

ECHEVERIA JULIANA (CRASSULACEAE), A NEW SPECIES FROM SINALOA, MEXICO

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Abstract: *Echeveria juliana* is described as a new species based on collections in the Rio Piaxtla Canyon, in the Sierra Madre Occidental near the border between the Mexican states of Sinaloa and Durango. This species appears to be related to *E. tobarensis* from Durango. It differs in the size of the rosette, its pale pink color, shape and pruinosity, as well as corolla size, color of the carpels, and its obovate leaves. The new species grows at an uncommonly low altitude of 360 m (1080 ft) in tropical deciduous forest. It belongs into the series *Urbinae* as it lacks an evident stem or tuberous roots, and by the possession of a second inflorescence and a long urceolate corolla.

Fieldwork and identification of Mexican Crassulaceae have occasioned the following novelty:

Echeveria juliana Reyes, González-Zorzano & Kristen sp. nov., Figs. 1–7.

Echeveria juliana *similis* *E. tobarensis* *sed rosulis* 13–18 cm diam. (*vs.* 6–12 cm), *foliis obovato-oblancoelatis, acuminato-caudatis, pruinosis, pallide roseis* (*vs. ovatis, acute acuminatis, glabris, griseo luridis*), *caulibus floralibus pallide roseis* (*vs. griseis*), *pedicellis* 4–9 mm longis (*vs.* 5 mm), *sepalis* 2.0–2.5 mm longis, *ovatis* (*vs.* 1.0–1.2 mm, *triangulari-ovatis*), *corolla longe urceolata* (*vs. urceolata*), *antheris ochraceis* (*vs. viridibus*), *carpellis viridibus* (*vs. albis*), *nectariis squamiformibus* (*vs. reniformibus*) *differt*.

Perennial herb. **Roots** fibrous. **Stem** hardly evident, to 2.7 cm long, 1–1.3 cm thick. **Rosettes** 13–18 cm wide. **Leaves** light pink, obovate to oblanceolate, glaucous to pruinose, margin entire, slightly hyaline, apex acuminate to caudate, 4.5–8.0 cm long, 2.5–3.8 cm wide, ca. 1 cm thick at the middle. **Floral stems** 1–2 per rosette, erect, to about 50 cm long including cincinni, leaves lanceolate, light pink, glaucous. **Inflorescence** paniculate, of 2 cincinni with 17–23 flowers, bracts lanceolate, 2–4 mm long, 1–2 mm wide, pruinose, pink. **Pedicels** 4–9 mm long, ca. 1 mm thick, descending to slightly ascending, pink, pruinose. **Flowers:** **Calyx** discoid, 2.5–3.5 mm thick; sepals equal, adpressed, triangular-ovate, 2.0–2.5 mm long, ca. 1 mm thick, pruinose, acute. **Corolla** urceolate to long urceolate, somewhat pentagonal, 10–12 mm long, ca. 4 mm thick at base, pruinose and pale pink; petals connate at base, lanceolate, acute and apiculate, 10–12 mm long, ca. 2.4–2.6 mm wide in the middle. **Androecium:** filaments whitish, with 5 epipetalous stamens 2.8–3.0 mm long including theca, and 5 antisepalous stamens 3.0–3.2 mm long, anthers green. **Gynoecium** 5.0–5.2 mm long including style, ca. 3.6 mm wide, yellowish green, stigma yellowish green. Nectar scales squamiform, 2.2 mm long, 1 mm wide, white.

Type: Mexico, Sinaloa: along river banks of Rio Piaxtla west of the mining town of Tayoltita (Durango), municipality of San Ignacio, 359 m. 8 May 2010. *J. Etter & M. Kristen 3056*. (Holotype: MEXU.)

Phenology: Plants bloom in April and May in habitat and in the greenhouse.

Distribution and Habitat: *Echeveria juliana* 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, *A. aff. filifera*, *Echinocereus* aff. *koehresianus* (G. Frank) W. Rischer, *Pilosocereus alensis* (F.A.C. Weber ex Roland-Gosselin) Byles & G.D. Rowley, *Pachycereus pecten-aboriginum* (Engelmann) Britton & Rose, and *Hechtia* sp.

Etymology: The name of the species honors Julia Etter for her dedication and courage in venturing into the remote back country of Mexico in search of Crassulaceae and Agavaceae. She has made significant contributions to science in searching for plants in the field and helping to enlarge the National Collection of Crassulaceae at the Botanical Garden (IB-UNAM) and the Mexican National Herbarium (MEXU) as well as maintaining the free web database www.crassulaceae.com.

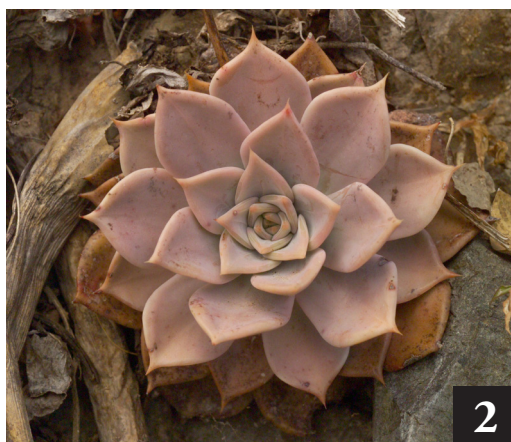


DISCUSSION

In 2009 the team of Julia Etter and Martin Kristen, collaborators of the Instituto de Biología, Universidad Nacional Autónoma de México (UNAM) and members of the Sociedad Mexicana de Cactología, A.C., made an exploratory field trip to the states of Durango and Sinaloa in search of species of the Crassulaceae and Agavaceae. At one of their frequent stops along the Piaxtla River they found high up on the river bank below an *Agave* sp. a beautifully colored *Echeveria* species. As very few echeverias are known to grow at such low altitudes, specimens were collected and sent back to the Botanical Garden of the Instituto de Biología, IB-UNAM, for further study and cultivation.

The plants did not produce flowers at UNAM due to infections of the flowering stems. However, the backup copy in the UNAM plant collection at the home of Julia and Martin in the Mexican state of Jalisco produced flowers and detailed close-up photos were taken. The photographs of the inflorescence and the flower suggested that it might be *Echeveria tobarensis* (Rose) Berger, recently rediscovered near Tepehuanes, Durango (Etter & Kristen 2011). After other trips in 2010 to the locations of *Echeveria tobarensis* and *Echeveria* sp. in the Piaxtla river valley, and after studying the species in question closely it was concluded that the differences of the two *Echeveria* species justifies its recognition as a new species.

The new species, *Echeveria juliana*, is placed in series *Urbinae* for its lack of an evident stem or tuberous roots and because of its secund inflorescence and urceolate corolla. It is easily distinguished from



Figures 1–3. *Echeveria juliana* in habitat. Photos by J. Etter & M. Kristen.



Figure 4. *Echeveria juliana* flowering in cultivation. Photo by J. Etter & M. Kristen.



Figure 5. Carpels of *Echeveria juliana*. Photo by J. Reyes & O. González Zorzano.

its apparently closer relative, *Echeveria tobarensis*, by the size of the rosette, its pruinose leaf surface, light-pinkish leaf color, size of the inflorescence and the color and shape of the flowers, and color of the anthers, nectaries and gynoecium (see Table 1).

Echeveria juliana is known only from the type locality in tropical deciduous forest at 359 m (1080

		<i>Echeveria tobarensis</i>	<i>Echeveria juliana</i>
Rosette		6–12 cm wide	13–18 cm wide
Leaf	Form	ovate	obovate-ob lanceolate
	Apex	sharp acuminate	acuminate-caudate
	Surface	glabrous	pruinose
	Size	3–6 cm long,	4.5–8 cm long,
	Color	grayish to light violet	light pink
	Floral stem	gray	light pink
Inflorescence		2 cincinni 30 cm long	2 cincinni to 50 cm long
Pedicels		5 mm long	4–9 mm long
Sepals	Size	1–1.2 mm long	2–2.5 mm long
	Form	ovate	triangular-ovate
Corolla	Form	urceolate	urceolate to largely urceolate
	Color	dark red (mentioned in the first description) to light pink (flowers observed in a greenhouse)	light pink
Anthers		green	ochre
Carpels		cream	green
Style		light olive green	green
Nectaries	Color	cream	white
	Form	reniform	squamiform

Table 1. Comparative table of *Echeveria tobarensis* and *Echeveria juliana*.



Figure 6. *Echeveria juliana* in habitat above Rio Piaxtla. Photo by J. Etter & M. Kristen

ft) altitude, whereas its recently rediscovered closest relative, *E. tobarensis*, grows at more than 2020 m (6630 ft) in pine forests (Etter & Kristen 2011). Unlike *E. tobarensis*, *E. juliana* does not tolerate low temperatures in cultivation. There are only a few echeverias known so far that grow below 1500 m (4920 ft) in the mountains of the Pacific slope: *E. pallida* Walther at 140 m (460 ft), *E. laui* Moran & Meyrán at 550 m (1800 ft), and *E. acutifolia* Lindley usually between 200 and 1000 m (660–3280 ft). Most of the *Echeveria* species are therefore found in temperate zones. *E. juliana* is the only species known so far in northwestern Mexico growing below 400 m (1310 ft).

The changes in geomorphology and morphoclimate are the result of various volcanic activities, products of long and intense geologic activity during the Cretaceous and Cenozoic periods. These changes caused geographic and genetic isolation in many populations of species of the Crassulaceae family. This can be seen in the richness and the endemism of different species of the Sierra Madre Occidental such as *Sedum lumbholtzii* Robinson & Fernald, *S. bellum* Rose ex Praeger, *S. kristenii* Reyes, González-Zorzano & Etter, *S. spathulisepalum* Clausen, *S. trichromum* Clausen, *S. craigii* Clausen, *Villadia pringlei* Rose, *Graptopetalum filiferum* (Watson) Whitehead, *G. bellum* (Moran & Meyrán) D.R. Hunt, among others.

This region, one of the largest zones of igneous-silicate origins in the world, covers an area of 289,000 square kilometers with altitudes varying from 200 m to up to 3000 m (Ferrusquía 1998).

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