Giant salvinia (*Salvinia molesta* Mitchell)

Gray Turnage, M.S., Research Associate III, Mississippi State University

<u>Problems</u>: Forms dense mats (~1 m thick) of vegetation that extend into open water. Portions of mats and individual plants can break away and float to new sites establishing new colonies which can inhibit growth of native plant species and reduce the water quality of habitat utilized by aquatic fauna. Mats can also inhibit recreational uses and commercial navigation in waterbodies and worsen flood events.

<u>Regulations</u>: State noxious in MS; Federal noxious.

<u>Description</u>: Giant salvinia can be confused with common salvinia; both of which are aquatic ferns from south America. The primary characteristic used to distinguish the two species from each other are the hairs (called trichomes) on the frond (leaf) surfaces. Giant salvinia has 'egg-beater' shaped trichomes (Figure 1) while common salvinia's don't touch in the middle and look more like a 'crow's foot'. Giant salvinia produces emergent and submersed fronds (submersed looks like roots) along the stem (Figure 1). Stems intertwine, forming dense floating vegetative mats.

<u>Dispersal</u>: Giant salvinia is native to South America but has been found throughout the southeastern U.S. and is becoming more common in MS (Figure 2; Turnage and Shoemaker 2018, Turnage et al. 2019). Plant fragments can be spread by aquatic fauna, water currents, wind, and boating equipment.

<u>Control Strategies</u>: Physical- drawdown will control giant salvinia by depriving the plant of water and stranding individual plants on land, thereby exposing them to temperature extremes. Mechanical-hand removal of small patches may be effective; mechanical mowers will not provide control and may cause further spread through fragmentation. Biological-the salvinia weevil has been very effective in areas south of the I-10 corridor where the insects can survive winter temperatures. Chemical-the herbicides diquat, glyphosate, and flumioxazin have all been shown to be effective against giant salvinia. Glyphosate and flumioxazin (alone or in combination) are more effective. Chemical solutions should be mixed with water and a non-ionic surfactant then sprayed on foliage (Table 1). Flumioxazin performs better than other herbicides in winter months and glyphosate or flumioxazin perform well in other seasons. Flumioxazin may require a buffering agent in tank solution with high pH.

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References

Turnage, G. and C. M. Shoemaker. 2018. 2017 survey of aquatic plant species in Mississippi waterbodies. Geosystems Research Institute, Mississippi State University, Mississippi State, MS. February 2018. GRI Report # 5077. Pp. 69.

Turnage, G. 2019. A Brief Introduction to Factors Affecting Water Quality, Aquatic Weed Control, Herbicide Labels, & Mixing Calculations. Mississippi State University, Geosystems Research Institute Report #5084. Pp. 22.

Turnage, G., A Lazaro-Lobo, S. L. Sanders, and M. Thomas. 2019. 2019 survey of aquatic plant species in Mississippi waterbodies. Geosystems Research Institute, Mississippi State University, Mississippi State, MS. February 2018. GRI Report # 5085. Pp. 35.

Madsen, J.D. and R.M. Wersal. 2006. Giant salvinia (*Salvinia molesta* D.S. Mitchell) MSU GRI Factsheet. Pp. 2.

Tables and Figures

Table 1. Chemical control strategies adapted from Madsen and Wersal (2006); the first row for each herbicide is the amount of product needed for commercial applications (100-gal solution), the second row is the amount of product needed for private landowners (25-gal of solution; typical ATV sprayer size); all rates are in imperial units (see Turnage 2019 for instructions on calculating ac-ft; and to gain a greater understanding of how aquatic plant management and aquatic ecosystem processes affect each other); herbicide will move to a constant concentration in the waterbody after application.

HERBICIDE	SPOT RATE	BROADCAST RATE	SURFACTANT	NOTES
Diquat	0.8%	3 qts/ac	1% (1 gal)	Foliar, fast acting contact
		24 oz	1 qt	
Glyphosate	4%	1 gal/ac	1% (1 gal)	Foliar, slow acting systemic
		1 qt	1 qt	
Flumioxazin	0.04%	6 oz/ac	1% (1 gal)	Foliar, fast acting contact
		1.5 oz	1 qt	

*****Diquat rates are based on a 3.73 lb/gal formulation, glyphosate rates are based on a 3.8 lb/gal formulation, and flumioxazin rates are based on a 4 lb/gal formulation; see Turnage (2019) regarding herbicide labels and formulation determination.

†This table is meant to be an aid in mixing herbicide solutions; it is not meant to be used as a replacement for herbicide label recommendations.

Figure 1. Image of giant salvinia trichomes (left), emergent fronds (right A), stem (right B) and submersed fronds (right C). Images courtesy of J. Madsen and R. Wersal (2006).

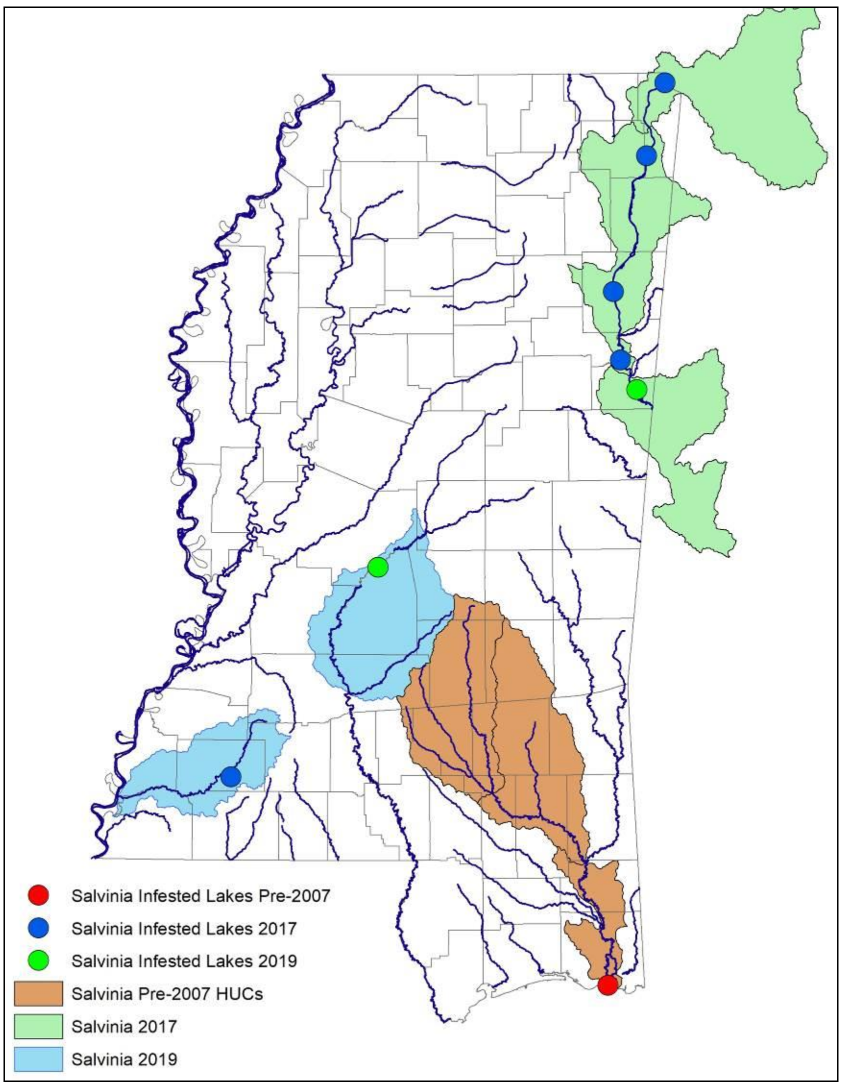

Figure 2. Mississippi Hydrologic Units and waterbodies infested by giant salvinia according to surveys by Turnage and Shoemaker (2018) and Turnage et al. (2019). Hydrologic units are based on HUC 8 codes.

Author Contact Information:

Gray Turnage, M.S.
Mississippi State University, Geosystems Research Institute
2 Research Blvd., Starkville, MS 39759
662-325-7527, Gturnage@gri.msstate.edu
www.gri.msstate.edu