

SEDUM COMMIXTUM, a fairly new species from Oaxaca, Mexico

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First publication in CSJA Vol.52, N°4, 1980.



Fig. 1. *Sedum commixtum* at the U.C. Botanical Garden, 1961. PCH photo.

On one of his many foot trips into the mountains of southern Mexico, Tom MacDougal in 1957 found a remarkable subshrubby Crassulaceous plant that has since spread rather widely, though thinly, in cultivation but has never been formally named. Hutchison received it in 1958 and grew it at the University of California Botanical Garden in Berkeley, where he studied it and made illustrations, herbarium specimens, and a description. The plant did not fit clearly in any genus, and he did not want to erect a new one for it. He therefore decided to place it in *Sedum*, the largest and most diverse genus and the most likely repository for such borderline species; and he tentatively named it *S. commixtum* [= mixed up] because it seemed to combine characters of several genera. Since the name has spread with the plant, we make it formal here, even though from the plant's viewpoint it is really the botanists who are mixed up -which we freely admit.

In *Sedum* section *PACHYSEDUM*, Uhl (1978) included 19 Mexican shrubs and subshrubs with axillary floral stems. His cytological analysis of many hybrids showed close genetic similarity among various of these species and showed *PACHYSEDUM* genetically closer to *Echeveria* and relatives than to other groups within *Sedum*. He pointed out that these newfound relationships called

for changes in classification. However, because of close genetic relationship of some of these plants to species now placed in *Echeveria* and related genera, the best rearrangement still is problematic.

On the basis of its habit and especially of the pairing behavior of its chromosomes in several hybrids, Uhl included *S. commixtum* in *PACHYSEDUM* (p. 504, as *Sedum sp.*). For the same reasons, and despite floral differences from other species, we keep it in *PACHYSEDUM*. And until a better place is found for *PACHYSEDUM*, we leave that in *Sedum*.

***Sedum commixtum* Moran & Hutchison, sp. nov.**

Suffrutex succulentes glaber ca. 3 dm altus. Rosulae laxae, foliis ca. 25 obovato-spatulatis 2-3 cm longis glaucis. Rami floriferi axillares 3-5 dm alti, thyrsos angusto 3-8-ramoso, ramis ultimis cincinnis compactis 3-12-floratis. Calycis segmenta inaequalia erecta ovata 4-6 mm longa. Corollae tubus urceolatus, segmentis excurvatis brevioribus. Filamenta antesepala 3 mm adnata, epipetala brevia fauci inserta, antheris omnibus exsertis. Typus: T. MacDougall B-188 (UC 1175225). Species insignis inter species subgeneris Pachysedi corollae segmentis quam tubo brevioribus crassioribusque et filamentis epipetalis brevissimis alteque inserlis bene distincta.

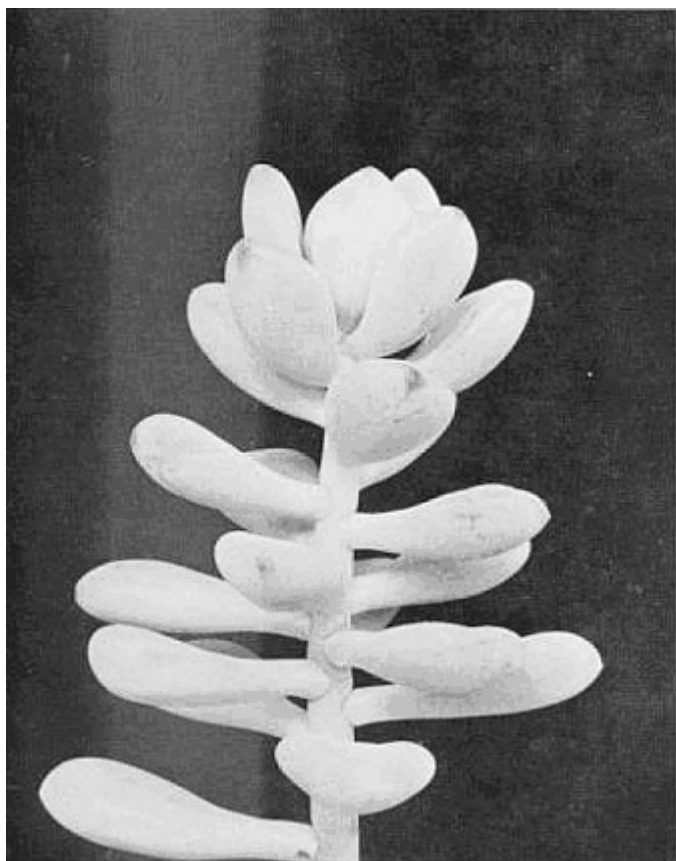


Fig. 2. Rosette of *S. commixtum*, at San Diego. x 1.5. RM photo.

Glabrous subshrub ca. 3 dm high, in nature sometimes trailing from cliffs. Stems several from base, terete, 3 mm thick, at first blue-glaucous, becoming purplish red below leaves, then brownish and woody; internodes ca. 2 mm; leaf sites ca. 4 mm high and wide, the attachment scar elliptic, ca. 1 mm wide. Rosettes lax, 5-6 cm wide, of ca. 25 leaves scattered over ca. 4-5 cm of stem, only smaller upper ones crowded. Leaves spreading, easily detached, blue-glaucous, often purplish red at tip, obovate-spatulate, broadly obtuse, faintly apiculate, 2-3 cm long, 11-17 mm wide, 5-10 mm thick above, ca. 4 mm wide and 3 mm thick at base, flattened or slightly concave ventrally, rounded

dorsally and very faintly asymmetrically keeled towards apex, the margins rounded. Floral stems axillary, taking several months to develop, erect to weakly ascending, 3-5 dm tall, 3-4 mm thick, pale green and glaucous, becoming purplish below, with some lateral shoots below, leafy throughout but more sparsely so than the primary stem, the internodes ca. 5-8 mm below and to 2 cm or more above; leaves spreading or slightly ascending, shorter and mostly relatively wider than primary leaves, decreasing upward, obovate, broadly obtuse and faintly apiculate, 10-17 mm long, 7-11 mm wide and 5 mm thick above, ca. 4 mm wide and thick at base, flattened ventrally, rounded dorsally, very slightly keeled if at all, the margins rounded; uppermost more ascending, very easily detached, smaller and relatively, narrower, elliptic-ob lanceolate, obtuse. Inflorescence 2-8 cm high, 25 cm wide, a rather compact thyrs of 3-4 branches or also with 1-5 more-separated branches below, each branch a crowded cincinnus of 3-12 flowers or bifurcate into two such cincinni. Pedicels 0 mm long, 1 mm or more thick. Calyx 5 mm long, 7-8 mm wide, the disk 3-0.5 mm wide, the segments upcurved and subappressed, markedly unequal, glaucous, 46 mm long, the base ca. 1 mm long, 1-2 mm wide, 0.5-0.8 mm thick, the blade elliptic, narrowly rounded at apex, 2-3.5 (-5) mm wide, 1.3-2 mm thick, convex ventrally, rounded dorsally, the margins rounded. Corolla light greenish yellow, glaucous, redmarked ventrally above, 5-6 mm long, the tube urceolate, ca.



Fig. 3. Flowering branch of *S. commixtum*, at U. C. Botanical Garden, 18 June 1964. x 1.8. RM photo

with sides slightly channeled, the limb 7-8 mm wide, the segments in bud imbricate, in anthesis gently outcurved with tip slightly recurved, ovate, acute with blunt subdorsal mucro, 3 mm long, 2.5 mm wide, thickened in lower half on either side of filament and thicker than wall of tube, irregularly marked with dark red, especially near margins but also across middle. Stamens 10, the filaments reddish above, the antesealous ca. 5 mm long from corolla base, adnate 3 mm but standing out conspicuously below, the free part \pm subulate, ca. 2 mm long and 0.5 mm wide, the epipetalous adnate ca. 4 mm and not discernable below, the free part (filament proper) ca. 1 mm long and 0.6 mm wide, \pm triangular, flattened and lying in channel of corolla segment; anthers exerted, dull yellow flecked with red, oblong, 1.2 mm long, 0.55 mm wide; antesealous slightly higher than epipetalous. Nectar glands yellowish, truncate, ca. 1.4 mm wide, 0.3 mm high, 0.2 mm

thick. Gynoecium 4.5-5 mm high, 3 mm thick, the pistils erect, appressed, connate ca. 0.8 mm, rounded on back, green or yellowish, tapering to reddish styles ca. 1.5 mm long. Ovules ca. 50, ca. 0.6 x 0.2 mm. Chromosomes: $n = 34$.

TYPE:

On rocks in partial shade, below Nevería, Santo Domingo Ozolotepec, ca. 36 km SE of Miahuatlán, Oaxaca, México (near 16°10'N, 96°18'W), ca. 2600 m, 6 November 1957, Thomas MacDougall B-188. Grown at University of California Botanical Garden (UCBG 58.858); herbarium specimens prepared by PCH 14 June 1961, 2 March 1962, 15 February 1963; holotype, UC 1175225; isotypes, SD and to go.

DISTRIBUTION:

Known to us only from the type collection and its progeny, the presumed source of all material in cultivation. Observed by Tom MacDougall elsewhere in the vicinity of the type locality, at 2600-3000 m; see his notes below.

Thomas MacDougall was a gentle and sagacious plantsman who for 40 winters traveled by bus and explored on foot in southern Mexico (Stix 1974, 1975). On one of his many trips into the hinterlands, he discovered *Sedum commixtum*. From notes sent to Charles Glass, here is his brief account - in case anyone wants to retrace his steps. "Nov. 5. In Miahuatlán. With Chico and Chico B., in lumber truck 4 hours, then walk 1½ hours it moonlight, to Lachibé, 3000 m.±, of S. Juan Mixtepec, where we camp at the abandoned lumber camp. Nov. 6. A heavy white frost. We continue, slightly downward. . . . We reach the campamento at Nevería, 3000 m. ±, and breakfast. The ice-making troughs are still standing here. [Nevería = icehouse, here a place where the high-mountain cold was used to make ice for the town below.] Down along a stream and gorge, collect, and photo, Echeveria-Sedum (B.188), glaucous and shrubby, trailing on cliff.... Into open wheat-growing country... . We reach Sto. Domingo Ozolotepec. Treat with authorities and leave at 3:30 P.M...."

He saw more *S. commixtum* November 10 at a pass at about 3000 m, above Santa Catarina Xanaguía (near 16°05'N, 96°14'W) and November 11 above San Juan Ozolotepec (near 16°08'N, 96°16'W) and below Portillo Tres Cruces, about 3000 m.

For a plant of the type collection of *S. commixtum*, Uhl (1978:504) reported a gametic chromosome number of $n = 34$, though this plant happened to be trisomic ($2n + 1$). He reported that in a hybrid with *S. lucidum* Clausen, meiosis was nearly normal: in about half the cells at metaphase I he noted only bivalent chromosome pairing, the other cells showing 1-4 univalents and probably a multivalent or two. He noted a single chromosome bridge in each of two cells at anaphase I; but many other cells at this stage appeared normal, and 7.0 percent of pollen was stainable. He concluded that the parental genomes were very similarly organized and probably had no more than a few small differences in chromosome structure and gene arrangement. Also, he reported similar observations for a hybrid with *Echeveria linguifolia* Lem. (That species he omitted from his account of *PACHYSEDUM* perhaps for want of a name in *Sedum*, for it clearly belongs with *S. cremnophila* Clausen; cf. Uhl 1976, Moran 1978) .

Sedum commixtum is a very distinct species, as all will agree; for it is its very distinctness that makes it so hard to place generically. In its subshrubby habit it resembles such species of

PACHYSEDUM as *S. treleasei* Rose and *S. pachyphyllum* Rose. The thick leaves, though of course different from those of each other species, again are characteristic; they are remarkable chiefly for the ease with which they are detached. The axillary flowering stem likewise is characteristic of *PACHYSEDUM*. The rather narrow thyrses, with compact if sometimes separated cymes, at once recalls that of *S. corynephyllum* Fröd. and is sometimes approached in other species. However, the flowers are unique in *PACHYSEDUM* and seem out of place. Whereas the corolla of the other species is of separate or nearly separate and often spreading petals, that of *S. commixtum* has an urceolate tube exceeding the outcurved segments. Furthermore, the segments are distinctively thickened on each side of a mid-channel and thicker than the walls of the tube. And the epipetalous filaments are so completely fused with the corolla as to be indistinguishable below and so may be said to be inserted at the mouth of the tube; and the short free part, or filament proper, lies in the channel of the corolla segment. Thus the flower is quite different in aspect from that of the other species and differs in characters that often are used in delimiting genera in the family.

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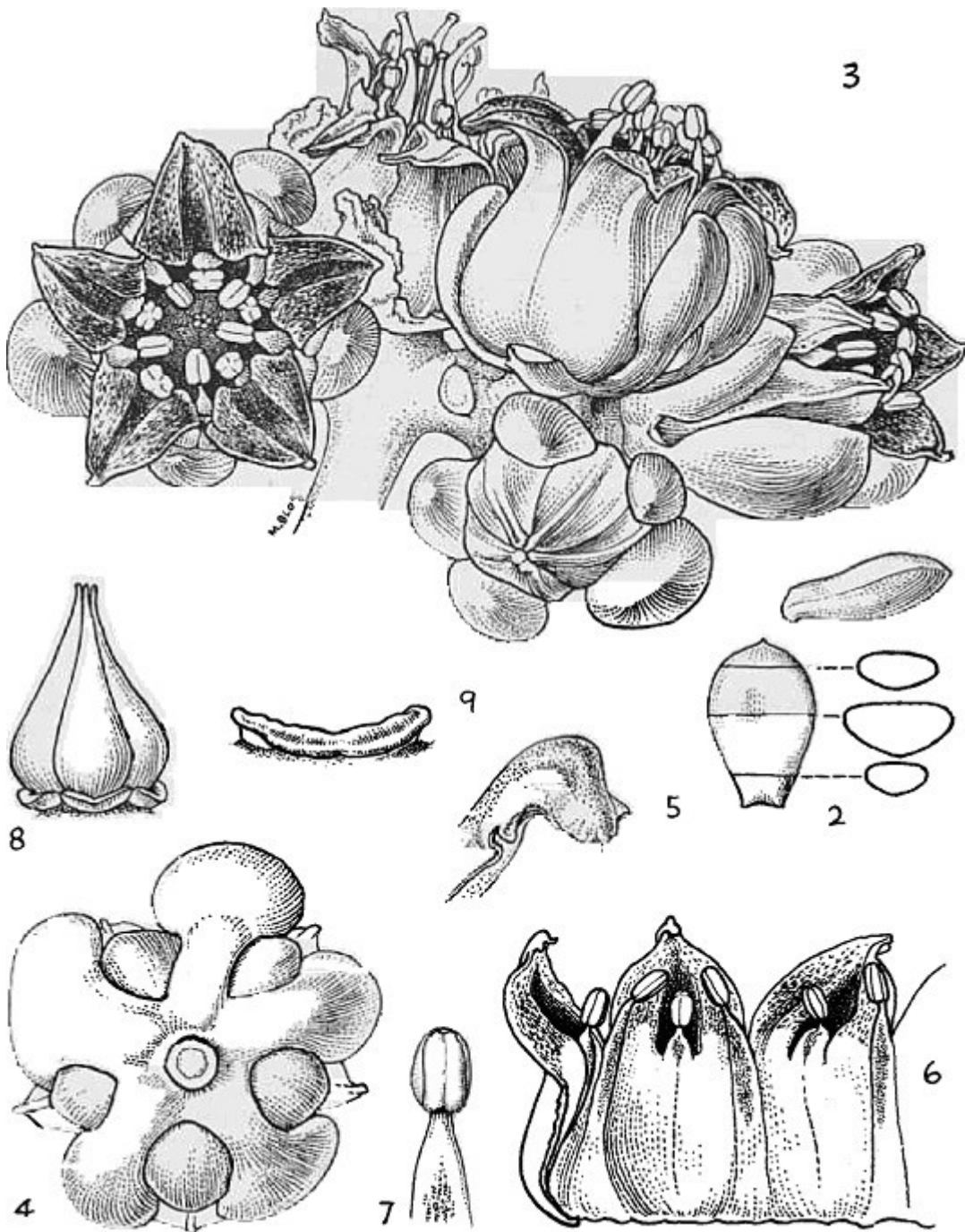


Fig. 4. Details of *S. commixtum*, drawn by May Blos, 24 February 1961. 1, 2. Leaf, x 1. 3, 4. Flowers, x 6. 5. Tip of corolla segment, greatly enlarged. 6. Inside of corolla, showing insertion of stamens, x 6. 7. Anther, x 9. 8. Gynoecium, x 6. 9. Nectar gland, x 12.