

Sedum sinforosanum (Crassulaceae), a new species from the state of Chihuahua, México



1. Barranca de Sinforosa, habitat of *Sedum sinforosanum*.

Abstract: *Sedum sinforosanum* is a new sedum from the Barranca de Sinforosa, Chihuahua, northwestern Mexico. It belongs to subgenus *Sedum* L. because of its free petals and sepals and is generally glabrous. It is distinguished from *Sedum suaveolens* by being many-branched, with smaller rosy-colored rosettes, the absence of bracteoles on the pedicels, petals not circinate, truncate, nectaries bright yellow, ovary pink and with straight styles.

Resumen: Se describe e ilustra una nueva especie del género *Sedum* en la Barranca de Sinforosa, estado de Chihuahua, noroeste de México. *Sedum sinforosanum* se ubica en el subgénero *Sedum* por sus pétalos y sépalos libres, generalmente glabros, se distingue de *S. suaveolens* por sus rosetas de menor tamaño evidentemente rosadas, muy cespitosa, ausencia de bractéolas en los pedicelos, pétalos no enrollados, así como nectarios truncados de amarillo intenso, ovario rosado y estilos rectos.

Introduction

In 2009 Julia Etter & Martin Kristen received a plant from Jean-Marc Chalet that they tentatively identified as *Sedum* aff. *suaveolens*, although Chalet's locality was at a distance of about 180 km NNW as the crow flies from the type locality (and so far only known locality) near Topia.

In December 2010 Etter & Kristen, collaborators with the Instituto de Biología, Universidad Nacional Autónoma de México (UNAM) and members of the Sociedad Mexicana de Cactología, A.C., went on an exploratory field-trip to locate the long lost *Echeveria*

tobarensis Berger (Etter & Kristen, 2011). On this same trip they went on to Topia in the state of Durango to take pictures of *Sedum suaveolens*. This species was discovered in 1976 by Myron Kinnach and Hernando Sánchez Mejorada on shaded cliffs of the canyon that lies about 500 m below Topia, near Los Molinos (Kinnach, 1978).

One of the next stops on their trip was Guachochi, Chihuahua. From here they followed Chalet's directions to Agua Blanca along the newly constructed paved highway. From Agua Blanca they continued on a dirt road towards Cumbres de Guerachi. A spectacular switchback road drops from 2100 m at the beginning of the descent into the 1300 m deep canyon. With Chalet's GPS position the locality was easy to find. The new species grew with *Agave vilmoriniana* on a shady and difficult-to-access cliff.

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2. *Sedum sinforosanum* in habitat on cliffs along road to Guerachi.

The next day they went to the viewpoint platform of the Barranca Sinforosa south of Guerachi (Figs. 1 & 2). They hiked down to the waterfall called ‘La Rosalinda’ at 1913 m altitude, where they found clusters of the same species on shaded cliffs above the small waterfall. Back up at the suspension bridge they discovered another small population on a rock just below the bridge. In the dry moss they also found *Graptopetalum filiferum* and a presumed hybrid between *Sedum sinforosanum* und *Graptopetalum filiferum* (Fig. 3). This locality was at 2205 m, a little over 400 meters higher than the plants at the type locality and also in a somehow different habitat with pines and oak trees.

This taxon from the Barranca de Sinforosa, Chihuahua, is allied with *Sedum suaveolens* Kimnach from the Barranca de Topia, Durango. We believe it deserves the status of a new species.



3. A natural hybrid of *Sedum sinforosanum* with *Graptopetalum filiferum* in cultivation and habitat (below).



Sedum sinforosanum Reyes, Etter & Kristen *species nova*.

Diagnosis: Sedo suaveolente simile sed valde caespitosum (vs. aliquot caespitosum), rosulis roseis 9 cm diam. (vs. caeruleas, 16 cm diam.), pedicellis usque ad 4 mm longis (vs. usque ad 7 mm), petalis recurvatis (vs. circinatos), gynoecio roseo (vs. album), nectariis luteis (vs. albos) differt.

Plant a perennial herb, glabrous, caespitose (Fig. 2). **Roots** fibrous. **Stems** 3–5 cm long, ca. 1.2 cm in diameter, offshoots with stems up to 8 cm long and ca. 5 mm in diameter. **Rosettes** 6.5–9 cm in diameter. **Leaves** rose-colored, obovate, 2.5–3.5 cm long, 1.5–2 cm wide, expanding or ascending, pruinose, margin markedly pink, apex cuspidate (Fig. 4). **Floral stems** subapical, 2–4 per rosette, green to pink, pruinose, 7–9 cm long, 1.8–2.5 mm in diameter. **Inflorescence** cymose, bracts lanceolate, 6–9 mm long, 3.5–5 mm wide, pruinose, slightly pink, 3–4 cincinni, with 4–7 flowers per peduncle (Fig. 5). **Pedicels** 3.5–4 mm long, ca. 1.5 mm in diameter, pruinose. **Sepals** 5, unequal, appressed, ascending, lanceolate, 4.5–5.6 mm long, 1.7–2.5 mm wide, green-reddish, pruinose. **Petals** 5, free, white with a slight pink tinge, 7.5–8.5 mm long, 3–3.5 mm wide, apex reddish, retrorse (Fig. 6). **Androecium:** filaments white, with 5 antisepalous stamens, 5.4–5.6 mm long, epipetalous stamens



4. Rosette of *Sedum sinforosanum*, near Cascada Rosalinda.

4.5–5 mm long, hyaline, thecae purple, pollen yellow. **Gynoecium** yellowish to pink, semi-globose, 2.2–2.7 mm thick, carpels free, style greenish, ca. 2 mm long. **Nectaries** quadrangular, yellow, ca. 1 mm wide. (Fig. 7).

Type: Mexico, Chihuahua, municipality of Guachochi, Barranca de Sinforosa, along road to Río Guerachi, 1841 m, December 16, 2010. *Julia Etter & Martin Kristen* 3128 (Holotype: MEXU).



5. Inflorescence of *Sedum sinforosanum*.



6. Detail of flowers of *Sedum sinforosanum*. Photo Jeronimo Reyes.

Flowering season: In cultivation, this species flowers from April to July.

Distribution and habitat: At the type locality *Sedum sinforosanum* grows in desert scrub with *Yucca madrensis* Gentry, *Agave vilmoriniana* Berger, and *Echinocereus chaletii* W. Rischer. Near the Cascada Rosalinda the species grows with *Agave filifera* subsp. *multifilifera* (Gentry) Ullrich, *A. shrevei* subsp. *magna* Gentry, *Mammillaria senilis* Lodd. ex Salm-Dyck, and *Graptopetalum filiferum* (Watson) Whitehead. It was found at the suspension bridge in pine and oak forest, and near the waterfall in a tropical deciduous forest.

Etymology: The specific epithet refers to the Barranca de Sinforosa.

DISCUSSION

It is surprising that at a relatively touristy and readily accessible place like the Barranca Sinforosa, and not far from the viewing platform, a species of *Sedum* could be found that had not been seen or studied before. We assume that more localities of this new species will be found in the 24 km distance between the Guerachi switchbacks at the southwest end of the plateau surrounding Guachochi and the Rosalinda waterfall, although access will be difficult due to the lack of roads and the steep terrain with many cliffs.

This new species is related to *Sedum suaveolens* with which it shares characters like the cymose



7. Nectary and gynoecium of *Sedum sinforosanum*.

inflorescence and white, odoriferous flowers. It differs in leaf color, the shape of the petals and the caespitose growing habit (see Table 1).

It is possible that *Sedum suaveolens* and *S. sinforosanum* are close relatives of *S. craigii* Clausen from the Barranca del Cobre because of their short, cymose inflorescences with white, odoriferous flowers, as is mentioned in the first description of *S. suaveolens* (Kimmach, 1978). The placement of these

Table 1. Comparative table of morphological and phenological characters and the distribution of *Sedum sinforosanum* and *Sedum suaveolens*.

	<i>Sedum sinforosanum</i>	<i>Sedum suaveolens</i>
Growth habit	very caespitose	slightly caespitose
Stem	3–5 cm long, offshoots up to 8 cm long	3 cm long
Rosette width	up to 9 cm	up to 16 cm
Leaves	obovate, pink	obovate, bluish green
Flowering stem	7–9 cm long	4–7 cm long
Inflorescence	cymose, 4–7 flowers	cymose, 4–6 flowers
Pedicels	3.5–4 cm long, without bracteole	3–7 mm long, with bracteole
Sepals	4.5–5.6 mm long	9–12 mm long
Petals	white with pinkish hue, not circinate, nectar chamber small	white, circinate, nectar chamber large
Gynoecium	pink, style upright	white, style recurved
Nectary	quadrangular to truncate, yellow	truncate-concave, white
Type locality	Barranca de Sinforosa, Chihuahua	Barranca de Topia, Durango
Altitude above sea level	1841–2205 m	1148 m

species is still uncertain. They have been placed in *Graptopetalum* for their overall appearance or they may be of hybrid origin (Clausen, 1981). In a molecular analysis of the genus *Graptopetalum* it was recognized that monophyly does not exist in the genus and that at least three subclades are grouped together, among them *Graptopetalum bellum* (*Tacitus bellus*) (Moran & Meyrán) D.R. Hunt, *G. bartramii* Rose, *G. craigii* (*Sedum craigii*) Clausen, and *G. suaveolens* (*Sedum suaveolens*) (Kimmach) Clausen. They all occur in the same geographical region but differ noticeably in morphology of the floral structures, which apparently offers more reliable data for phylogeny (Acevedo-Rosas, et al. 2004). The complex system of mountains in this region, the product of intense geological activity during the Cretaceous and Cenozoic periods (Reyes, González & Kristen, 2012), resulted in the geographical isolation of these species.

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All photos by Julia Etter and Martin Kristen, except where noted.

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