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A new species of broad-leafed *Anthurium* (Araceae) from the central region of Veracruz, Mexico

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Abstract

We describe and illustrate *Anthurium tiswatl*, a new species of *Anthurium* sect. *Andiphilum* from Veracruz, Mexico. It is morphologically similar to *A. macdougallii*, but differs from that species in having long cataphylls, blades and spadix, collective veins arising from the first or fifth pairs of basal veins, and yellowish to whitish berries when ripe.

Keywords: *Anthurium andicola*, *Anthurium macdougallii*, Tequila, Section *Andiphilum*

Introduction

Anthurium Schott (1829: 828; subfamily Pothoideae), with 950 described species, is the genus with the largest number of species within the Araceae family (Mayo *et al.* 1997, Boyce & Croat 2020). It is restricted to the Neotropics and, like many other Araceae genera, it has a wide variety of life forms such as terrestrials, epilithic, holo-epiphytes, and hemiepiphytes herbs, which are distributed from Mexico to South America, from sea level to more than 2000 m elevation (Croat 1983, 1988, Mayo *et al.* 1997).

In Mexico, *Anthurium* is represented by 65 taxa (59 spp. and six infraspecific taxa), 36 of which belong to section *Andiphilum* Schott (1860: 508) Croat (in Croat & Hormell 2017: 118) (Pérez-Farrera *et al.* 2022, Croat *et al.* unpubl. data). Species within this section are characterized by having D-shaped or broadly sulcate petioles, mostly orange berries when ripe with a pasty mesocarp and large seeds (Croat & Hormell 2017, Carlsen & Croat 2019). Fourteen taxa are registered for the state of Veracruz, including four species belonging to the section *Andiphilum* (Croat & Acebey 2015, Croat *et al.* unpubl. data). As part of collaborative research projects, we visited the municipality of Tequila, Veracruz, in March 2022, where we found an entity of *Anthurium* that does not correspond to any previously described species. This species was collected, photographed, and discussed by local advisors as part of an effort to create, for this region, a 100-hour corpus of Nahuatl audio recordings on a range of topics. Here, we describe and illustrate a new species of *Anthurium* sect. *Andiphilum* from the central region of the state of Veracruz, Mexico.

Materials and methods

In April 2022, we collected specimens from two populations in Tlaxacapitzco, Tecuanca, in the municipality of Tequila, in Veracruz (18°44'09"N, 97°03'56"W, and 18°44'12"N, 097°03'54"W) between 1800 and 1810 m (Fig. 2). The specimens were examined and compared with specimens deposited in the herbaria HEM, MEXU, MO and XAL. Using fertile, living, and dry material, the taxonomic description was made following the methodology by Croat & Bunting (1979), Croat (1983) and Díaz Jimenez *et al.* (2022). The specimens collected were deposited in the herbaria HEM, MO and XAL.

We used QGIS version 3.34.3 (QGIS 2023) to generate the map to illustrate the only locality known for this species. The layers that delimit the states and municipalities of the Mexican Republic were obtained from a shapefile available on the Geoportal of La Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO 2021).

Taxonomy

Anthurium tiswatl Díaz Jim. & Croat, *sp. nov.* (Fig. 1).

Anthurium tiswatl Díaz Jim. & Croat is similar to *A. macdougallii* Matuda (1951: 373–374), but differs from that species in having longer cataphylls (11–16 vs. 5.5–7.0 cm in *A. macdougallii*), longer blades (44–65 vs. 18–33 cm), collective veins arising from first or fifth pairs of basal veins (vs. collective veins arising from the fourth or sixth pairs of basal veins), and yellowish and whitish berries when ripe (vs. orange). It can also be confused with *A. andicola* Liebm. (1849: 22), but *A. tiswatl* differs in having leaf blades with a greater number of basal lateral veins (7–9 vs. 3–6), yellowish-green or light green spathe at anthesis (vs. dark purple to brown), and yellowish and whitish berries when ripe (vs. light violet and white).

Type:—MEXICO. Veracruz: Municipio Tequila, Tlaxacapitzco, Tecuanca, 18°44'09"N, 97°03'56"W, 1804 m, 6 April 2022, *Pedro Díaz Jiménez & Gabriela Citlahua Zepahua 1674* (holotype: XAL!, isotypes: HEM!, MO!).

Terrestrial or epipetric; **stem** thick, up to 16 cm long and 7–8 cm in diam.; leaf scars 3–4 cm wide; roots thick, 2.8–5.0 mm in diam.; cataphylls subcoriaceous, 11–16 cm long, light green, acuminate at apex, drying light brown, weathering to a fibrous network at the base, persisting. **Leaves** erect; petioles erect, 48–72 cm long, 10.0–19.5 mm diam., broadly sulcate with acute margins or flattened adaxially, light green or brown-reddish, drying dark brown; geniculum 3.0–3.1 cm long, 17.5–20 mm diam., flattened or sulcate adaxially, green or reddish; blades widely ovate to ovate-triangular, coriaceous, acute or rounded at apex, sometimes with an apiculum up to 5 mm long, deeply and broadly lobed at base, 44–65 cm long, 36–56 cm wide, broadest at point of petiole attachment; anterior lobe 30–48 cm long, the margins broadly rounded and ± undulate; posterior lobes 16–20 cm long, 13–25 cm wide, rounded at apex, often directed outward; sinus parabolic or ± birectiform, rounded at apex; the upper surface glossy dark green, the lower surface semiglossy light green, drying matte green or brown semiglossy on both surfaces; midrib raised above, diminished and flat at apex, raised below, dark green or yellowish-green above and light green or yellowish below; basal veins 7–9 pairs, the first or second free to base, the second to the third coalesced to 2.5 cm, third to the fourth of 1.5–4 cm and fourth to remaining of 4–7 cm; posterior ribs naked; primary lateral veins 5–7 per side, departing midrib at 20–35° angle, slightly raised above, raised below, yellowish-green above and light green or yellowish below, tertiary venation visible on both sides, prominently raised below; collective veins arising from first or fifth pair of basal veins, sunken above, raised below, 4.5–24.0 mm from margin. **Inflorescence** erect, shorter than leaves; **peduncle** thick, 40–54 cm long, 8–11 mm diam., terete, dark green or brown-reddish; **spathe** erect, lanceolate, coriaceous, yellowish-green or light green, and tinged at margins with purple, up to 11 cm long, 4.5 cm wide, acuminate at apex, subcordate at the base, inserted at 50–60° angle on peduncle, short stipe; **spadix** tapered, dark purple at anthesis, up to 14.8 cm long, 17 mm diam. at the base, 7 mm diam. at the apex, with 6–7 flowers visible in the principal spiral, 8–9 flowers visible in the alternate spiral, **flowers** rhombic, 2.0–4.1 mm wide, 2.6–4.5 long, the sides weakly sigmoid; tepals greenish or dark, minutely papillate, the lateral tepals 1.2–2.6 mm wide, the inner margin ± straight; **pistils** weakly emergent, 1–1.5 mm long, dark, **stigma** oblong to linear. **Infructescence** pendent; spadix up to 17 cm long, 28 mm diam., tepals brown or light brown; immature **berries** green or yellowish-green when immature, yellowish and whitish when ripe, obovoid, ± round at apex, 7.2–12.0 mm long, 6–9 mm wide; **seeds** 1 or 2, oblong, greenish to whitish, 5.5–10.0 mm long, 3.5–6 mm diam.

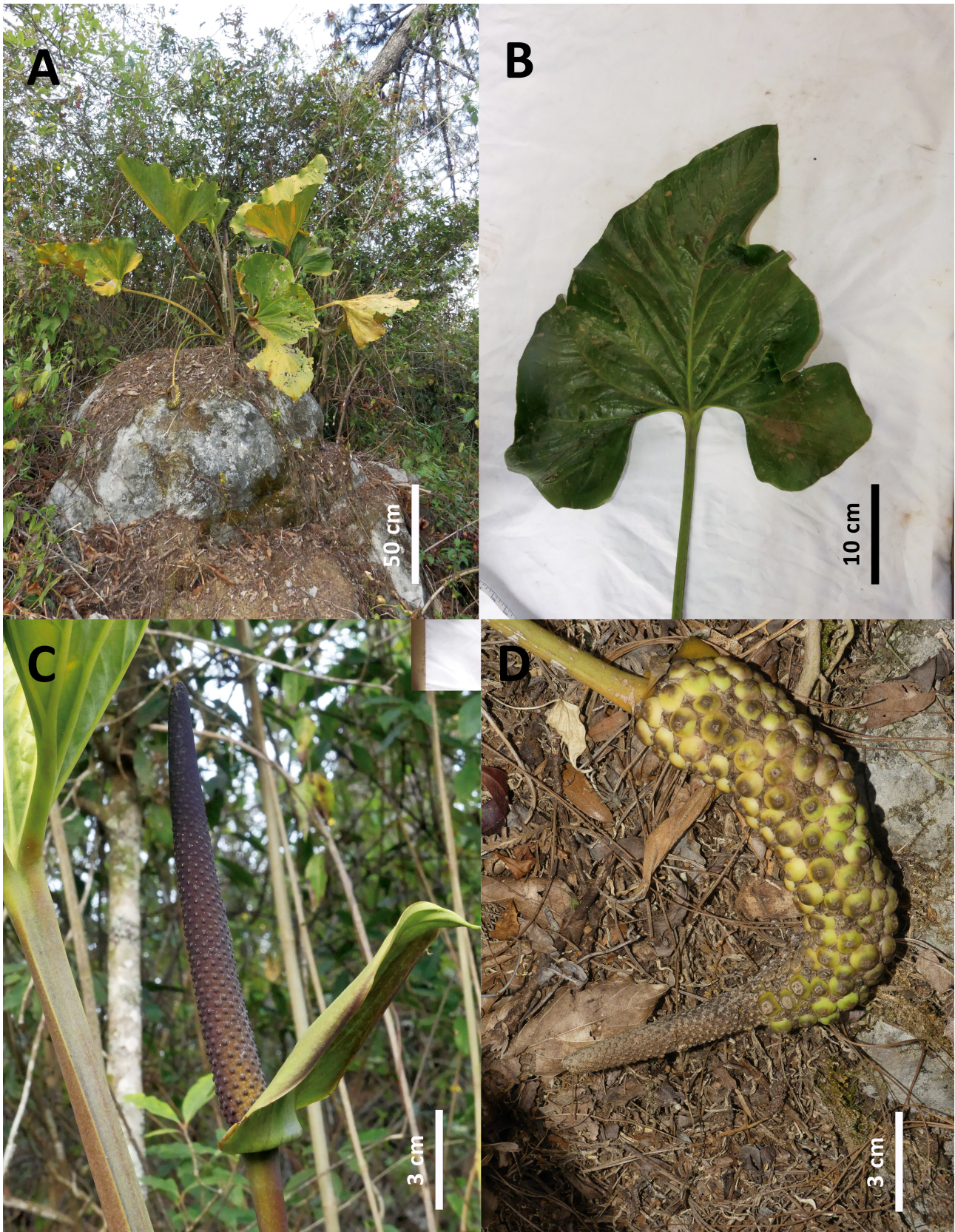


FIGURE 1. *Anthurium tiswatli*. **A.** Adult plant in its habit; **B.** Adaxial view of the leaf blade with a portion of the petiole; **C.** Inflorescence at anthesis (male phase) showing yellowish-green spathe, tinged with purple on the margins; **D.** Infructescence showing yellowish-green immature berries. Photos by P. Díaz Jiménez.



FIGURE 2. Map showing the collection site (black dot) of *Anthurium tiswatl* sp. nov. in Tequila, Veracruz, Mexico.

Distribution, habitat and phenology:—*Anthurium tiswatl* is endemic to the municipality of Tequila (Fig. 2), Veracruz, Mexico, in the central region of the state, at 1800–1900 m, in pine-oak forest. It grows in the understory, on the edges of the forest, or in forest fragments. In the vicinity, *Anthurium tiswatl* may be found in the municipalities of Atlahuilco, Ixtaczoquitlán, Los Reyes, Magdalena, Omealca, Orizaba, San Andrés Tenejapan and Zongolica. All specimens with inflorescences and infructescence were collected in April.

Eponymy:—This species is named for the local name as it is known in its type locality, named as such because of its morphological traits and habitat. The term “tiswatl” is the local, central Veracruz variant pronunciation of “teswatl”, a plant name documented in sources from the mid-16th century (e.g., Hernández 1959) and widely used in Nahuatl-speaking communities in the northeastern Sierra de Puebla. An explanation for the local use of the term “tiswatl” for an *Anthurium* might be related to the etymology of this term: ti- ‘rock’ or ‘stone’ and iswatl ‘broad leaf’ such as that found in maize plants and many other monocots. The *Anthurium* here described is broad-leafed and is often found in rocky soil, hence the incorporated element ti-.

Preliminary conservation status:—Applying the IUCN Red List Categories and Criteria and considering the area where the two populations of *Anthurium tiswatl* were found, in an area of about 2 km² and on private property, with fragments of cleared forest, this species could be considered as Critically Endangered ([CR B2ab(ii,iii,iv,v)]) (IUCN 2012), but further studies are needed, since the species could be found in a larger area in the central region of Veracruz.

Additional specimen examined (paratype):—MEXICO. Veracruz: Mun. Tequila, Tlaxacapitzco, Tecuanca, 18°44′12″N, 97°03′54″W, 1809 m, 6 April 2022, *Pedro Díaz Jiménez & Gabriela Citlaha Zepahua 1673* (HEM!)

Discussion

Anthurium tiswatl represents the fifth species of *Anthurium* section *Andiphilum* for the state of Veracruz, and the

thirty-seventh within this section for Mexico. It is characterized by its large and robust size, broadly sulcate and thick petioles, broadly ovate to ovate-triangular and coriaceous blades, parabolic or \pm birettiform sinus, up to nine pairs of basal veins, tertiary venation prominently raised below, visible on both sides, spathe shorter than the spadix, yellowish-green or light green at anthesis, and yellowish to whitish berries when ripe. It is similar to *A. macdougallii*, a recently resurrected species endemic to the state of Oaxaca. Both species are terrestrial or epipetric, they have leaves with sulcate petioles, and ovate-triangular, wrinkled and strongly coriaceous blades, but *A. macdougallii* differs in having shorter cataphylls and blades, collective veins arising from the fourth or sixth pairs of basal veins, shorter spadix and orange berries when ripe (Díaz Jiménez *et al.* 2022; Table 1). The new species can also be morphologically related to *A. andicola*, a species that is distributed in the same area, with the same life form, terrestrial or epipetric (although *A. andicola* can also grow as epiphytic), and with sulcate petioles, blades ovate-triangular, coriaceous and glossy, but that differs in having blades with fewer pairs of basal veins, dark purple to brown spathe at anthesis, and light violet and white berries when ripe (Díaz Jiménez *et al.* 2022; Table 1).

TABLE 1. Morphological comparison of *Anthurium tiswatli* with similar species within the genus, and their distribution.

Trait	<i>A. andicola</i>	<i>A. macdougallii</i>	<i>A. tiswatli</i> sp. nov.
Cataphylls (cm)	2–8	5.5–7.0	11–16
Blades (cm)	17.0–37.5	18–33	44–65
Basal lateral veins	3–6	6–9	7–9
Collective veins	Arising from the first basal vein or from one of the lowermost primary lateral veins	Arising from the fourth or sixth pairs of basal veins	Arising from first or fifth pairs of basal veins
Peduncle (cm)	16–40	15–32	40–54
Spathe at anthesis	Dark purple to brown	Green or dark purple	Yellowish-green or light green
Ripe berries	Light violet and white	Orange	Yellowish and whitish
Distribution	Mexico (Oaxaca and Veracruz)	Mexico (Oaxaca)	Mexico (Veracruz)

Anthurium tiswatli can also be confused with *A. ixtlanense* Díaz Jim., Pérez-Farr. & Croat (2020: 105–108), a species endemic to the Sierra de Juárez, Oaxaca. It is similar to *A. tiswatli* by its robust size, thick and broadly sulcate petioles with acute margins, and strongly coriaceous blades, but *A. ixtlanense* differs in having more pairs of primary lateral veins per side, collective vein arising from the sixth to eighth pair of basal veins, the base of the spathe rounded or obtuse and the spadix almost twice as long (Díaz Jiménez *et al.* 2020). Many potential undescribed plant species are hidden in the local knowledge of different ethnic groups, especially in understudied areas. Documenting local wisdom regarding nearby species, and commonly used names (which generally include some attribute of such species), may be helpful for botanists, and part of a conjoined effort to protect biodiversity and traditional knowledge.

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References

- Boyce, P.C. & Croat, T.B. (2020) The Überlist of Araceae, totals for published and estimated number of species in aroid genera. <<http://www.aroid.org/genera/20201008Uberlist.pdf>> accessed 21 January 2024.
- Carlsen, M.M. & Croat, T.B. (2019) An analysis of the sectional classification of *Anthurium* (Araceae) comparing infrageneric groupings and their diagnostic morphology with a molecular phylogeny of the genus. *Annals of the Missouri Botanical Garden* 104: 69–82. <https://doi.org/10.3417/2018215>
- CONABIO (2021) Sistema Nacional de Información sobre Biodiversidad. Comisión Nacional para el Conocimiento y Uso de la

- Biodiversidad, México. <<http://www.conabio.gob.mx/informacion/gis/>> accessed 15 December 2023.
- Croat, T.B. (1988) Ecology and life forms of Araceae. *Aroideana* 11: 4–55.
- Croat, T.B. (1983) A revision of the genus *Anthurium* (Araceae) of Mexico and Central America. Part I: Mexico and Middle America. *Annals of the Missouri Botanical Garden* 70: 211–420.
<https://doi.org/10.2307/2399049>
- Croat, T.B. & Bunting, G.S. (1979) Standardization of *Anthurium* descriptions. *Aroideana* 2: 15–25.
- Croat, T.B. & Acebey, A. (2015) Araceae. In: *Flora de Veracruz*. Fascículo 164. Instituto de Ecología A, C., Centro de Investigaciones Tropicales, Universidad Veracruzana, Xalapa, 211 pp.
- Croat, T.B. & Hormell, R. (2017) New Central American species of sect. *Andiphilum* (Araceae)—The *Anthurium silvigaudens* Standl. & Steyerl. complex. *Aroideana* 40: 117–149.
- Díaz Jiménez, P., Pérez-Farrera, M.A., Croat, T.B., Cedeño-Fonseca, M., Gómez-Domínguez, H., Ortiz, O.O. & Aguilar-Rodríguez, P.A. (2020) Two new species of *Anthurium* sect. *Andiphilum* (Araceae) from Mexico. *Phytotaxa* 454: 104–110.
<https://doi.org/10.11646/phytotaxa.454.2.2>
- Díaz Jiménez, P., Pérez-Farrera, M.A., Croat, T.B. & Aguilar-Rodríguez, P.A. (2022) A new species of *Anthurium* (Araceae) from Mexico and resurrection of *Anthurium macdougallii*. *Nordic Journal of Botany* 1–10.
<https://doi.org/10.1111/njb.03737>
- Hernández, F. (1959) Obras completas. Tomo II: Historia natural de Nueva España, vols. 1 y 2: Historia de las plantas de Nueva España. Mexico City: Universidad Nacional Autónoma de México.
- IUCN (2012) The IUCN Red List categories and criteria: Version 3.1, 2nd ed. IUCN Species Survival Commission. Gland, Switzerland and Cambridge, UK. <<https://portals.iucn.org/library/sites/library/files/documents/L-2001-001-2nd-Es.pdf>> accessed 21 January 2024
- Liebmann, F.M. (1849) *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjøbenhavn* (1–2):1–120.
- Matuda, E. (1951) Nuevas Araceas de México. *Anales del instituto de Biología de la Universidad Nacional de México* 22: 369–383.
- Mayo, S.J., Bogner, J. & Boyce, P.C. (1997) *The genera of Araceae*. Royal Botanical Garden, Kew, London, 370 pp.
https://doi.org/10.1007/978-3-662-03531-3_7
- Pérez-Farrera, M.A., Díaz Jiménez, P., Croat, T.B., Hentrich, H., Padilla-Vega, J. & Aguilar-Rodríguez, P.A. (2022) *Anthurium tacotalpense* (Araceae), a new species from Mexico. *Phytotaxa* 538: 74–78.
<https://doi.org/10.11646/phytotaxa.538.1.6>
- QGIS (2023) Geographic Information System, version 3.34.3. QGIS Association. <<https://www.qgis.org/es/site/>> accessed 15 December 2023.
- Schott, H.W. (1829) Für Liebhaber der Botanik. *Wiener Zeitschrift für Kunst, Litteratur, Theater und Mode* 3: 828.
- Schott, H.C. (1860) *Prodromus Systematis Aroidearum*. Typis Congregationis Mechitharisticae, Vienna, pp. 1–602.