Integrated Prescribed Grazing with other Weed Management Strategies

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Apply fundamental IPM Principles to Prescribed Grazing

- Clear objectives
- Careful planning
- Priorities must be well defined, and outlined
- Logistics and timeline
- Monitoring and documentation
- Evaluation
- Responding to changes, flexibility

Steps to Developing an Integrated Weed Management Program using Prescribed Grazing

- Define long-term vegetation management goal and land use plan
- Consider the entire landscape, not just the weed infestation
- Develop a plan to meet specific objectives for the land
- Role of stakeholders
- Timeline
- Adaptive Management – Flexibility and change

Steps to Developing an Integrated Weed Management Program using Prescribed Grazing

- Understand weed biology and ecology
- Know plant communities and site characteristics
- Available weed mgmt. strategies
- List resources and plan logistics
- Prioritize activities
- Describe how plan will be monitored and evaluated
- Economics

Prescribed grazing considerations

- Identify the best use of prescribed grazing in the landscape?
- Identify the limitations or constraints to prescribed grazing?
- How will grazing affect the application/effectiveness of other strategies?

Weed Biology and Ecology

- Understanding the biology and ecology of the target weed(s) is critical
- Knowing the extent of the infestation across the landscape (accurate surveys and assessments)

Orange hawkweed

Plant Community Ecology

- Understanding the plant community
- Adapt management and plant communities change
- Include restoration: natural regeneration or supplemental plantings

Spotted knapweed

Weed Management Strategies

- Classical Biological Control
- Chemical
- Cultural – including competition, reseeding
- Fire (prescribed burning)
- Mechanical – mowing, hand-pulling

Spotted knapweed

Biological Control

- Insects and livestock are two forms of herbivory
- Insects are highly host-specific herbivores – timed to a specific life stage of the plant
- Plant-feeding (phytophagous) insects often have secondary affects on plant
- Livestock are generalist feeders, but with careful management can function as specialist herbivores

Biological Control (cont'd)

- Depending on the weed and insect herbivore, livestock herbivory can be manipulated to protect, preserve or enhance the activity of the insects
  - by altering the weed's phenology to favor a desirable insect
  - effect can be synergistic, where the combined effect of livestock and insects is greater than each alone

Chemical

- Several studies integrating herbicides with prescribed grazing
- Herbicides either applied pre- or post-grazing
- Often driven by economics and practicality

Cultural

- Reseeding
- Enhance plant competition

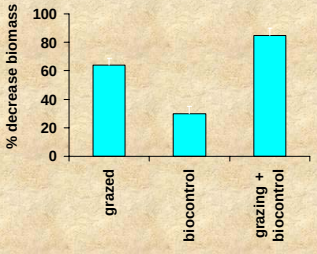
Example – leafy spurge

- Program near Salmon, ID
- Goats readily graze leafy spurge
- Biological control agents are defoliaters and larvae develop inside the roots. Adult density can be very high

Leafy spurge (cont'd)

- Goats graze at pre-flower stage annually for 3 years
- Biocontrol agents flourish in reduced patch density, stem size
- Result in further reduction in in leafy spurge biomass

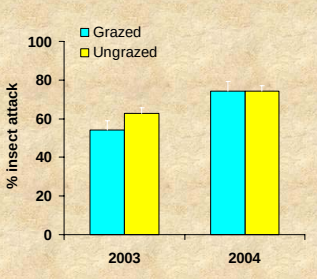
Synergistic effects of grazing and biocontrol



Example – yellow starthistle

- Livestock readily graze when in rosette and bolting stage.
- Seed-feeding biocontrol agents.
- Plants regrew following grazing – change in phenology favored most effective seed-feeding weevil.

Integrating biocontrol and prescribed grazing to manage yellow starthistle



2003, $P = 0.19$ 2004, $P = 0.98$

Integrating prescribed grazing, biocontrol, chemical control and reseeding

- Study in Idaho, Salmon River
- Steep canyon grasslands
- Late winter grass seeding
- Goats trampled seed into ground to increase grass establishment
- Goats grazed seedheads
- Sprayed cheatgrass before perennial grasses emerged

Current limitations to integrating prescribed grazing

- We have little experience to date at the community or landscape level
- Even less research - most knowledge anecdotal
- What are the obstacles?