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A New Species of *Anthurium* (Araceae) sect. *Urospadix* subsect. *Obscureviridia* from Espírito Santo, Eastern Brazil

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Communicating Editor: Lucia G. Lohmann

Abstract—*Anthurium angustifolium* Theófilo & Sakur., a new species of *Anthurium* (Araceae) sect. *Urospadix* subsect. *Obscureviridia* from Espírito Santo (Eastern Brazil) is described and illustrated. *Anthurium angustifolium* is closely related to *A. viridispathum* and *A. gladiifolium*. It differs from *A. viridispathum* by its deflexed leaves, purplish peduncle and spadix, and reddish berries, and from *A. gladiifolium* by its narrowly elliptic blades, with obscure secondary veins, and by a smaller number of flowers on the principal and alternate spirals. A key for Eastern Brazilian species of subsect. *Obscureviridia* is given and a comparison of the characters that separate *A. angustifolium* from related taxa is provided.

Keywords—Atlantic forest, epiphytes.

Anthurium Schott includes ca. 905 species (Boyce and Croat 2012), constituting the largest genus of Araceae. The genus includes terrestrial to epiphytic representatives, and is found in extreme environments such as rocky outcrops and swamps (Coelho et al. 2009). The most comprehensive taxonomic treatment for the genus to date was published in *Das Pflanzenreich* (Engler 1905), where 486 species were recognized in 18 sections. In earlier treatments, the same author treated 155 species grouped in 16 sections (Engler 1878), and 308 species grouped in 17 sections (Engler 1898). Currently, 19 sections are recognized (Keating 2002; Croat et al. 2005; Croat and Carlsen 2013), one of which is section *Urospadix* Engl.

Section *Urospadix* is characterized by short internodes, decomposed cataphylls and prophylls that are often persistent, blades that are usually oblong-lanceolate, lanceolate, or linear-lanceolate, with visible and frequently numerous primary lateral veins, and sub-globose berries (Engler 1878; Croat 1983). When originally described by Engler (1878), sect. *Urospadix* included 23 species, 14 of which occur in Eastern Brazil.

Engler (1898) proposed an infra-sectional classification, with 74 species split into five subsections: *Occultinervia* Engl. (one sp.), *Dependentia* Engl. (one sp.), *Insculptinervia* Engl. (five spp.), *Flavicientiviridia* (21 spp.), and *Obscureviridia* Engl. (46 spp.). Among those subsections, *Obscureviridia* was the largest and characterized by chartaceous to coriaceous concolored blades, with barely visible primary lateral veins. Subsequently, Engler (1905) added another six species to this last subsection. Some species were transferred to other sections (e. g. *Flavicientiviridia* – Coelho et al. 2009), and currently 42 species are accepted within *Obscureviridia*, of which 23 are native from Brazil, and 18 are restricted to Eastern Brazil. In recent years, seven new species were described within subsection *Obscureviridia*: (i) *A. minarum* Sakuragui & Mayo (Sakuragui and Mayo 1999); (ii) *A. maricense* Nadruz & Mayo (Coelho and Mayo 2000); (iii) *A. ensifolium* Bogner & E. G. Gonç. (Bogner and Gonçalves 2002); (iv) *A. ameliae* Nadruz & Catharino (Coelho and Catharino 2005); (v) *A. viridispathum* E. G. Gonç. (Gonçalves 2005); (vi) *A. alcatrazense* Nadruz & Catharino (Coelho and Catharino 2008); (vii) *A. molle* E. G. Gonç. & J. G. Jardim (Gonçalves and Jardim 2009); and (viii) *A. queirozianum* Nadruz (Coelho 2010).

A new species collected during field studies in the Mestre Álvaro Environmental Protection Area, Espírito Santo is described here. We provide illustrations of key morphological traits, comments on the ecology and conservation of the new species, as well as a key to the species of subsect. *Obscureviridia* from Eastern Brazil.

MATERIALS AND METHODS

This study was based on the analysis of specimens deposited at the herbaria MBML, RB, VIES, holotype images from F, K, RB, and SP, as well as relevant bibliography. Morphological studies were performed using a stereoscopic microscope Olympus SZX9. Vegetative and floral characters followed the terminology described by Croat and Bunting (1979), and Stearn (1993).

TAXONOMIC TREATMENT

***Anthurium angustifolium* sp. nov.** Theófilo & Sakur.—TYPE: BRAZIL. Espírito Santo: Município da Serra, Área de Proteção Ambiental do Mestre Álvaro, 5 Feb 2011 (fl.), R. T. Valadares 1042 (holotype: RB; isotypes: MO, VIES).

Herbaceous epiphyte, rarely rupicolous. Stem 4.5–5.0 × 1.5–1.8 cm, with short internodes 0.3–0.7 cm long, prophylls and cataphylls light green when young, brown to ferruginous when mature, entire at the apex, brittle at the stem base, 10–11 × 1.9–2.4 cm. Leaves deflexed, petiole 9.5–13.5 × 0.4–0.7 cm, light-green, flat adaxially with obtuse margins when young, becoming flat with acute margins at proximal direction and slightly sulcate at distal direction when mature, always rounded abaxially, geniculum 0.8–1 cm long, thicker than the petiole, sheath light green, 1.2–1.7 cm long; blade light green, 34.5–48.7 × 6.5–8.1 cm, strongly contrasting colors on the two surfaces, upper surface dark-green, lower surface pale green, chartaceous when fresh, sub-coriaceous when dry, narrowly elliptic, apex acute, base cuneate to obtuse, midrib prominent and rounded on both sides, lighter or the same color as the blade, primary lateral veins obscure on both sides when fresh, becoming prominent when dried, little differentiated from the finer veins, 34–36 on each side, forming an angle of 35–40° with the midrib at the leaf base, 40–45° in the middle of the blade and towards the apex, infra-marginal collective vein starting from the leaf

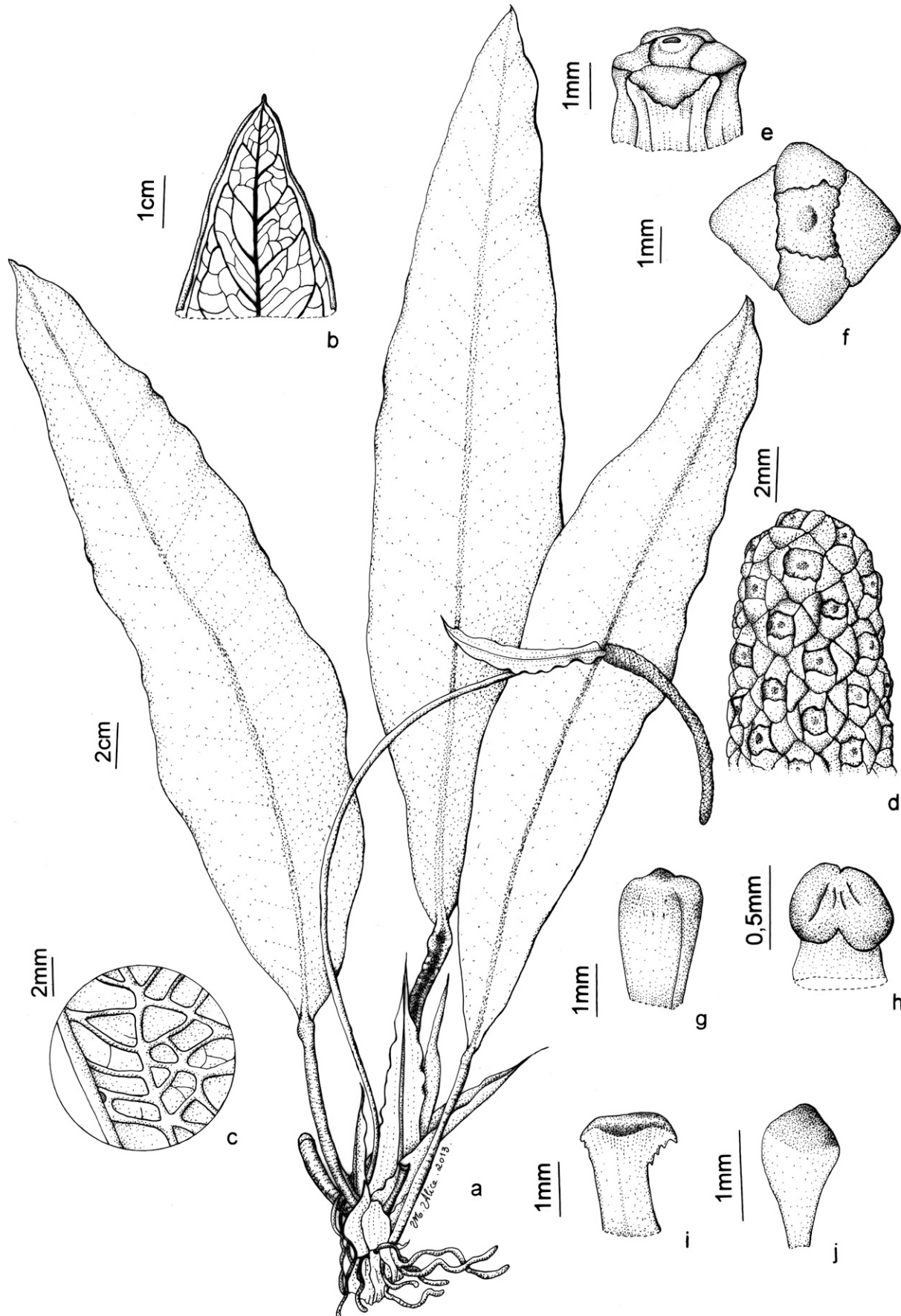


FIG. 1. A. Habit. B. Apex of the leaf blade. C. Detail of the caliber of tertiary veins and vein collector. D. Detail of the inflorescence. E. Flower in lateral view. F. Flower in front top view. G. Gynoeceum. H. Stamen. I. Lateral tepal. J. Anterior tepal.

base or, more rarely 2.3-2.4 cm above it, 0.4-0.7 cm from margin. Inflorescence: peduncle vinaceous, rarely greenish at the base, terete, 31-32.5 × 0.4-0.5 cm; spathe membranaceous, vinaceous, vinaceous with greenish hues or vinaceous at base turning light-green towards the apex, deflexed before and during anthesis, reflexed post-anthesis and during frutification, linear-lanceolate, apex acute, forming an acute angle with the peduncle, 4.4-4.7 cm × 0.7-1, decurrent 0.2-0.3 cm long; spadix sessile, rarely stipitate, vinaceous during anthesis, brownish in post-anthesis and during frutification, cylindrical, tapered, 7.8-9.9 × 0.7-0.8 cm, stipe vinaceous, 0.2-0.3 cm long; 4-5 flowers per principal spiral and 6-8 per alternate spiral; tepals vinaceous until anthesis, brownish at the apex, becoming light-green towards the base post-anthesis and during frutification, hooded, dorsally acute, internally convex, lateral tepals 2.50-2.51 × 1.5-2.0 mm, anterior and posterior tepals 1.50-1.55 × 1.0-1.10 mm, filaments flattened, 0.55-0.80 × 1.50-1.75 mm, anthers dorsifixed, extrorse, 0.40-0.45 × 0.45-0.55 mm, gynoecium vinaceous, globose, sessile, bilocular, with one ovule per locule, placentation apical, funicle glabrous, 1.50-1.60 × 0.55-0.60 mm. Berries with light green apex when immature, reddish and turning translucent towards the base when ripe, seeds oblong, yellowish. Figure 1.

Etymology—The epithet refers to the narrowly elliptic shape of the leaf blade.

Habitat and Distribution—*Anthurium angustifolium* can be an epiphyte, rupicolous, or can grow on forest floors, usually

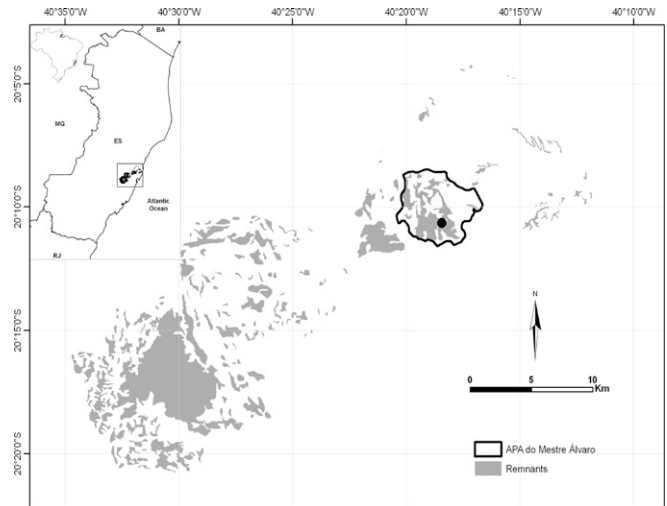


FIG. 2. Location of the study area and type locality of *A. angustifolium*. APA do Mestre Álvaro is the Environmental Protection Area Mestre Álvaro.

occurring at elevations above 600 m. Thus far, it is only known from the type locality (Fig. 2). This species can be recognized by the short stems and deflexed chartaceous leaves, which are pale-green abaxially, making it readily spotted among the associated species of Bromeliaceae, Orchidaceae, and ferns (Fig. 3).

DISCUSSION

KEY TO THE SPECIES OF *ANTHURIUM* SECT. *UROSPADIX* SUBSECT. *OBSCUREVIRIDIA* FROM EASTERN BRAZIL (BAHIA, ESPÍRITO SANTO, MINAS GERAIS, PARANÁ, RIO DE JANEIRO, SANTA CATARINA AND SÃO PAULO STATES)

1. Presence of black punctations on the abaxial surface of blades 2
 2. Spathe linear to linear-oblong *A. minarum* Sakuragui & Mayo
 2. Spathe lanceolate to linear-lanceolate 3
 3. Leaf blade oblong, coriaceous; spadix stipitate *A. binotii* Linden
 3. Leaf blade lanceolate to linear-lanceolate, chartaceous; spadix sessile *A. queirozianum* Nadruz
1. Absence of black punctations on the abaxial surface of blades 4
 4. Leaf blade oval, oval-lanceolate to oblong-oval *A. microphyllum* (Hook.) G. Don
 4. Leaf blade lanceolate, linear-lanceolate, oblong, oblong-lanceolate, oblong-elliptic, elliptic, linear-elliptic, linear-oblong to narrowly-elliptic 5
 5. Peduncle shorter than the petiole *A. ensifolium* E. G. Gonçalves
 5. Peduncle longer than the petiole 6
 6. Midrib prominent and keeled abaxially *A. molle* E. G. Gonçalves & J. G. Jardim
 6. Midrib prominent and rounded abaxially 7
 7. Collective vein not defined from 1/5 to 1/2 of the leaf blade length 8
 8. Leaf blade lanceolate; spadix stipitate, 5-6 flowers per principal spiral, 6-7 flowers per alternate spiral, if 6 then, spadix up to 3 cm *A. gaudichaudianum* Kunth
 8. Leaf blade oblong-lanceolate; spadix sessile, 8-9 flowers per principal spiral, 5-6 flowers per alternate spiral, if 6, spadix > 5 cm *A. purpureum* N. E. Br.
 7. Collective vein defined for the entire leaf blade length 9
 9. Number of primary lateral veins > 30 10
 10. Berries dark-green at the apex, turning light-green to cream-colored towards the base *A. viridispathum* E. G. Gonçalves
 10. Berries reddish at the apex, turning translucent towards the base 11
 11. Leaf blade coriaceous, oblong-lanceolate; spathe lanceolate; 6-7 flowers per principal spiral, 9-10 flowers per alternate spiral *A. gladiifolium* Schott
 11. Leaf blade chartaceous, narrowly-elliptic; spathe oblong-lanceolate; 4-5 flowers per principal spiral, 6-8 flowers per alternate spiral *A. angustifolium* sp. nov.
 9. Number of primary lateral veins < 30 12
 12. Leaf blade lanceolate to elliptic; spadix sessile *A. alcatrazense* Nadruz & Catharino
 12. Leaf blade oblong, oblong-elliptic to oblong-lanceolate; spadix stipitate 13
 13. Midrib prominent and rounded throughout its length adaxially *A. inconspicuum* N. E. Br.
 13. Midrib prominent and rounded at base, turning acute to sub-acute towards the apex adaxially 14
 14. Leaf base obtuse, truncate-emarginate to cuneate; placentation apical *A. maricense* Nadruz & Mayo
 14. Leaf base truncate to cordate; placentation sub-apical *A. ameliae* Nadruz & Catharino

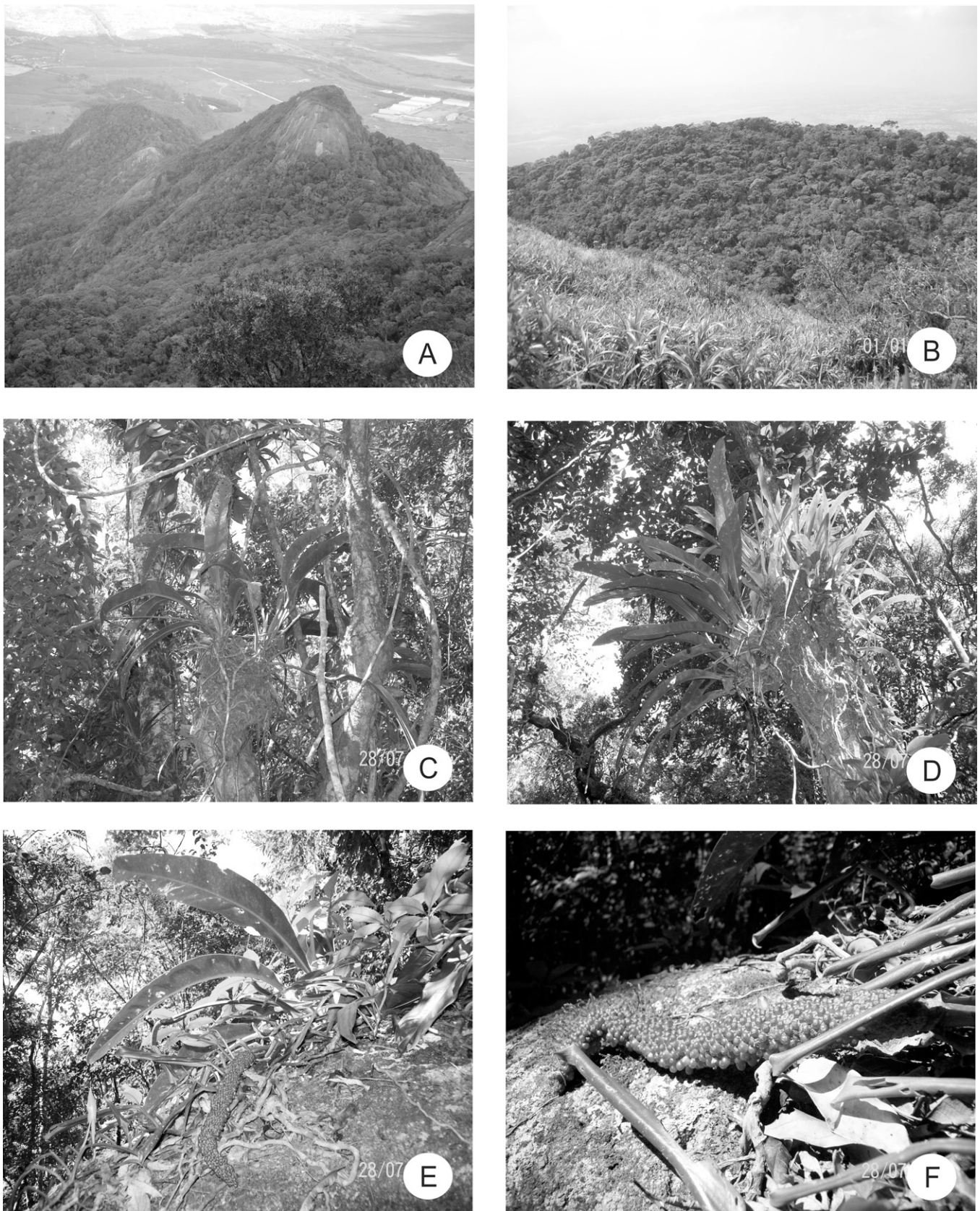


FIG. 3. A–B. Overview of the vegetation at the Environmental Protection Area Mestre Álvaro, Espírito Santo, Brazil. C–D. Epiphytic habit. E. Rupicolous habit. F. Reddish inflorescence.

TABLE 1. Key morphological traits in *A. angustifolium* and closely related taxa.

Character	<i>A. angustifolium</i>	<i>A. gladiifolium</i>	<i>A. viridispathum</i>
Prophylls and cataphylls	Entire to brittle	Decomposed to fibers	Decomposed to fibers
Leaf blade	Narrowly elliptic, chartaceous, deflexed	Oblong-lanceolate, chartaceous, deflexed	Elliptic, coriaceous, erect
Spathe	Linear-lanceolate	Lanceolate	Lanceolate
Flowers	4–5 per principal spiral, 6–8 per alternate spiral	6–7 per principal spiral, 9–10 per alternate spiral	5–6 per principal spiral, 7–8 per alternate spiral
Berry	Reddish apex, base translucent	Reddish apex, base translucent	Dark-green apex, base light-green to cream-colored
Seeds	Yellowish, oblong	Yellowish, oblong	Green turning to off-white, elliptic to obovate

Anthurium angustifolium is morphologically similar to *A. gladiifolium* and *A. viridispathum*. It differs from *A. gladiifolium* by its narrowly elliptical leaves, with prophylls and cataphylls with entire apices, becoming brittle towards the base of the stem, primary lateral veins obscure on both sides, with 4–5 flowers per principal spiral and 6–8 per alternate spiral. *Anthurium gladiifolium* is an epiphytic and terrestrial species, widely distributed through the tropical rain forest of Bahia and Minas Gerais (Coelho and Temponi 2013); it has oblong-lanceolate blades, prophylls and cataphylls decomposing to fibers at the stem base, primary lateral veins slightly impressed to barely visible above, with 6–7 flowers per principal spiral and 9–10 per alternate spiral. *Anthurium angustifolium* differs from *A. viridispathum* by having berries with a reddish apex and turning translucent towards the base, and having oblong yellowish seeds. On the other hand, the berries of *A. viridispathum* have a dark-green apex turning pale green to cream-colored toward the base, and elliptic to obovate greenish seeds (Table 1). This last species is exclusively saxicolous and poorly collected, only known from two localities in the Espírito Santo state, at elevations between 500–700 m (Gonçalves 2005).

Conservation—*Anthurium angustifolium* is critically endangered CR - B1ab (ii,iii,v) + 2ab (iii,v) - in accordance to IUCN (2001) categories and criteria. In this category are inserted species facing a high risk of extinction in the wild, with extent of occurrence < 100 km², area of occupancy < 10 km², heavily fragmented, known from a single location, with continuing decline inferred from the number of mature individuals and steady decline in habitat quality.

The Environmental Protection Area Mestre Álvaro is located within the metropolitan area of Vitória, Espírito Santo, and is heavily used for ecotourism. Non-monitored visitation leads to frequent extraction of species with ornamental potential, such as representatives of Orchidaceae and Bromeliaceae with which *A. angustifolium* is found in frequent association. Restricting the access of this Protection Area would help to prevent the decline of populations from this species.

ACKNOWLEDGMENTS. The authors are grateful to Jose Manoel Lucio Gomes for providing the infrastructure during our first field trip; Marcus Nadruz Alberto Coelho for providing bibliographic references; Luana Calazans and three anonymous reviewers for their valuable comments in the manuscript; and, FAPERJ for a graduate scholarship to the first author.

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