Less conventional approaches to IPM: Novel strategies for effective weed management in California

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Techniques and considerations that can improve weed management on California grasslands
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Multiple control efforts in a single season
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Use of seeding for weed management
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Trait-based approaches to weed management
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Trait-based approaches to weed management
Taeniatherum caput-medusae (Medusahead)

- Invaded 17 western US states
- Spreads at a rate of 12% per year
- Can grow to 2,000 plants per square ft
- Livestock grazing losses can reach $20/acre
What demographic processes might play a role in mediating medusahead dominance?
Methods

Oak woodland

Open grassland

habitat
Methods

Oak woodland

Open grassland

habitat

seed density

0 seeds/m²
100 seeds/m²
1000 seeds/m²
10000 seeds/m²
50000 seeds/m²
Methods

- **Habitat**
  - Oak woodland
  - Open grassland

- **Seed Density**
  - 0 seeds/m²
  - 100 seeds/m²
  - 1000 seeds/m²
  - 10000 seeds/m²
  - 50000 seeds/m²

- **Management**
  - Not clipped
  - Clipped once
  - Clipped twice
Results

- Before clipping

-
Results

![Graph showing germination rate (%) vs. seeding rate (meters-squared)](image)

Guy Kyser

Gornish & James, in review
Results

![Graph showing establishment rate (%) for different seeding rates (meters-squared). The graph compares oak and open conditions.](image)

Gornish & James, in review
Results

Gornish & James, in review

Litter effects
Management implications
Management implications
Management implications
Management implications
Management implications
Results

After clipping
Results

Gornish & James, in review
Results

Gornish & James, in review
Potential mechanism
Potential mechanism
March

Potential mechanism
Potential mechanism
March

Potential mechanism
Potential mechanism
Compensation from younger cohorts limits long-term success of single effort control
More info on Medusahead

Medusahead
THE STATE OF THE WEED

An overview by
Theresa Becchetti
Josh Davy
Elise Gornish

Presentation + handouts available from:

E Gornish website
UC Weed RIC website
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Multiple control efforts in a single season

Use of seeding for weed management

Trait-based approaches to weed management
Use of seeding for invasive species management
How does seeding control invasive species?
How does seeding control invasive species?

Resource uptake
How does seeding control invasive species?

Resource uptake

Shading / physical restriction
How does seeding control invasive species?

Resource uptake

Shading / physical restriction

Encourage proliferation of antagonistic fauna
In addition to invasive species management, seeding is beneficial for lots of reasons

Increasing forage
Increase wildlife cover
Provide erosion control
Enhance water filtration
Reduce fire danger
Carbon sequestration
Experiment in Yolo Co.

Seeding treatments

None
Annuals
Native Perennials
Exotic Perennials
Mixed Perennials
(Native + Exotic)
**Burned**
- No seeding
- Low diversity seeding
- High diversity seeding

**Unburned**
- No seeding
- Low diversity seeding
- High diversity seeding
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Trait-based approaches to weed management
Trait based choices of species to use in vegetation management
Choosing plant species based on traits that confer resilience to drought
SLA (mm² leaf area / g dry mass) vs. Total Mid-winter Precipitation (Dec.–Feb., cm)

- Weighted
- Unweighted

Graph shows a trend line for both weighted and unweighted data, indicating an increase in SLA with increasing precipitation.
Specific leaf area (SLA)
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Questions?

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