

Table 1. Management options for control of parrotfeather.

Category	Technique	Note	Rating
Biological	Grass Carp	Not a preferred food, use of grass carp has many drawbacks	Poor
	Leaf Feeding Beetle	Not approved for release in U.S.	May hold promise
Mechanical <sup>1</sup>	Harvesting	Small areas	Fair
	Raking	Biomass production is too great for this method	Poor
	Hand Pulling	Small areas	Fair
Physical <sup>2</sup>	Drawdown	Large-scale	Unknown
	Dredging	Large-scale, expensive	Excellent

<sup>1</sup>Care must be taken to remove all plant fragments.

<sup>2</sup>Plants can grow in moist soil. Drawdown should facilitate complete drying of sediment.

Table 2. Recommended aquatic herbicides and rates for use in controlling parrotfeather.

Herbicide	Trade Name	Application Rate	Type of Chemical	Effectiveness <sup>1</sup>
2,4-D	DMA-4 IVM	2.0 – 4.0 <sup>a</sup>	Selective Systemic	Excellent
	Aqua-Kleen	100 – 200 <sup>b</sup>		
	Navigate	100 – 200 <sup>b</sup>		
	Hardball	10.0 – 20.0 <sup>a</sup>		
Diquat	Reward	8.0 <sup>a</sup>	Broad Spectrum Contact	Good
	Aquathol K	4.0 - 8.0 <sup>c</sup>		
Endothal	Aquathol Super K	8.0 – 13.0 <sup>c</sup>	Broad Spectrum Contact	Fair
Glyphosate	Rodeo	2.0 – 5.0 <sup>a</sup>	Broad Spectrum Contact	Good
	AquaPro	2.0 – 5.0 <sup>a</sup>		
Imazapyr	Habitat	1.0 – 3.0 <sup>a</sup>	Broad Spectrum Systemic	Excellent
Triclopyr	Renovate 3	3.0 – 8.0 <sup>a</sup>	Selective Systemic	Fair

<sup>a</sup>Rates expressed as quarts of product per surface acre as a surface broadcast application

<sup>b</sup>Rates expressed as pounds of product per surface acre, applied to plants

<sup>c</sup>Rates expressed as quarts of product per surface acre applied to the water

<sup>1</sup>Excellent = ≥ 90% control of treated plants

Good = 80% control of sprayed plants

Fair = < 80% control of sprayed plants; re-growth can be expected

\*\*Use a non-ionic surfactant with broadcast applications

\*\*Use the higher rates for dense plant infestations

## FURTHER READING

Sutton, D.L. 1985. Biology and ecology of *Myriophyllum aquaticum*. Proceedings, 1<sup>st</sup> International Symposium on watermilfoil (*Myriophyllum spicatum*) and Related Haloragaceae Species. 23-24 July 1985. Vancouver, B.C. pp. 59-71.

Sutton, D.L. 1985. Parrot-feather. Aquatics 7: 6-7, 10.

Moreira, I, A. Monteiro, and T. Ferreira. 1999. Biology and control of parrotfeather (*Myriophyllum aquaticum*) in Portugal. Ecology, Environment and Conservation 5:171-179.

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## MORE INFORMATION

Washington Department of Ecology:

<http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua003.html>

<http://www.ecy.wa.gov/programs/wq/plants/weeds/parrot.html>

United States Department of Agriculture: National Plant Database:




[http://plants.usda.gov/cgi\\_bin/topics.cgi?](http://plants.usda.gov/cgi_bin/topics.cgi?)

[earl=plant\\_profile.cgi&symbol=MYAQ2](http://plants.usda.gov/cgi_bin/topics.cgi?)

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# INVASIVE SPECIES FACT SHEET

## Parrotfeather [*Myriophyllum aquaticum* (Vellozo) Verdecourt] Description, Distribution, and Management

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## INTRODUCTION

*Myriophyllum aquaticum* (Vellozo) Verdecourt, synonymous with *Myriophyllum brasiliense* Cambessedes, belongs to the Haloragaceae family and is native to South America. Parrotfeather is a common component of aquaria landscaping because of its aesthetic appearance and ease of cultivation. The ease of cultivation and attractiveness as a pond plant has aided in the escape and subsequent colonization of natural areas by parrotfeather. The brittle nature of the stems results in many fragments that root easily in moist soil to establish new colonies. Although parrotfeather is not listed on the federal or state noxious weed list, it can cause problems in shallow ditches, streams, ponds, and shallow lakes. Infestations of parrotfeather can choke streams and impede runoff forcing the flooding of adjacent lands. In South Africa parrotfeather infests all of the major river systems where it poses a direct threat to the water supply. In addition, parrotfeather provides mosquito larvae a refuge from predation that may promote the spread of mosquito born disease.

## DESCRIPTION

Parrotfeather has both an emergent and submersed growth form. Emergent leaves are whorled, stiff, and usually have 20 or more linear divisions on each leaf (Figure 1). The leaves appear feather-like and grayish green. Flowers are produced in the axils of emergent leaves (Figure 1). Parrotfeather is a dioecious species (meaning there are male and female plants), however only female plants are found outside of South America. Male plants are rare even in native populations of South America. For this reason, seed production is not known to occur and reproduction is exclusively vegetative. Vegetative reproduction occurs solely by fragmentation of emergent and/or submersed shoots.



Fig. 1. Emergent shoot, leaves, and white flowers (in leaf axils). Photo by John D. Madsen.

Submersed shoots are comprised of whorls of four to six filamentous, pectinate leaves arising from each node. When the submersed shoots reach the water surface, plant growth changes to a horizontal pattern with extensive lateral branching followed by vertical growth of the stem (Figure 2). The horizontal growth results in the senescence of aerial leaves as they become submersed, followed by the growth of emergent shoots and adventitious roots from the stolon (the original emergent stem) after leaf senescence (Figure 3). Parrotfeather lacks specialized structures for storage, dispersal, and reproduction (e.g. tubers, turions, and winter buds) and therefore stolons serve all these functions.





Fig. 2. Adventitious root growth from parrotfeather rhizomes. Photo by Ryan M. Wersal.



Fig.3. Lateral branching of emergent shoots at the water surface. Photo by Ryan M. Wersal.

## HABITAT

Parrotfeather grows well in shallow wetlands, slow moving streams, irrigation reservoirs or canals, edges of lakes, ponds, sloughs, or backwaters (Figure 4). Parrotfeather is not seriously affected by frost or frequent inundation of salt water; the latter may promote root growth. However, plants growing in northern latitudes may have emergent shoots and leaves killed by a hard frost. Parrotfeather requires rooting in bottom sediment, so environments where light can penetrate to the bottom generally favor colonization. In general, depths of less than 100 cm are optimum; however parrotfeather has been observed growing in waters up to 2 meters deep. Regardless of conditions, once parrotfeather is established it usually persists in spite of variations in the environment.



Fig. 4. Typical infestation of parrotfeather in a small wetland near Lake, MS. Photo by Victor Maddox.

## DISTRIBUTION

Parrotfeather has been introduced into Southeast Asia, Australia, New Zealand, Japan, South Africa, and North America. The earliest specimen recorded in the United States was collected April 20, 1890, from Haddonfield, New Jersey. Since then, parrotfeather has spread to 26 states including Hawaii. The current distribution is as far north as New York on the east coast, Washington on the west coast and in nearly every southern state (Figure 5). In Mississippi, parrotfeather is widespread through out the state (Figure 6).

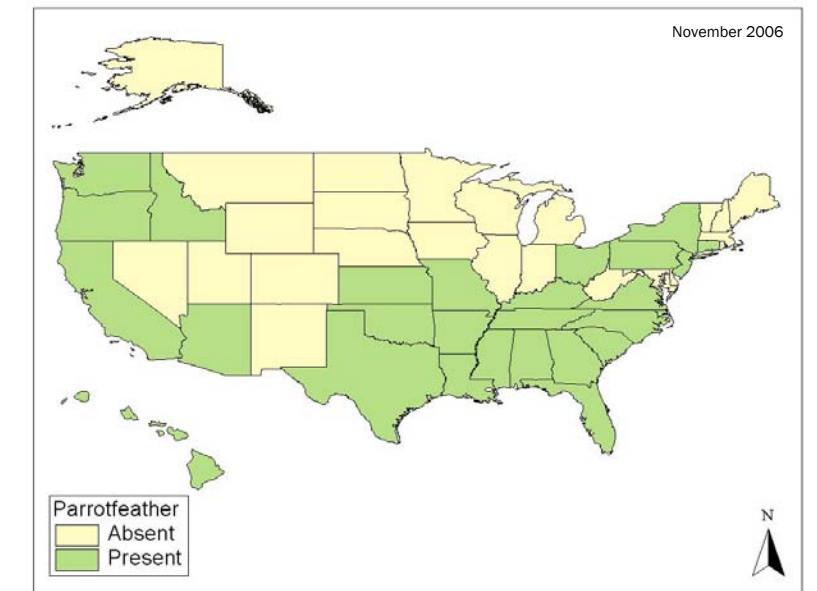


Fig. 5. The occurrence of parrotfeather in the United States.

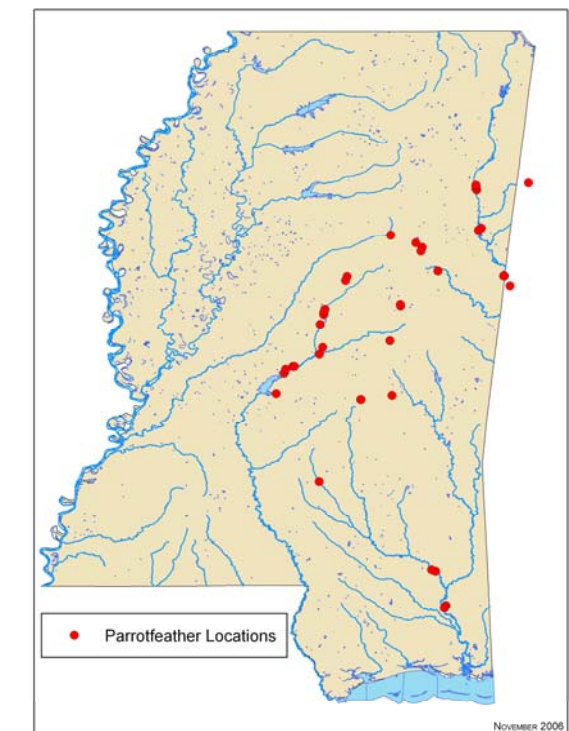


Fig. 6. Mapped locations of parrotfeather in Mississippi.

## MANAGEMENT

### Biological Control:

Currently, the grass carp (*Ctenopharyngodon idella*) and a leaf feeding beetle (*Lysathia* spp.) have been evaluated for control of parrotfeather infestations (Table 1). Studies show that grass carp are not effective against parrotfeather because the plant is unpalatable and not a preferred food of the fish. The leaf-feeding beetle showed some promise in South Africa by significantly reducing emergent shoot biomass.

### Mechanical and Physical Control:

Hand pulling and harvesting may offer temporary control on small infestations of less than one acre. Raking may not be feasible due to the rapid biomass production of parrotfeather, as dense mats are likely heavy and may damage equipment. Care must be taken to remove all plant parts (emergent shoots, submersed shoots, and roots) as well as fragments or re-growth will occur. Drawdowns may offer control in some situations, however, all water must be removed to facilitate compete drying of bottom sediments since parrotfeather will root and survive in moist soil. Dredging is generally very expensive and not feasible for most management situations.

### Chemical Control:

Herbicides are the most common and effective means of controlling parrotfeather. Herbicide formulations that can be used to control parrotfeather include 2,4-D, diquat, glyphosate, endothall, imazapyr, and triclopyr (Table 2). Glyphosate has been used as a broadcast treatment; however, it requires multiple applications per year for several years to be effective. The systemic herbicide 2,4-D as a broadcast treatment has shown promise in controlling parrotfeather using a broadcast treatment. Generally, only broadcast treatments have been applied to parrotfeather and little information is available on subsurface applications. Currently, no herbicide has been shown to be totally effective in controlling parrotfeather with out repeated applications over time. Always read and follow label instructions when applying herbicides.