

SEDUM RARAMURI (CRASSULACEAE), A NEW SPECIES FROM CHIHUAHUA, MEXICO

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Abstract: *Sedum raramuri* Metzger is a new species of section *Sedum* known only from two sites in Chihuahua, Mexico. It may have been found first by *F. Brandt* and *M. Kimnach* in March 1967 at the waterfall at Cusarare, although no plants survived at the Huntington and no herbarium specimens were made. However, a *Sedum* species was also found at the same locality in 1970 by *Bob Reeves* and it appears to be conspecific with the new species; his specimen is cited here as the paratype. In May 2000, the type collection was made by *Jean Metzger* near Basihuare. This new species is named in honor of the native people, the Raramuri (often called the Tarahumara by Spanish-speaking people), long resident in this area of the Sierra Madre Occidental. *Sedum raramuri* differs from *S. compactum* in its sublinear, nearly terete leaves and its spreading petals, from *S. mellitulum* in its slightly larger leaves and tuberous roots and from *S. alamosanum* in its tuberous roots and non-glaucous leaves.

Key words: *Sedum raramuri* sp. nov., new species, Crassulaceae, Chihuahua, Mexico

History

Sedum raramuri Metzger, described below, may have first been discovered by *Fred Brandt* and *Myron Kimnach*, who in 1967 were on a Huntington Botanical Gardens expedition in Chihuahua. At the waterfall of Cusarare, growing on mossy rocks, a single plant of a sedum was observed growing with *Echeveria chihuahuensis von Poelln.* and an *echinocereus*. Several cuttings of the sedum were brought back to the Huntington, where they soon expired; no herbarium specimen was made nor photos taken, so the identity of that specimen is uncertain. However, in 1970 *Bob Reeves* of Las Cruces, New Mexico, collected *S. raramuri* at the falls, and this collection—cited here as a paratype—grew for a time at the Huntington.



Figure 1. The type locality of *S. raramuri*. May 1, 2000. Thi.- plants grew on the ver

Table 1. Comparison of *Sedum raramuri* with suspected related species

	<i>S. compactum</i>	<i>S. mellitulum</i>	<i>S. alamosanum</i>	<i>S. raramuri</i>
Roots	Often tuberous	Fibrous	Fibrous	Often tuberous
Stems with inflorescence	To 2 cm long	To 7-8 cm long	7-10 cm long	To 5-7 cm long
Leaves	Cymbiform, ovate-deltoid, ca. 4 mm long, ca. 1.5 mm thick, not glaucous	Linear, terete, 5-6 mm long, 1 mm thick, not glaucous	Linear-lanceolate, 4-5 mm long, glaucous	Linear-oblancoate, 4-6 mm long, 0.8 mm wide, 0.4 mm thick, not glaucous
Petals	Erect-incurved, elliptic, white	Stellate, white or pinkish	Stellate, greenish white, red-streaked	Stellate, narrow-lanceolate, white, flushed pinkish near apices
Nectaries	Obdeltoid, truncate, yellowish green	Obdeltoid or spatulate-oblong, truncate, red	Oblong	Obtuse, bifid, narrowing at base, orange

The type collection was made by the late *Jean Metzger*. On May 1, 2000, he saw the species at Basihuare (some 15 km to the south) near the entrance to the village, across a bridge leading to the east, on a vertical, west-facing, apparently limestone ledge 1-4 m high and 20 m long, located 10 m from the bridge and 2 m above ground level. Five or six mats of the species were seen, each composed of 40-50 rosettes. Some plants were collected for further study, and propagules of these were grown at one time or another in the collections of *J. Metzger* (Wegscheid, France), *J. Meyran* (Mexico City), *Carolina Chazaro* (Jalapa, Mexico), *Ray Stephenson* (Choppington, UK) and *Helmut Regnat* (Ottobrunn, Germany). *Metzger* reported that *Sedum liebmannianum* *Hemsley* (not recorded from Chihuahua—more probably it was *S. stelliforme* *S. Watson*) grew on the same ridge and that other nearby succu-

lents were *Echeveria craigiana* *Walther* (more likely *E. cbihuahuaensis*) and *Echinocereus* aff. *scheeri* (*Salm-Dyck*) *Scheer*.

Sedum raramuri appears to be difficult to grow, and at the present time it is not certain that it is still in cultivation.

Jean Metzger decided it was a new species and submitted an article and description to the *Cactus and Succulent Journal* (US). During the process of correspondence and revision, the author died. The present article retains much of his original text as well as additional data from the journal editor at the time, *Myron Kimnach*.



Figure 2. A mat of rosettes about 10 x 10 cm. The mauve color is due to sunlight.



Figure 3. Rosettes of a plant cultivated in England, with drying inflorescences.

Morphology

In *The Genus Sedum* L. (*Fröderström*, 1936), *Sedum raramuri* keys out closest to *S. compactum* *Rose*, which, however, grows in Oaxaca, a thousand miles to the southeast. *S. raramuri* may be more closely allied with the Sonoran *S. alamosanum* *S. Watson* and the Chihuahuan *S. mellitulum* *Rose*. The leaves are papillose in all four species, which can otherwise be differentiated by the characters listed in Table 1.



Figure 4. A single cluster of bulbils with elongating rosettes and long, non-bulbous, anchoring roots.

Description

Sedum raramuri *J. Metzger*, sp. nov. (section *Sedum*; section *Americana* *Orthocarpia* *Fröderström*).

Planta perennis dense gregarie crescens, radice singula carnosa a tubero subterraneo oriunda, tempore sicco anni ad rosulam parvam foliis approximatis conniventibus reducta, periodo pluvioso in caulem debilem foliiferum supra sparse ramosum 40-50 mm longum producta. Folia alterna late linearia obtusa semiteretia basi subpulviniformi. Flores albi stellati diametro ca. 12 mm, sepalis basi connatis cupuliformibus, petalis 5 lanceolatis subacutis mucronatis, antheris juvenilibus rosaceis, deinde albis, ovario quinquepartito carpellis bulbiformibus breviter apiculatis.

Type locality: Mexico, Chihuahua, Basihuare (on road from Creel to La Bufa), ca. 2000 m.

Holotype: *J. Metzger* 7006.2 (BASBG).

Paratype: Chihuahua, falls at Cusarare, March 28, 1970, *Bob Reeves* s.n., Huntington Botanical Gardens 48306 (HNT).



Figure 5. A plant of *S. raramuri*, cultivated in France, showing its late-season vegetative stage.



Figure 6. Flowers of *S. raramuri* on a plant cultivated in England

Plant perennial, entirely papillose, annually forming a moss-like mat of closely-set rosettes. Roots seasonally tuberous, slightly elongated, globose or more or less carrot-shaped, the principal tuber 5x4 mm, each tuber often with a corkscrew-shaped fleshy tap-root 6-8 cm long that narrows at the base. **Rosettes** 50-70, 5-6 mm wide, at the onset of the rainy season elongating to form erect, thin, at first unbranched stems 5-7 cm high, white, usually flushed pink. **Leaves** alternate, at first ascending, slightly incurved, later spreading, flattish, oblanceolate, obtuse, with a broadened base and a white spur, 4-6 mm long, 0.8 mm wide, 0.4 mm thick.

Cultivated plants begin flowering in mid-September and end in late November. Pedicel of first **flower** stout, 2 mm long, those of later flowers more slender, 5-8 mm long; buds narrow, turbinate to elliptical, obtuse, white with a green apex, 5-6 mm long, sepals 5, ascending, unequal, united at base to form a roundish calyx; petals white, narrowly obovate, subacute, 6 mm long and 2 mm wide, mucronate, at first divergent, when fully opened stellate-spreading; stamens 10, erect, free, 4-5 mm long; anthers at first light pink to deep purple, later turning white; filaments at first divergent, later spreading, very thin, white. Carpels erect, narrowly turbinate, white, with slightly divergent apices, 0.5-0.6 the length of the petals, stigma very small, white, mature carpels light brown, only slightly spreading. Nectaries 0.5 mm high, rounded and bifid, merging into a narrower basal portion, orange gradually fading into white.

Chromosome number: $n = 48-50$ {*Bob Reeves* s.n., counted by *Charles Uhl*, Cornell University}.



Figures 7, 8. Plant of the *Reeves* collection cultivated by *Helmut Regnat* in Germany.

Discussion

Considering the overall distribution pattern of Mexican Crassulaceae, and particularly *Sedum*, the northern part of of the Sierra Madre Occidental—specifically the state of Chihuahua—is poorer in species than the more southern regions. This may be related to the extreme climatic conditions prevailing in this part of Mexico. Reputedly, part of the area has not had rain for the past five years, which has endangered the existence of many plant species. The new *sedum* described here is well-adapted to extreme conditions, which explains why the habit of the plant is utterly different in the dry and rainy seasons. During the dry season the tuberous roots allow the plant to resist extreme drought and the prevailing high temperatures. The small size of the closely-set rosettes and their papillose leaves also diminish evaporation, preventing desiccation. The long fleshy roots at the center of the cluster of tubers securely anchor the rosettes in the ground. In cultivation, the formation of these roots begins near the end of November, after the end of the flowering period and at the onset of the dry period. At this time, the caudex withers and finally dries completely. At soil-level, numerous small rosettes soon develop to form a continuous mat, similar to what one sees in habitat in early May. One might compare this perennial life-cycle to that of Old World *sedums*

whose caudex disappears in the fall, leaving the bulbous roots to survive and ensure the continuation of the plant. However, in *S. raramuri* the bulbs totally disappear as the plant develops in the rainy season and then form again soon after the dry-season rosettes reappear.



Figure 9. *Sedum raramuri* at Cusarare falls, May 13, 2001. Figs. 1, 2, 4, 5 by *Jean Metzger*; 3, 6 by *Ray Stephenson*; 7, 8 by *Helmut Regnat*; 9 by *Julia Etter* and *Martin Kristen* (their number 00623).

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