

acid wetlands at lower elevations on Kauai.

The Hawaiian Islands are over 2500 miles from the nearest continent in any direction, so how did *D. anglica* get to the bogs of the island of Kauai? There are two likely possibilities. The high-altitude jet stream runs directly from Japan to the Hawaiian Islands during parts of the year, and small seeds of the Japanese populations of *D. anglica* may have been blown over that way and settled out on Kauai. The other route involves a migratory bird, the Pacific Golden Plover (*Pluvialis fulva*), that yearly migrates from Alaska and Canada to Hawaii. When the birds arrive in Hawaii, they set up territories on lawns and other open flat habitats. One of their favorite haunts is open sedge bogs. In their non-stop flight from temperate North America to Hawaii, it is easy to envision seeds of *D. anglica* stuck in the mud on the feet of a plover being planted in its first landfall, a bog in the Alakai plateau on Kauai, the northernmost of the main Hawaiian Islands.

Whether by jet stream or plover, the colonization of *D. anglica* to Hawaii must have been a one in a million occurrence. If the introductions were more frequent, there would have been no opportunity to evolve tropical habitat tolerance, since that presumably would have required isolation of the gene pool of *D. anglica* in Hawaii for sufficient generations to allow for divergence. Thankfully for CP enthusiasts in tropical settings, the tropical adaptations of *D. anglica* in Hawaii allows for their cultivation in warm climes without heroic measures, such as seasonal stints in refrigerators.

The correct names for the subspecies of *Sarracenia purpurea* L.

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The article by Reveal (1993), reviewed in CPN 22(3):78, claims that owing to McDaniel's lectotypification (1971), the universally used nomenclature for the northern and southern subspecies of *S. purpurea*, the most widespread of all the American pitcher plants both in the wild and in cultivation, must be radically changed. This article, requested by CPN, examines the issue.

Sarracenia purpurea L., described by Linnaeus (1753: 510) was first treated as two entities by Rafinesque (1840) who treated the northern ('Canada to Virginia') element as *S. gibbosa* and the southern ('Virginia to Florida') variant as *S. venosa*. Wherry (1933) pointed out that the two taxa meet in New Jersey rather than in Virginia. He also noted that, although there are real differences between the two taxa, they are not sufficient for specific status, and treated them as subspecies: *S. purpurea* ssp. *venosa* (Raf.) Wherry and *S. purpurea* ssp. *gibbosa* (Raf.) Wherry. Wherry later (1972) adjusted the nomenclature to follow the International Code of Botanical Nomenclature (the Code), which rules that, where there are more than one infra-specific taxa of the same rank within any species, that to which the nomenclatural type of the species belongs should take the name of the species, that is, it should be autonomic. Thus one of the subspecies of *S. purpurea* must be *S. purpurea* ssp. *purpurea*. The question is, to which subspecies should the type of Linnaeus's species be attributed: the northern or the southern subspecies? Wherry (1972) indicated that 'although Linnaeus preserved no type specimen, his discussion indicates that his

species represented the northern of these, which according to common usage should therefore bear the name *S. purpurea* subsp. *purpurea*; for the southern one the published combination is *S. purpurea* ssp. *venosa* (Raf.) Wherry.'

However, McDaniel in his monograph of the genus (1971) was first formally to choose a nomenclatural type (lectotype) for *S. purpurea*. It should be remembered that a nomenclatural type is the element (specimen or illustration) to which the name of a taxon is permanently attached. This 20th Century American concept, now internationally agreed upon, has helped stabilize names. Since earlier authors, such as Linnaeus, did not use this concept, types of their names have been selected retrospectively, that is, lectotypified, by later taxonomists. This process is governed by the Code. In the absence of a Linnaean specimen, McDaniel chose a plate from the protologue, as is permitted by the Code. He chose plate 70 of Catesby's Natural History of Carolina, Florida and the Bahamas, one of the works cited by Linnaeus in his protologue. Unfortunately, that plate depicts the southern subspecies of *S. purpurea*, which according to the Code, should then have become known as *S. purpurea* ssp. *purpurea*, the northern becoming *S. purpurea* ssp. *gibbosa* (Raf.) Wherry, or, if treated as a variety, *S. purpurea* var. *terrae-novae* de la Pylaie as McDaniel pointed out (1971:24).

McDaniel's work was largely ignored, possibly owing to the obscurity of its publication as a Bulletin of the Tall Timbers Research Station, a series of publications known more for work on ornithology than anything else. By contrast, Wherry was followed. The beginning of the 1970's saw an upsurge in interest in carnivorous plants that had not been seen since the 19th Century. A flood of popular books came forth. Initially they followed Wherry's 1933 nomenclature (Schwarz (1974), J. & P.A. Pietropaolo (1974), Swenson (1977)), later the nomenclature suggested by his 1972 publication (Schnell (1976), Slack (1979, 1986) J. & P. A. Pietropaolo (1986), Temple (1988), Cheers (1983, 1992)). In addition, the twenty-one volumes of the Journal of the International Carnivorous Plant Society and the 17 volumes of the Carnivorous Plant Society Journal have followed Wherry's nomenclature and overlooked that of McDaniel. Finally, the many specialist carnivorous plant nurseries in North America, Australia, Europe and Japan without exception follow Wherry in utilizing his nomenclature for the two subspecies where, as is usually the case, they are distinguished. The southern subspecies is probably the most popular American pitcher plant in cultivation and is sold as a house plant by the tens of thousands by at least one Dutch nursery. I have not been able to find a single instance of McDaniel's nomenclature, the legal one according to the Code, being adopted for infra-specific taxa in *S. purpurea*. It was not until 1993, that Reveal drew attention to this state of affairs and pointed out that McDaniel's names for the infra-specific variants of *S. purpurea* are correct and must be used.

Reveal (1993) reviews the acceptance of Wherry's usage by systematic authors. In general they are less consistent than horticultural authors in accepting sub specific rank for the infra specific taxa. Although Bell (1949) was inclined to reject Wherry's distinction between the northern and southern infra-specific taxa, on the grounds that he suspected that the differences are 'more environmental than hereditary', he admitted that if the two came true from seed (which we now know to be so) 'the two subspecies of Wherry would seem to be justified.' Reveal reports that Fernald (1950), Gleason (1952) and Gleason & Cronquist (1963, 1991) accept Wherry's distinction, as do, in Canada, Rousseau (1974), Taylor & MacBride (1977) and Scoggan (1978), though using the infra-specific epithet 'purpurea' at the variety or form level rather than the sub specific. Scoggan (1957), Looman & Best (1979), Porsild and Cody (1980), Moss (1983) and Hinds (1986) defined the range of *S. purpurea* so as to exclude that of the southern taxon, according to Reveal, thus also supporting the distinction

between the two taxa, perhaps implying specific rank for the southern subspecies.

The two taxa are usually distinguished in the exterior indumentum and shape of the pitcher which is felty and fat in the southern taxon, glamorous and slender in the northern. They also differ in the margin and dimensions of the pitcher lid which in the southern subspecies is strongly crinkled and with wings easily meeting over the mouth, in the northern subspecies often entire, with wings not overlapping. These characters are well known to those who grow the plants. Less well known is that different species of mosquito inhabit each of the two taxa: *Wyeomyia smithii* inhabits the northern taxon, *W. haynei* the southern (cited in Wherry, 1972). From my own observations, the northern taxon usually has a vertical, rather than a horizontal rhizome and tends to have more numerous pitchers (6-10 rather than 4-5) per crown than the southern subspecies. A form of the northern subspecies lacking anthocyanin, *S. purpurea* subsp. *purpurea* f. *heterophylla* (Eaton) Fernald, has long been recognized in horticulture and can be locally dominant from New York to Nova Scotia. A most distinct botanical variety of the southern subspecies, in the gulf coast region, *S. purpurea* subsp. *venosa* var. *burkii* D. Schnell (Schnell 1993) has long been known (Wherry, 1933) under cultivation as *S. purpurea* subsp. *venosa* 'Louis Burk'. It is recognized by short peduncles, white stigma and pale pink petals.

To abandon, as Reveal suggests, the well-known and widespread usage of the infra-specific names of *S. purpurea* in favour of that resulting from McDaniel's lectotypification, would cause universal dismay and confusion. Accordingly I am proposing to conserve *Sarracenia purpurea* with a new type, under Art. 14 of the new, unpublished Tokyo (1993) Code which permits the conservation of any species name with a new type. In this case, the obvious two choices seem to be a Kalm specimen at Uppsala and a plate in a work by Clusius (1601). Both represent the northern subspecies and conserving either as lectotype over that of McDaniel would protect existing usage of names.

Kalm was a student of Linnaeus who collected specimens for him from New York into Canada (the range of the northern subspecies). According to Stearn (1957:114), his specimens were available to Linnaeus and used in preparation of the *Species Plantarum*. Kalm generally collected in sets of three. The first went to Linnaeus and I presume that this may well have been the specimen or one of the specimens that occupied the now mysteriously empty *Sarracenia* cover in Linnaeus's herbarium (Jackson, 1907). The second went to Kalm's private herbarium (destroyed by fire), the third to Queen Ulric of Sweden, thence to the University of Uppsala. This sheet survives. It is favoured as an alternative lectotype by Reveal (1993), though as he points out that there is no proof, in the form, for example of an annotation, that it was seen by Linnaeus. Otherwise it would easily be adjudged the most suitable element for lectotypification over, for example, the Catesby plate.

The plate of Clusius is eligible for consideration because it is cited by Linnaeus in *Hortus Cliffortianus* (1737), the precursor to the great *Species Plantarum* of 1753 which is the starting point for all plant names. It clearly represents a specimen of the northern subspecies in its vertical rootstock, numerous, slender pitchers with short, broad wings to the hood. As an undoubted 'original element', it takes precedence over the Kalm specimen as a candidate for typification.

If the proposal to conserve with a new type is accepted by the Committee for Spermatophyte and the General Committee of the International Association of Plant Taxonomy (IAPT), then the cataclysmic upset will be avoided and we will legally be able to call the northern subspecies *S. purpurea* L. ssp. *purpurea* and the southern subspecies *S. purpurea* ssp. *venosa* (Raf.) Wherry) as we have long been doing. The adjudication might take 12 months from the date of publication of the formal proposal

in *Taxon* (the journal of the IAPT). In the meantime I strongly propose that the existing usage be maintained by growers and that Reveal's recommendation be laid aside for the present.

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