Biological Control: Using Nature to Fight Against Invasives

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Good bugs

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Good bugs

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Jake Farnum
Invasive plants
The story behind plant invasions

• How:
  – Deliberate (60%*) (waterhyacinth, earleaf acacia, kudzu, Brazilian peppertree)
    • Erosion control, ornamental, medicinal, food
  – Accidental introduction (11%*) (spotted knapweed, alligatorweed, Caesarweed)
    • Seed or other propagule contaminant
  – Unknown (28%*)

Problems caused by invasive plants

• Crowd out/out compete native vegetation
• Reduce forage and habitat for native fauna
• Threaten commercial, agricultural, and recreational activities
• Harm to human/animal health
• Alter fire regimes
• Alter water flow
How to control invasive plants

- Cultural
- Mechanical
- Biological
- Chemical
Cultural control

- Growing requirements/cultural conditions
Cultural control

Mulches

Barriers

Drawdown
Mechanical control

• Disrupt, damage or remove
Mechanical control

Harvesting

Burning
Chemical control

- Herbicides

Amy Ferriter, State of Idaho

Bud Mayfield, USFS
Biological control

- Natural enemies
- Does not eradicate pest
- Reduces density
Theory behind biological control

• Enemy release hypothesis

Casey terHorst, bigsciencelittlesummaries.com
Biological Control

Positive
- Safe (Host specific)
- Self perpetuating
- High return on investment
- Spreads to new areas
- Environmentally friendly
  - Reducing pesticide use

Negative
- High up front cost
- Slow
- Will not eradicate pest
- Doesn’t always “stick”
The Process

• Foreign exploration
  – Native range
  – Look for species that are feeding on target
  – Not feeding on nearby plants

• Quarantine (importation)
Host specificity testing (Quarantine)

- Centrifugal testing
  - Choice
  - No Choice
While in quarantine.....

• Basic biology studies
  – Development time
  – # eggs laid/female
  – Where/when eggs laid

• Impact studies
The paperwork... plants

- Technical Advisory Group (TAG)
- Taxonomy plant
- Plant impacts
- Alternative plant management
The paperwork..... Insects

• Insect background
• Host range testing
• Impact studies
• Basic biology information
TAG Decision Time

- No
- Maybe
  - More tests
TAG Decision Time

- Yes – More waiting.....
  - US Fish and Wildlife evaluation
    - Letter of Concurrence issued
    - Environmental Assessment
    - Public Comment

- Process take 8-10 years
Once approved

• Releases!
  – Evaluation
    • Establishment
    • Effectiveness
    • Spread

  – Field host specificity
Integrated Pest Management

• Biological control not a panacea for all targets
• Many targets require integration of tactics
• Special considerations with biocontrol
  – Living organisms
  – Must partition control tactics in time or space to not harm/eliminate biological control agents
    • Refuges
    • Spray/ cut/ burn when agents are not active
Challenges in aquatic environments

• Floating, moving plants
• Eutrophication
  – Plant growth increases
  – More difficult to control
• Changing nutrient levels
  – Changes impact of agents
Aquatic Project Talks:

- Hydrilla
- Water Lettuce
- Waterhyacinth
Questions?

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