

USE OF INSECT BIOCONTROL FOR THE MANAGEMENT OF SALVINIA



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USE OF INSECT BIOCONTROL FOR THE MANAGEMENT OF SALVINIA

- General Biocontrol Concepts
- Agent – Biology/Impact
- Host-Specificity
- Current U.S. Status
- Process for Hawaiian Introduction
- Integration
- Capabilities



Bio what???



What is Biocontrol?

Introduction, by man, of parasitoids, predators, and/or pathogenic microorganisms to

SUPPRESS

populations of plant or animal pests.



Important Aspects

- Host-Specific Agents
- Target Exotic Plants
- Release Small Numbers
 - Population increase
 - Expansion in distribution
- Suppression is Key
 - Long-term process
 - Stress the target
 - Bring into equilibrium



**Can
insect biocontrol
agents
suppress
plant populations?**



SUCCESSFUL AQUATIC PLANT BIOCONTROL PRGRAMS

- Alligatorweed

- Early 1960's
- Flea Beetle
- Moth
- Thrips



- Waterhyacinth

- Early 1970's
- Weevil (2 species)
- Moth



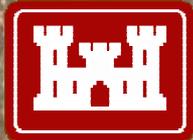
- Waterlettuce

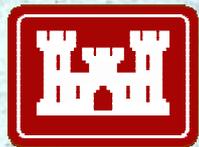
- Mid 1980's
- Weevil

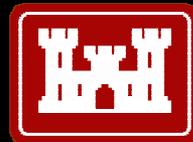
- Hydrilla

- Late 1980's
- Leaf-Mining Fly (2 species)

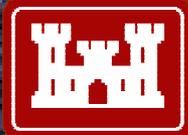






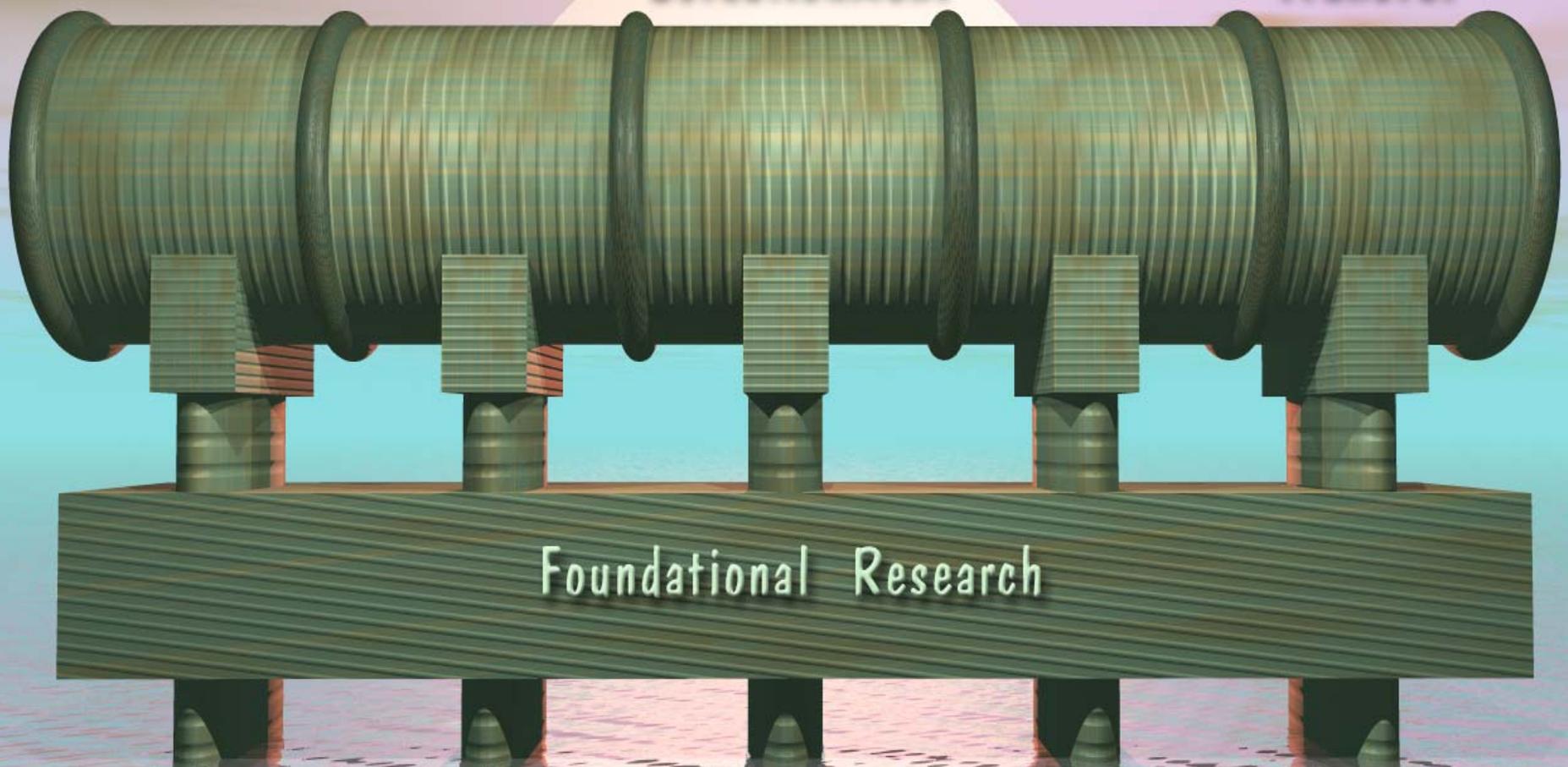








Overseas Quarantine Release/
Establishment Evaluation Technology
Transfer



Biological Control "Pipeline"

Cyrtobagous salviniae

- Recognized as the management option of choice
- Control achieved in 12 countries on three continents
- Australia, Fiji, India, Kenya, Namibia, South Africa, Sri Lanka, Zambia, Zimbabwe, etc.
- Present in Florida – On *Salvinia minima*
- Host Specific on *Salvinia* spp.

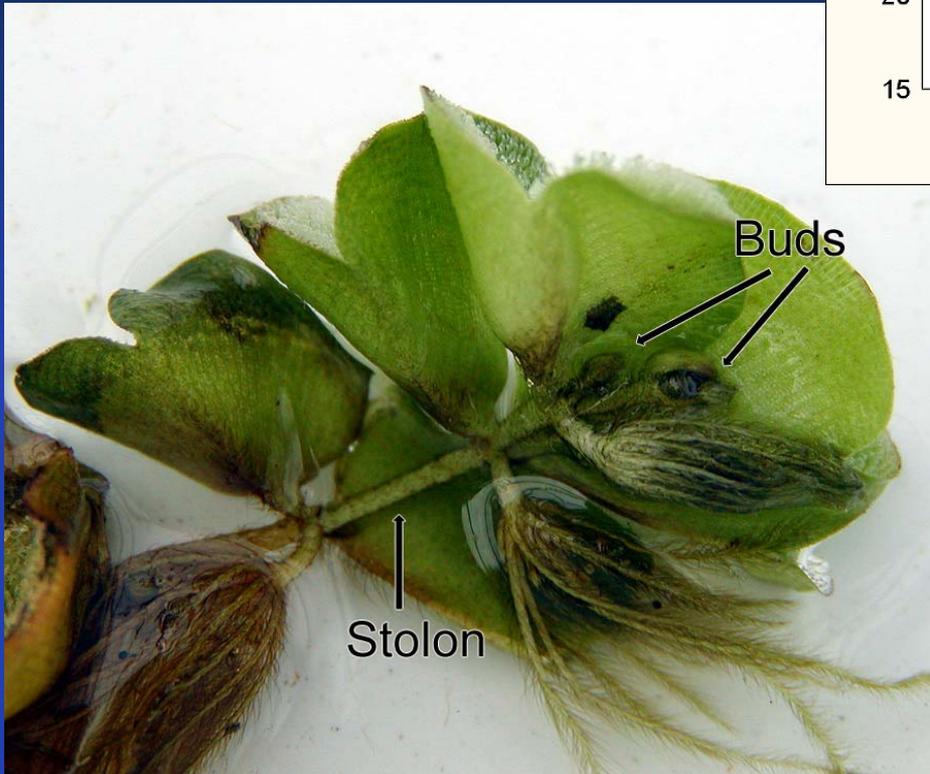
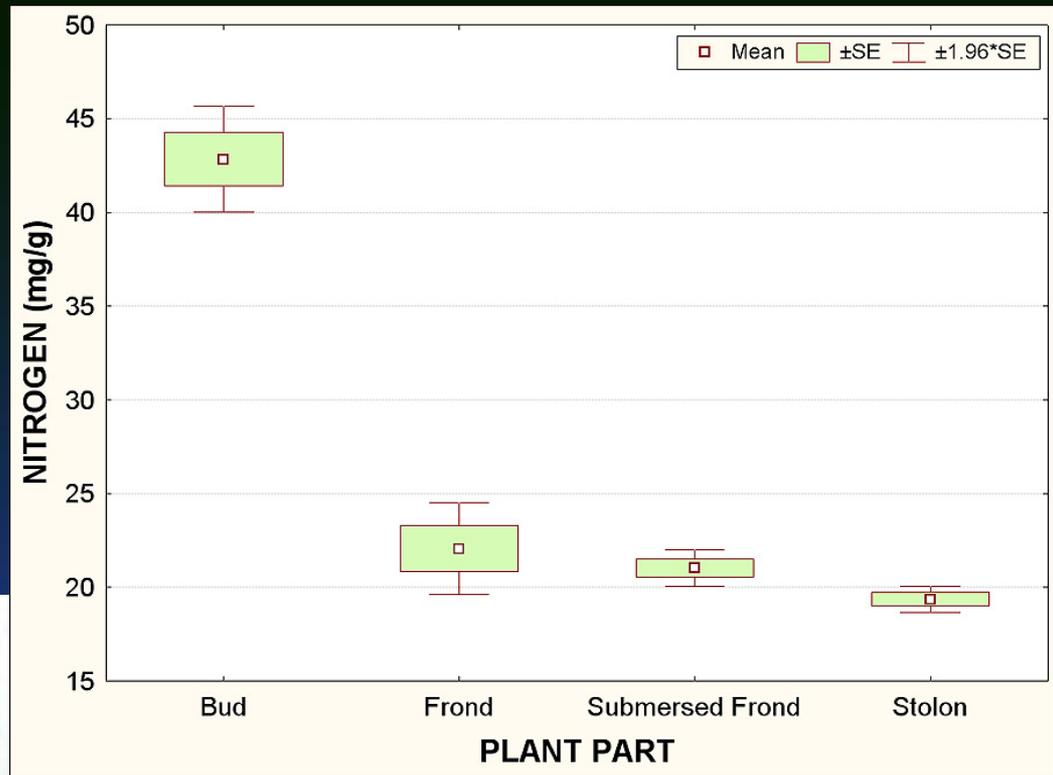


Cyrtobagous salviniae

- Small, Black Weevil – 1.5 to 2.0 mm in length
- Originally from Brazil
- Developmental Time – 6 to 8 Weeks
- Adults Feed on Buds
- Larvae Feed on Rhizomes
- Dependent on Nitrogen
- Impact can Occur in Months
- Impact in Tropical and to some extent Temperate regions













HOST-SPECIFICITY

- Extensive testing in Australia and South Africa
- Years of field testing
- Overseas test results used for U.S. release
- 51 plant species in 27 Families
- Agricultural
 - Maize - Rice
 - Sugarcane - Asparagus
 - Banana - Pineapple
- Several fern species
- Bottom Line - Only feeds on *Salvinia* spp.



Review Process

Technical Advisory Group (TAG)

- Recommendations Only
- TAG Membership
 - Bureau of Land Management
 - Bureau of Reclamation
 - Fish and Wildlife
 - National Park Service
 - National Biological Survey
 - Bureau of Indian Affairs
 - Canada & Mexico



TAG Membership Continued

- USDA, ARS
- USDA, APHIS
- USDA, CSREES
- Forest Service
- Documentation Center
- Corps of Engineers
- Environmental Protection Agency
- Weed Science Society
- National Plant Board



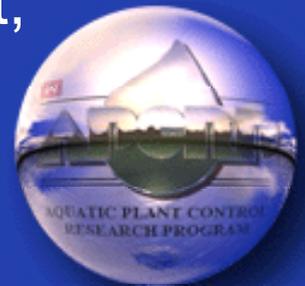
CURRENT U.S. STATUS

- “Florida” strain released (1999)
 - Eastern Texas – Failed to establish
- “Australian” strain released (2001)
 - La/TX – Tentative Establishment
- Can release “Australian” Strain in U.S. (2002)
- “Australian” strain = “Florida” strain
- “Florida” strain may be more damaging



HAWAIIAN INTRODUCTION

- Conduct herbivore survey
- Contact Hawaiian DOA – Mission, TX APHIS Lab
- Submit application to APHIS, PPQ
- U.S. F&WD consultation
- New Environmental Assessment
- Additional host-specificity testing???
 - avocado, coffee, lychee, macadamia
 - bean, broccoli, carrot, cucumber, eggplant, Kai choy
 - awa (*Piper methysticum*)
 - noni (*Morinda citrifolia*)

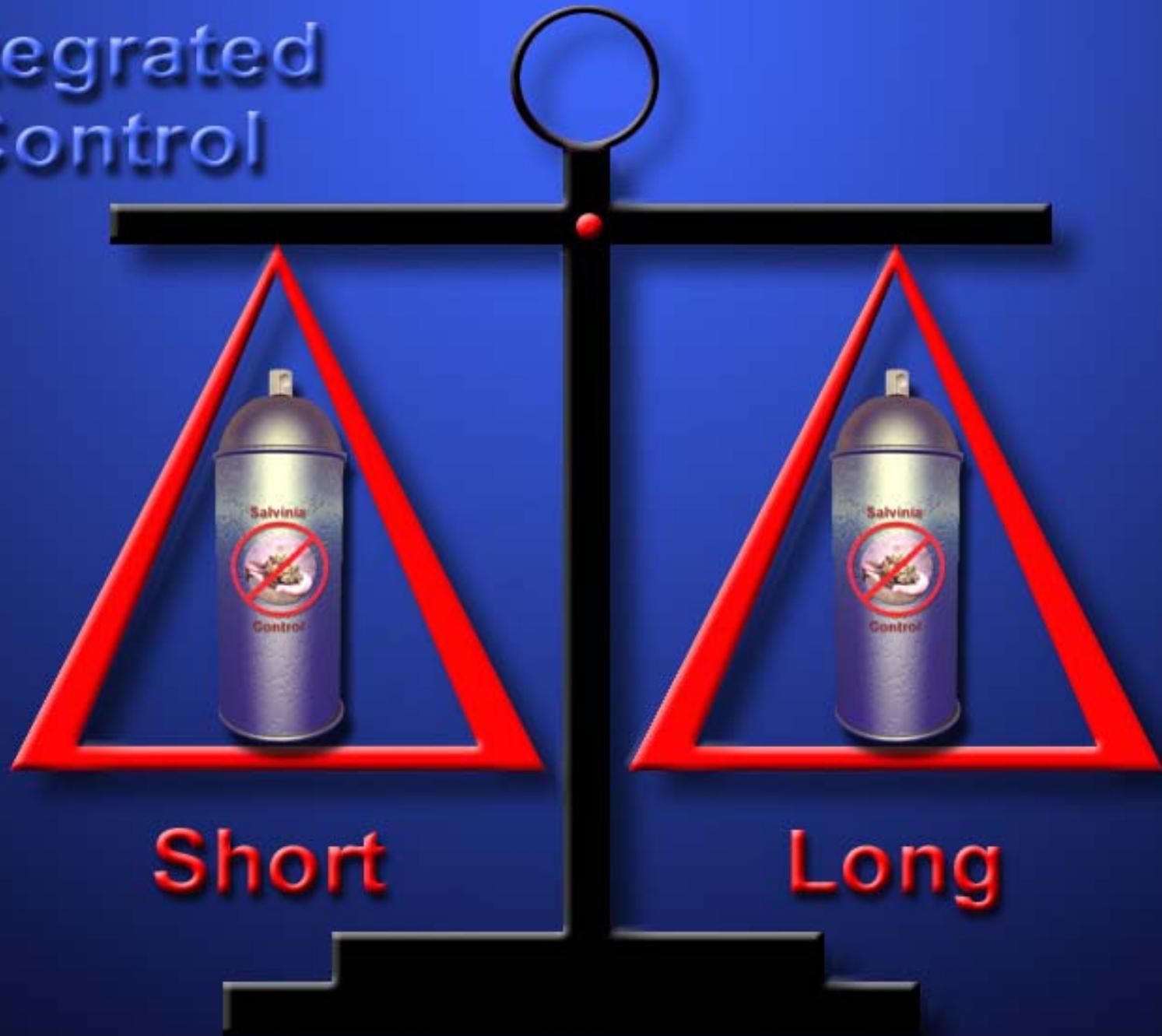


Integrated Control

- Use all available control methods
 - Maximize strengths
 - Avoid impacts/conflicts
 - Holistic approach
- Education/Technology transfer mechanisms
- Preventative measures
- Long-term Monitoring
 - Plant distribution
 - Effectiveness of controls
- Continually evaluate ecosystem



Integrated Control



Biocontrol Capabilities

- Years of experience
 - large-scale rearing
 - release and establishment
 - biocontrol monitoring
 - technology transfer tools
- Professional contacts
- Advice/Information
- Large-scale rearing facilities
 - LAERF – Lewisville, TX
 - WES
- Consultation
- Training

