# INVASIVE PLANT FACTSHEET
# Brittle naiad (*Najas minor* All.)

Problems: Forms dense surface mats of vegetation that inhibit growth of native plant species and reduce the water quality of habitat utilized by aquatic fauna. Mats can also inhibit recreational uses in waterbodies and worsen flood events.

Regulations: No federal or MS regulations prohibiting movement of this plant.

Description: Brittle naiad is an annual submersed plant species that can be confused with some pondweeds, coontail, cabomba, and native naiad species. Brittle naiad has opposite recurved leaves that are short (<1 inch) and narrow with serrated edges. Plants can vary in color from green to greenish brown (Figure 1). Plants produce seeds in the late summer and fall that sprout the next growing season. Stems and leaves intertwine, forming dense surface mats.

Dispersal: Brittle naiad is native to Europe, western Asia, and Africa but has been found in at least 28 U.S. states (mostly in the southeastern, midwestern, and northeastern U.S.) and is becoming more common in MS (Figure 2; Turnage and Shoemaker 2018, Turnage et al. 2019, 2020). Seeds are spread by aquatic fauna (waterfowl), plant fragments, water currents, and boating equipment.

Control Strategies: Physical-drawdown is unlikely to provide long term control as seeds can survive for years in sediments; however, bottom barriers and dyes may provide control if implemented early. Mechanical-harvesters may reduce nuisance growth but likely cause further spread through dispersal of plant fragments and attached seeds. Biological-there are no known biological control mechanisms for brittle naiad. Chemical-the herbicides diquat, endothall, copper, and fluridone have all been shown to be effective against brittle naiad; however, repeated applications may be necessary to deplete brittle naiad seed banks. Chemical solutions should be mixed with water and applied via subsurface injection to infested waterbodies (Table 1).

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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. December 2019. GRI Report # 5085. Pp. 35.

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United States Department of Agriculture (USDA). 2020. Najas minor. www.plants.usda.gov. Date Accessed: 10-27-2020.

## Tables and Figures

Table 1. Chemical control strategies for brittle naiad; the first row for each herbicide is the amount of formulated 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*,† | EARLY SEASON RATE | LATE SEASON RATE | NOTES |
|---|---|---|---|
| Diquat | 0.185 ppm | 0.37 ppm | Short term control; do not use in turbid or muddy water |
| | 0.25 gal/ac-ft | 0.5 gal/ac-ft | |
| Copper ETA | 0.5 ppm | 1.0 ppm | Short term control; do not use in water with hardness <50 ppm |
| | 1.5 gal/ac-ft | 3 gal/ac-ft | |
| Endothall | 2.0 ppm | 4.0 ppm | May need to use drop hoses if treating through a thermocline |
| | 1.3 gal/ac-ft | 2.6 gal/ac-ft | |
| Fluridone | 10 ppb | 45 ppb | Slow acting, may need bump application 30 days after first |
| | 0.86 oz/ac-ft | 3.8 oz/ac-ft | |

***** Diquat rates are based on a 3.73 lb./gal formulation, copper ETA rates are based on a 0.9 lb/gal formulation, endothall rates are based on a 4.23 lb./gal formulation, and fluridone rates are based on a 4.0 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.

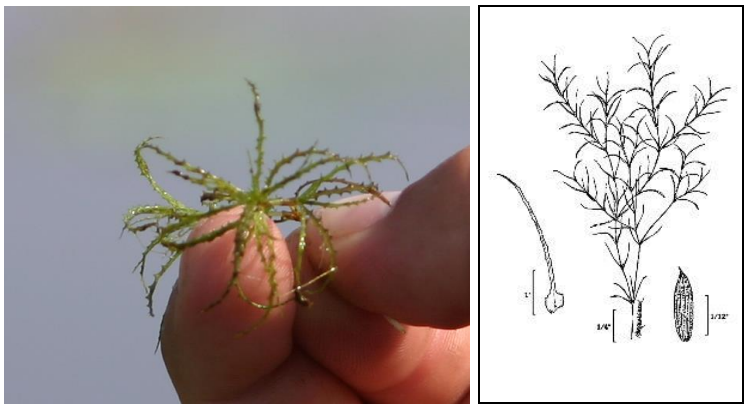

Figure 1. Image of brittle naid leaves (left) and line drawing (right). Image credit: R. Wersal; Line drawing: USDA 2020.

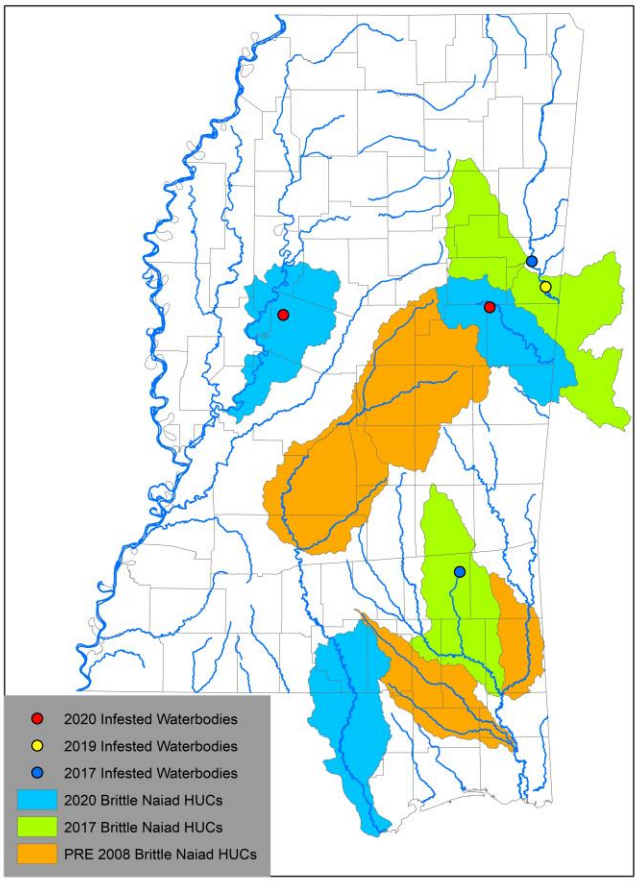


Figure 2. Mississippi Hydrologic Units and waterbodies infested by common salvinia according to surveys by Turnage and Shoemaker (2018) and Turnage et al. (2019, 2020). Hydrologic units are based on HUC 8 codes.

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