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DARMERA, THE CORRECT NAME FOR
PELTIPHYLLUM (SAXIFRAGACEAE), AND A NEW
COMBINATION IN PELTOPHYLLUM (TRIURIDACEAE)

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Current work by the senior author on vegetative and floral anatomy of Burmanniaceae, Petrosaviaceae, and Triuridaceae, which are obscure, mainly tropical families of achlorophyllous, saprophytic monocotyledons, has led to two realizations: (1) the long discarded triuridaceous name *Peltophyllum* Gardner (1843) must be used in preference to *Hexuris* Miers (1850), and (2) of particular relevance to horticulturists and to western North American botanists, the well-known saxifragaceous genus *Peltiphyllum* (Engler) Engler (1891) requires a substitute name.

In 1841 John Miers (see also his 1845 paper) described *Triuris* with a single species, *T. hyalina*. Later, George Gardner (1843, 1845) published a new genus and species, *Peltophyllum luteum*. Gardner's original description follows (1843: 176; 1845):

PELTOPHYLLUM, *Gardner*.

Flores dioici. *Masc.* ignoti. *Fæm.* *Perigonium* 6-partitum, coloratum, patens, persistens; laciniis ovatis, longè acuminatis; acumine plano. *Ovaria* plurima, in tori apice sessilia, adpressa, libera. *Styli* ad apicem incrassati, obliquè truncati. *Fructus* ignotus.

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Herba *parvula Brasiliensis*. Folia a scapo distantia, longè petiolata, peltata, valdè reticulata. Radix tuberosa, fibrosa. Scapus subramosus, basi squamosus; pedunculis basi bracteatis, unifloris; floribus luteis.

Peltophyllum luteum, Gardn. Herb. Bras. n. 3570.

Peltophyllum luteum was based on a single collection (*Gardner 3570*), which we have not seen, and which apparently has been lost (Giesen, 1938; Malme, 1896). The Fielding-Druce Herbarium at Oxford University, which has a "very full set" (Clokier, 1964: 169) of Gardner's specimens, informed us (pers. comm., 1976) that it does not have *Gardner 3570*.

Peltophyllum differed from *Triuris* in having 6 instead of 3 caudate tepal lobes and also in having remarkable peltate leaves associated with the flowering scapes. Miers (1850, 1852) pointed out that the peltate leaves do not belong to the triuridaceous plant, but probably are of seedlings of Menispermaceae. Rejecting *Peltophyllum*, Miers (1850, 1852) created the new name *Hexuris gardneri* for Gardner's fertile material, and since then, *Peltophyllum* Gardner seems not to have been accepted other than by Schumann (1894) (for later references see Giesen, 1938, the most recent monograph on the family).

The name *Hexuris* Miers (1850) is clearly illegitimate. Miers substituted this name for *Peltophyllum* Gardner (1843) because "peltophyllum" is scarcely applicable to the exclusively squamate Triuridaceae. However, according to the International Code of Botanical Nomenclature (Art. 62), a legitimate name cannot be rejected merely because it is inappropriate or disagreeable. Therefore, the name *Peltophyllum*, however descriptively inappropriate, must be retained since it is clearly possible from Gardner's description (1843, 1845) to select the fertile material as the type (which is here designated the lectotype of *Peltophyllum luteum* Gardner). It should be emphasized that apart from the accounts of the peltate leaves and attached tuberous roots, which apparently belong to Menispermaceae (Miers, 1850, 1852), Gardner (1843, 1845) adequately described the new triuridaceous plant, although fruits and male flowers were not discovered until much later by Malme (1896). Gardner in 1845 also accurately figured a female plant complete with its roots and scale leaves.

The consequence of the above is that the well-known name *Hexuris* Miers must be replaced with the more obscure *Peltophyllum* Gardner. Schumann (1894) and the staff workers of *Index Nominum Genericorum* had come to the same conclusion. Following Giesen's (1938) circumscription of *Hexuris* Miers, *Peltophyllum* then includes 2 species: *P. luteum* Gardner (1843) and *P. caudatum* (Poulsen) Schmid & Turner.

The consequence to western North American botanists of the imbroglio over Triuridaceae comes with the recognition that the saxifragaceous

name *Peltiphyllum* (Engler) Engler (1891)² is illegitimate because it is a mere orthographic variant (Art. 75) of the earlier, legitimate *Peltophyllum* Gardner (1843, Triuridaceae) and thus is a later homonym (Art. 64). Therefore, a different generic name must be used for the single species of *Peltiphyllum* (Engler) Engler, the familiar "umbrella plant" (or "Indian rhubarb") of California and southern Oregon, *P. peltatum* (Torrey in Benth) Engler, a name that has been used in all manuals of our region since the Englerian genus was established (see also Engler, 1930, and Wagner, 1907).

In 1899 the horticulturist Andreas Voss [1857–1924—see obituary in *Gartenwelt* 28:238–240 (1924)] published the name *Darmera*³ with *Peltiphyllum* (Engler) Engler (1891) [the latter name corrected to *Peltophyllum* Engler in Post and Kuntze (1903)] in synonymy. The reason for Voss's (1899) erection of *Darmera* was his recognition of the prior publication of the form genus *Peltophyllum* Massalongo (1854, 1859a), which was applied to a fossil leaf and fruit attributed to Nymphaeaceae (see Summary). *Peltophyllum* Massalongo, however, is also an illegitimate later homonym of *Peltophyllum* Gardner, a fact that Voss (1899) overlooked.

Darmera Voss (1899), not *Peltiphyllum* (Engler) Engler (1891),⁴ therefore is the correct name for the saxifrage. Voss clearly made the combination *Darmera peltata* (Torrey in Benth) Voss in 1899 in a highly obscure horticultural journal, *Gärtnerisches Zentral-Blatt* (full citation in *Just's botanischer Jahresbericht* 27 (Abt. 2):194 (1899), which ceased publication after only a single volume, issued in 1899.

² The genus *Peltiphyllum* is based on *Saxifraga* Linnaeus section *Peltiphyllum* Engler (1872), with the single species *Saxifraga peltata* Torrey in Benth.

³ *Darmera* commemorates Karl Darmer of Berlin, the founder and first president of the *Allgemeinen Deutschen Gärtner-Verein*, and an indefatigable promoter of horticulture in Germany (Voss, 1899).

⁴ Because it lacks a Latin description, *Peltiphyllaceae* Krach (1976: 23) is not validly published (Art. 36); however, were this name validly published, it would be illegitimate since *Peltiphyllum* (Engler) Engler is illegitimate (Art. 18). The proper designation for a familial segregation of *Darmera* Voss (syn.: *Peltiphyllum*) from Saxifragaceae would, of course, be one based on the generic name *Darmera*. Although this might be supported by the growing body of organographic, cytological, chemical, anatomical, and especially embryological evidence (Krach, 1976; also Bensel and Palser, 1975a, b; Saxena, 1973; Spongberg, 1972), familial recognition (*sensu* Krach, 1976) at this time seems premature. Perhaps segregation at the tribal or subtribal level is more appropriate. On the other hand, the distinctness of *Darmera* from other Saxifragaceae (e.g., *Darmera* differs from all other saxifrages in its embryo development and unitegmic testa) precludes submerging the genus in *Saxifraga*, a return to the original Englerian (1872) concept (see footnote 2). As noted by Takhtajan (1959, 1973), *Darmera* is certainly worthy of further detailed investigation.

Consequently, *Darmera* Voss (1899) has been overlooked by subsequent botanists (including *Index Kewensis*), the name appearing only in a 1903 publication by Voss, but not in his later books; in Post and Kuntze (1903), to which Voss had contributed; in Pilger (1906–08); Engler (1930); Lemée (1930); and in *Index Nominum Genericorum*. Curiously, the last 4 sources all relegate *Darmera* Voss to the synonymy of *Peltiphyllum* (Engler) Engler (1891) despite the fact that the latter is doubly bastardly in view of the prior legitimate *Peltophyllum* Gardner (1843) and the prior illegitimate *Peltophyllum* Massalongo (1854). None of the preceding sources, incidentally, correctly cite the original and valid publication of *Darmera* and *Darmera peltata*, namely, Voss (1899).

The lamentable conclusion is that two admirably appropriate descriptive names, *Peltiphyllum* (Engler) Engler and *Hexuris* Miers, are illegitimate. It is ironic that the legitimate but descriptively inappropriate *Peltophyllum* Gardner must be used for plants bearing only minute scale leaves. It is also regrettable that *Peltiphyllum peltatum* (Torrey) Engler, a familiar and striking Californian/Oregonian plant that is often cultivated, must yield its generic name to insignificant South American saprophytes and assume the obscure name *Darmera* Voss. The only alternative to these required changes is to conserve *Peltiphyllum* (Engler) Engler against *Peltophyllum* Gardner.

SUMMARY

(1) Triuridaceae:

PELTOPHYLLUM Gardner, Proc. Linn. Soc. 1:176 (1843), Trans. Linn. Soc. 19:157, pl. 15 (1845), non Massalongo (1854), non Engler (1891). Type: *Peltophyllum luteum* Gardner.

Hexuris Miers, Proc. Linn. Soc. 2:72 (1850), Trans. Linn. Soc. 21:44 (1852), nom. superfl., illeg.

(a) PELTOPHYLLUM LUTEUM Gardner, op. cit. (1843, 1845).

Hexuris gardneri Miers, op. cit. (1850, 1852), nom. superfl. illeg.

Triuris lutea (Gardner) Benth. & J. D. Hooker, Gen. Pl. 3:1002 (1883).

(b) **Peltophyllum caudatum** (Poulsen) Schmid & Turner, comb. nov.

Sciaphila caudata Poulsen, Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 36–38:165 (1886).

Hexuris caudata (Poulsen) Giesen, Pflanzenreich Heft 104:75 (1938).

(2) Saxifragaceae:

DARMERA A. Voss, Gärt. Zentral-Bl. 1:645 (1899).

Saxifraga L. sect. *Peltiphyllum* Engler, Monograph. Gatt. *Saxifraga*, 108 (1872). Type: *Saxifraga peltata* Torrey in Benth. *Peltiphyllum* (Engler) Engler in Engler & Prantl, Nat. Pfl. 3 (2a): 61 (1891), Nachtrag 3:141 (1906), Nachtrag 4:109 (1914), nom. illeg., later homonym of *Peltophyllum* Gardner (1843).

DARMERA PELTATA (Torrey in Benth.) Voss, op. cit. 646 (1899).

Saxifraga peltata Torrey in Benth., Pl. Hartweg., 311 (1849).

Peltiphyllum peltatum (Torrey in Benth.) Engler, op. cit. (1891).

(3) ?Nymphaeaceae, fossil leaf and fruit:

PELTOPHYLLUM Massalongo, Monograf. Dombeyacee Foss., 22 (1854), Spec. Photo. Anim. Quor. Pl. Foss., 75, pl. 28 (1859a), nom. illeg., non Gardner (1843), non Engler (1891—"Peltiphyllum"). Type: *Peltophyllum nelumbioides* Massalongo.

PELTOPHYLLUM NELUMBIODES Massalongo, op. cit. (1854, 1859a).

A check of the *Compendium Index of Paleobotany* (see Schmid and Schmid, 1973) and of the paleobotanical literature revealed acceptance of Massalongo's illegitimate genus only by Schimper (1874: 603), Meschinelli and Squinabol (1893: 326), and, of course, Massalongo himself (1854, 1858, 1859a, b). Other than the listing of the genus by Andrews (1970) in his index of generic names, there has been no recent discussion or acceptance of *Peltophyllum* Massalongo. The taxonomic affinities of Massalongo's fossil leaves from the Eocene of northeastern Italy are not known. Massalongo's assignment of the fossils to Nymphaeaceae ("Cabombee" or "Cabombeae"—Massalongo, 1858, 1859a, b, but initially to Dombeyaceae in Massalongo, 1854) was based on strictly superficial resemblances (Schmid and Schmid, 1973, 1974), as was typical of paleobotanical work of this era. After examining the original photograph in Massalongo (1859a), Hickey had "serious doubts that the type is really nymphaeaceous" (pers. comm., 1976). In view of the above, we are not perpetuating *Peltophyllum* Massalongo with a substitute generic name.

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FROST SENSITIVITY AND RESPROUTING BEHAVIOR OF ANALOGOUS SHRUBS OF CALIFORNIA AND CHILE

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Detailed comparisons of the structure and function of sclerophyll vegetations centered in the matched climatic regions of central Chile and coastal California have shown a large degree of similarity in spite of divergent evolutionary histories of the floras of these 2 areas (Mooney *et al.*, 1970; Mooney *et al.*, 1977; Parsons, 1976). Principal differences are related to features responsive to land-use treatment which has differed substantially between regions, particularly in the past century (Mooney *et al.*, 1972; Aschmann and Bahre, 1977).

Additional functional differences between these vegetations, particularly in phenological patterns of the woody plants, have been ascribed in part to the small climatic dissimilarities that exist between regions (Mooney *et al.*, 1977). The broad aspects of the climate of the 2 regions are, however, quite similar. Monthly rainfall, drought duration, and mean temperatures can be matched station for station in coastal California and Chile (di Castri, 1973). Furthermore, the direction and magnitude of climatic changes that have occurred from the Pleistocene to the present have been quite comparable (Miller *et al.*, 1977).



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