

## *SEDUM CHAZAROI* (CRASSULACEAE), AN ENDEMIC NEW SPECIES FROM SOUTHERN JALISCO, MEXICO

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**Abstract:** *Sedum chazaroi* (Crassulaceae), an endemic new species from southern Jalisco, Mexico, is described and illustrated. This taxon belongs to section *Sedastrum* (Rose) Berger based on characters such as its basal rosettes, dense pubescence and paniculate inflorescences. Among differentiating characters from the rest of species of section *Sedastrum* are bigger rosettes (1.5-6 cm in diameter), larger and thicker floriferous stems (57-85 cm long and 1.1-1.8 cm in diameter) and a dense pubescence. *Sedum chazaroi* is compared with closely allied species like *S. ebracteatum*, *S. hintonii* and *S. mocinianum*.

**Keywords:** Jalisco, Mexican endemic species, Mexico, *Sedastrum*, succulent plants.

**Resumen:** Se describe e ilustra *Sedum chazaroi* (Crassulaceae), una especie nueva endémica del sur del Estado de Jalisco, México. Este nuevo taxón pertenece a la sección *Sedastrum* (Rose) Berger por presentar rosetas basales, pubescencia densa e inflorescencias paniculadas. Se distingue de las demás especies de esta sección por sus rosetas de mayor tamaño, las cuales llegan a medir 1.5-6 cm de diámetro, por sus ramas floríferas de 57-85 cm de largo y 1.1-1.8 cm de diámetro, y por su indumento denso. Se le compara con *S. ebracteatum*, *S. hintonii* y *S. mocinianum*, con los cuales parece estar estrechamente relacionado.

**Palabras clave:** especies mexicanas endémicas, Jalisco, México, plantas suculentas, *Sedastrum*.

*Sedum* section *Sedastrum* (Rose) Berger (Crassulaceae) is characterized by dense basal rosettes with usually pubescent leaves, fleshy, thickened rootstocks, numerous stems dying after flowering, paniculate inflorescences and flowers with white, very thin petals that possess a nectarial concavity (Clausen, 1943; Uhl, 1992). This section contains about five species (Pérez-Calix, 1998) distributed from northern Mexico to Honduras, with most diversity in central Mexico (Clausen, 1943; Uhl, 1992).

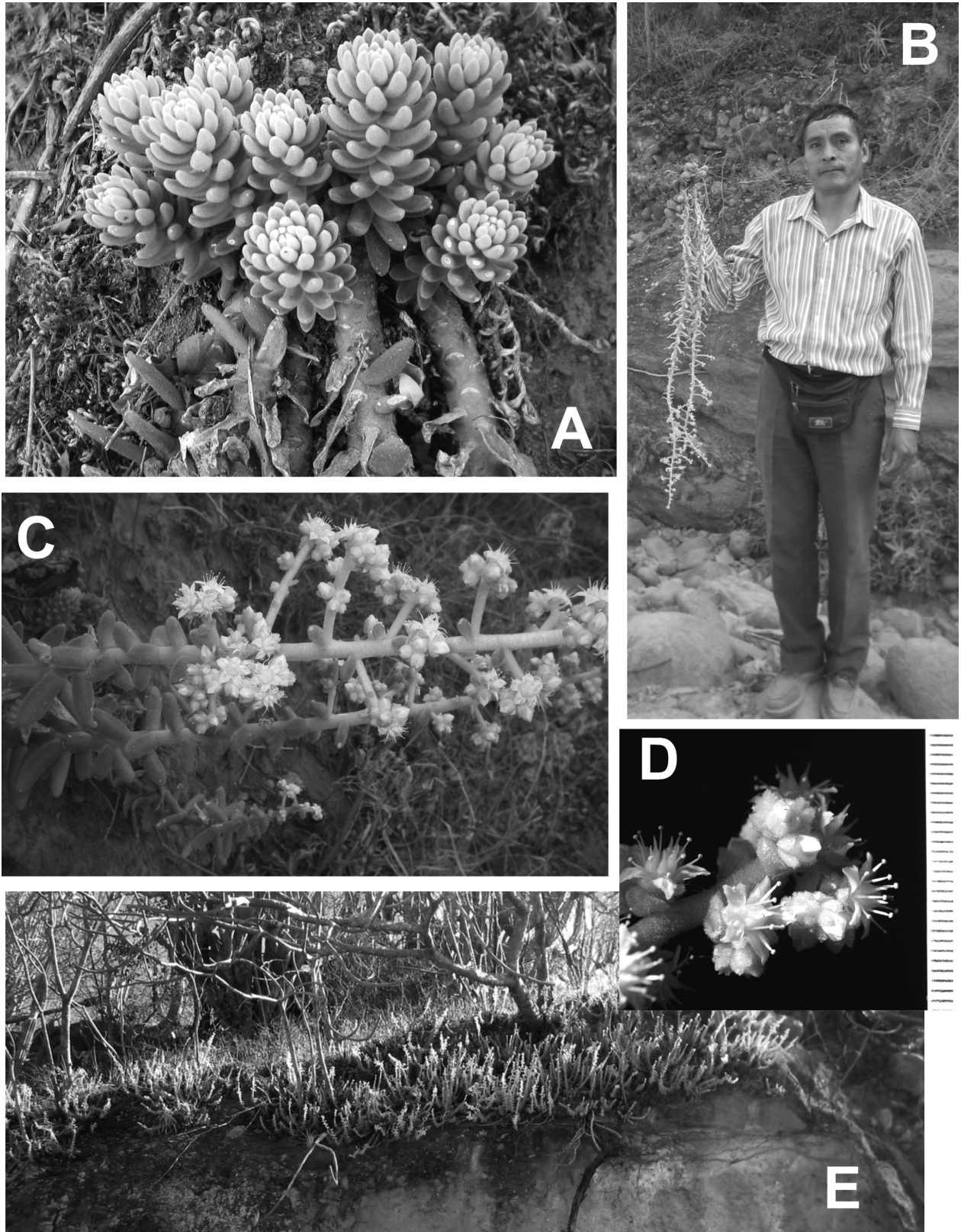
During botanical exploration to southern Jalisco, we collected a member of *Sedum* sect. *Sedastrum* with long and pendulous floriferous stems that cannot be identified as any of the described species of the section. After reviewing the literature (Clausen, 1943, 1978, 1979; Pérez-Calix, 1998) we concluded that this species has never been described. We describe and characterize this new species below.

*Sedum chazaroi* P. Carrillo & J. A. Lomelí sp. nov. (figure 1). Planta herbacea perennis dense pubescens; caules erecti ad

10 cm longi; folia 25-35(70) in rosula dense et spiraliter disposita, triangularia vel oblonga, 8-33 mm longa; inflorescentia paniculata ad 85 cm longa decumbens vel pendula, ramis 9-26 late divaricatis ad 15.5 cm longis, 3-27 flores ferentibus, floribus sessilibus vel subsessilibus; petala 5 alba, 4-5 mm longa; carpella 5 glabra, 4.5-5-5 mm longa ad basem cavata.

**TYPE:** México, Jalisco, municipio de Tolimán, arroyo La Ciénega, 19°36'N, 103°54'W, 760 m. Tropical deciduous forest; rocky cliffs of N and NW exposure; 20 Dec 2005; **P. Carrillo-Reyes and J. A. Lomelí-Sención 5105.** (Holotype: GUADA; Isotypes: IBUG, IEB, MEXU, MICH, MO, NY, XAL).

**Herbaceous perennials**, densely pubescent (except petals, stamens and carpels), pubescence of hyaline hairs ca. 0.5 mm long. **Sterile stems** erect, to 10 cm long, 8-10 mm in diameter at the base. **Leaves** 25-35 (70), rosulate, crowded, spiraled, triangular when young, oblong-elliptic to oblong



**Figure 1.** *Sedum chazaroi* P. Carrillo & J.A. Lomelí-Sención A. Habit, depicting the rosettes and pendulous floriferous stem; B. José A. Lomelí showing a mature plant with pendulous inflorescence; C. Inflorescence; D. Detail of inflorescence; E. Habitat in rocky ravines at Arroyo La Ciénega, Tolimán, Jalisco.

at maturity, 8-33 mm long, 4-10 mm wide and ca. 4 mm thick, apex acute. **Floriferous stems** decumbent or pendulous, (30-) 50-85 cm long, 11-18 mm in diameter at the base. **Inflorescence** a panicle, peduncle to 62 cm long with 9-26 secondary thyrsoid branches 8-15.5 cm long, each branch with 3-27 flowers in cincinnae 6-25 mm long; bracts similar to the leaves, lingulate to oblong, 10-32 mm long, 5-10 mm wide and 5-7 mm thick; bractlets lingulate, 4-8 mm long, 4-7 mm wide and 2-4 mm thick. **Flowers** sessile to subsessile, 9-10 mm in diameter, with a fetid odor; calyx pubescent, with 5 free subequal lobes, green-whitish, the lobes deltate to triangular, 2-3 mm long, 1.5-2.5 mm wide at the base, apex obtuse; corolla glabrous, with 5 free white petals, these ovate to elliptic, ca. 5 mm long, 2-3 mm wide; stamens 10, glabrous, 5 of them opposite and adnate to the petals, 2-2.5 mm long, the other 5 alternate to the petals, 4-5 mm long, filaments white, anthers pinkish at predehiscence; pollen whitish; nectaries oblong to ovate, ca. 0.4-0.5 mm long, carpels glabrous, vesiculose, whitish green, 4.5-5.5 mm long including the style, with a concavity at the base when nectarial scale is placed, styles ca. 1.5 mm long, terete. **Follicles** containing numerous seeds.

**Distribution and habitat:** *Sedum chazaroi* is a narrow endemic species from southern Jalisco, it is known only from two localities with populations of a few individuals. It grows on vertical, rocky cliffs with sporadic streams from 750 to 1360 m of altitude. The vegetation in both localities is a tropical deciduous forest with *Bursera* spp., *Cnidoscolus*

sp., *Euphorbia macvaughii* Carvajal & Lomelí, *E. oaxacana* B.L. Rob. & Greenm., *Fouquieria formosa* Kunth, *Hechtia* sp., *Mammillaria* sp., *Pilosocereus* sp. and *Stenocereus* sp.

**Phenology:** Flowering from November to January.

**Etymology.** The specific epithet honors Miguel de Jesús Cházaro-Basáñez *Sedum* (Britton and Rose 1905) a researcher of the Universidad de Guadalajara, devoted scholar of the succulent plants from Western Mexico.

**Additional examined specimens:** MEXICO, Jalisco. Mpio. Toluimán, arroyo La Ciénega, Toluimán, 19 Sep 1987, **J.A. Lomelí-Sención 87-01056** (IEB); ibíd. 11 May 1991 (herborized later), *E. Sahagún s.n.* (GUADA, OAX); municipio de Tenamaxtlán, Arroyo San Ignacio, 1 km al SE de San Ignacio, 20°01'20.8" N, 104°09'10.2" W. alt. 1360 m, Oct 2005, **G. Tinoco & H. Orozco s.n.** (GUADA, IBUG).

## Discussion

In a recent phylogenetic analysis of the Acre clade (Carrillo-Reyes et al., in prep.), three species of *Sedum* sect. *Sedastrum* were sampled (*S. hemsleyanum* Rose, *S. hintonii* R.T. Clausen and *S. chazaroi*) and they were retrieved in a well supported clade. These results strongly support the monophyly of this section as well as the placement of the new species in this group. *Sedastrum* Rose was originally described as a separate genus from *Sedum*. Although additional studies

**Table 1.** Comparison of salient morphological features between *Sedum chazaroi* and its closest relatives.

| Species                                  | <i>S. chazaroi</i>        | <i>S. hintonii</i>    | <i>S. ebracteatum</i>            | <i>S. mocinianum</i>        |
|------------------------------------------|---------------------------|-----------------------|----------------------------------|-----------------------------|
| Character                                |                           |                       |                                  |                             |
| Indumentum                               | dense                     | dense                 | moderate                         | dense                       |
| Hair length                              | ca. 0.5 mm                | to 1.5 mm             | less than 0.3 mm                 | ca. 0.5 mm                  |
| Number of leaves per rosette at maturity | 25-35 (-70)               | ca. 25                | 15-25                            | 12-18                       |
| Leaf shape                               | oblong-elliptic to oblong | oblong or elliptical  | suborbicular to oblong-spatulate | elliptic to oblong-elliptic |
| Floriferous stem position                | decumbent or pendulous    | erect                 | erect, decumbent or pendulous    | erect                       |
| Floriferous stem length (cm)             | (30-) 50-85               | to 24                 | 15-25                            | 3-10                        |
| Number and length of panicle branches    | 9-26, to 15 cm            | to 10, less than 7 cm | 1-18, to 15 cm                   | to 10, less than 5 cm       |
| Number of flowers per branch             | 3-27                      | 3-10                  | (3-) 6-more than 60              | 1-3                         |
| Bract length (mm)                        | 10-32                     | 10-12                 | 20-80                            | 4-9                         |
| Bract width (mm)                         | 5-10                      | 4-5                   | 10-25                            | 3-7                         |

including all representatives of *Sedum sect. Sedastrum* are necessary to accurately determine the affinities of *S. chazaroi*, based on morphological features it seems to be most closely related to *S. mocinianum* Pérez-Calix. Both species are rock-dwelling plants with succulent leaves densely covered by hyaline hairs ca. 0.5 mm long. However, the former species is a more robust plant with rosettes of 25-35 (-70) leaves (vs. 12-18) and paniculate inflorescences to 85 cm long (vs. thyrsoid inflorescences about 10 cm long). These species are not sympatric and are found in different types of vegetation; *Sedum chazaroi* is distributed in southern Jalisco in tropical deciduous forest between 750 and 1360 m of altitude, whereas *S. mocinianum* occurs in Guanajuato and northern Jalisco (and probably also in southern Durango) in tropical deciduous forests and in the ecotone with xerophytic scrub, between 1480 and 2400 m of altitude (Pérez-Calix, 1998). *S. chazaroi* is also similar morphologically to the widely distributed *S. ebracteatum* Sessé & Moc., both of which are robust plants with thyrsoid inflorescences that occur in tropical deciduous forests in western Mexico. However, *S. chazaroi* can be distinguished by the presence of a dense pubescence (vs. moderate pubescence), its oblong-elliptic to oblong leaves (vs. suborbicular to oblong-spathulate) and its very large inflorescences of (30-) 50-85 cm long (vs. 10-40 cm long). In addition, although *S. ebracteatum* is widely distributed, apparently there are no collections known from southern Jalisco. Morphological characters also suggest that *Sedum chazaroi* is related to *S. hintonii*, mainly in characters such as a dense indumentum and in the shape of leaves. However *S. chazaroi* is a more robust plant with differentiating characters from *S. hintonii* like length of hairs (ca. 0.5 vs. to 1.5 mm long), number of leaves per rosette (25-35 (-70) vs. ca. 25), position of the inflorescence (decumbent or pendulous vs. erect), length of the floriferous stem (30-85 vs. to 24 cm) and number of branches (9-26 vs. to 10). Both species occur at medium-low altitudes (less than 1400 m) at cliffs in tropical deciduous forests, but *S. hintonii* is only known from the type collection in the municipality of Coalcomán, Michoacán (Clausen, 1943) and for an additional recent report of another locality in the municipality of Artea-

ga, also in the Sierra Madre del Sur, in southern Michoacán (Anaya, 2005). There are some other reports of populations of *Sedum* of this section that could be related to *S. hintonii* but their taxonomic status needs to be established (Clausen, 1946; Sánchez-Mejorada, 1975). Salient morphological features of *S. chazaroi*, *S. ebracteatum*, *S. hintonii* and *S. mocinianum* are compared in table 1.

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### Literature cited

- Anaya A. 2005. The real *Sedum hintonii*. *Sedum Society Newsletter* **75**:10-12.
- Britton N.L. and Rose J.N. 1905. Crassulaceae. *North American Flora* **22**:7-74.
- Carrillo-Reyes P., Sosa V. and Mort M. In prep. Molecular phylogenetics of the "Acre clade" (Crassulaceae); the most diverse group in stonecrops.
- Clausen R.T. 1943. The section *Sedastrum* of *Sedum*. *Bulletin of the Torrey Botanical Club* **70**:289-296.
- Clausen R.T. 1946. A New Sub-species of *Sedum ebracteatum* from the Sierra Madre del Sur. *Cactus and Succulent Journal (US.)* **18**:86-87.
- Clausen R.T. 1978. *Sedum*-seven Mexican perennial species. *Bulletin of the Torrey Botanical Club* **105**:214-223.
- Clausen R.T. 1979. *Sedum* in six areas of the Mexican Cordilleran Plateau. *Bulletin of The Torrey Botanical Club* **106**:205-216.
- Pérez-Calix E. 1998. *Sedum mocinianum* (Crassulaceae) una especie nueva del centro de México. *Acta Botánica Mexicana* **45**:49-54.
- Sánchez-Mejorada H. 1975. Un interesante *Sedum* de Chamela, Jalisco. *Cactáceas y Suculentas Mexicanas* **20**:84-88.
- Uhl C. 1992. Chromosomes of Mexican *Sedum* VI. Section *Sedastrum*. *Rhodora* **94**:362-370.

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