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A New Species and a Nomenclatural Change in *Graptopetalum* (Crassulaceae)

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ABSTRACT. *Graptopetalum glassii* from Colima, Mexico, is described and illustrated. It is closely related to *G. pentandrum*, differing in being smaller and in having a herbaceous habit and a larger number of oblanceolate pale green leaves. *Graptopetalum pentandrum* subsp. *superbum* is raised to species rank. Characters that support the change of status are a larger size of the plants, a squamose surface of the stem, a pink-violet color of the rosette, oblong-obovate leaves, and a profusely branched inflorescence.

RESUMEN. *Graptopetalum glassii* de Colima, México, es descrita e ilustrada. Está cercanamente relacionada con *G. pentandrum*; sin embargo, difiere en poseer un menor tamaño, un hábito herbáceo con un mayor número de hojas oblanceoladas de color verde mas pálido. *Graptopetalum pentandrum* subsp. *superbum* es elevada a nivel de especie. Caracteres que apoyan el cambio de estatus son un tamaño mas grande, una superficie del tallo escamosa, un color rosa-violeta de la roseta, hojas oblongo-obovadas y un mayor número de ramas en la inflorescencia.

Key words: Colima, Crassulaceae, *Graptopetalum*, Mexico.

Graptopetalum Rose (Crassulaceae) includes approximately 19 species from Arizona, U.S.A., to Oaxaca, Mexico, found in inaccessible places in semiarid vegetation over rocky hills or walls of ravines, from sea level to 7500 ft. Only a few species have wide distribution, such as *G. pachyphyllum* Rose and *G. rusbyi* (Greene) Rose, while most of the species are restricted to specific mountains or ravines. For example, *G. mendozae* Glass & Cházaro grows in the foothills of small mountains in the north of Veracruz, Mexico (Glass & Cházaro, 1997), and *G. marginatum* Kimnach & Moran is known only from the north of Tepic in Nayarit, Mexico (Kimnach & Moran, 2002).

Plants of *Graptopetalum* are characterized by caulescent or acaulescent rosettes. The caulescent species are pendent or bushy, and the leaves are thick. The inflorescence is lateral and the flowers usually have a fetid odor; petals are pale, erect, and fused in the lower half and rotate in the apex, where they have red to brown dots often forming bands across the petals. The stamens are initially erect; after anthesis they become strongly recurved (Uhl, 1970).

In 1995 Charles Glass and Mario Mendoza found a population of a *Graptopetalum* species restricted to a gypsum wall on the Pacific slopes of Mexico in the state of Colima. Due to its distinctive characters, we describe it here as *G. glassii*. This new

species and the new combination that follow are the result of a phylogenetic study of the genus *Graptopetalum*, which is currently in preparation by the first author. The names are here published separately to make them immediately available for use.

Graptopetalum glassii Acevedo-Rosas & Cházaro, sp. nov. TYPE: Mexico. Colima: Municipio de Ixtlahuacán, Carretera libre de Ixtlahuacán a Colima, justo enfrente del señalamiento del km 21 de la autopista Colima–Tecomán, sobre una pared de suelo yesoso con exposición NE, 410 m, 12 ene. 2000, *R. Acevedo, M. Cházaro & J. A. Machuca 1724* (holotype, XAL; isotypes, MO, NY). Figure 1.

Graptopetalo pentandro cognatum. Plantae perennes caespitosae. Caules maximam partem decumbentes breves vel plantae acaules. Rosula ejus *G. pentandri* minor sed foliis pluribus munita congestaque. Folia oblanceolata vel late oblanceolata, albo-viridia. Inflorescentia sub cymae compositae formam; flores pentandri; petala triangulari-lanceolata-acuta; calyx cupuliformis; gynoecium obovatum.

Plants perennial, caespitose, forming compact clusters; *stem* mostly decumbent, smooth, short or the plants stemless; suberect at first, then pendent, to 55 mm long, 3–5 mm thick; at first nearly white-glaucous, later red-brown-glaucous; mostly caespitosely branching by ascending (when young) and pendent (with age) slender stems from below rosette. Rosettes 20–30(40) mm diam. when mature, with 30 to 40(50) crowded leaves; *leaves* white-green to pale blue-green to yellow-green with palest rosy blush, especially in youngest leaves and with exposure to more intense light, glabrous, slightly glaucous, ascending-erect when young, later the apical ones ascending-erect and the basal ones expanding, 13–16(20) × 8–12 mm, ca. 2–5 mm thick, inner surface slightly concave, outer surface markedly convex, vaguely keeled in upper 2–4 mm, oblanceolate to broadly oblanceolate; apex somewhat acute or slightly apiculate, light green. *Inflorescence* a compound cyme, generally 6–12 cm high; unbranched or with 1 or 2(3) simple or bifurcate branches; peduncle 2.5–8 cm tall, 2–3.5 mm thick, smooth, light green, pink or red-tinged, with 16 to 18 bract leaves, soon deciduous, similar to rosette leaves but ovate rather than oblanceolate, diminishing markedly in size, 7–10 × 6–7 mm, 2.5 mm thick, bracteoles mostly elliptic to lanceolate, 1.5–3 × 1–1.5 mm; *flower* buds about 9 mm long, typically 5-merous; *calyx* cup-shaped, 4 mm high, sepals 5, gray-green, tips 3 mm long; *corolla* ca. 8–9 mm long when unopened, 12–14 mm wide when expanded, yellow-white marked with red, flecks and partial banding toward the tips, the tips nearly solid red, petals 5 (rarely 6), 3.5 mm wide near base, triangular-lanceolate, acute, united for ca. 2.7 mm, rotate in the distal half; *stamens* 5, antesepalous, at first erect, after anthesis strongly reflexed between the petals, 6–7 mm long, ca. 0.4 mm wide, base adnate to corolla tube, filaments white, the apical half pink or red dotted, anthers with gray-yellow pollen; *nectar glands* 5, yellow, 0.3 mm tall, 0.5 mm wide, 0.3 mm thick, somewhat reniform, the inner face strongly concave, the external convex; *gynoecium* obovate, green-yellow, reddened apically, ca. 6–6.5 mm long, 3–3.5 mm thick, the styles 1 mm long or less.

Distribution and ecology. Known only from the type locality at an elevation of 410 m, where the plant occurs in tropical deciduous forest. *Graptopetalum glassii* grows on gypsum slopes of hills.

Phenology. *Graptopetalum glassii* flowers from late February to April or early May. Flowers produce a disagreeable fetid odor.

Etymology. The species is named after Charles Glass (1934–1998), who collected plants of the new taxon for the first time. Mr. Glass worked as the Curator of Plants for *Cante, A.C.* (a non-governmental organization), a small botanical garden located in San Miguel de Allende, Guanajuato, Mexico, where he studied succulent plants such as Cactaceae and Crassulaceae. Mr. Glass carried out many field trips to remote and interesting places of Mexico, where he found and described new taxa of these groups.

Graptopetalum glassii differs from *G. pentandrum* in its shorter herbaceous habit, caespitose growth, a smaller size of the stem, rosette, and leaves, and a shorter inflorescence (Table 1). *Graptopetalum glassii* can be recognized in the field among other known species of the genus by its beautiful little light green and dense rosettes, its shorter and slender stems, and the numerous conglomerate leaves (more than 40); this discovery also represents the third record in the genus having haplostemonous flowers.

Plants of *Graptopetalum glassii* are sold as *G. sotoi*; M. Cházaro and C. Glass were planning to publish it. Figure 1 depicts a cultivated plant, which is more branched and robust than wild plants. Table 1 summarizes the main differences among *Graptopetalum glassii* and the closely related species *G. pentandrum* and *G. superbum*, and is based on our own observations.

Paratype. MEXICO. **Colima:** near La Salada, approx. 25 km S of Colima on a steep and shaded gypsum slope, 29 Dec. 1995, *C. Glass & M. Mendoza 8910* (*Cante, A.C.*).

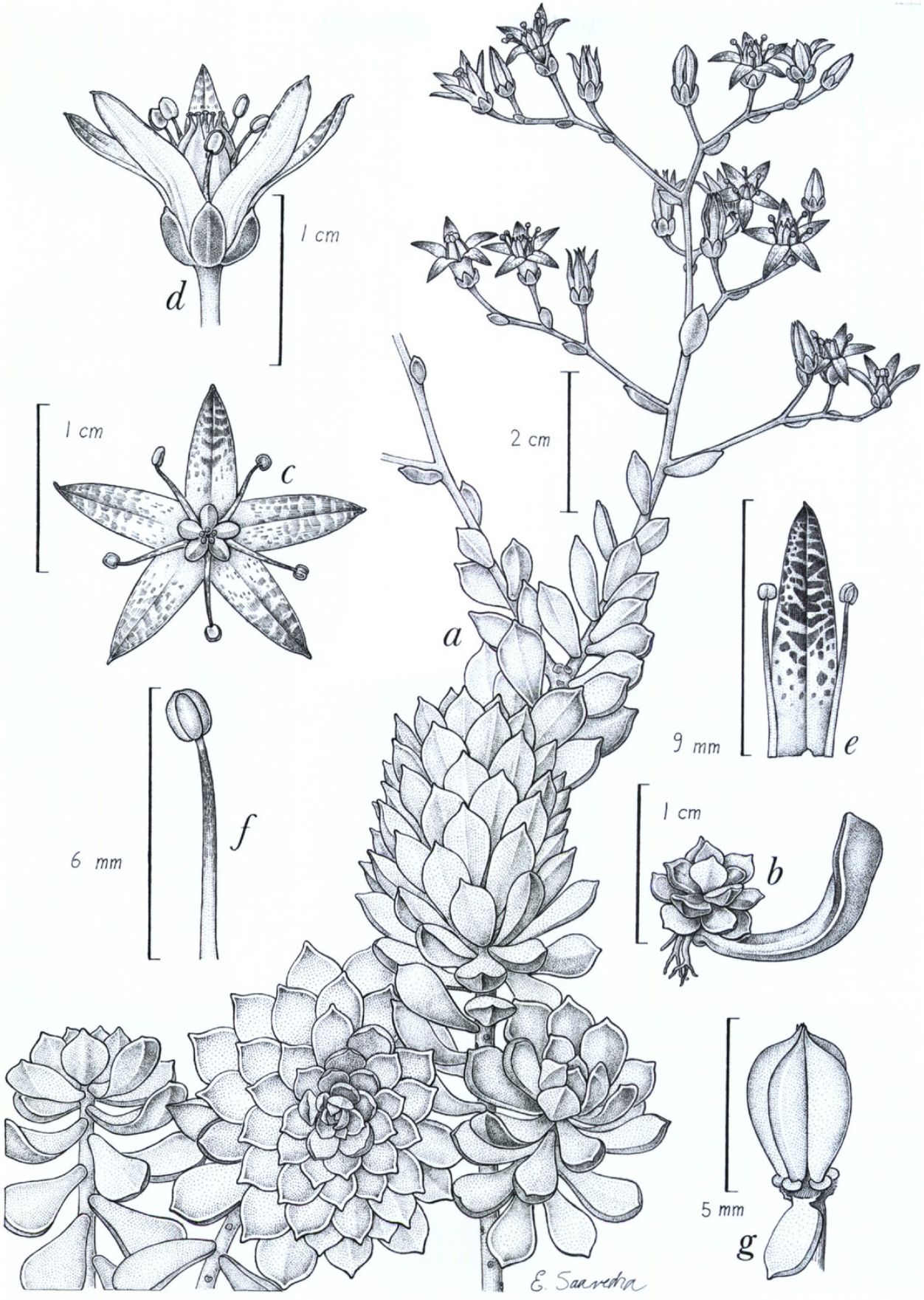

Figure 1. *Graptopetalum glassii* Acevedo-Rosas & Cházaro. —a. Habit. —b. Propagation of plant by leaf cutting. —c. Front view of flower. —d. Lateral view of flower. —e. Petal and stamens. —f. Stamen. —g. Gynoecium with nectary scales. Based on living collection established at "Clavijero" botanical garden in Xalapa, Veracruz, Mexico (acc. no. 2003-16), holotype: *R. Acevedo et al. 1724* (XAL).

Table 1. Distinguishing characters of *Graptopetalum glassii* and its closest relatives.

	G. glassii	*G. pentandrum*	*G. superbum*
Habit	herbaceous	suffrutex	suffrutex
Plant	caespitose	caespitose-ramose	ramose
Size	16 cm	40 cm	80 cm
Stem surface	smooth	smooth	squamose
Stem diameter	3–5 mm	3–6 mm	10–12 mm
Leaf form	oblanceolate	obovate	oblong-obovate
Leaf color	blue-green to white-green	blue-green to white-blue	gray-blue to pink-violet
Leaf length	13–20 mm	20–40 mm	40–55 mm
Rosette diameter	40 mm	60 mm	90 mm
Number of leaves per rosette	30–40	15–30	12–20
Inflorescence length	6–12 cm	20–35 cm	30–40 cm
Number of branches per inflorescence	1–2	3–4	12–15

Graptopetalum superbum (Kimnach) Acevedo-Rosas, stat. nov. Basionym: *Graptopetalum pentandrum* Moran subsp. *superbum* Kimnach, Cact. Succ. J. (Los Angeles) 59: 142. 1987. TYPE: Cultivated. Mexico. La Barca, near Guadalajara, the native locality unknown, *Avina s.n.*, HBG acc. no. 49307 (holotype, HNT sheet #6392).

Graptopetalum superbum was described as a subspecies of *G. pentandrum* by Kimnach (1987). *Graptopetalum superbum* is distinguished from *G. pentandrum* by its larger size, a squamose surface of the stem, a pink-violet color of the rosette, leaves oblong-obovate, a profusely branched inflorescence (see Table 1), and different chromosome number (*G. superbum* $n = 64$, *G. pentandrum* $n = 32$, according to Uhl (in Kimnach, 1987)).

Morphological cladistic analyses indicate that *Graptopetalum glassii*, *G. pentandrum*, and *G. superbum* are closely related and belong to a small group (Acevedo et al., in press) that occurs in the area of Nueva Galicia in western Mexico. Among the characters they share are five stamens in a single whorl (haplostemonous flowers) instead of ten in two whorls, which the rest of the species in the genus have. Among Crassulaceae, only some genera of Sedoideae and the representatives in the Crassuloideae include haplostemonous species, and all are from the Old World (Berger, 1930).

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