AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

A. PROPOSAL

Inclusion of *Sarracenia* spp. and natural hybrids in Appendix II.

B. PROPONENT

The United States of America.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Magnoliopsida (Dicotyledonae)

12. Order: Nepenthales

13. Family: Sarraceniaceae

141. Genus and Species: *Sarracenia* L.

S. alabamensis Case and Case
spp. *wherryi* Case and Case
syn. = *S. rubra* spp. *wherryi* (Case and Case) Schnell
S. alata Wood
syn. = *S. sledgei* Macfarlane
S. flava L.
syn. = *S. rugelii* Shuttlew. ex A. DC.
S. leucophylla Raf.
syn. = *S. drummondii* Croom
S. minor Walt.
S. psittacina Michx.
S. purpurea L.
spp. *purpurea*
syn. = *S. p.* spp. *gibbosa* (Raf.) Wherry
syn. = *S. p.* forma *heterophylla* (Eat.) Fern.
syn = *S. p.* var. *ripicola* Boivin
spp. *venosa* (Raf.) Wherry
S. rubra Walt.
spp. *rubra*
spp. *gulfensis* Schnell

Details on individual taxa are in the Annex to this proposal. A complete list of *Sarracenia* names, including synonyms and hybrids, is in Schlauer (1986)

142. Natural Hybrids: 21 known natural hybrids are listed in Annex; others may occur

15. Common Names: English: pitcher plants, trumpets, bugle-grass, bog-bugles, dumb-watches, watches, buttercups, Eve's cups, frog bonnets
French: sarracénies
Spanish:

16. Code Numbers:

2. Biological Data

21. Distribution: The genus is confined to the southeastern portion of the United States, with the exception of S. purpurea purpurea, which extends north along the eastern coastal plain to Newfoundland in eastern Canada, nearby St.-Pierre and Miquelon (France), and western Canada as far as the Northwest Territories and British Columbia (Wood, 1960; Straley et al., 1985). Sarracenia purpurea has reportedly become naturalized in northern Europe (Almborn, 1983; Nelson, 1986). See Annex for further distributional data.

22. Population: Sarracenia often forms concentrated monospecific, multispecific, and hybrid populations. There may be few to thousands of individuals of a taxon in a colony. Several taxa are considered rare in one or more states and provinces (see Annex), and several are candidates for listing as endangered or threatened (i.e. vulnerable) species under U.S. law (see topic 43. below). Alteration of habitats has caused reproduction to decline or cease in some populations where mature plants yet persist for long periods, giving a false impression of abundance. Plants can come back rapidly by seed and rhizome proliferation if habitats are not severely altered. Some colonies thrive in disturbed sites along roadsides where moisture collects, especially in the Gulf coastal region (Miller, n.d.; Plotkin, pers. comm. to D. Fuller, 1985). The principal threat to populations is decline because of habitat development, although commercial (and amateur) collecting of some populations and particular genetic variants presents a significant threat (Miller, n.d.; G. Folkerts, pers. comm. to U.S. Fish and Wildlife Service [FWS], 28 Jan. 1987). Habitat disturbance is causing an increase in hybridization in some populations (T. Mellichamp, pers. to FWS, 13 Jan. 1987).

23. Habitat: Sarracenia spp. and hybrids are restricted to wet, mediacid soils in bogs and wet savannas, the margins of pocosins (upland swamps), as well as particular sandy slopes (Wood, 1960). The habitats are poor in minerals, which may have stimulated the evolution of carnivory in the genus. McDaniel (1971) observed that the various Sarracenia spp. do not show significant differences in habitat preferences, with each being restricted by the availability of suitable wetland habitats within its range. Sarracenia minor is frequently found in the more drained, upland parts of savannas or even in light pine (Pinus) woods, whereas most other species of the genus are most abundant in more moist, open areas (Schnell, 1976). The Gulf coastal area is the centre of Sarracenia diversity; historically, this region had the largest populations of Sarracenia species. However, Folkerts (1982) reports that 97 percent of Gulf Coast bogs (which once covered an estimated 3,000 square kilometres) have been drained for plantation forestry, agriculture, highway construction and coastal development. He also cites water pollution, herbicides, and trampling by livestock as threats to Sarracenia habitat.

3. Trade Data

31. National Utilization: Sarracenia spp. and hybrids are desired because of their unusual carnivorous adaptations and attractive leaves and for some, flowers. The domestic market has three segments: 1) mass marketing especially of rosetted taxa (e.g. S. purpurea) for impulse sales at nurseries, supermarkets, and discount stores; 2) mass marketing of taller taxa (e.g. S. leucophylla) to the floral industry for use as attractive foliage; and 3) speciality nursery mail order of many taxa (especially rosetted ones) for hobbyists (B. Hanrahan, pers. comm. to FWS, 17 and 24 Jan. 1987). The domestic mass market of rosetted taxa probably does not exceed about 10,000 plants a year, nearly all of wild origin. Floral industry interest in Sarracenia appears to be fairly new and expanding, and uses plants of wild origin primarily. One company in Texas recently sought 10,000 pitchers (leaves) of S. leucophylla each week if they could be made available. This company also obtained S. alata, and sought certain natural hybrids (e.g. S. x mitchelliana). The dedicated hobby market consumes about 2,500 plants a year, of which about 1,700 are of wild origin. One specialist who has studied Sarracenia at many sites since 1974 and has kept careful notes on the presence of digging holes has noted a twenty-fold increase in removal of isolated plants or small clusters since 1982, and knows of few sites where no digging has occurred. Collecting for medicinal use is another factor that may deplete wild populations (see 34. Potential Trade Threats).

32. Legal International Trade: As of December 1985, there was no recorded trade in the three Appendix I Sarracenia (S. oreophila, S. alabamensis alabamensis, and S. jonesii) in the Wildlife Trade Monitoring Unit's database in Cambridge. The full extent of annual U.S. exports of wild, non-listed Sarracenia spp. and hybrids is not known, but it is believed to be the great majority of the market. From April 1981 to April 1984, the Netherlands reported importing 133,000 Sarracenia (F. Campbell, pers. comm. to FWS, 28 Jan. 1987). In 1985, one company in North Carolina supplied over 100,000 wild specimens of S. purpurea and lesser quantities of other species to a company in Europe. The European company also obtained nearly 35,000 wild S. psittacina in 1985. Such plants are purchased in lot quantities at US$ 0.15-0.17 each, below cost for artificially propagating taxa. U.S. exports go particularly to Europe (Netherlands, United Kingdom of Great Britain and Northern Ireland, Federal Republic of Germany), Australia, Japan and Canada. Expanding secondary markets from Europe are anticipated in Asia, especially China, although the European market itself may saturate in a few years unless the floral industry gets interested (Folkerts, pers. comm. 28 Jan. 1987; Hanrahan, pers. comm. 17 and 24 Jan. 1987). The United States also imports some plants (S. purpurea) from Europe, probably those originally supplied from North Carolina (Hanrahan, pers. comm. 17 Jan. 1987). In addition, one U.S. company has been importing about 30,000 wild S. purpurea purpurea per year from Canada. While most of the international trade is not known as to taxon, it is believed that all species and many hybrids are involved.

International Carnivorous Plant Society (ICPS) members rely on its official journal, Carnivorous Plant Newsletter, for information and guidance on carnivorous plant propagation, conservation, and literature. ICPS membership has grown significantly since 1982. This growth in membership and success of the ICPS journal reflect the growing popularity of carnivorous plants. In addition to disseminating information about biology and horticulture, ICPS members actively participate in trade shows and exhibitions, exchange wild and artificially propagated plants with other hobbyists in their country (especially the United States) and other countries, and oversee and contribute to a seedbank for carnivorous plant conservation.

Scientists and other carnivorous plant experts have expressed concern that growing international demand for Sarracenia spp. and hybrids, when coupled with their shrinking and selective wetland habitats, may significantly deplete wild populations in the southeastern United States (Schnell, 1986; Miller, n.d.; Campbell, 1983; Schnell and Mazrimas, 1976; Folkerts, pers. comm., 28 Jan. 1987); some noted that limited harvest from large populations of some species does not pose a significant threat (Miller, n.d.; Mellichamp, pers. comm., 13 Jan. 1987). Fortunately, large-scale commercial propagation of Sarracenia spp. and hybrids by cuttings and tissue culture is underway in the Netherlands (Mellichamp, 1986). Sarracenia apparently has great potential for mass production through meristem tissue culture. Gagliardo (1984) reports that the use of apical meristems reduces the time required to grow flowering specimens by half.

33. Illegal Trade: The full extent of illegal trade is not known, although advertisements of the Appendix I Sarracenia taxa in U.S. journals and nursery catalogues demonstrate a continuing demand for protected species. In Japan, S. oreophila (Appendix I) is offered by one nursery, which is perhaps a result of illegally obtaining a stock plant for propagation [D. Fuller, TRAFFIC (U.S.A.), pers. comm. to FWS, 25 Sept. 1986]. One or more non-listed species are legally protected in Florida and New York, and possibly protected in five other states (see Annex). However, enforcement is minimal and difficult, and plants currently are being taken from nature preserves and state parks in at least Alabama, North Carolina, and Texas (Folkerts, pers. comm., 28 Jan. 1987). Twenty-two S. oreophila were dug about 30 May 1986 from a site in Alabama (D. Fuller, pers. comm. to FWS, 25 Sept. 1986). Since most plants in commerce are field collected (T. Gibson, pers. comm. to FWS, 2 Oct. 1984), it is possible that protected plants are smuggled with non-protected species.

34. Potential Trade Threats: The use of Sarracenia rhizomes in medicine is a potential trade threat. Moore (1984) reports that a U.S. chemical company asked him to supply 500 pounds of S. purpurea rhizomes for chemical extracts; he supplied them with 186 pounds. Extracts of S. purpurea, containing the alkaloid sarracenin, were once thought to be helpful in the treatment of smallpox (Schnell, 1984), and as a treatment for a painful neurological disorder, tic douloureux (Wherry, 1976). Schnell (1984) reports that researchers who tested extracts of S. flava for anti-tumour activity reported some success in 1974. Whether there is continuing medicinal use of any Sarracenia nationally or internationally is not known.

4. Protection Status

41. National: Few states explicitly protect these Sarracenia spp. and hybrids. Several other important states have no general rare plant conservation laws: Alabama, Connecticut, Kentucky and Louisiana. States with natural heritage programmes within the range of Sarracenia include Delaware, Massachusetts, Mississippi, New Hampshire, New Jersey, and West Virginia (L. McMahan, pers. comm. to D. Fuller, 1986). Detail on state protection is provided in the Annex.

42. International: Not known.

43. Additional Protection Needs: Stricter state plant conservation laws are essential to give individual states the authority to protect their native Sarracenia spp. and hybrids from over collection. Clearly, protection of wetland habitats especially in the Gulf coastal plain states is most urgent for survival of the rarer Sarracenia taxa and populations, which have already lost so much habitat.

Sarracenia alabamensis alabamensis, S. alabamensis wherryi, and S. jonesii are candidates for listing as endangered or threatened (i.e. vulnerable) under the U.S. Endangered Species Act of 1973, as amended (S. oreophila is already listed as endangered). Sarracenia rubra ssp. gulfensis may be added as such a candidate, and the remaining taxa of Sarracenia and Darlingtonia are now being considered for listing under the similarity of appearance provision of that national law.

5. Information on Similar Species

Confusion exists over the taxonomic status of a few Sarracenia (S. rubra complex, including S. alabamensis and S. jonesii) (Case and Case, 1976; Schnell, 1977). Identification is especially difficult because of the large number of natural hybrids, as well as back crosses that result in the formation of hybrid swarms. Bell and Case (1956) described 19 different natural hybrids and their distributions, while 21 are reported by Slack (1979). In addition, there are at least eight artificial hybrids (see Annex).

Schnell (pers. comm. to D. Fuller, 27 Aug. 1985) suggested that Sarracenia rhizomes -- the most commonly traded form of Sarracenia -- if modified by traders could be confused with rhizomes of Iris spp. McDaniel (1971) notes that the rhizomes of all Sarracenia spp. are similar in appearance, with variation in thickness being the only significant difference between species. Mellichamp (pers. comm., 13 Jan. 1987) doubts that all taxa can be identified by rhizomes alone. The rhizome may live for 20 to 30 years intact and vegetative reproduction may occur naturally by fragmentation (McDaniel, 1971).

6. Comments from Countries of Origin

All but S. purpurea purpurea are endemic to the United States.

7. Additional Remarks

Most experts on Sarracenia confirm that the two principal threats -- habitat destruction and collection -- combine to form an even greater threat. As wetlands are drained, the remaining colonies of Sarracenia

become more vulnerable to collection. Uncontrolled commercial collections may eliminate the incentive to preserve remaining habitat if few healthy individuals remain in a given area. Collection by hobbyists, although not done in volume, can be comprehensive at small sites and also deplete unusual genetic variants, thus decreasing the genetic variability of the species.

Listing all Sarracenia under CITES will facilitate trade monitoring and allow biologists to determine where trade is detrimental to wild plants. It will assist in the enforcement of state laws. Appendix I Sarracenia taxa will benefit from listing, because comprehensive listing will require port inspectors to carefully inspect shipments of all Sarracenia, and thus discourage smuggling of Appendix I rhizomes.

8. References

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Annex: Distribution and U.S. Status of Non-listed Sarracenia

Species	Distribution*	Population Status (state)**	Conservation Status and State Protection***	Notes*
S. alabamensis ssp. wherryi	s.w. Alabama and s.e. Mississippi above "boot-heels"; perhaps extreme n.w. Florida	locally abundant in 1976 in western part of limited range	possibly protected in Mississippi through the heritage program, where considered endangered; possibly vulnerable in Alabama; candidate for national listing as endangered or vulnerable	
S. alata	Gulf Coast from s.w. Alabama to Texas, extends inland in Mississippi	common from Mobile Bay region into Louisiana, less common in e. Texas	possibly protected in Mississippi through the heritage program	
S. flava	n.w. Florida, Alabama to s.e. Virginia	very common in the Gulf area, locally common in s. Georgia	considered critically endangered in Virginia	
S. leucophylla	w. Florida, s. Georgia, e. Mississippi	common to occasional in Florida and Mississippi	Florida lists this species as endangered; considered vulnerable in Mississippi	
S. minor	c. Florida north to s.e. North Carolina to n.e. Georgia	rare in the Gulf area; more numerous in North Carolina and near Orlando, Florida	Florida lists this species as "commonly exploited"	

Species	Distribution*	Population Status (state)**	Conservation Status and State Protection***	Notes*
S. psittacina	s. Georgia to n.w. Florida and west to w. Florida and s. Alabama to s.e. Louisiana	fairly common throughout its range	Florida lists this species as "commonly exploited"; possibly protected in Mississippi through the heritage program; considered endangered in Louisiana	
S. purpurea	Florida to Mississippi and Iowa; Georgia, South Carolina, Virginia, Maryland north to Labrador, Hudson Bay, Mackenzie District, and British Columbia. Naturalized in northern Europe.	most abundant in bogs in the northern part of its range*	possibly protected in Delaware, New Hampshire, New Jersey, Massachusetts, and Mississippi through heritage programs; explicitly protected in New York; considered vulnerable in Indiana and possibly endangered or endangered in Delaware, Illinois, Maryland, Mississippi and Ohio; S. purpurea f. heterophylla endangered in Michigan.	S. purpurea ssp. purpurea is northern, S. p. ssp. venosa southern
S. rubra	s. Mississippi to w. Florida; c. Alabama; c. Georgia to s.e. North Carolina	rare in Florida, more numerous in Alabama and Mississippi	Florida lists this species as endangered; considered endangered or vulnerable in Alabama, Florida, Mississippi, and South Carolina	S. rubra ssp. gulfensis is a disjunct (from S. rubra ssp. rubra) in western Florida "panhandle" and a possible candidate for listing as endangered or vulnerable

* Information based mainly on McDaniel (1971).
** Information from Miller (n.d., [1979?]).
*** Based on information compiled by L. McMahan, pers. com. to D. Fuller, 1986; and by L. Morse, The Nature Conservancy, pers. com. to FWS, 1986.

See list of known hybrids, following.

Annex: *Sarracenia*: The Hybrids

INTERSPECIES CROSS	LATIN NAME
S. alata x *S. rubra*	*S.* x *ahlesii* (W)
x *S. minor*	-
x *S. psittacina*	- (W)
S. flava x *S. oreophila*	-
x *S. purpurea*	*S.* x *catesbaei* (W)
x *S. leucophylla*	*S.* x *mooreana* (W)
x *S. alata*	- (W)
x *S. rubra*	*S.* x *popei* (W)
x *S. minor*	*S.* x *harperi* (W)
x *S. psittacina*	- (W)
S. leucophylla x *S. alata*	*S.* x *areolata* (W)
x *S. rubra*	*S.* x *readii* (= *S.* x *farnhamii*) (W)
x *S. minor*	*S.* x *excellens* (W) (= *S.* x *cantabridgiensis*) (W)
x *S. psittacina*	*S.* x *wrigleyana* (W)
S. minor x *S. psittacina*	*S.* x *formosa* (W)
S. oreophila x *S. purpurea*	-
x *S. leucophylla*	-
x *S. alata*	-
x *S. rubra*	-
x *S. minor*	-
x *S. psittacina*	-
S. purpurea x *S. leucophylla*	*S.* x *mitchelliana* (W)
x *S. alata*	*S.* x *exornata* (W)
x *S. rubra*	*S.* x *chelsonii* (W)
x *S. minor*	*S.* x *swaniana* (W)
x *S. psittacina*	*S.* x *courtii* (W)
S. rubra x *S. minor*	*S.* x *rehderi* (W)
x *S. psittacina*	*S.* x *gilpinii* (W)

The above list includes both natural hybrids which occur in the wild (W), and artificially developed hybrids. (The list may not be complete.)