass as a species that has a detrimental economic importance, as it is the second highest of five possible ratings (A, B, C, D, or E). The rating system is used as a guideline for county agricultural commissioners to establish priority in dealing with pests. Ratings are based on the impact of the pest, the distribution of the pest, and the resulting ability for it to be controlled or eradicated.





TechLine  
INVASIVE PLANT NEWS  
INNOVATIVE RESEARCH, SUCCESS STORIES, AND TIPS FOR INVASIVE PLANT MANAGERS

### Medusahead Seed Suppression with Spring Application of Milestone® Specialty

By Josh Davy, Guy Kyser, Joseph DiTommaso, Matthew Rosella, and Grace Washburner  
Edited by Celestine Dawson

Medusahead (*Taeniatherum caput-medusae*) is an invasive annual winter grass that plagues western rangelands in eight western states (Figure 1). Controlling this grass is a challenge, in part due to difficulty in selectively targeting an undesired single grass in a grassland environment and because the economic return on investment for control can be low on western rangelands. Recent research showed that medusahead could be controlled by applying Milestone® specialty herbicide pre-emergence in the fall at 14 fluid ounces per acre (fl oz/A), with suppression achieved at 7 fl oz/A. However, the 14 fl oz/A rate is only registered for use as a spot treatment with not more than 50 percent of an acre treated.

Greenhouse studies by Dr. Matt Rosella with USDA-ARS in Montana found a reduction in medusahead's ability to produce seed if Milestone was applied during the boot growth stage. The



### Weed Control in Natural Areas in the Western United States

Weed Research & Information Center • University of California




### Medusahead Management Guide for the Western States

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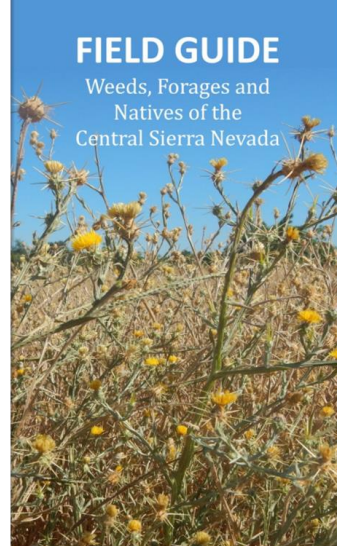
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### FIELD GUIDE

Weeds, Forages and Natives of the Central Sierra Nevada



<http://pubhtml5.com/sucj/lode>

University of California  
Agriculture and Natural Resources  
ANR Publication #567 | October 2016  
<http://anrcatalog.ucdavis.edu>

### Barb Goatgrass and Medusahead: Timing of Grazing and Mowing Treatments

**Barb goatgrass (*Aegilops triuncialis* L.) and medusahead (*Taeniatherum caput-medusae* (L.) Nevski)** are invasive annual grasses that have spread or have the potential to spread throughout much of California's annual grasslands. Originally from the Mediterranean, Middle Eastern, and Central Asian regions, these species were first introduced to the western United States in the late 1800s or early 1900s.

Barb goatgrass primarily occurs in California, although there are records from Washington, Oregon, and Nevada, as well as from some mid-Atlantic states (Meisinger et al. 2006). Medusahead is widespread in California and the Intermountain West, occupying roughly 2.4 million acres across the western United States (Duncan et al. 2004). Estimates for the extent of barb goatgrass infestation are not currently available, though it is much less widespread than medusahead. Barb goatgrass is a B-rated noxious weed and medusahead is a C-rated noxious weed in the State of California, meaning that they both cause economic or environmental detriment. Barb goatgrass has a higher rating due to its more limited distribution and, therefore, greater opportunity for containment than




Figure 1. Barb goatgrass and medusahead compared with other common annual grasses, showing a later phenology. Left to right: Barb goatgrass, jointed goatgrass, hairy barley, medusahead, riggud bromine, soft bromine. Photo: J. S. Davy

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<http://matchgraze.com>

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