

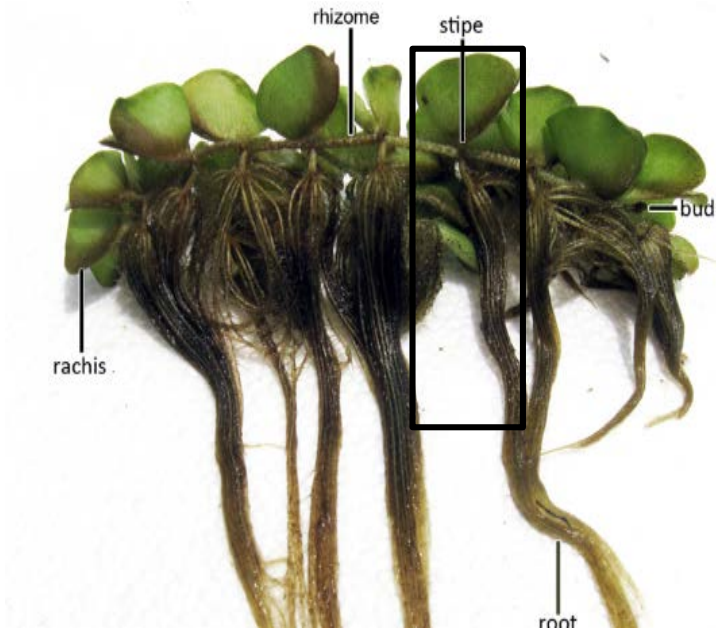
Large Scale Giant Salvinia Weevil Production at Caddo Lake

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A ramet-the
functional and
structural unit of
giant salvinia

- The Explosive Growth Rate of Giant Salvinia (*Salvinia molesta*)
- Asexual reproduction
- Under ideal conditions, one ramet can become 40 sq. mile mat in 3 months (Creagh, 1991)
- Spread by boats and trailers

***Salvinia molesta* -The World's Worst Weed**

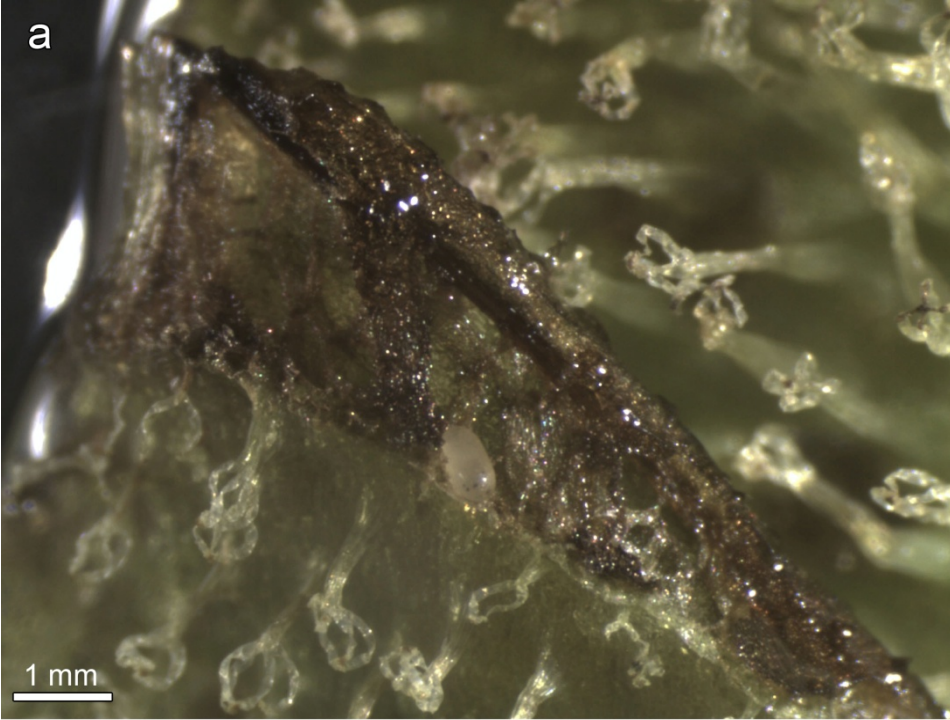
- Outcompetes native plants
- Degrades water quality
- Destroys wildlife habitat
- Eliminates most recreational opportunities

Control Methods: Strengths and Weaknesses

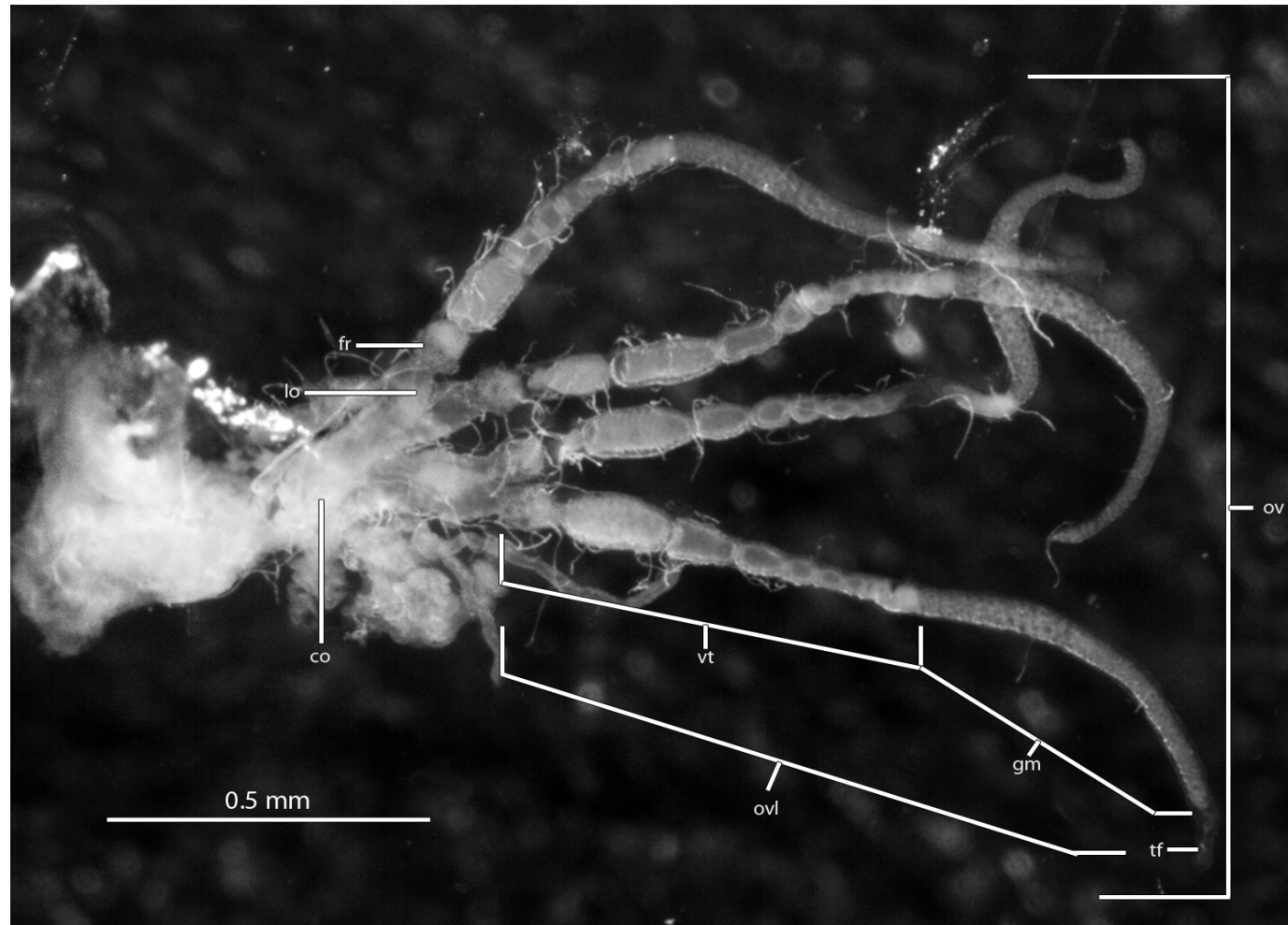
- Chemical-must be applied “repeatedly and indefinitely”

Tipping and Center (2003)

- Mechanical
- Drawdowns
- Biological Control-salvinia weevil



The Reproductive Morphology of *C. salviniae*



Salvinia Weevil Population Dynamics

- $10,000 \text{ females} \times 100 \text{ eggs} = 1,000,000 \text{ individuals}$
- Half of which (500,000) would be females (healthy population)
- $500,000 \times 100 = 50,000,000$
- Two generations!

Lake Moondarra, Before and After Biological Control

Photo by Peter Room, University of
Queensland, AU

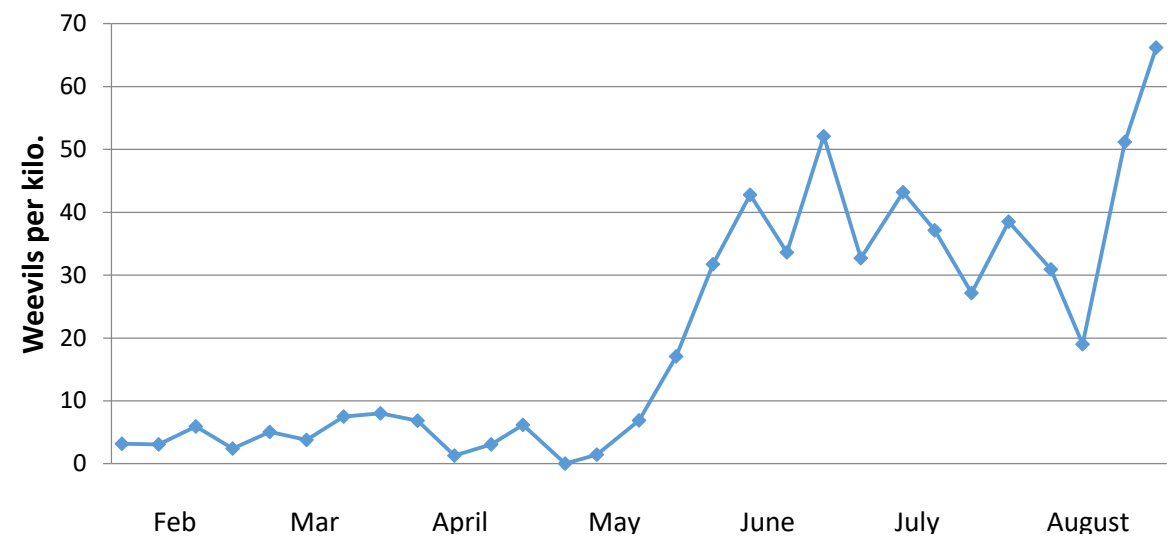


Before and After

Six Acre Rearing Pond in Gheens, LA



The Population Dynamics of
Cyrtobagous salviniae in a Rearing
Pond at Golden Ranch Plantation



Delta Farms, Lafourche Parish, LA



Biocontrol at Lake Steinhagen, Two Years after Weevil Release



Limitations to Successful Biocontrol of *Salvinia molesta* at Caddo Lake

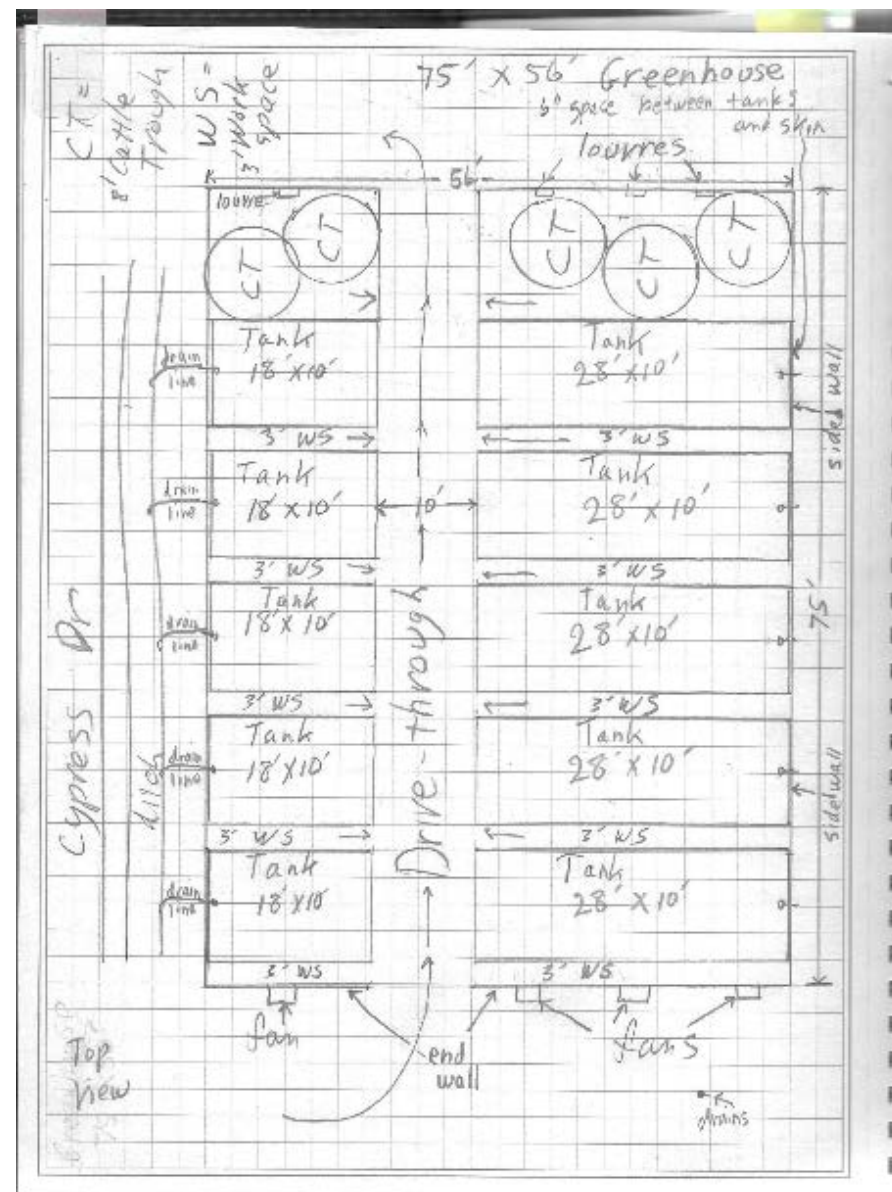
- Cold winters/short growing season
- Founding population from Mission, TX (N 26° 12' 41' W 98° 19' 17")
- Cold hardiness/overwintering
- But see: Tipping and Center, 2003; Mukherjee et al, 2014

Limitations, Cont.

- Spring floods/drift
- Extreme heat
- Drought
- Set-up and labor costs

The Weevil Production Facility Concept

- Worked with local groups to build greenhouse
- Short growing season, colder winters, labor intensive activity, inaccessible backwaters
- Produce greater numbers in less time
- Shelter weevil population from unusually cold weather
- Build compact facility with efficient floor plan and climate control
- Use lake water for tanks.
- Release weevils in sheltered areas with minimal drift, unlikely to be sprayed
- Original drawing on right (reduced) addresses most limitations



Where Science Meets Mass Production

- Provide optimal conditions for mass-rearing weevils in a facility with an efficient floor plan that streamlines the work flow.
- Quantify production and effects on salvinia, and extrapolate production space required to mitigate an infestation of a given size



Release Site in Willowson Woodyard



Preliminary results

- Produced 165,000 (adults) in first year/ (660,000 W/L, USACE method). 85,000 so far this year (340,000 USACE)
- Introduced almost a quarter million (adult) weevils to release site in Willowson Woodyard (200 acres heavily infested with salvinia)
- Population survived through the winter (mild), and has caused extensive damage in a six inch thick mat.

Entering Willowson Woodyard (6" thick)



Weevil Damage in Willowson Woodyard, 2015



More Damage



Etc.



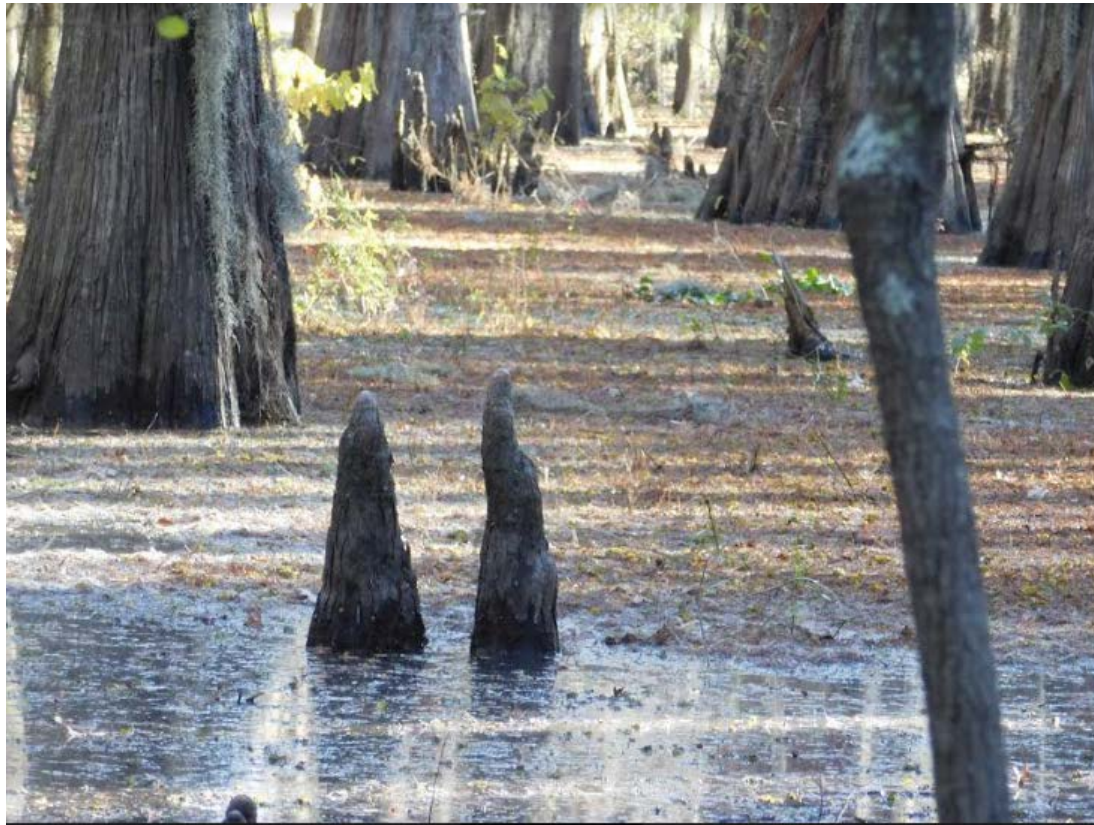
More Damage



Etc.



2016



Hyacinth proliferating



Water opening up



Etc.



Etc.



Etc.



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