

Weeds of Hawaiian Range and Pasture Lands

*Jumping the Fence Lines: Escaped Agricultural Plants in
Hawaii*

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Weeds of Hawaiian Range and Pasture Lands: Outline

◆ Range and Pasture Weeds

- Grasses
- Forbs
- Shrubs and Trees
 - ☞ Species
 - ☞ History
 - ☞ Distribution
 - ☞ Impacts
 - ☞ Control Measures



◆ Integrated Weed Management Planning

- Adaptive Management Process



Weeds of Hawaiian Range and Pasture Lands: Grasses

Three most invasive grasses in Hawaii pasture systems:

- *Schizachyrium condensatum*
- *Pennisetum setaceum*
- *Andropogon virginicus*

Other “weedy” grasses in pastures:

- *Digitaria insularis* (sourgrass)
- *Panicum repens*; (Torpedo or wainakugrass)
- *Paspalum conjugatum* (Hilo grass)
- *Sporobolus indicus* (rattail or smutgrass)



Weeds of Hawaiian Range and Pasture Lands: Grasses



Reduction in *Schizachyrium* grass on Kauai through improved pasture management – from 30% cover to less than 2% cover.



Grazing fountain grass at Pu'u Wa'awa'a



Weeds of Hawaiian Range and Pasture Lands: Grasses



Control of Broomsedge through improved grazing management practices.



Improving soil fertility will help reduce sourgrass cover and increase the competitiveness of desirable grass.



Prescribed burning along with seeding and improved grazing management may also control *Schizachyrium* grass infestations.



Weeds of Hawaiian Range and Pasture Lands: Forbs



Invasive forbs in Hawaii:

1. *Senecio madagascariensis* (Fireweed)
2. *Amaranthus spinosus* (Spiny Amaranth)
3. *Hedychium coonarium* (white ginger)
4. *Mimosa pudica* (sleeping grass)
5. *Bryophyllum pinnatum* (air plant)
6. *Wedelia trilobata* (Wedelia)
7. *Verbascum thapsis* (Common mullein)
8. *Elephantopus spicatus* (False elephantsfoot)



Weeds of Hawaiian Range and Pasture Lands: Forbs



Fireweed control can be achieved through rotational grazing management: left side of fence continuous grazing, right side rotational grazing

Fireweed control can also be accomplished rotational grazing sheep in infested pastures (photo courtesy of Greg Friel)



Weeds of Hawaiian Range and Pasture Lands: Forbs



A Maui rancher is successfully using multi-species grazing (goats, sheep, and cattle) to control several types of weeds in his pastures, including spiny amaranth, gorse, lantana, apple of Sodom and others.



Weeds of Hawaiian Range and Pasture Lands: Shrubs and Trees

Shrubs and trees that are poisonous or dangerous for livestock:

1. *Lantana camara* (lantana)
2. *Solanum linnaeanum* (Apple of Sodom)
3. *Crotalaria longirostrata* (Rattle pod)
4. *Acacia farnesiana* (Klu)
5. *Physalis peruviana* (Poha, cape gooseberry)
6. *Nicandra physalodes* (Apple of Peru)
7. *Ricinus communis* (Castor bean)



Weeds of Hawaiian Range and Pasture Lands: Shrubs and Trees

Shrubs and Trees that are highly invasive in Hawaiian range and pasture lands:

1. *Ulex europaeus* (gorse)
2. *Acacia confusa* (Formosan koa)
3. *Rhodomyrtus tomentosa* (Downy rosemyrtle)
4. *Acacia mearnsii* (Black Wattle)
5. *Pluchea carolinensis* (sourbush)
6. *Syzygium cumini* (java plum)
7. *Schinus terebinthifolius* (Christmas berry)
8. *Psidium guajava* (Guava)
9. *Psidium cattleianum* (strawberry guava)



Weeds of Hawaiian Range and Pasture Lands: Shrubs and Trees

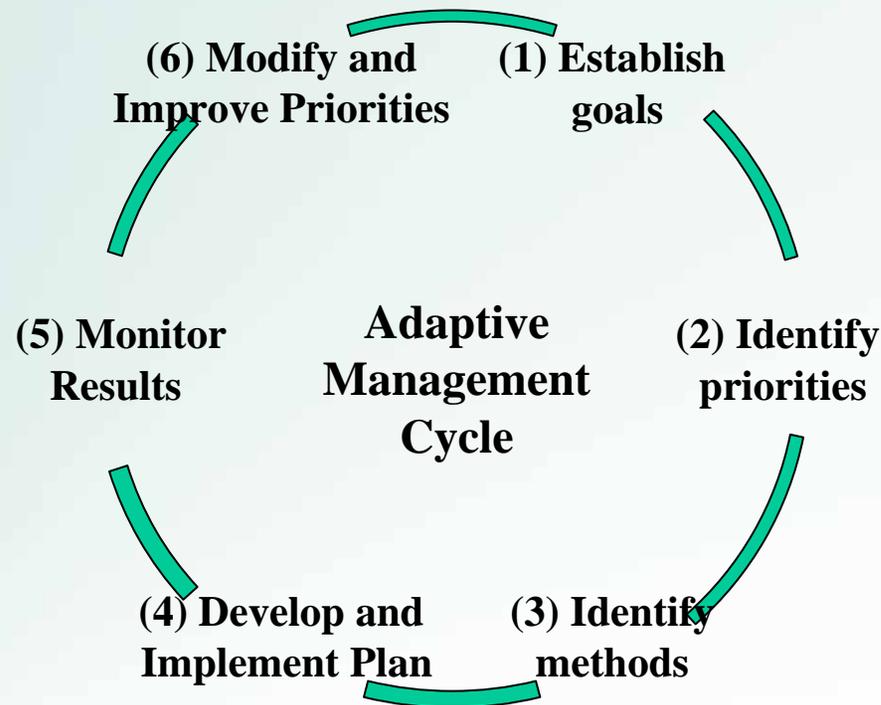


Control measures for shrubs and trees:

1. Mechanical
 - Chaining
 - Bulldozing
 - Cutting
2. Chemical
3. Multi-species grazing
 - On young plants of some species/early in invasion
 - Follow up after other control measures



Integrated Weed Management: An adaptive Management Process



Integrated Weed Management : An Adaptive Management Approach

Integrated Weed Management Concepts:

- No single management technique is perfect for all weed control situations and often multiple management actions are required for effective control
- Integrated Weed Management (IWM) is a process where the best combination of management techniques (biological, mechanical, chemical, cultural) are selected to efficiently and effectively control the target weed



Integrated Weed Management : An Adaptive Management Approach

Integrated Weed Management Principles:

- Three primary principles in IWM:
 1. Work to establish and maintain functioning desirable plant communities
 2. Implement appropriate prevention methods
 3. Choose the appropriate control actions



Integrated Weed Management : An Adaptive Management Approach

Integrated Weed Management Principles:

1. Work to establish and maintain functioning desirable plant communities
 - Grazing Management
 - Proper grazing management of livestock essential component of IWM
 - Involves closely controlling the distribution, timing and frequency of grazing and the kind and class of grazing animal
 - Other land use practices may also contribute to disturbances to the function of the desirable community and may need to be changed
 - Consider restoration and re-vegetation efforts to establish the desirable plant community



Integrated Weed Management : An Adaptive Management Approach

Integrated Weed Management Principles:

2. Implement appropriate prevention methods

IWM includes combining preventive measures with normal land management activities and weed control activities.

Preventing weeds from invading a site is the most effective and least costly method for controlling weeds.

Be sure the control actions you implement do not contribute to the spread of the weed.



Integrated Weed Management : An Adaptive Management Approach

Integrated Weed Management Principles:

3. Choose appropriate control actions.

The selected control actions should ideally be those that:

Can be applied at the most effective time. Treatments should be applied at the point in the life-cycle of the weed that it is most vulnerable

Least damaging to non-target organisms. Before implementation you should carefully consider the effects of the treatment combinations on both target and non-target species.

Least hazardous to human health.

Least damaging to the general environment.



Integrated Weed Management : An Adaptive Management Approach



Integrated Weed Management Principles:

3. Choose appropriate control actions. (Continued)

The selected control actions should ideally be those that:

Most likely to reduce the need for weed control actions over the long-term.

Most easily implemented. The easier it is to implement the control actions the more likely it is that the plan will be completed.

Most cost-effective in the short and long term. Carefully consider the cost and benefits of the possible control actions.



Integrated Weed Management : An Adaptive Management Approach

Generally weed control objectives will be to eradicate, suppress or contain weed populations.

Each situation is different so landowners and managers will need to tailor their management actions to their specific situation.

Generally, IWM programs for large weed infestations select from the following list:

- Preventing weeds from becoming established in the first place
- Altering livestock grazing practices to promote desirable plant vigor
- Using appropriate types of livestock to graze weed species
- Re-seeding with a mixture of competitive, desirable plants
- Releasing biological control insects to weaken weed plants and reduce seed production
- Spraying with an herbicide selected to provide maximum weed control without damaging desirable plants



Thank you!

