

# ECHEVERIA ANDICOLA, A NEW SPECIES FROM CENTRAL PERU

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**Abstract:** *Echeveria andicola* Pino, a new species endemic to central Peru, is described. Although fairly common in the departments of Junin, Pasco and Huanuco, the plants had formerly been identified as *E. chichlensis* or *E. peruviana*; however, careful analysis supports the recognition of these plants as an unpublished species. A comparison with other similar species of the area is presented.

**Key words:** *Echeveria andicola* sp. nov., Crassulaceae, Peru flora

## Introduction

*Macbride* (1938) listed all the Peruvian species of *Echeveria* known up to that time. Among the collections of *E. chichlensis* (*Ball*) *Berger*, he mentions plants collected at Huanuco, Tarma (Junin) and Huariaca (Pasco), as well as plants of *E. peruviana* *Meyen* from Tarma, all of which were growing far away from their type localities and at relatively lower altitudes. Herbarium material collected later at those localities does not adequately show the distinguishing features of these species. While we were studying the varieties of *E. chichlensis*, we visited these localities to examine the plants in habitat and noticed how they differed from *E. chichlensis* and *E. peruviana*.

## Results

### *Echeveria andicola* Pino sp. nov.

Planta succulenta glabra caule subterraneo erecto 4-10 cm longo 1-2 (-3) cm crasso, rosula 7-13 (-18) cm diam., foliis plants, juvenilibus obovatis postremo obovatis oblongis 5.5-8 cm longis 2.5-4 cm latis 3-4 mm crassis, supra viridibus, infra saepe rubropunctatis, apicibus subacutis vel obtusis, mucrone triangulato parvissimo piano vel deorsum curvato instructis. Caulis floriferus racemosus erectus simplex 20-35 cm longus 4-6 mm basin diametentis, bracteis lanceolatis caducis 3-3-5 cm longis 9-13 mm latis 2-3 mm crassis, pedicellis ascendentibus rubribus 0.2-1 cm longis. Flores prismaticipentagonales, corollis 12-14 mm longis 8-10 mm crassis prope basin, sepalis erectis lanceolatis 6-9 mm longis 1.8-2.2 mm latis, petalis rubribus ellipticis oblongis 1-1.4 cm longis, gynoecio ovoideo 8-9 mm longo 4-5 mm crasso stylis rubribus apicem versus. Floret a Novembri ad Majum. Habitat supra saxa in an-dibus centralibus Peruviae apud 2500-3500 m.

**Type locality:** Peru, Dept. Junin, Prov. Tarma, Dist. Acomayo, road to Chanchamayo, between Picoy and Palcamayo, near Pishqamarka ruins, on a 45° slope of rocks and clay at the side of the road, 3170 m, growing with *Ephedra andina* and *Peperomia* aff. *hartwegiana*, 11°18'56"S, 75°42'35"W, April 13, 2004, *G. Pino* 1320.

**Holotype:** USM 190013.

**Etymology:** *andicola* in reference to its habitat in the Andes mountains.

A succulent glabrous herb, usually with a single rosette. **Roots** 3-8, tuberous, 0.4-0.6 cm thick, 5-12 cm long, light brown to white. **Stem** subterranean, 1-3 (-4) cm diameter, 4-10 cm long, rarely branched, erect. **Rosette** 7-13 (-18) cm diameter. **Leaves** 18-40, sessile, succulent, horizontally flat, obovate when young, later lanceolate-obovate to oblong, 5.5-8 (-10) cm long, (1.5-) 2.5-3.5 (-4) cm wide 2 cm from apex, 2.5-4 cm wide at middle, 1.2-1.8 (-2.2) cm wide at base, 2-3 mm thick, acute or sometimes obtuse, with a miniature triangular mucro 0.5 mm long, 1 mm wide, flat or sometimes recurved, upper side flat to slightly convex, light green, sometimes slightly glaucous, lower side flat, green, sometimes red-dotted and obscurely keeled, margins smooth but faceted near apex when young. **Flowering stem** simple, erect, 20-35 cm long, 4-6 mm diameter at base, 1.5-2 mm diameter at apex, yellowish green near base, bright red towards apex. **Peduncular bracts** 7-10 (-15), lanceolate, 3-3.5 cm long, 9-13 mm wide, 2-3 mm thick, yellowish green. **Flowers** 11-22, appearing from November to May. **Pedicels** erect, 0.2-1 cm long, 1.2-1.5 mm diameter, bright red, with 1 linear, curved bracteole, 0.9-1.3 mm long and 1.8-2.2 mm wide, yellowish green. **Calyx** lobes united at base, erect. **Sepals** linear-lanceolate, acute, 6-9 mm long, 2-2.5 mm wide, green, reddish at base. **Corolla** ovoid, pentagonal, 8-10 mm thick near base. **Petals** elliptic-oblong, acuminate, 1.0-1.4 cm long, 3-3.5 mm wide, exterior red, keeled, apex uncinata, recurving, inner surface pink. **Stamens** 10, the 5 epipetalous 4-5 mm long, the antepetalous 7-8 mm long. **Filaments** cream, 0.8 mm thick at base, gradually tapering to 0.1 mm. **Anthers** ovoid, greenish yellow, 1.2-1.4 mm long and 0.5-0.6 mm wide. **Gynoecium** ovoid, 8-9 mm long, 4-5 mm thick. **Carpels** 5, greenish white. **Styles** 4-5 mm long, parallel, almost touching each other, stigma red. **Fruit** pentalocular, loculicidal capsule 0.6-0.9 cm long, 5-6 mm thick. **Seeds** narrow-ovoid, 0.7-0.8 mm long, 2-3 mm diameter, light brown, apex acuminate.



Figure 1. Young *Echeveria andicola*, showing obovate leaves.



Figure 2. Young *E. andicola*, showing glaucous faceted leaves.

**Distribution and specimens examined:** Peru, Dept. Junin, Prov. Tarma, Dist. Palcamayo, Huagapo Cave, on rocky hill at left side of cave entrance, 11°16'04"S, 75°47'15"W, 3510 m, growing with *Pilea serpyllacea*, *Peperomia nivalis*, *Sedum* cf. *plicatum*, *Hippeastrum* sp., April 13, 2004, *G. Pino* 1335. Dist. Tarma, between Palca and Carpapata, 2900 m, shallow soil on boulders, perennial herb flower stalk 0.1-0.3 m, Mar 18, 1939, *H. K. Stork* 10967, (F 1678081). 7 km west from Tarma, 3300 m, April 9, 1952, *P. Hutchison* 630 (USM 19599). Road from Tarma to San Ramón, 2000-2500 m, *J. Folsom*, Feb 1986 (HTN). Prov. Jauja, Dist. Rícrán, Rícrán, 3750 m, April 9, 1967, *E. Vicuña* 3 (USM 19600). Prov. Concepcion, Dist. Comas. Around Chacas-town on rocky walls beside waterfall, 3000 m, May 21, 2005, *Pamela Puppo* 064. Dept. Pasco, Prov. Cerro de Pasco, Dist. Cerro de Pasco, road from Cerro de Pasco to Huariaca, 3150 m, on ledges along road above river below Atacocha, April 23, 1960, *H. E. Moore, Jr., Adolfo Salazar & Earl E. Smith* 8322, (USM 19604). Between Salcachupan and Cerro de Pasco, 3400 m, Jan 31, 1950, *R. Ferreyra* 6614 (USM 19890). Dist. Huariaca, at km 337.5 of the Central Peruvian Highway, 3300 m, on rocks by waterfall facing west, with *Peperomia naviculifolia*, *P. galioides* and *Pilea serpyllacea*, 10°28'18"S, 76°11'03"W, April 12, 2004, *G. Pino* 1308 (USM 190015). Huariaca, at km 342 of the Central Peruvian Highway, on vertical rock walls at the end of the town, facing east, 3200 m, with *P. naviculifolia*, 10°25'45"S, 76°11'55"W, April 12, 2004, *G. Pino* 1316 (USM 190014). Dept. Huanuco, Prov. Ambo, Dist. Ambo, above estate of Quicacan, 2400 m, on clay and rocks, with grass, Jan 29, 1950, *R. Ferreyra* 6570 (USM 19894). Road from Ambo to Tomayquichua, 10°07'S, 76°12'W, 2600 m, on rocks, growing with *Peperomia naviculifolia* and *P. galioides*, Oct 30, 2003, *G. Pino* 1190.



Figure 3. Very large *E. andicola* with almost linear leaves growing with *Peperomia naviculifolia* Trel.



Figure 4. *Echeveria andicola* leaf sizes and shapes. Figure 5. Leaves of (from left to right) *E. andicola*, *E. oreophila*, *E. chilensis*, and *E. excelsa*. Figure 6. Leaf mucro enlarged. Figure 7. Plant ex-situ, with flowers and dry fruits.

## Discussion

The leaf-shape, although quite variable, differs from that of all other *Echeveria* taxa growing in the area. Young leaves are obovate (Fig. 1). On very young leaves the margins and apices are angled or faceted (Fig. 2). When the plants are in growth they develop rather oblong leaves that are almost linear in some plants growing in the shade (Fig. 3). Leaf margins lose their angles and become rounded (Fig. 4). They are flat or somewhat convex but never clearly concave as in *E. chilensis*, where they are almost always lanceolate to linear-acute from the earliest stages (Pino, 2002). Another acute-leaved species from the area is *E. excelsa* A. Berger, with very large, narrowly triangular leaves, glaucous with a purple tinge, very rigid and similar to those of an *Aloe* species (Fig. 5). A very remarkable character of the leaves of *E. andicola* is the presence of a minute triangular apical mucro that may be obscure because it is sometimes curved backwards and hidden by the leaf margin (Fig. 6). A geographically close species with such a structure is *E. oreophila* from the south of Cajamarca and north of La Libertad (Kimmach, 2002). It also shares the obovate shape of the leaf, but this character is constant and leaves are almost always spatulate. The mucro in *E. oreophila* is, however, larger and always obvious, and this species also quickly develops a very thick and long aerial stem that later branches from the base.

Flower development is also characteristic. The flowering stem of *E. andicola* is erect with a constantly straight apex. Peduncular bracts are deciduous and present only at the base of the stem, as in *E. chilensis* (Fig. 7), but in the new species the flowers are regularly distributed along the stem and in the latter they are clustered near the apex. In *E. oreophila* the bracts persist at the base of each flower pedicel and all along the stem, doubling the length of the corolla. In *E. andicola*, *E. peruviana* and *E. oreophila* the pedicel is short and almost always straight, compared to the long, sometimes decurved pedicels of *E. chilensis*. The length of the corolla is shorter than in all the other species compared and therefore prismatic rather than pyramidal (Fig. 8). The color of petals and stems is redder than in the other related species (Fig. 9).



Figure 8. Comparison of flowers of *E. andicola* (left) and *E. chilensis* (right).

Figure 9. Apex of flowering stem with bright red flowers.

Figure 10. Fruiting *E. andicola* at the type locality.

Figure 11. *Echeveria andicola* on the road to Chanchamayo.

	<i>E. andicola</i>	<i>E. chilensis</i>	<i>E. oreophila</i>	<i>E. peruviana</i>
<b>Stem</b>	Subterranean and simple	Subterranean but sometimes aerial, seldom branching	Constantly aerial in adult plants, branching readily from the base	Subterranean and simple
<b>Leaf form</b>	Obovate to oblong	Lanceolate-oblong	Spathulate to obovate	Ovate to oblong
<b>Leaf upper surface</b>	Flat to slightly convex	Concave	Flat	Flat to concave
<b>Leaf tip</b>	Acute with 0.5 × 1 mm mucro	Acute	Obtuse to truncate with 1 × 2 mm mucro	Acute to acuminate
<b>Flowering stems</b>	Erect and straight at tip	Erect but often crooked near apex	Emerging from the sides of the plant, then recurving upward	Emerging from the sides of the plant, then erect
<b>Peduncular bracts</b>	Deciduous, lanceolate, 3-3.5 cm long, 9-13 mm wide	Deciduous, linear-oblong to lanceolate, 3-6 cm long, 6-10 mm wide	Persistent and constant at the base of each flower, oval-obovate-oblong, 3-3.5 cm long, 7-9 mm wide	Persistent, lanceolate, 1.5-3 cm long, 6-12 mm wide
<b>Flower pedicel</b>	0.2-1 cm long, erect	0.8-2.5 cm long, sometimes curved downward	0.2-0.4 cm long, erect	0.4-1.2 cm long, erect
<b>Corolla size</b>	1-1.4 cm long, 0.8-1 cm diameter	1.4-1.8 cm long, 0.8-1 cm diameter	1.2-1.4 cm long, 0.6-0.8 cm diameter	1.4-1.6 cm long, 0.5-0.6 cm diameter
<b>Color of petals</b>	Dark red	Red or yellow at base, tips red	Light rosy red	Dark red
<b>Sepals</b>	Linear-lanceolate	Linear-oblong	Ovate-lanceolate	Lanceolate
<b>Distribution</b>	Valleys of Pasco, northern Junin and southern Huamuco	Valleys of Lima and southern Ancash	Valleys of southern Cajamarca and northern La Libertad	Valleys of Tacna

Table 1. Main differences among *E. andicola*, *E. chilensis*, *E. oreophila* and *E. peruviana*.

The distribution of this species is mainly along the Peruvian Central Highway after it turns north beyond the city of La Oroya, crossing the departments of Pasco and Huanuco, along the upper Iluallaga River basin (Fig. 10) as well as in the valleys in the northern part of Junin draining to the Palca River (Fig. 11).

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