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Epidendrum petacaense, a new species of Orchidaceae from Sinaloa, Mexico

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Abstract

A new, unusual species of the *Epidendrum anisatum* group, *Epidendrum petacaense* is described from the extreme northern range of this genus, and is illustrated in full color, and compared with some of the closely related species: *E. anisatum, E. vandifolium*, and *E. lowilliamsii*. Photographs in parallel are presented for the four species in a figure to facilitate comparisons. With other recent discoveries, the total count for the genus *Epidendrum* is 127 species and two natural hybrids in Mexico.

Keywords: *Epidendrum vandifolium,* Anisatum group, lithophytic, *Bletia santosii*

Introduction

The genus *Epidendrum* Linnaeus (1763: 1347) is the largest genus of Orchidaceae in the neotropics, ranging from North Carolina in the eastern United States to northern Argentina in Misiones, and it grows from the beaches in Brazil at sea level to about 4000 m elevation in Ecuador, where it is found occasionally covered by snow (Hágsater & Soto 2005). In Mexico it is distributed from Sinaloa to Chiapas along the Pacific coast and from Nuevo León and Tamaulipas to the Yucatan Peninsula along the Atlantic. The species are found in Mexico from the coastal plains to the pine forests and cloud forests, in almost all the different types of vegetation in Mexico. The highest diversity is found in seasonally dry forests to pine-oak forests between 1500 and 2500 m elevation.

Solano-Gómez *et al*. (2020: 19) registered 125 *Epidendrum* species in Mexico, to which the recently transferred *E. viscidum* Lindley (1840: 81) Hágsater & Salazar (2022: pl. 1948), one new species *E. fredmulleri* Hágsater (2022a: pl. 1912), as well as the new species presented here add up to a total of 127 species. Another novelty, *E. mayarum* Hágsater (2022b: pl. 1926) substitutes the Mesoamerican *E. isthmi* Schlechter (1922: 34) (Hágsater & Karremans: in press), so that does not change the total number.

The *Epidendrum anisatum* Lexarza in La Llave & Lexarza (1825: 27) group (García-Cruz 1992: 55) is endemic to Mexico, and is distributed mainly in the states of Sinaloa, Durango, Nayarit, Jalisco, Colima, Michoacán, México, Morelos, Guerrero, and Oaxaca, and is well represented in pine-oak forests at an elevation of 1800 to 2800 m. It is only to be found in the hilly areas of the Pacific watershed of the country, chiefly in the physiographic provinces of Sierra Madre Occidental, Eje Volcánico, Sierra Madre del Sur and the Mountainous System of the North of Oaxaca, not reaching the isthmus of Tehuantepec, which acts as a geographic barrier in the southern area of the distribution of the group (García-Cruz & Hágsater 1998).

The group comprises 19 species, including the new species here proposed, an unpublished sub-species (González Tamayo†, pers. comm.), and a natural hybrid *E. magnificum* × *E. anisatum* (Hágsater & Salazar 2020) of two different groups of species.

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With *Epidendrum vandifolium* Lindley (1849: 269) in the northern limit of the distribution of the anisatum group, and restricted to the Sierra Madre Occidental, the observations made by Juan Pío-León in Sinaloa close to the border with Durango, show a population of plants with clearly different morphological characteristics, namely the color of the flowers, the prominent clinandrium-hood, as well as other floral and vegetative features. Thus, it is clear that we are dealing with two different species. Both species are found in the same physiographic province, at least some 20 km from each other in the presently known and documented distribution and the same elevation and vegetation.

Material and methods

During a routine search of recent additions of species of *Epidendrum* at the site of iNaturalist (https://www.naturalista.mx/), the team at AMO Herbarium detected an unidentified species of the genus added by Juan F. Pío-Léon in his explorations to document the endemic flora of the state of Sinaloa. Julián Duarte immediately contacted Juan Pio-León asking him to make a digital photographic series and herbarium samples of the unidentified species. Under the guidance of Duarte, Pío-León proceeded to collect more material and make the photographic series with a Samsung Galaxy A8-2018 (SM-A530F) Camera and prepared several herbarium specimens. A Lankester Composite Dissection Plate (LCDP) was prepared from the photographic series by Anaís Cisneros of the AMO Herbarium team. A map with the distribution of the specimens of the new species found in Sinaloa was prepared using QGIS 3.22.5 Białowieża software.

A search was made in GBIF and AMODATA to find potential misidentified additional specimens from the states of Durango and Sinaloa, none was found. The only species found in the vicinity was *Epidendrum vandifolium* (García-Cruz 1995) at a lower elevation of 1100–1500 m (the type of its synonym, *E. durangense* Hágsater & Holman (1984: 301), was collected in the vicinity). Two other observations have been detected for *E. vandifolium*: https://www.naturalista.mx/observations/99300135 and https://www.naturalista.mx/observations/36198964

Taxonomy

Epidendrum petacaense Hágsater, J.Duarte & Pío-León, *sp. nov.* (Figure 1).

Type:—MEXICO: Sinaloa: Municipio La Concordia, Sierra de los Bules o Agua Zarca, cerca de La Petaca, 1759 m, 23 julio 2022, *J. F. Pío-León*, *L. A. Cárdenas & M. Pérez 349* (holotype: CIIDIR!; isotypes: AMO! MEXU! USON!) (LCDP voucher, digital images AMO!).

Epidendrum petacaense is similar to *E. vandifolium* but the flowers are bright lilac-magenta, calli white (*vs.* flowers red to pale magenta, occasionally green, the calli red), margin of sepals and petals spreading (*vs.* margins revolute), lateral lobes of the lip dolabriform to flabellate (*vs.* lateral lobes widely rectangular, more or less rounded), mid-lobe sub-orbicular, forming a narrow isthmus at the base, bilobed, the apical lobes rounded (*vs.* mid-lobe oblong-cuneate), clinandrium-hood surpassing the body of the column (*vs.* clinandrium-hood reduced, not surpassing the column), and the ovary inflated ventrally behind the perianth (*vs.* ovary terete, only slightly inflated towards the apex).

Description:—Lithophytic, sympodial, caespitose, erect to arching *herb*, 9–35 cm tall including inflorescence. *Roots* 2.0–5.0 mm in diameter, fleshy, thick, green to white becoming red when wet, tinged red at apex when in growth. *Stems* 9–30 cm long and 0.5–1.0 cm thick, simple, cane-like, terete, thin, sub-erect to arching; base covered by tubular sheaths, non-foliar, whitish with minute black dots, striated when dry, papyraceous; frequently producing keikis from upper half of mature stems. *Leaves* 6–13, distributed along apical half of stems, alternate, articulate, sub-coriaceous; sheaths tubular, with minute wine-colored dots; blade 3–7 × 0.4–0.6 cm, linear-lanceolate, acute, smooth, light green, margins entire, spreading. *Spathe* lacking. *Inflorescence* 2.5–5.0 cm long, apical, erect, straight, racemose to paniculate, pluri-annual, producing new racemes from old peduncles over several years; peduncle 1.2–2.0 cm long, terete, thin, straight, provided with 2–3 bracts 5–7 mm long, tubular, acuminate, embracing, gradually smaller. *Floral bracts* 1.5–3.0 mm long, much shorter than ovary, triangular-ovate, acuminate, embracing, gradually shorter. *Ovary* 11–15 mm long, terete, ventrally inflated behind perianth, furrowed. *Flowers* 5–7 per raceme, successive, non-resupinate, magenta-lilac, column totally white to magenta at base and apex white; fragrance none registered. *Sepals* 8–9 × 3–4 mm, free,

spreading, obovate to elliptic, obtuse, 5-veined (lateral veins short branched), margins entire, spreading; lateral sepals oblique, minutely apiculate. *Petals* 7–9 × 2.0–2.5 mm, obovate-oblanceolate, apex rounded, 3-veined (lateral veins short branched), margins minutely dentate, spreading. *Lip* 6.0–7.0 × 7.0–9.0 mm, united to column, 3-lobed, base cordate, margins erose-crenulate; lateral lobes 3.0–4.0 × 3.5–4.0 mm, dolabriform to flabellate, in some plants they overlap mid-lobe, appearing entire; mid-lobe 3.5 × 4.5 mm, sub-orbicular, forming a narrow isthmus at base, bilobed, apical lobes rounded, margin erose; bicallose, calli prominent, digitiform, divaricate; disc with 3 parallel ribs that disappear before reaching apical sinus. *Column* 5 mm long, short, thin at base gradually wider towards apex which is sharply bent downwards some 45°, with pair of apical rounded wings. *Clinandrium-hood* short, slightly surpassing body of column, margin entire; *Rostellum* apical, slit. *Lateral lobes of stigma* small, 1/3 length of stigmatic cavity. *Anther* reniform, 4-celled. *Pollinarium* formed by 4 pollinia, obovoid, laterally compressed, sub-equal; caudicles soft and granulose, as long as pollinia; viscarium semi-liquid. *Nectary* shallow, penetrating ¼ of pedicellate ovary, not inflated, unornamented. *Capsule* not seen.

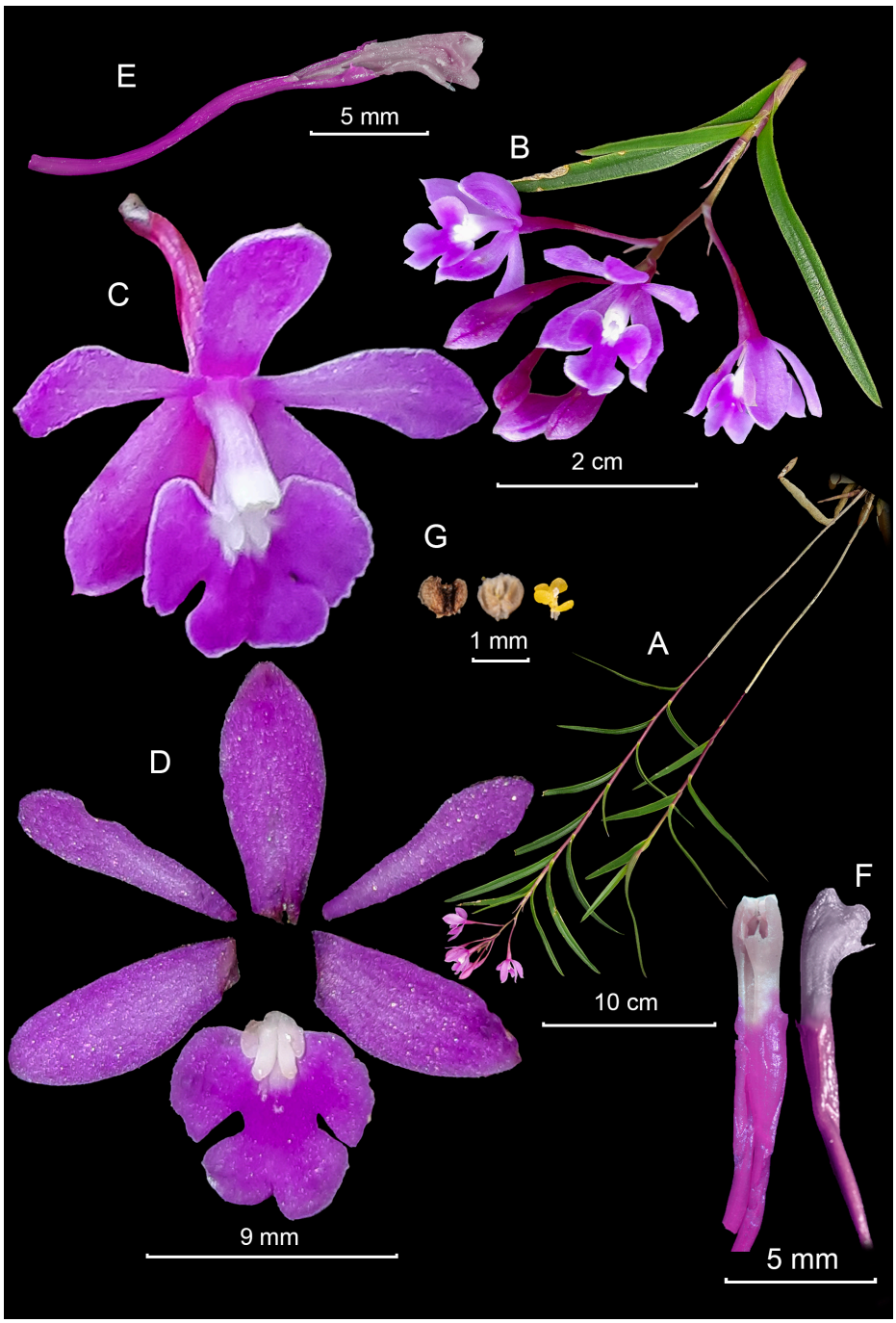

FIGURE 1. Lankester Composite Dissection Plate of *Epidendrum petacaense* Hágsater, J.Duarte & Pío-León. A Habit. B. Inflorescence. C. Flower. D. Dissected perianth. E. Ovary and longitudinal section of column. F. Column, lateral and ventral view. G. Anther cap and pollinarium. Prepared by Anaís Cisneros from the images of the pretype by J.F. Pío-León.

Distribution and ecology:—The known distribution of the species is a single locality in pine-oak forest, on the western slope of the Sierra Madre Occidental, at an elevation of 1750 m, corresponding to the *madrense-tropical* region as defined by González-Elizondo *et al.* (2012) (Figure 2). This area is close to the extreme northern range along the Pacific of the genus *Epidendrum*. It was found on a slope and rocky cliffs covered by bryophytes and lichens, with a northern exposure, together with *Agave rzedowskiana* Carrillo *et al.* (2003: 240), *Arbutus sp.* Linnaeus (1753), *Lamourouxia sp.* Kunth (Bonpland & Humboldt 1818), *Muhlenbergia sp.* Schreber (1789), *Pitcairnia sp.* L'Heritier (1789) and *Rhynchospora sp.* Willdenow (1809) (Figure 3). It has been observed in flower from mid-July to the end of August.

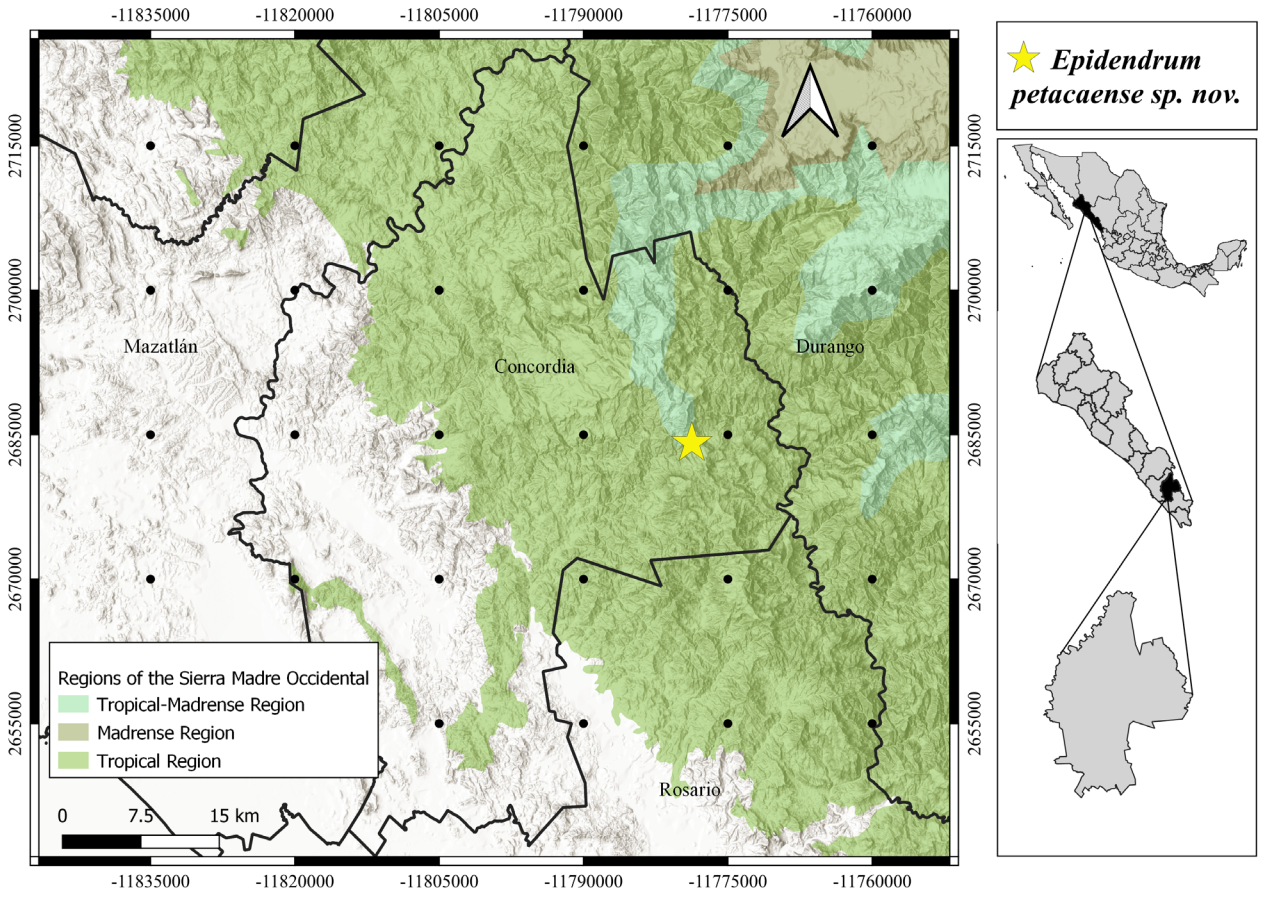

FIGURE 2. Geographic location of *Epidendrum petacaense* Hágsater, J.Duarte & Pío-León. The regions of the Sierra Madre Occidental are according to González-Elizondo *et al.* (2012).

Etymology:—The specific epithet is coined in reference to the locality near where the type was collected, La Petaca, in the State of Sinaloa, close to the border with the state of Durango, Mexico.

Conservation status:—DD. Data deficient. *Epidendrum petacaense* is only known from the type locality, an area of less than 0.5 km². It should potentially be considered Critically Endangered, but data on populations is lacking. However, the individuals were found mainly in slopes near 90°, of difficult access and areas which are not apt for agriculture nor human habitation, so it is improbable that they are endangered by anthropogenic activity in the short and medium term.

Additional specimens examined (paratype):—MEXICO: Sinaloa: Mun. Concordia, Sierra de Los Bules o Agua Zarca, cerca de La Petaca, 1750 m, 21 August 2022, *J. F. Pío-León & M. Pérez 361* (CIIDIR!).

Other records:—Mexico: Sinaloa: Mun. Concordia, 17 July 2022, *Millán-Otero s.n.* (digital images, AMO!). https://www.naturalista.mx/observations/128435566

Taxonomic Discussion:—*Epidendrum petacaense* belongs to the *Epidendrum anisatum* group (García-Cruz & Hágsater 1998), which includes sympodial, cespitose, erect plants, characterized by basal roots, very fleshy, thick forming large masses, erect stems, cane-like, terete, leaves distributed usually beyond the middle of the stems, linear to narrowly elliptic or elliptic, coriaceous, apical inflorescences, lacking any spathe at the base, racemose, rarely paniculate, and usually producing new racemes from the same peduncles in successive years thus pluri-racemose, the

flowers are generally dull colored, green-yellow to red. The new species is recognized by the bright lilac-magenta flowers with the calli white, the petals 7–9 mm long, obovate-oblanceolate, the lateral lobes of the lip are dolabriform to flabellate, in some plants they overlap with the mid-lobe giving the appearance of an entire lip, the mid-lobe is sub-orbicular, bilobed, the disc has three thin parallel ribs that are short and disappear at the middle of the lip. It is similar to *E. vandifolium* Lindley (1849: 269) which also grows in the Sierra Madre Occidental in the same general area, though more widespread. The type of *Epidendrum durangense* Hágsater & Holman (1984: 301), now considered a synonym of *E. vandifolium* (García-Cruz 1995:145, Govaerts 2003), was found epiphytic about 40 km distant and has been found even closer. That species has reddish to pale purple flowers, sometimes green, the sepals are 10–14 mmm long, the lateral sepals descendent, the petals 9.5–11 mm long, descendent; the lateral lobes of the lip are widely rectangular, separated from the mid-lobe by deep sinuses, and the mid-lobe is oblong-cuneate, the clinandrium-hood reduced, not surpassing the body of the column. Both species in the vicinity in pine-oak forests. *Epidendrum vandifolium* is usually epiphytic on oaks, but occasionally also lithophytic. *Epidendrum petacaense* has only been seen lithophytic, in rocky slopes and cliffs. *Epidendrum anisatum* is distributed in the Eje Volcánico and the Sierra Madre del Sur, and has beige flowers with very small red dots, the column green, and the disc tinged wine-red, petals (6.5–) 9–12.4 (–14) mm long, narrowly spatulate; the lateral lobes of the lip elliptic to sub-orbicular, the disc provided with 3 prominent ribs, the mid-rib reaching the apical sinus of the lip (García-Cruz 1995), and has a night and early morning fragrance of anisaldehyde (Hágsater & Holman 1984: 304). *Epidendrum lowilliamsii* García-Cruz (1992: 132) is distributed in the Eje Volcánico Transversal, also has a prominent clinandrium-hood, surpassing the body of the column, and similarly thin stems but different narrower linear-leaves, the flowers yellow green, the lateral lobes larger than the mid-lobe, obliquely ovate, the margins irregularly dentate, and the mid-lobe oblong, emarginate (see Figure 4, for digital images of the four species compared).

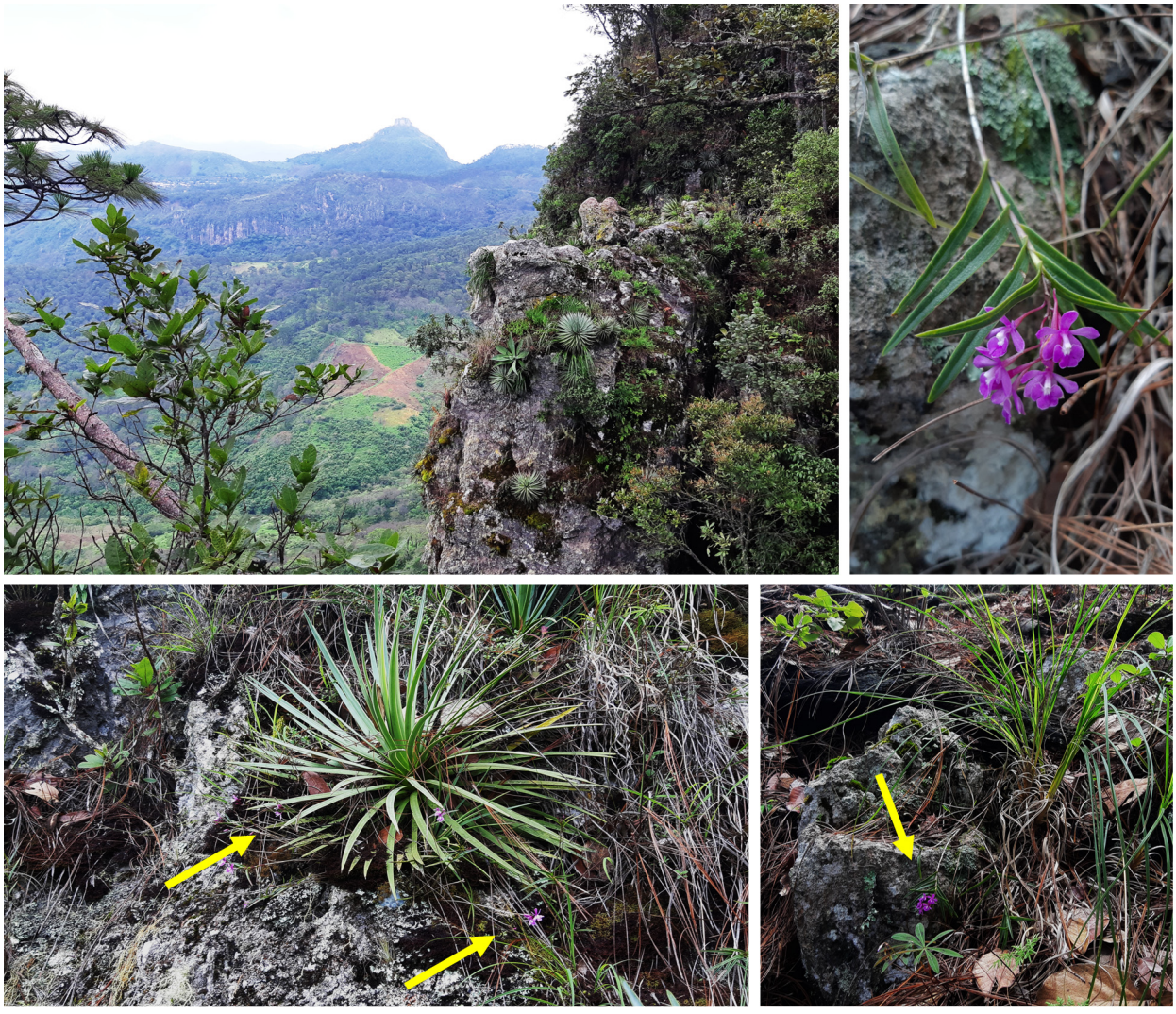

FIGURE 3. Habitat of *Epidendrum petacaense* Hágsater, J.Duarte & Pío-León. The yellow arrows indicate some of the individual plants in the natural habitat. Photographs by J.F. Pío-León.

FIGURE 4. Comparison of the four morphologically similar species. A. *Epidendrum petacaense,* (*Pío-León 349*); B. *E. lowilliamsii*, (*García-Cruz 1245*); C. *E. vandifolium* (*Hágsater 4666*, type of *E. durangense*); D. *E. anisatum* (*Greenwood s.n.*).

The region where the new species was discovered is very interesting for orchids, possibly also for other botanical groups (Ávila-González *et al.* 2019). For several years it has been recognized that it harbors some orchids, possibly vicariants of species whose geographic range along the Mexican Pacific slope end at the limits of Jalisco and Nayarit. Northward in Sinaloa, Sonora and Durango they are replaced by morphologically similar but different species or subspecies. For example: *Encyclia adenocaula* (Lexarza) Schlechter (1918: 470) and *E. adenocaula* subsp. *kennedyi* (Fowlie & Withner) Soto Arenas, Salazar & Hágsater (2003: 7), as well as *Bletia parkinsonii* Hooker (1839:t.3736) and *B. santosii* H.Ávila, J.G.González & Art.Castro (Ávila-González *et al.* 2019: 360). Hágsater & González Tamayo (1975), and Withner (1998) discuss the consistency and variation of *Encyclia adenocaula* and *Encyclia kennedyi*, with Soto *et al*. (2003) finally transferring the latter as a subspecies of the former. *Encyclia adenocaula* subsp. *kennedyi* is found in the same general area of the new species, and ranges south to the state of Nayarit and possibly into Jalisco (see discussion of Hágsater & González Tamayo 1975). However, *E. petacaense* is clearly different with usually much narrower leaves, the color of the flowers and their morphology is very distinct within the Anisatum Group.

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