

The Potential for Classical Biological Control of Connecticut River Hydrilla

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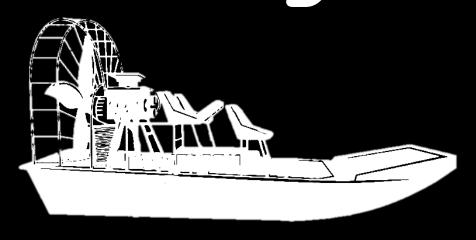


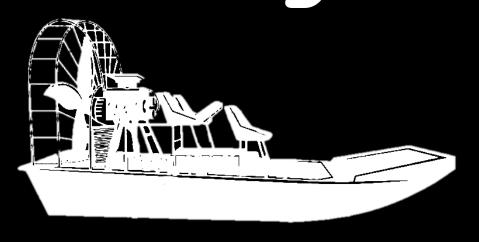


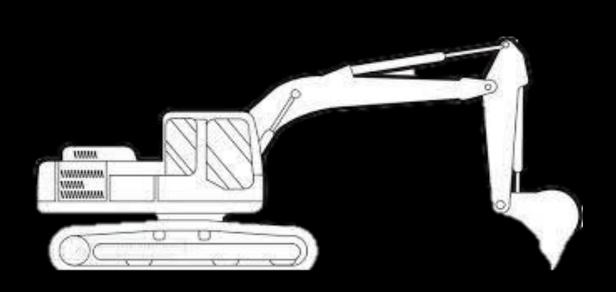
Estimated economic and health costs of invasive species in the United States have increased from \$2 billion in the 1960s to \$21 billion in the 2020s

Aquatic ecosystems are not immune to these types of invasions, and they are reported to cost the United States \$15 billion annually

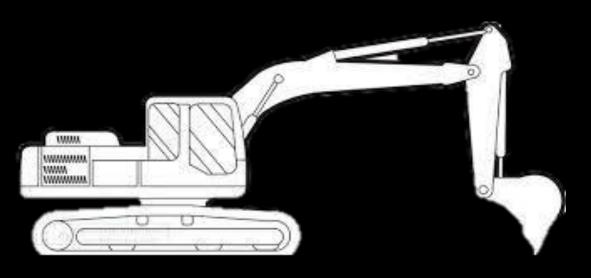
The northeastern United States is particularly vulnerable; the costs of invaded aquatic ecosystems in this region dominate the costs of terrestrial invasions

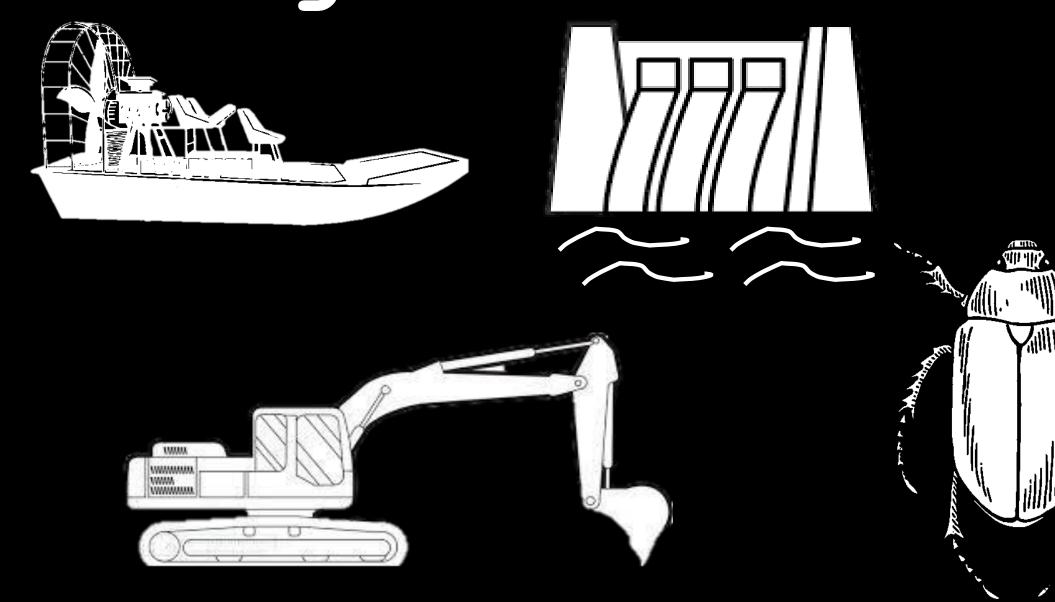


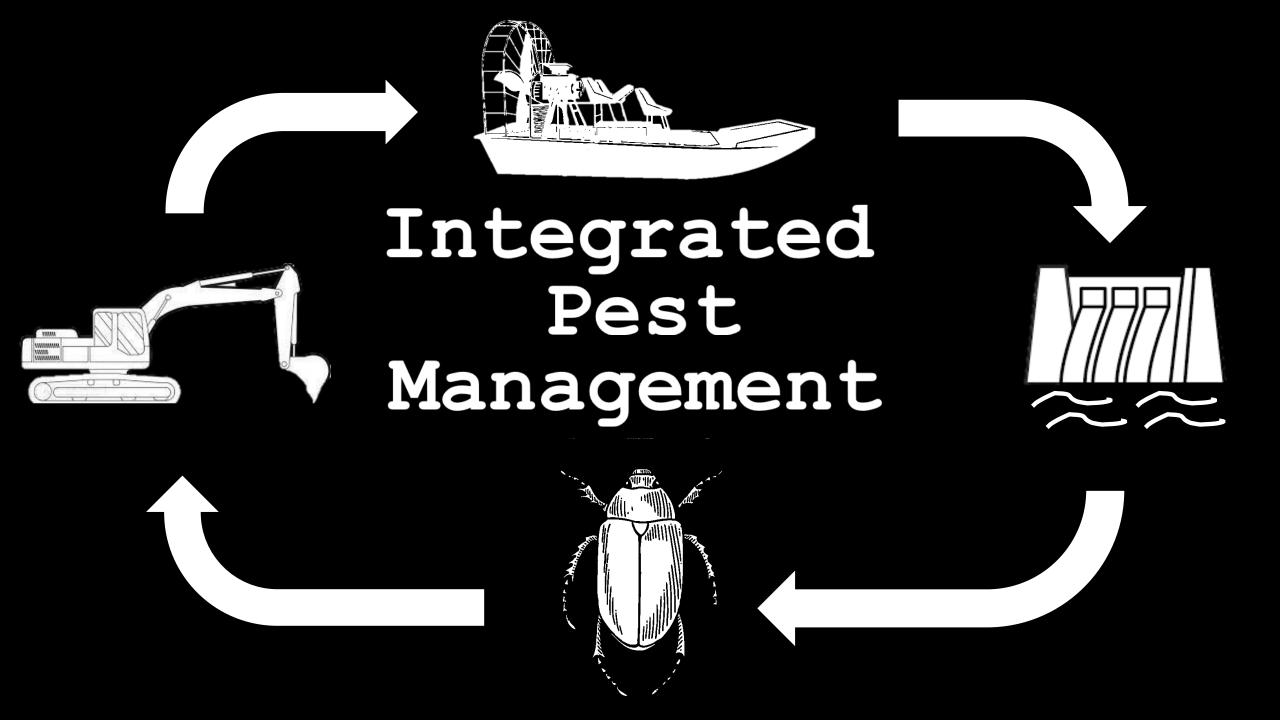




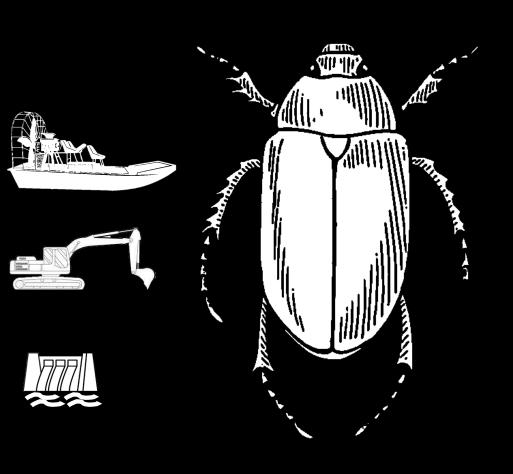








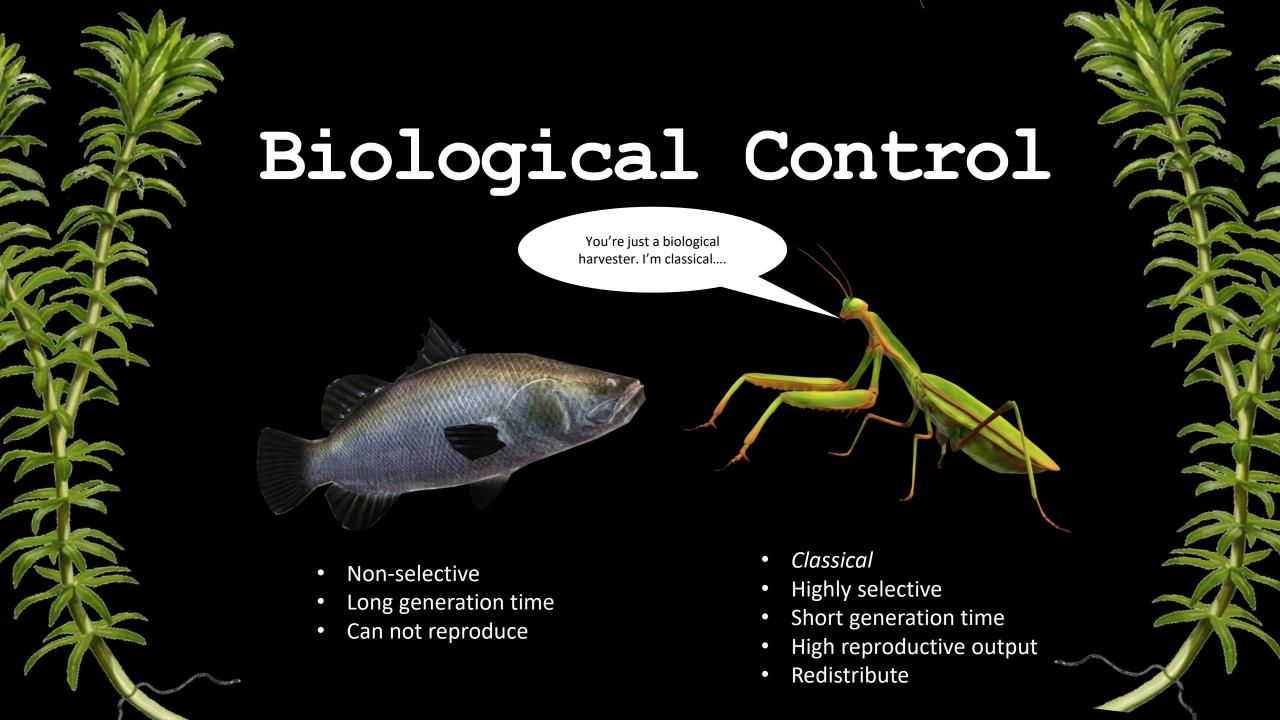
Biological Control



Biological control is the action of parasites, predators, herbivores or pathogens in maintaining another organism's population density at a lower average than would occur in their absence - DeBach, 1964













Overseas Quarantine Research Research

Quarantine Research

Release



Quarantine Research

Release

Establishment



Quarantine Research

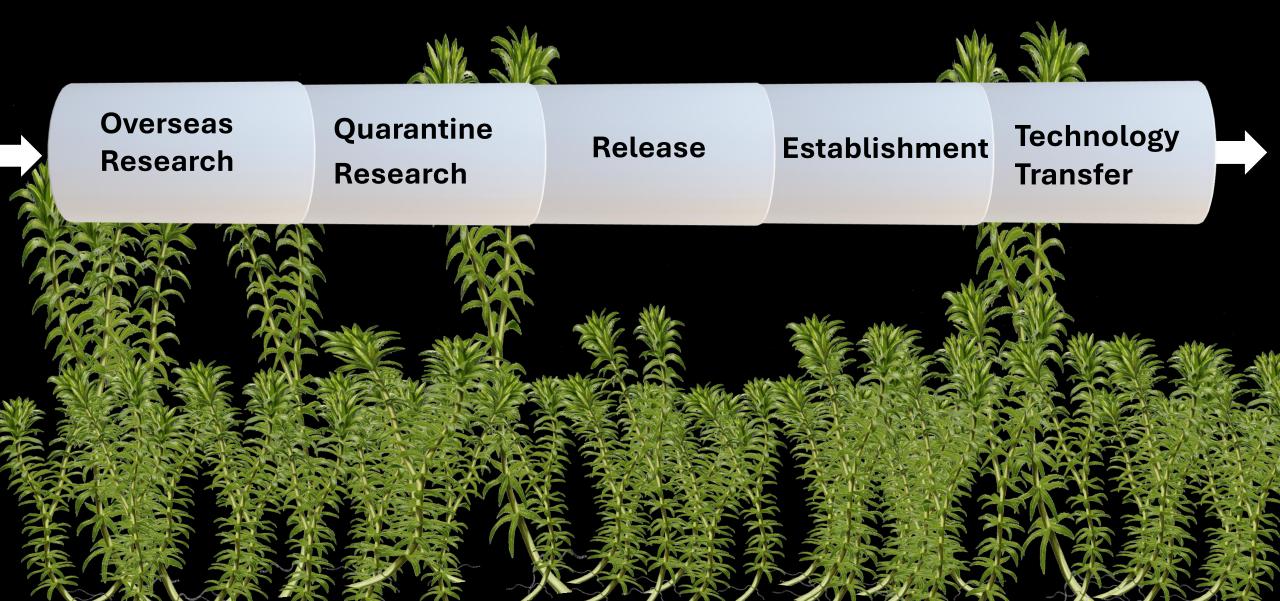
Release

Establishment

Technology Transfer



The Biological Control Pipeline



The Biological Control Pipeline





About

WATER HYACINTH WEEVIL is native to South America, were introduced to the U.S. in the 1970s to control waterhyacinth. By feeding on the plant's leaves and stems, they reduce its growth, support native vegetation recovery, and lessen the need for chemical or mechanical controls

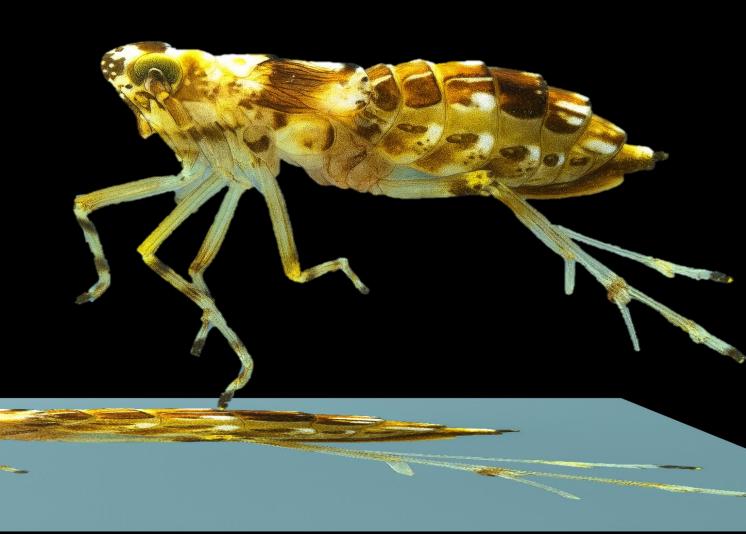




About

WATERHYACINTH PLANTHOPPER,

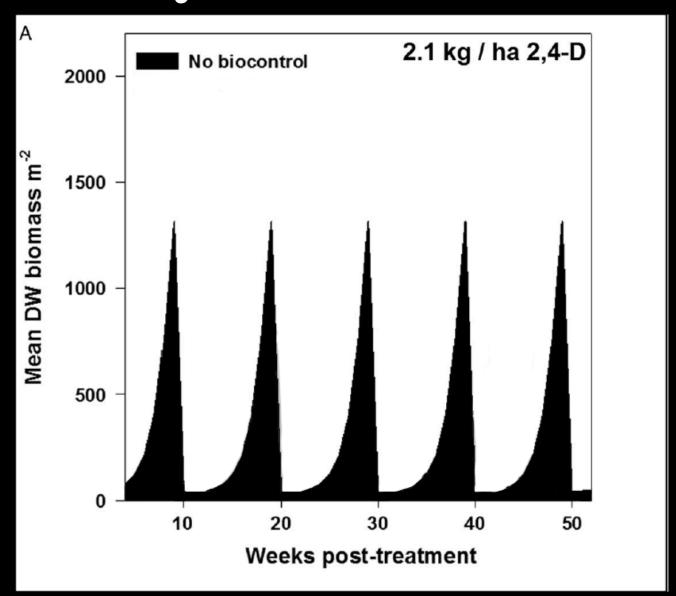
Megamelus scutellaris, is native to South America and was introduced to the U.S. in the 2000s as a biological control agent for waterhyacinth. Both nymphs and adults are mobile, allowing the insect to disperse. By feeding on the plant's vascular tissue, they weaken and suppress waterhyacinth growth.



• 58.2% less biomass • 97.3% fewer inflorescences 16.8% decrease in coverage

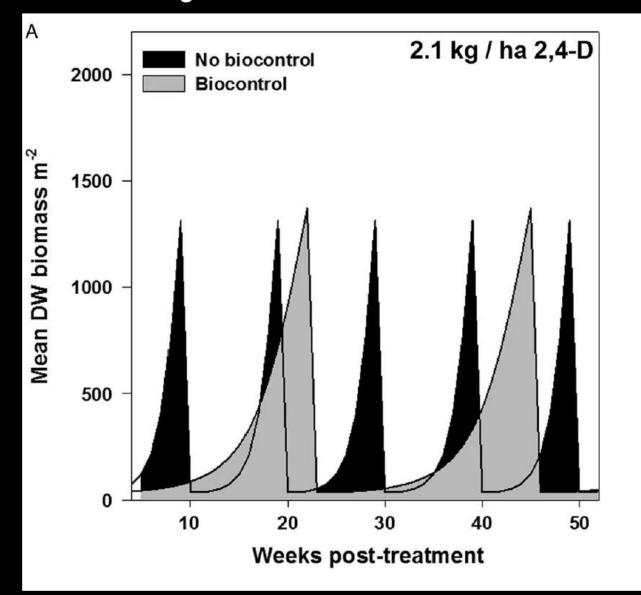
Tipping et al. 2014

Waterhyacinth IPM: Biomass Reduction





Waterhyacinth IPM: Biomass Reduction





Waterlettuce



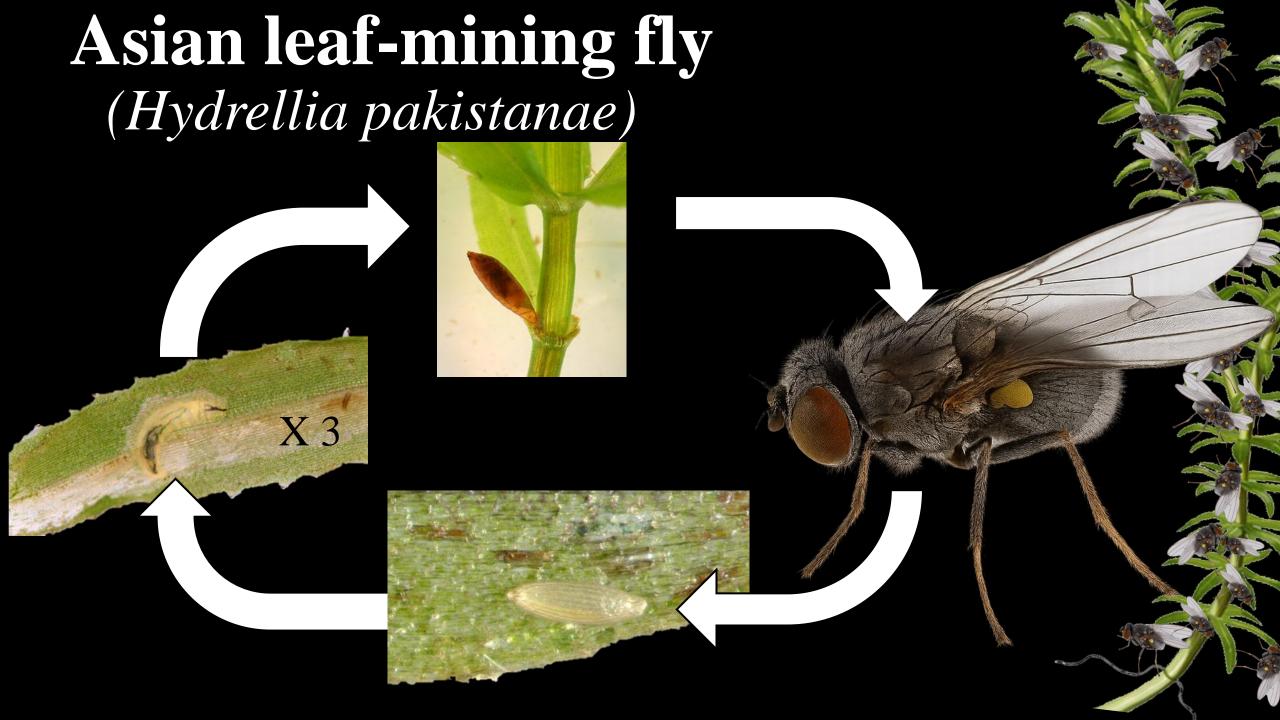






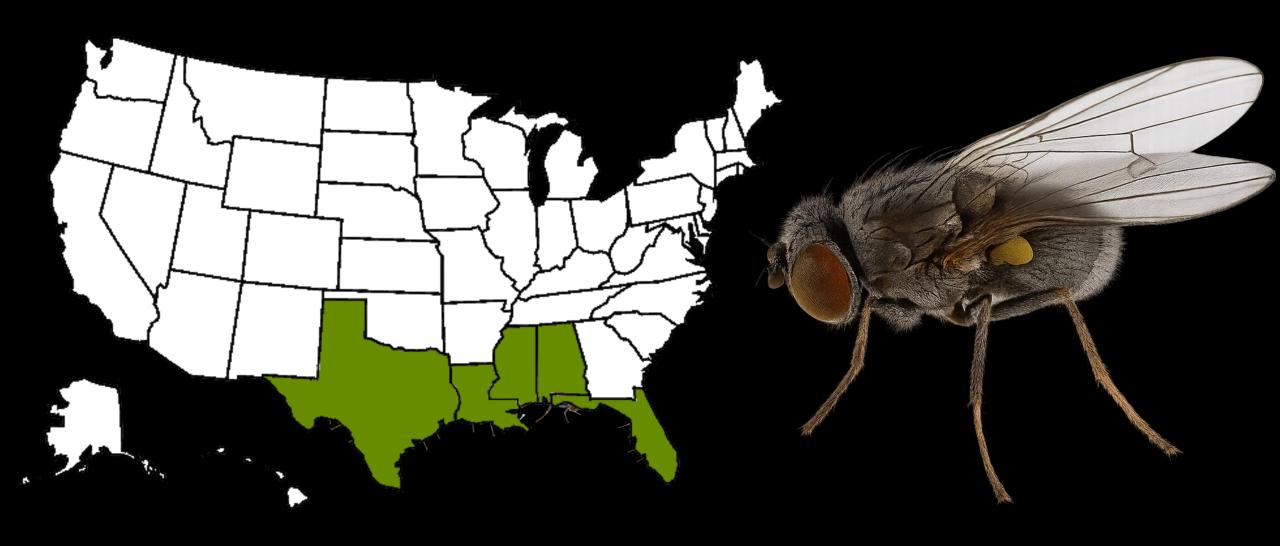






Asian leaf-mining fly

(Hydrellia pakistanae)



Asian leaf-mining fly

(Hydrellia pakistanae)



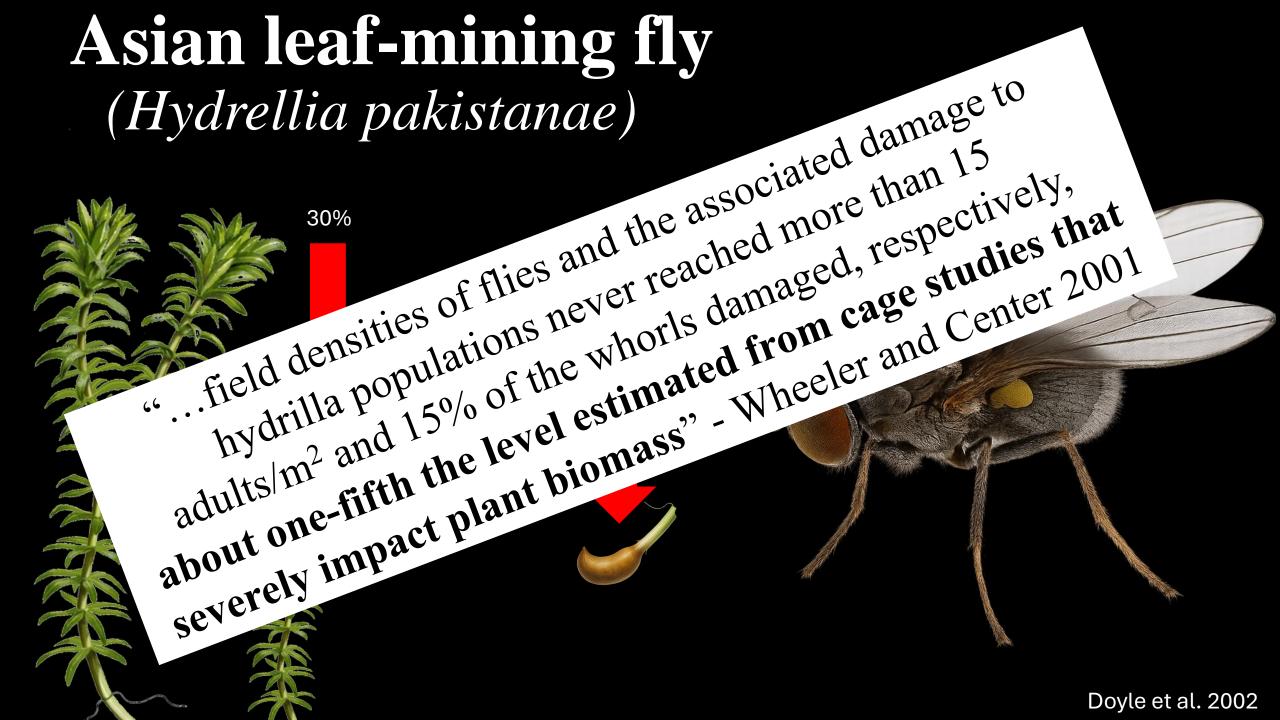




Asian leaf-mining fly

(Hydrellia pakistanae)







Asian leaf-mining fly (Hydrellia pakistanae)

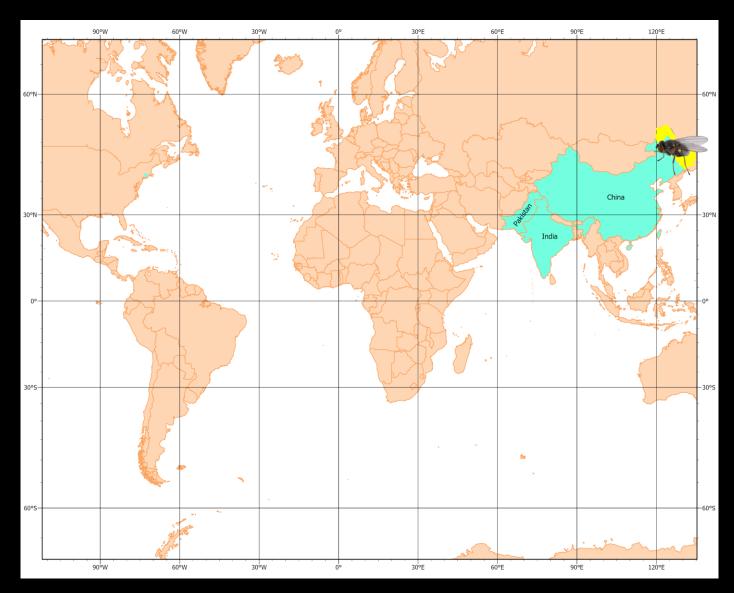








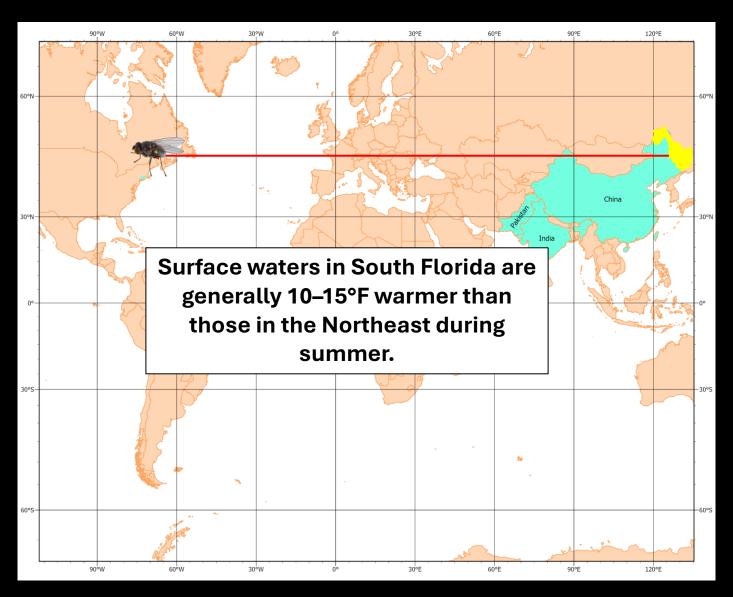
Climatic Niche Overlap







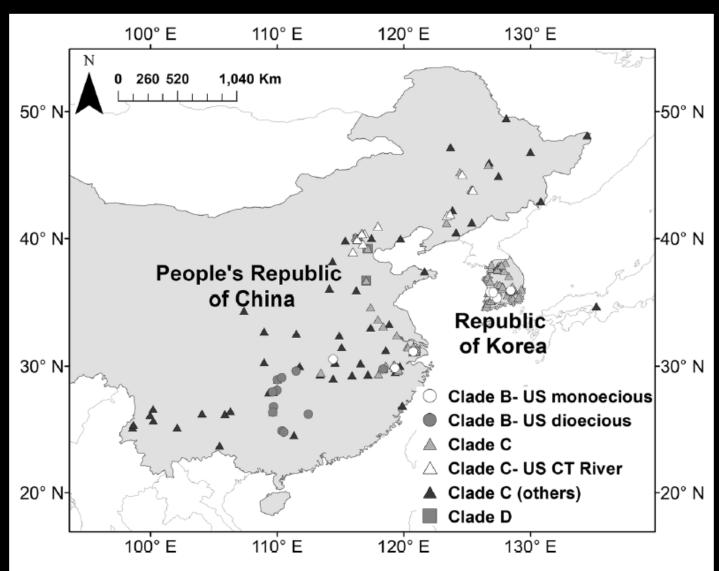
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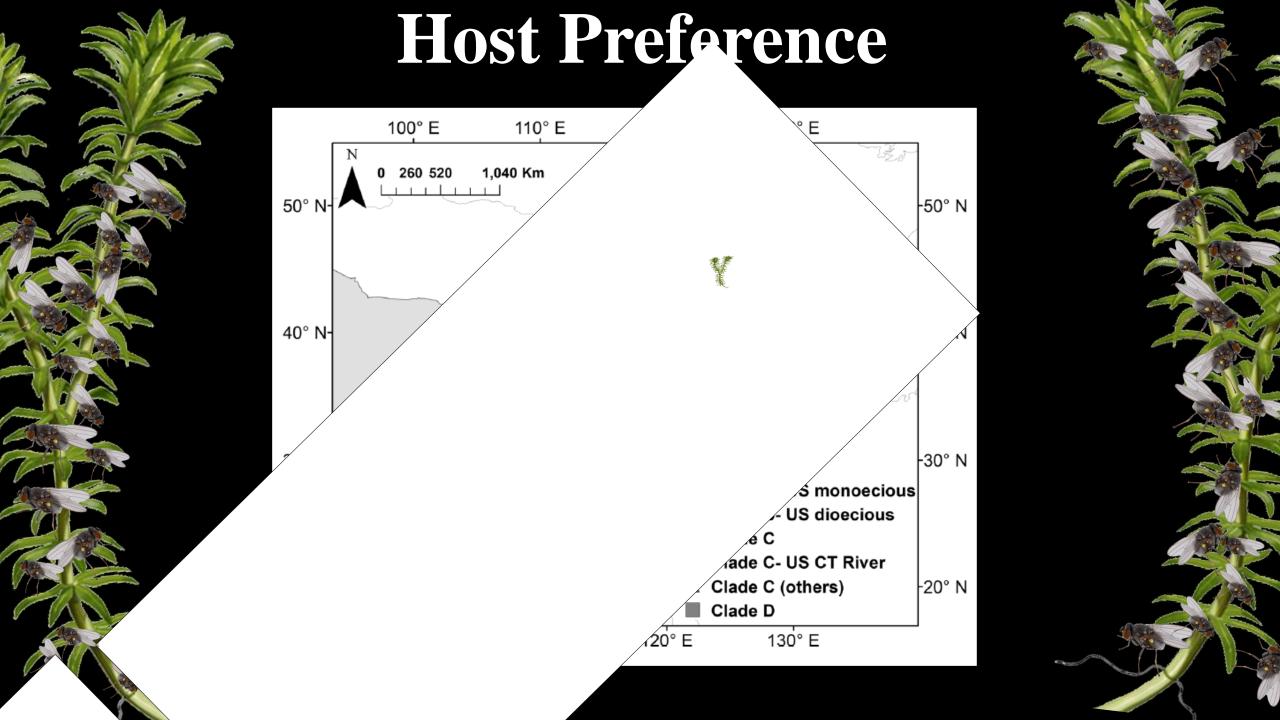




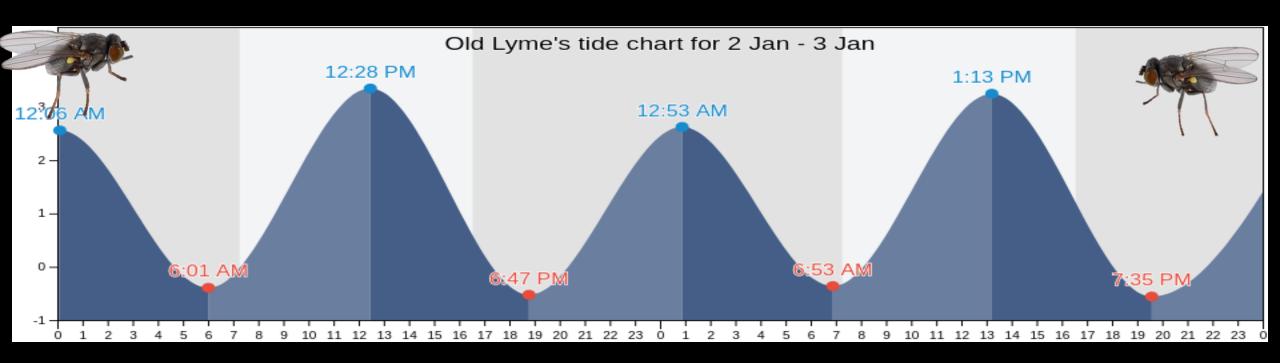
Host Preference



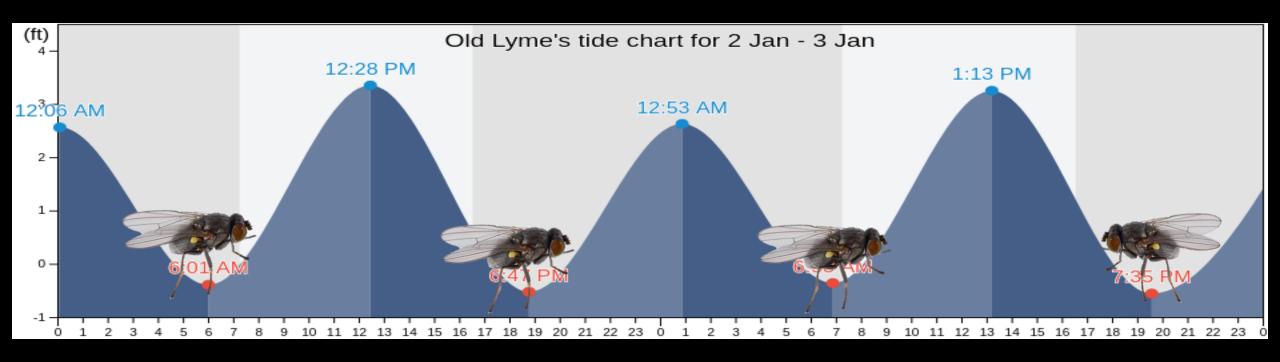




Habitat Compatibility



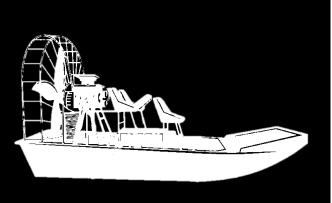
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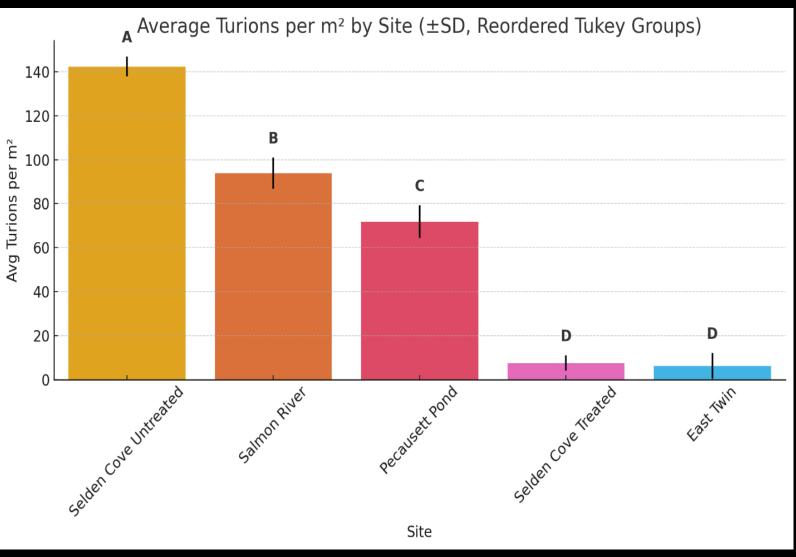


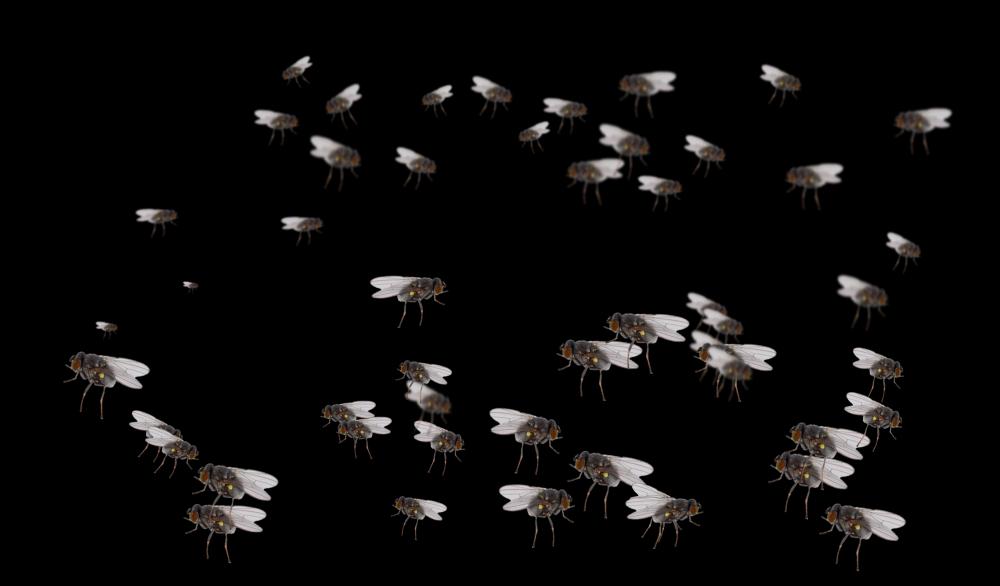




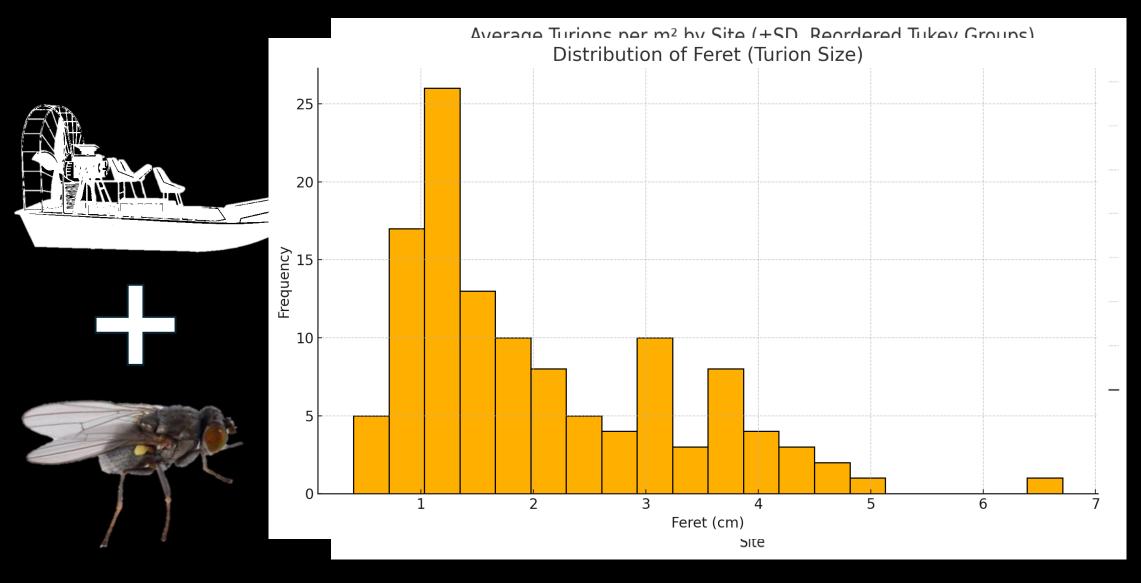
Integrated Pest Management







Integrated Pest Management



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