SEDUM KRISTENII (CRASSULACEAE), A NEW SPECIES FROM DURANGO, MEXICO

JERÓNIMO REYES SANTIAGO
email: jreyes@ibiologia.unam.mx

OMAR GONZÁLEZ ZORZANO
email: ozorzano@prodigy.net.mx

Jardín Botánico, Instituto de Biología, UNAM,
Apartado Postal 70-614,
Ciudad Universitaria, 04510, México D. F

JULIA ETTER
www.crassulaceae.com
email: editors@globetrotters.ch

Abstract: *Sedum kristenii* Reyes, González-Zorzano & Etter is described as a new species from the Mexican state of Durango. It belongs in the group Americana of the section *Sedum* and is related to *Sedum lumholtzii*, *Sedum copalense* and *Sedum bellum*, from which it differs in roots, nectary color, and the size of stems and leaves.

Fieldwork in Durango near the border with Sinaloa and comparative morphological studies of Mexican Crassulaceae revealed the following novelty:

Sedum kristenii Reyes, González-Zorzano & Etter sp. nov., Figs. 1–6.

Sedum kristenii *simile* S. copalensi, S. lumholtzii *et* S. bello *sed caule carens, radicibus tuberculatis (vs. cum caulibus, radicibus fibrosis), rosulis compactis, rotundatis (vs. semi-imbricatis vel elongatis), foliis spathulato-clavatis papillosis, valde parvis (vs. obovatis, oblongis vel oblanceolatis), nectariis griseo-fuscis (vs. viridibus, aurantiacis, albis) differt.*

Perennial herb 0.3–0.7 cm high. **Root** tuberous. **Stem:** acaulescent. **Rosettes** 6–13 mm wide. **Leaves** spatulate to clavate, 4–11 mm long, 2.0–2.6 mm wide, papillose, yellowish green, apex obtuse, margin entire. **Floral stems** 1–2 per rosette, basal, ascending, finely papillose, 7–8 cm long including inflorescence, ca. 1.5 mm thick, brownish-grey to slightly reddish; basal leaves of the floral stem ascending, spatulate, spurred, 9–15 mm long, 1.9–3.0 mm wide, margin with reddish papillae, apex obtuse. **Inflorescence** cymose, cincinni 2–3, each with 2–4 flowers 2.5–4.0 cm long. Pedicels 0.8–1.6 mm long, ca. 1 mm thick, papillose. Corolla limb rotate, 10.7–12.8 mm wide (the limb of the solitary terminal flower 13.0–14.2 mm wide). **Sepals** 5, 3.5–4.3 mm long, 1.1–1.3 mm wide, lanceolate, acuminate, with reddish papillae. **Petals** 5, basally free for 5.3–5.8 mm in length, 1.8–2.0 mm wide (the solitary terminal flower 6.9–7.2 mm long, 2.1–2.4 mm wide), lanceolate, white, expanded to slightly retrorse, apex mucronulate, reddish. **Gynoecium:** 5 carpels, white, apocarpous, 3.1–4.0 mm long, style white to slightly pinkish, stigma hyaline. **Androecium:** filaments white, antisepalous stamens 3.1–3.9 mm long, epipetalous stamens 2.5–2.7 mm long, the anthers ca. 0.5 mm long, quadrangular, reddish in bud, black when expanded. **Nectaries** stipitate, brownish-grey.

Type: Mexico, Durango, municipality of San Dimas, along Río Piaxtla between Tayoltita and San Ignacio, Sinaloa, 472 m, May 7th, 2010. *Julia Etter & Martin Kristen 3053* (Holotype: MEXU).

Phenology: This species flowers from November to January in a greenhouse.

Distribution and habitat: *Sedum kristenii* grows in tropical deciduous forest on the banks of the Rio Piaxtla. The predominant associated species are: *Bursera* spp., *Plumeria rubra* L., *Pseudobombax* sp., *Agave vilmoriniana* Berger, *Pilosocereus alensis* (F.A.C. Weber ex Roland-Gosselin) Byles & G.D. Rowley, *Pachycereus pecten-aboriginum* (Engelmann) Britton & Rose, *Hechtia* sp.

Etymology: The specific epithet honors its discoverer, Martin Kristen, who is well-known for his investigative explorations into remote Mexican back country — expeditions which have furthered the knowledge of the Crassulaceae and Agavaceae plant families in Mexico.

Figure 1. *Sedum kristenii* in habitat. Photo by J. Etter & M. Kristen.

DISCUSSION

In the course of fieldwork in May 2010 Julia Etter and Martin Kristen found a plant without flowers and in shriveled, dried condition, belonging to the genus *Sedum*, growing high on the river banks in the Rio Piaxtla. Plants were collected and received by the Botanical Garden of the Instituto de Biología, UNAM for further study and cultivation.

It was determined that the species is closely related to *Sedum lumholtzii* Robinson & Fernald. Due to the very scarce information provided by the original description and the available herbarium specimen fragments (isotype in the Herbarium of the New York Botanical Garden), which offered not much more help, more fieldwork was necessary, and a population of *S. lumholtzii* was found near the village of Tepoca, Sonora. In cultivation the plants produced flowers for study and comparison.

Another species that shares similar characters is *Sedum bellum* Rose ex Praeger, from which no live plants are known in Mexico, as it never has been found for recollection. Ray Stephenson kindly provided pictures which helped to determine differences.

Sedum kristenii belongs to the group Americana of the section *Sedum* for its flat, rosulate leaves that are widest above the middle and for its white flowers (Meyrán & López 2003). It is easily distinguished by its well-defined rosettes in relation to its floral stems, as well as for the diminutive papillae on the otherwise glabrous leaves (Table 1).

The main morphological characteristics that separate *S. kristenii* from the other related species are (1) its acaulescent habit, with neither stems nor evident ramifications; (2) papillae on the stem and leaves;

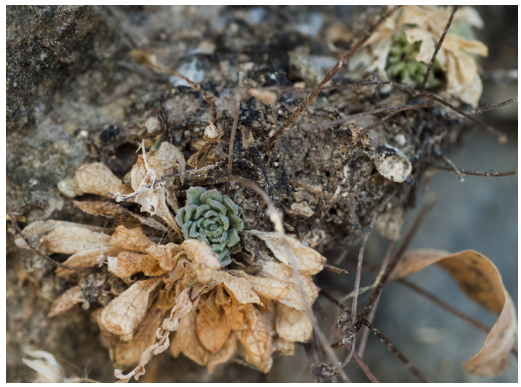

Figure 2. *Sedum kristenii* in rosette in habitat. Photo by J. Etter & M. Kristen.

Figure 3. Flowering *S. kristenii* in cultivation. Photo by J. Etter & M. Kristen.

		Sedum copalense	*Sedum lumholtzii*	*Sedum bellum*	*Sedum kristenii*
Growing habit		branching and prostrate	branching and erect	branching and prostrate	branching and erect
Length (cm)		to 5.2	to 25	to 7.5	acaulescent
Texture		tuberculate	puberulent	puberulent	tuberculate
Root		fibrous	fibrous		tuberous
Rosette		semi-imbricate	rounded	elongated	rounded
Leaf	Shape	obovate	obovate-oblanceolate	spatulate	spatulate-clavate
	Texture	smooth	puberulent	pruinose	papillose
	Color	light green	bluish green	glaucous pale green	pale green
	Length (mm)	10–15	12–25	20–25	4–11
	Width (mm)	6–7	6–7	10	2–2.6
Flowering stem		terminal, diffusely paniculate	cymose	double cyme	double cyme
Length (cm)		10–18		ca. 2	7–8
Pedicels length (mm)		1.5–2	2–6	sessile	0.8–1.6
Sepal length (mm)		2.5	2.7–3.2	3–4	3.5–4.3
Petal	Color	white	white	white	white
	Length	4–5	4–5	7	5.3–5.8
Nectary	Color	brownish green	red-orange	white-yellowish	brownish-grey
	Form	rectangular	elliptic	quadrate-spatulate	stipitate

Table 1. Comparative table of *Sedum kristenii* and its closest relatives *S. copalense*, *S. lumholtzii*, and *S. bellum*.

Figure 4. Flowers of *Sedum kristenii* in cultivation. Photo by J. Etter & M. Kristen.

Figure 5. Rosettes of *Sedum kristenii* in cultivation. Photo by J. Etter & M. Kristen.

(3) its rosette measures less than 1.3 cm in diameter; and (4) the stipitate form of its nectaries is completely different from the other related species. As is evident in the original first description of *S. copalense* (Kimnach 1996), in the herbarium specimen as well as in live specimens at the national collection of Crassulaceae at the botanical garden of UNAM, this species differs from *S. kristenii* in its long decumbent stems, its inflorescence of up to 18 cm length, as well as in the smooth texture of the stems and leaves. Also, its rosettes become modified as they elongate, turning into inflorescences – whereas this does not occur in *S. kristenii*.

From the revision of *Sedum lumholtzii* it is clear that it is different from *S. kristenii* for its fibrous roots and branching stems; pubescent and ciliate leaves; its small, truncate, red nectaries, and its type locality at Nacori, Sonora, at 1100 m (3700 ft) altitude (Robinson & Fernald 1894).

Finally, *S. kristenii* is compared to *S. bellum* because of the geographic proximity of its habitat. *S. bellum* was described from Minas de San Ramón, about 80 miles west of Durango City. It differs notably from *S. kristenii* in its pruinose stems and leaves as well as its long stems, and also in its rosettes and leaves of greater size and its flowering period from

Figure 6. *Sedum kristenii*: whole plant, including tuberous roots, in cultivation. Photo by J. Reyes.

April to May and not at the end of the year like *S. kristenii* (Rose 1921).

It is important to point out that the new species is tentatively put into group Americana in the section Sedum because it shares major characteristics with the species in this section, and not into section Cockerellia as proposed by R. Clausen where he includes *S. lumholtzii* because the cytological studies realized were not conclusive (Clausen & Uhl 1943).

As a final observation it is concluded that more explorations into the great mountains and canyons of Durango, Mexico, are necessary to obtain more specimens for a wider morphological, cytogenetic and molecular study to determine the natural position of each species.

ACKNOWLEDGMENTS

We thank Ray Stephenson for valuable comments and additional data that have improved the manuscript; Myron Kimnach and Pablo Carrillo Reyes for revising the manuscript and for their thoughtful suggestions helping to improve this article greatly. Our appreciation also goes to Enriqueta Molina of SINAREFI/SAGARPA for his support of the project "Red de *Echeveria*" in agreement with the Instituto de Biología de la Universidad Nacional Autónoma de México, and to SEMARNAT for the official federal collecting permit SEMARNAT SGPA/DGVS/02315/10. We thank Martin Kristen for the free use of the extensive Crassulaceae web database (www.crassulaceae.com) which he designed and maintains.

LITERATURE CITED

Clausen RT, Uhl C. 1943. Revision of *Sedum cockerellii* and related species. *Brittonia* 5: 33–46.

Kimnach M. 1996. *Sedum copalense*, a new species from Sinaloa, Mexico. *Cactus and Succulent Journal* 68: 242.

Meyrán J, López L. 2003. *Las Crasuláceas de México*. Sociedad Mexicana de Cactología, A.C. México, D.F.

Robinson BL, Fernald ML. 1894. *Sedum lumholtzii*. *Proc. Am. Acad. Arts* 30: 116.

Rose JN. 1921. *Sedum bellum* Rose ex Praeger. *Journ. Roy. Hort. Soc.* XLVI: 141.