

# Ecology and management of medusahead

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Adapted from an overview put together by  
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If you have questions about specific pesticides or pesticide uses outlined in this PowerPoint, please do not hesitate to contact the author, Matthew Shapero, for clarification.

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## Overview

Medusahead background  
Invasion dynamics  
Control  
Current Research



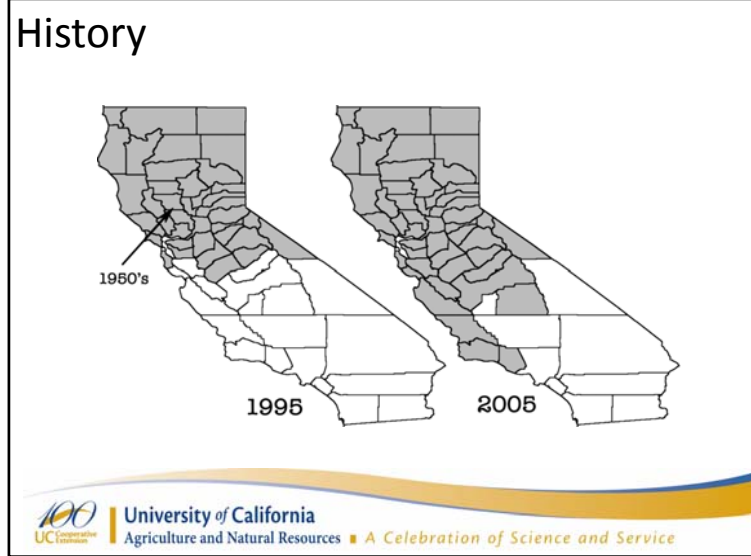
Photo: Emilio Laca

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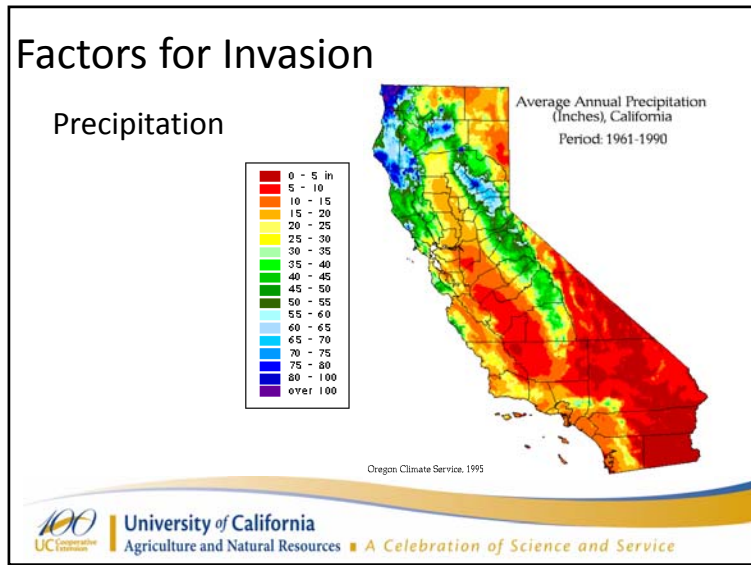


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Photo: Emilio Laca

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### Factors for Invasion

#### Soils

Photo: Alex Boehm

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## Factors for Invasion

Thatch



Photo: Gilbert DelRosario

## Factors for Invasion

Seed Dispersal



Photo: Erica Spotswood

## Impacts of Invasion

Decreased Habitat



Photo: Pacific Southwest Region US Fish and Wildlife Service

## Impacts of Invasion

Thatch



Photo: Ryan Steineckert



## Impacts of Invasion

Competition



Photo: Medusahead Management Guide for the Western States

## Impacts of Invasion

Decreased Grazing



Photo: Ryan Steineckert

## How do we combat it?

We need to understand medusahead growth



Photo: Medusahead Management Guide for the Western States

## Medusahead Growth Stages




V2



V3

Photos: Emilio Laca

### Medusahead Growth Stages




R4, beginning      R4      R5

Photos: Emilio Laca

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### Medusahead Growth Stages

Seed kernel development.



R7      R8      R9      M10

Photos: Emilio Laca

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### Phenology

- Stays green longer and matures later than most other annual grasses
  - Often doesn't mature until May
- Most seeds rapidly germinate in the fall (95-99%)
  - Practices that limit a single year of seed production can drastically reduce plant numbers

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## How to control medusahead

- Burning
- Herbicide
- Competition (seeding)
- Grazing
- Mowing



Photo: Josh Davy

## Burning

- Must be dry enough to carry fire
- Must be early enough that seeds have not dropped from the head
  - Fire is not great at controlling seeds on the soil surface



## Burning

- Advantage
  - Nearly eliminates medusahead plants
  - Does not harm clover, filaree, or perennial grasses
- Disadvantage
  - Grazing is very limited the next year due to very low forage production
    - May be three years before normal production returns
  - Most desirable annual grasses are also lost
  - Often by the time forage production returns to normal, so does the medusahead cover

## Herbicide

- Aminopyralid (milestone) before germination
- Aminopyralid in the spring
- Grass selective herbicides
- Glyphosate



Photo: Emilio Laca

## Aminopyralid before germination



## Aminopyralid before germination

- **Effective, but expensive** - \$2.85/ounce @ 14 oz/acre = **\$39.90/acre**
- 14oz/acre is only registered as a spot treatment
- A study at Red Bluff suggests that this approach lasts about 4 yrs

## Aminopyralid in the spring

- Still being tested
- Low rates are acceptable
  - 2-4 oz/acre possibly
- Does not kill plants, but prevents seed production



## Grass selective herbicides

Clethodim <i>Arrow 2EC</i>	<b>Rate:</b> 4 to 8 fluid oz product/acre (1 to 2 oz a.e./acre) <b>Cost (2013)<sup>1</sup>:</b> \$120/gal (~\$4 to \$8/acre) <b>Timing:</b> Early postemergence <b>Safety on established perennial grasses:</b> May vary by species and growth stage. Older, established bunchgrasses should be safe but may show injury. Annual grasses will be severely injured or killed. <b>Plantback interval:</b> None <b>Grazing restriction:</b> Depending on the type of application, label restrictions vary all the way from no restriction to "Do not graze." Check with your county before use. <b>Remarks:</b> Registered for use on noncrop, fallow ground, and native prairie restoration projects. Check with your county to make sure your intended use is permitted.
Fluazifop <i>Fusilade DX</i>	<b>Rate:</b> 24 fluid oz product/acre (6 oz a.e./acre) <b>Cost (2014)<sup>2</sup>:</b> \$170/gal (~\$32/acre) <b>Timing:</b> Early postemergence <b>Safety on established perennial grasses:</b> May vary by species and growth stage. Older, established bunchgrasses should be safe but may show injury. Annual grasses will be severely injured or killed. <b>Plantback interval:</b> None <b>Grazing restriction:</b> do not graze for 12 months after application <b>Remarks:</b> Registered for use on noncrop and fallow ground; 24(c) registration for wildland in California and Oregon. Check with your county to make sure your intended use is permitted.

From: Medusahead Management Guide for the Western States



## Glyphosate

Glyphosate  
*Roundup Pro*,  
*Accord XRT*, and  
others

**Rate:** 0.75 to 1 pt product (41% glyphosate)/acre (4.5 to 6 oz a.e./acre) for early-season selective control in shrubland or other perennial systems; 1 to 2 qt product/acre (0.75 to 1.5 lb a.e./acre) for late-season, non-selective control.  
**Cost (2014)<sup>1</sup>:** \$16/gal (~\$2/acre for early-season treatment, ~\$4 to \$8/acre for late-season treatment)  
**Timing:** For selective control in shrubland, apply postemergence in spring after all seedlings are up and before heading; the tillering stage is ideal. For late-season, non-selective control, apply to rapidly growing plants before seeds are produced.  
**Remarks:** Glyphosate is a non-selective herbicide with no soil activity.

From: Medusahead Management Guide for the Western States

Spray when individuals are in the R5-R7 stage.



Photo: Josh Davy

## Competition/seeding



Photo: Josh Davy

## Seed desired grasses

- Weeds must be controlled the year before planting (herbicide is best)
- Retreat weeds the fall of planting with grazing or burning
- The more ground prep, the better it works
- Tilling and drill seeding are the most successful in creating seed to soil contact
- Success seen with annual ryegrass across the state



## Grazing

Critical to match phenology and grazing

- Defoliate late to reduce plant's ability to make seed
- Precipitation, air temperature, soil, etc. cause variations in maturity

April 11th



April 30th





## Grazing



Photo: Emilio Laca

- It will not reduce medusahead every year, particularly on years with late spring rain
  - It will not get worse on late spring rain years, it's just harder to make an impact so be patient
  - On dry years, medusahead reductions can be seen
- Sometimes difficult to balance with stockers: desirable forages are already dry and cattle need to be shipped to greener, higher quality forage

## Mowing

- Mowing acts similar to grazing in eliminating seed production
  - The window for mowing is longer than grazing because the awns on the seed head decrease palatability
  - However, medusahead individuals that escape mowing will respond with an explosion of seed production, so two mowing events in a single season is ideal

## Mowing

- Disadvantages
  - Relatively inexpensive, but often infeasible over large scales and on rocky landscapes
  - Late season fire is a concern with mowing



Photo: Emilio Laca

## Approximate costs per acre

- Fertilizer
  - 30 lbs/acre N: \$26.70
  - 60 lbs/acre N: \$53.40
- Roundup: \$15
- Mowing: \$18
- Supplement: \$10
- Forage Replacement: \$34
- Seeding: \$30-1000
- Burning: \$2



Photo: Emilio Laca

## IPM approach

- IPM = Integrated pest management
- Best method of control is using different approaches within and across years
- This results in more complete medusahead control + often comes with benefits to desired species and natives
- Single treatment applications will fail for long-term control

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**Current Research**



Photo: Emilio Laca

## What's new in medusahead research?

Lots of research is being conducted to investigate novel medusahead control and eradication. Much of it is occurring through the UC system and UCCE!

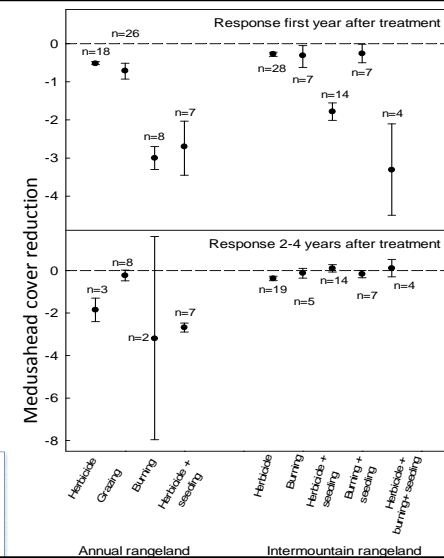


Photo: Emilio Laca

## Control review

### Overall conclusions

- Current methods are not adequate for long term medusahead control
- Seeding might be a particularly useful avenue for medusahead control



## Mowing – one project

Mowing two years in a row, while medusahead is in the boot stage.

Medusahead reduced from 50 to 5% cover

Medusahead seed production reduced by almost 90%



Photo: Emilio Laca

## Mowing – another project

Mowing in the boot stage in oak and grassland plots

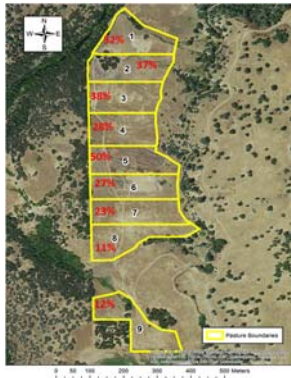
Medusahead cover reduced by 75% but seed production only reduced by 40%

Oak tree maintenance can help isolate medusahead patches and reduce overall cover



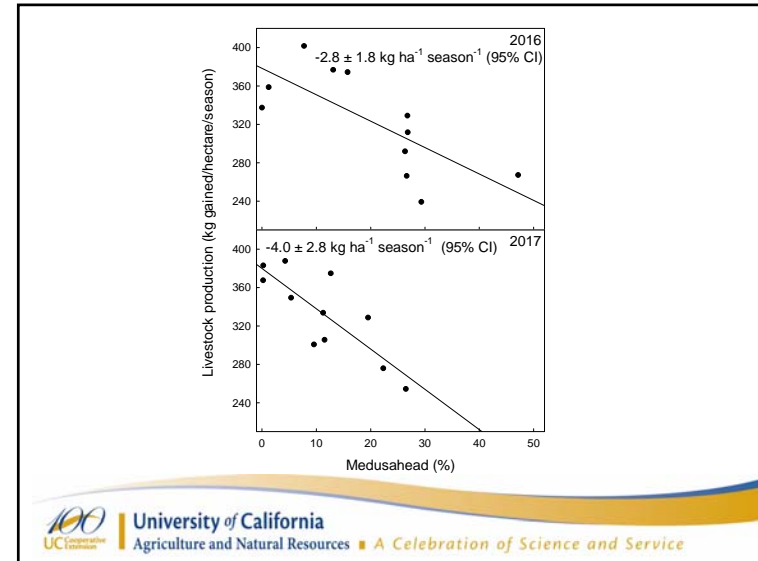
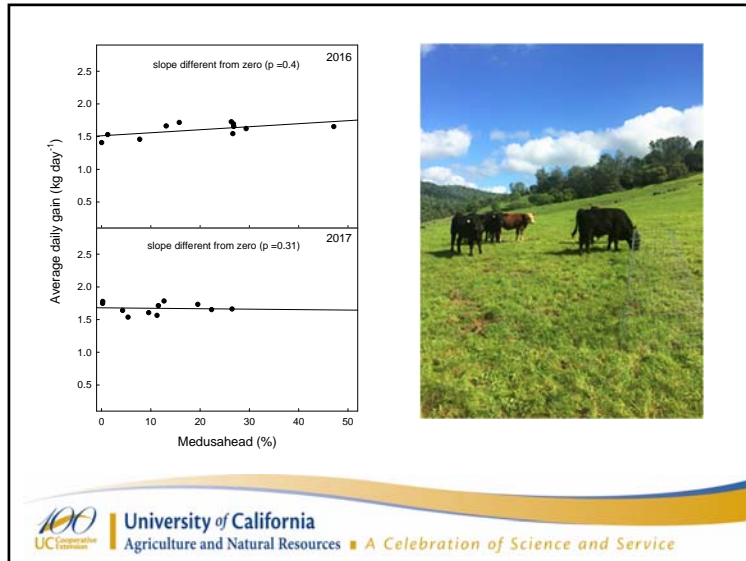
Photos: Elise Gornish

## Economic impacts of medusahead



- Forage nutrition
- Forage quantity
- Avoidance





## Implications

- Medusahead decreases gains by lowering carrying capacity rather than individual animal gain
- Average effect size 3.4 lbs loss/ac/season (range 0.8 to 6). With a 10% reduction in medusahead, at \$1.19 per lb. for feeder cattle, average revenue increase could be \$40/ac/season (range \$9 to \$71).

## Just a reminder....

- Cooperative extension's role is to help you get where you want to go, not where we think you should go
- One size does not fit all
- We test the tools
- IPM approach





## Useful information

California invasive plant council: <http://www.cal-ipc.org/>

UC Integrated Pest Management Program:

<http://www.ipm.ucdavis.edu/index.html>

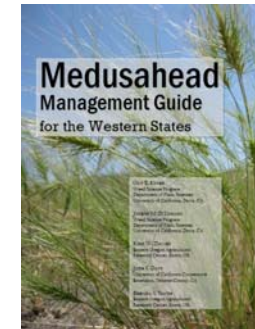
Invasive Plant News: <http://techlinenews.com/>

Research Gate: <https://www.researchgate.net>

USDA:

<http://www.invasivespeciesinfo.gov/plants/medusahead.shtml>

## More information is in this guide! Download for free!!



<http://wric.ucdavis.edu>

## Questions?

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