

= 18 for the most common form and  $2n =$

36 for the larger tetraploid populations . The larger tetraploid " race " , as Peter Taylor called it , can be up to twice as large as the regular diploid species . Populations of this race have been located in Florida .

= = Distribution and habitat = =

*U. inflata* is native to the southeastern United States . Peter Taylor 's 1989 taxonomic monograph listed the following states where native populations of this species have been located : Alabama , Arkansas , Delaware , Florida , Georgia , Kentucky , Louisiana , New Jersey , North and South Carolina , Tennessee , Texas , and Virginia . In addition to these states , the United States Department of Agriculture 's online PLANTS database acknowledges populations in Connecticut , Maryland , Michigan , Mississippi , New York , Oklahoma , and Pennsylvania . The states of Maryland , Michigan , and New York have classified *U. inflata* as an endangered or threatened species while Tennessee has listed it as a species with " special concern " .

*U. inflata* inhabits aquatic environments such as lakes , ditches , and swamps from shallow to deep waters at low altitudes .

= = Invasiveness = =

As early as 1980 , specimens of *U. inflata* were beginning to be collected or recorded outside its traditionally accepted range . Populations have been established in Washington state , New York , and Massachusetts . The colonies in Washington are obvious introductions , but while the populations in New York and Massachusetts are most likely the result of recent introductions , it is more difficult to say with certainty how they were introduced .

In southeastern Massachusetts , several samples of *U. inflata* have been gathered from Federal Pond beginning in 1990 , representing its first collection north of New Jersey on the east coast . Bruce Sorrie has identified a substantial population in this location . Sorrie indicated that human @-@ aided introduction of this species to Massachusetts is likely since Federal Pond has been used for various purposes since the late 18th century , though Sorrie also notes that transfer of propagules by waterfowl or herons from *U. inflata* 's native range may be just as likely .

Three years after the first collection in Massachusetts , a study of the area around Spruce Pond in Orange County , New York yielded the first record for *U. inflata* in New York State . The authors of the study speculate that , unlike the population found in Massachusetts , it is unlikely that the population in Spruce Pond was the result of human introduction because the pond is in a remote area and rarely used . More recently in 2005 , a study in northern New York identified populations of *U. inflata* in six lakes in the Adirondack Mountains , representing another northern extension of its range . In two of these lakes *U. inflata* was the most frequently encountered species in 2000 , whereas a census of the lakes found no *U. inflata* whatsoever in 1983 . This impressive growth in what is probably a new location for the species is similar to the growth patterns of other invasive aquatic plant species . The authors of this study also noted that at one of these sites , many of the native species declined in frequency or could not be found , possibly due to the presence and proliferation of *U. inflata* . Lab experiments and observations in the field supported the authors ' hypothesis that the presence of *U. inflata* in Adirondack lake systems damages the natural nutrient cycles that sustain the native flora . *U. inflata* likely shades out the native flora , specifically *Eriocaulon aquaticum* , a submersed macrophyte isoetid that releases oxygen into the sediment . In this case , *U. inflata* could indirectly change the biogeochemical cycle in the Adirondack lakes by hindering the growth of native isoetid macrophytes and subsequently having a negative effect on the proper balance of sediment chemistry . The consequence of this may include enhanced growth of algae and other changes to the ecology of the freshwater ecosystems that it may invade .

Even earlier than the collections in Massachusetts and New York , a population of *U. inflata* was located in Horseshoe Lake in Kitsap County , Washington in 1980 . Since then , further specimens of *U. inflata* have been recorded from other Puget Sound area lakes in Kitsap , Mason , Pierce , and

Thurston counties . One population has even been recorded from the more southern Silver Lake in Cowlitz County . Information on this species in Washington State provided by the state 's Department of Ecology includes a statement that *U. inflata* 's presence in Horseshoe Lake was " probably the result of a discarded aquarium . " Washington 's Department of Ecology also indicates that in the areas where it occurs , *U. inflata* forms dense floating mats , becoming a nuisance for recreational activities . Residents of Lake Limerick , which has extensive populations of *U. inflata* , spend thousands of dollars each summer to rid their lake of the dense , weedy mats . A variety of control methods have been used to control the weed , including a sonar treatment , biocontrol utilizing grass carp , and manual extraction . Washington considers this species to be problematic but has not classified it as a noxious weed . Instead , it is on a monitor list of wetland and aquatic species under quarantine , meaning that it is prohibited to sell this species and it may be included on the state 's noxious weed list in the future .

Most carnivorous plant species require very specific environmental conditions to thrive . This narrow habitat tolerance means that many carnivorous plants are threatened or endangered in their native ranges . *U. inflata* 's ability to thrive in a variety of locations that it has been introduced to represents an ability to tolerate a much larger range of habitats than most carnivorous plant species .

= = Cultivation = =

*U. inflata* is one of the many *Utricularia* species that is cultivated by carnivorous plant enthusiasts . Because it requires no dormancy and due to its swift growth , it is one of the easier suspended aquatic species to cultivate . Barry Rice , author of *Growing Carnivorous Plants* , says that this species is the easiest suspended aquatic *Utricularia* that he has grown . Rice also mentions that *U. inflata* has been used as an aid in the cultivation of particularly difficult species , such as *Aldrovanda vesiculosa* , that are much more sensitive to high nutrient concentrations . When growing these species together , *U. inflata* will grow rapidly in the presence of higher nutrients , which allows *A. vesiculosa* to enjoy the conditions it thrives in .

Rice , the Washington Department of Ecology , and the United States Geological Survey 's Nonindigenous Aquatic Species information resource all indicate that cultivation of this species is suspected as the most likely source of its introduction into Horseshoe Lake in Washington . The spread from lake to lake in Washington is probably the result of waterfowl moving from lake to lake and carrying plants or propagules with them .

= = Botanical history = =

*U. inflata* was first named and described by Thomas Walter in 1788 . *U. radiata* has often been mistaken for *U. inflata* because of their similar morphology and overlapping distribution . In the past , *U. radiata* has been misidentified as *U. inflata* or placed at the rank of variety . *U. radiata* was first identified by Alvan Wentworth Chapman in 1860 as *U. inflata* var. *minor* and noted that it was " in every way smaller " than *U. inflata* . John Kunkel Small in 1903 was the first to elevate *U. inflata* var. *minor* to the species level under the name *U. radiata* . Further studies of the two taxa were mixed on how to treat them . In 1950 , Merritt Lyndon Fernald treated them as two varieties of the same species while Henry Gleason considered them to be different , but allied species in 1952 . In 1962 , Grady Reinert and R. K. Godfrey further supported the separation of the two taxa into different species . Peter Taylor 's authoritative monograph of the genus in 1989 solidified the distinctiveness of the two species .