



Sedum pyriseminum (Crassulaceae), a morphologically remarkable new annual species from the state of Durango, Mexico

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Mexico is a proven centre of diversity and endemism for *Sedum* L. (Crassulaceae) and species new to science are continually being discovered. *Sedum pyriseminum* E. Pérez-Calix is described and illustrated based on specimens originating from the Mexiquillo region, Durango, Mexico. *Sedum pyriseminum* E. Pérez-Calix is a small annual plant, 2 cm or less in height. Although other *Sedum* species with this habit are known, *S. pyriseminum* does not closely resemble any of them. It is most similar to *S. vinicolor* S. Watson (= *S. forreri* E. L. Greene), with which it could be confused as a consequence of their similar size and sympatric distribution. The conservation status of *Sedum pyriseminum* is assessed as Vulnerable (VU).

Key Words: Mexiquillo, *Sedum forreri*, *Sedum vinicolor*, vulnerable species.

México es un probado centro de diversidad y endemismo de *Sedum* L. (Crassulaceae) y se siguen descubriendo especies nuevas para la ciencia. En el presente artículo se describe e ilustra a *Sedum pyriseminum* E. Pérez-Calix, una nueva especie originaria de la región de Mexiquillo, Durango, México. Es una pequeña planta anual, de 2 cm o menos de alto. Aunque se conocen otros *Sedum* con este hábito, *S. pyriseminum* no se asemeja estrechamente a alguna de ellas. Sin embargo, se compara con *S. vinicolor* S. Watson (= *S. forreri* E. L. Greene), con la que someramente podría confundirse, por su talla similar y por crecer en simpatria. El estado de conservación de *Sedum pyriseminum* se evaluó como vulnerable (VU).

Palabras clave: especie vulnerable, Mexiquillo, *Sedum forreri*, *Sedum vinicolor*.

Introduction

Sedum Linnaeus (1753: 430), with ca 420 species, is the most diverse and most widely distributed genus of the family Crassulaceae. According to various authors (Thiede 1995; Pérez-Calix & Franco, 2004; Hart & Bleij, 2005), Mexico stands out as a global centre of diversification and endemism for the genus *Sedum*. This diversity can be appreciated from the habit and longevity which range from minute herbaceous annuals to shrubby and robust perennial species. Twelve annual or biennial *Sedum* species have been reported from Mexico (Fröderström, 1935; Meyrán y López Chávez, 2003). The Mexican regions with the highest diversity of these plants are the Sierra Madre Occidental and the Mexican Plateau, from which 10 species are recorded (Clausen, 1977).

During fieldwork in the state of Durango, Mexico, samples of a very small plant (1.5–2 cm) were collected, which could be identified as *Sedum*. As it was very distinct from all other known representatives of this genus it is here described as a species new to science.

Material and Methods

Two trips to Mexiquillo, municipality of Pueblo Nuevo, Durango were organized in order to collect samples of a *Sedum* species whose identity was uncertain. With this material and reference works for the genus (Fröderström, 1935; Clausen, 1977, 1984; Meyrán y López Chávez, 2003), as well as comparison with material of annual and biennial *Sedum* species in the herbaria ENCB, IEB y MEXU, it was attempted without success to assign a species name to the samples. The author therefore decided to describe and name this species as new to science. A morphological description was prepared, including life form, root morphology, phyllotaxy, leaf shape and size, inflorescence and floral organs morphology, as well as seed shape and size. Observations and measurements were realized using a stereoscopic microscope Rossbach, Kyowa with magnification up to 45×. It was taken into consideration that as a consequence of the succulent nature of Crassulaceae, the drying process alters structure shapes and sizes, so the description was made before dehydration of the material. Finally, the conservation status of the species was determined based on the criteria and categories of the IUCN (2012).

***Sedum pyriseminum* E. Pérez-Calix, spec. nov., Fig. 1.**

Sedum pyriseminum differs from *Sedum vinicolor* by the elliptic to oblong-elliptic or obovate leaves, the sepals of unequal sizes, the white short gamopetalous corolla, the fungiform yellow nectaria, and the pyriform, smooth, brownish seeds.

TYPE:—MEXICO. Durango: municipality Pueblo Nuevo, Mexiquillo, 2550 m, 23°43'9.20"N; 105°40'9.95"O, 19 September 2013, E. Pérez 5268 (holotype: IEB!; isotypes: CIIDIR!, MEXU!).

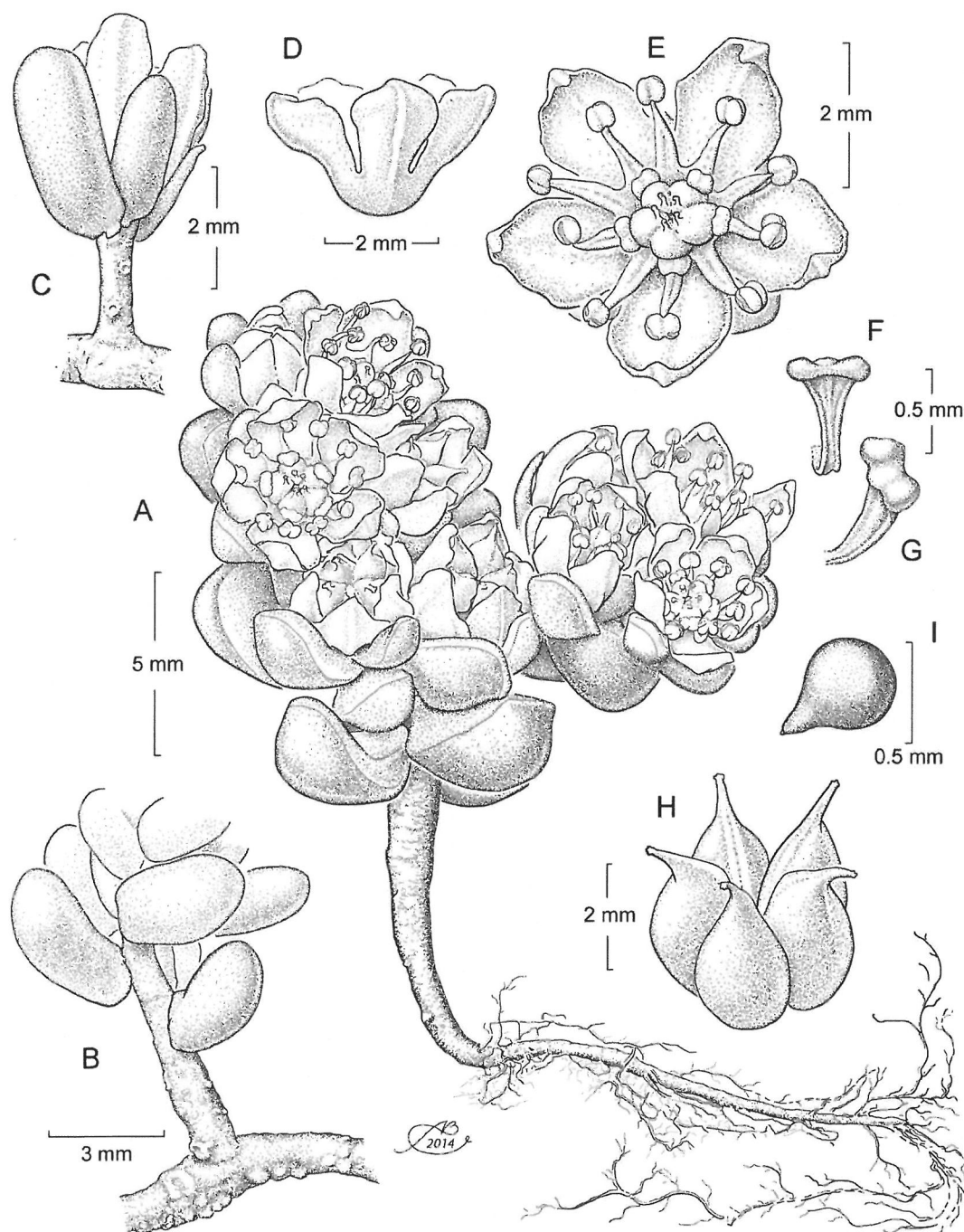


FIGURE 1. *Sedum pyriseminum* E. Pérez-Calix, spec. nov. **A)** Habit; **B)** Detail of the plant showing the leaf insertion; **C)** Lateral view of flower; **D)** Lateral view of corolla; **E)** Superior view of flower; **F)** Dorsal view of nectary; **G)** Superior view of nectary; **H)** Follicles; **I)** Seed. Illustration by Alfonso Barbosa based on the holotype (E. Pérez 5268 (IEB)).

Herbaceous annual plants, lithophytic, 1.5–2 cm high, succulent, glabrous. Roots fibrous, branching from a short, slightly thickened main root. Stem branched at the middle, ca 1 mm diameter, partly rugulose at the surface, reddish. Leaves sessile, broadly elliptic to oblong-elliptic or obovate, 3.8–5 mm long, 2–3.8 mm broad, ca 2 mm thick, semicircular in transversal section, apex obtuse and thickened, truncate, spurred at the base, abaxially flattened, adaxially convex, green towards reddish-brown. Inflorescence terminal, cymose, with 1–8 cincinniform branches, with up to 8 or less crowded flowers. Flowers sessile or with pedicels to 1 mm long. Sepals 5, clearly of different sizes, free; the longest sepal oblong, lanceolate or ovate-oblong, 2–3.5(–4.5) × 1–1.5(–2.5) mm, apex rounded, thickened; the shortest one lanceolate, 1–1.5(–2.5) × 0.3–0.6(–0.8) mm. Corolla white, short gamopetalous; the limb ca 2 mm diameter, the tube 0.5–1 mm long; petals 5, ovate to ovate-lanceolate, 2–3 mm long, apex acute, internally sulcate, keeled externally, apex cucullate. Stamens 10, arranged in two alternating whorls, the outer one opposite the petals, basally fused and inserted in the corolla tube, filaments ca 1.5 mm long, clearly flattened and broadening towards the base, anthers black, ca 0.5 mm long. Nectaries fungiform, yellow, with a stalk ca 1 mm long. Ovary globose, carpels 5, fused ca 0.5 mm at the base style ca 0.5 mm, stigma inconspicuous; ovules 8 per carpel, pyriform. Follicles ca 2 mm long, slightly extended in the apex, reddish. Seeds 6–8 per follicle, pyriform, ca 0.7 mm long, smooth, brownish.

Distribution, habitat, phenology:—*Sedum pyriseminum* is only known from the type locality, “Jardín de Piedras”, in Mexiquillo, municipality of Pueblo Nuevo, Durango, Mexico. It grows on flat terrain on bare rock, especially in fissures filled with sand and gravel in which runoffs are formed during the rainy season. The species has been registered as flowering and fruiting in September.

Observations:—The new taxon superficially resembles *Sedum vinicolor* S. Watson (1886: 428) (= *Sedum forreri* E. L. Greene (1888: 162)). Table 1 shows the characters by which both species can be distinguished from each other. Due to its peculiar and unique features, such as the filaments which are flattened and broadened towards the base and shortly fused to a ring-like structure at the very base; the fungiform nectaries with a relatively long stalk; as well as the thick and pyriform seeds without any surface patterning, which can be observed with a stereoscopic microscope with magnification 45×, this new species is morphologically one of the most aberrant species in *Sedum* and apparently without close relatives.

TABLE 1. Comparison of differentiating characters of *Sedum pyriseminum* and *Sedum vinicolor*.

	<i>Sedum pyriseminum</i>	<i>Sedum vinicolor</i>
Plant height (cm)	1.5–2	3–8
Leaves:		
Shape	Broadly elliptic to oblong-elliptic or obovate.	Oblong to ovate or lanceolate.
Length (mm)	3.8–5	2–6
Sepals	Clearly of different sizes.	Not clearly of different sizes.
Shape	The longest one oblong, lanceolate or ovate-oblong; the shortest one lanceolate.	Oblong-lanceolate.
Length (mm)	1–1.5(–2.5) to 2–3.5(–4.5)	2.5–3
Width (mm)	0.3–0.6(–0.8) to 1–1.5(–2.5)	1–1.5
Petals		
Shape	Ovate to ovate-lanceolate.	Oblong-linear.
Length (mm)	2–3	4–5.5
Color	White	Middle and upper part white, frequently with 3 transversal red lines, slightly dark red at the base.
Nectaries		
Shape	Fungiform	Oblong-spathulate
Length (mm)	Ca. 1	Ca. 3.5
Color	Yellow	Dark red
Seeds		
Shape	Pyriform	Obovate
Length (mm)	Ca. 0.7	Ca. 1
Testa (ornamentation)	Smooth	Reticulate

Conservation status:—*Sedum pyriseminum* is here assessed as Vulnerable according to Criterion D subcriteria 1 and 2 (VU D1 + 2) (IUCN (2012). The single known population is estimated to consist of less than 1000 mature individuals and its area of occupancy is very limited ($\leq 200 \text{ m}^2$). Moreover, the locality of Mexiquillo is used for recreational activities, as a consequence of which people walk and drive over the type locality. This exposes populations of *Sedum pyriseminum* to trampling and movement of the sand where they grow.

Etymology:—The specific epithet refers to the pear-shaped seed, which is rare in the genus *Sedum*.

Paratypes:—MEXICO. Durango: municipality Pueblo Nuevo, Mexiquillo, 2550 m, 23°43'9.20"N; 105°40'9.95"O, 19 September 2006, E. Pérez 4710 (IEB!, CIIDIR!, MEXU!); *ibid.*; 27 September 2005, S. Zamudio 13228 (IEB!).

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