

upper surface weakly glossy to matte, medium green, lower surface weakly glossy to semiglossy, paler, drying matte, greenish; midrib obscurely and obtusely angular at base, becoming acutely raised toward the apex above, higher than broad at base, becoming round-raised toward the apex, conspicuously paler than surface below; primary lateral veins 10–12 per side, departing midrib at 40–45° angle, weakly arcuate to the collective vein, sunken above, raised below; interprimary veins almost as conspicuous as primary lateral veins; tertiary veins obscure above, slightly darker than surface below; collective vein arising from near the base, sunken above, raised below, equally as prominent as primary lateral veins, 1–4 mm from margin. *Inflorescences* spreading, shorter than leaves; peduncle 29–32 cm long, 3–5× as long as petioles, green tinged reddish, terete; spathe spreading to reflexed, green, lanceolate-ovate to ovate, 5–7.7 cm long, 2–2.6 cm wide, clasping at base; spadix creamy white to yellow to grayish or brown, cylindroid to clavate, held at 90° angle to peduncle, 4.5–6 cm long, 8–10 mm diam. near base, 9 mm diam. near apex; flowers rhombic, 1.2–1.6 mm long, 1.3–1.8 mm wide; 10–12 flowers visible in principal spiral; tepals matte, densely papillate; lateral tepals 0.8–1.1 mm wide, the inner margins straight, the outer margins 2-sided; stigma ellipsoid, 0.3–0.4 mm long; stamens emerging somewhat irregularly in a complete sequence, the laterals preceding the alternates by 1–2 spirals; anthers pale white, 0.6–0.7 mm long, 0.5–0.6 mm wide; thecae oblong, not divaricate; pollen yellow, faintly aromatic at anthesis. *Infructescence* to 13 cm long, 1.5–1.7 cm diam.; berries pinkish to bright red, obovoid, ca. 4.6–7 mm long, 4–5 mm diam.; seeds 2 per berry, yellow, oblong, slightly flattened, 2.5–3.1 mm long, 1.2–1.5 mm diam., 0.9–1.2 mm thick.

Anthurium eximium is endemic to Costa Rica and is found strictly on the Pacific slope, in tropical wet forest formation from sea level to 800 m.

This species can be distinguished by the oblanceolate, epunctate leaves, persistent cataphylls, clasping, lanceolate spathe, cylindrical to clavate spadix, and bright red berries.

Anthurium eximium most closely resembles *A. bradeanum* and *A. spathiphyllum* (which are both restricted to the Atlantic slope), but differs from both by having entire cataphylls. *Anthurium bradeanum* also differs in having typically more elliptic leaf blades and 16–20 flowers per principal spiral (10–12 in *A. eximium*). *Anthurium spathiphyllum* also differs from *A. eximium* in having leaf blades with 20–30 primary lateral veins per side (vs. fewer than 13 in *A. eximium*).

In his monograph, Engler (1905) cited *Anthurium eximium* as a synonym of *A. consobrinum*. The leaf shapes in both species are very similar, but *A. eximium* has the collective vein arising from near the base, while *A. consobrinum* has the collective vein arising from about the middle. In addition, Schott's illustration of *A. consobrinum* clearly shows a long, slightly tapered spadix with pistils and berries greatly exceeding the tepals. *Anthurium consobrinum* is a common species of the Atlantic lowlands, and numerous collections are consistent with Schott's drawing. The berries of *A. consobrinum* are white with purple, pink, or orange apices as opposed to the solid bright red berries of *A. eximium*.

Anthurium eximium is a member of sect. *Pachyneurium* despite certain features it shares with sect. *Calomystrium*, including the thick, persistent, intact cataphylls, and the presence of linear raphide cells on both blade surfaces.

COSTA RICA. PUNTARENAS: 2.5 mi. SE of Golfito, along hwy. from Río Claro to Golfito, 60 m, 8°36'N, 83°4'W, Croat 67622 (MO); Punta Mala, Tonduz 6768 (BR, CR); Palmar Norte, 100–200 m, Croat 35121 (MO, CR); Santo Domingo de Golfo Dulce, Tonduz 7260 (BR, CR, US); 100 ft., Allen 5211 (US); Osa Peninsula, Corcovado National Park, 0–1 km W of park headquarters at Sirena, 0–200 m, Gentry & Acevedo 48690 (B, CM, MO), Knapp 2192 (MO, PMA), Liesner 2846 (MO), 2996 (MO); Parque Nacional Corcovado, 0–150 m, 8°27'–30'N, 83°33'–38'W, Kernan 70 (CR, F, K, MO); Rincón de Osa, 20–300 m, Liesner 1934 (MO); 5 km W of Rincón de Osa, NW of airfield, 50–200 m, 8°42'N, 83°31'W, Burger & Liesner 7286 (MO, NY); E base of Fila Barigones, 1 km S and 2 km W of Cañasas, 12 km S of Rincón de Osa, 60 m, 8°34'N, 83°25'W, Croat & Grayum 59823 (MO); Las Cruces Botanical Garden, Croat 57240 (MO). SAN JOSÉ: Santa María de Dota, Croat 55204 (MO); Cerro Pelón, N base, just E of main road, 0.5 km S of San Martín de Puriscal, 800 m, 9°44'N, 84°23'W, Grayum & Baker 4694 (MO); Montañas Jamaica, 2.5 km NE of Bijagual de Turrubares, Carara Reserve, 460–520 m, 9°45'N, 84°33.5'W, Grayum et al. 5478 (MO); Río Negro, ca. 1.5 km E of Santa Rosa de Puriscal, 320 m, 9°42'N, 84°23'W, Grayum et al. 8339 (CR, MO).

Anthurium fasciale Sodiro, *Anales Univ. Centr. Ecuador* 19: 288. 1905. TYPE: Ecuador. Tungurahua: Río Pastaza, Sodiro s.n. (holotype, B; isotype, G). Figures 126, 133.

Epiphytic or terrestrial; stem climbing, to 50 cm long, 1–3 cm diam.; roots moderately few, descending, drying 2 mm diam.; cataphylls subcoriaceous, lanceolate, 14–24 cm long, acute at apex, drying whitish, straw-colored, persisting as a reticulum of fibers. *Leaves* mostly spreading; petioles 11–40(60) cm long, 5–11 mm diam.,

D-shaped, flattened or convex with an acute medial rib adaxially, the margins sharply raised, rounded abaxially; geniculum moderately thicker than petiole, 1–2 cm long; sheath 2–7 cm long; blades coriaceous, oblong-linear to broadly oblong, narrowly acute at apex, obtuse to shortly attenuate or narrowly acute at base, 47–120 cm long, 5–20 cm wide, broadest at or near the middle, the margins moderately to conspicuously undulate; upper surface weakly glossy to semiglossy, slightly quilted, dark green, lower surface semiglossy to glossy, slightly to moderately paler; both surfaces drying green to yellow-brown; midrib convexly raised, or sometimes acutely raised toward the apex above, paler than surface, acutely raised below; primary lateral veins 17–33 per side, departing midrib at 60–90° angle, slightly arcuate to the collective vein, convexly raised above, flat and darker than surface below, drying raised on both surfaces; interprimary veins almost as conspicuous as primary lateral veins; tertiary veins moderately obscure above, darker than surface below, raised above and below when dried; reticulate veins obscure; collective vein arising from the base, equally as prominent as interprimary veins, (1)2–7 mm from margin. *Inflorescences* erect-spreading; peduncle 8–40(62) cm long, 2–8 mm diam., 0.6–2.3× as long as petioles, terete; spathe reflexed, subcoriaceous, green, ovate to broadly oblong, ca. 6.5–12 cm long, 1.5–3 cm wide, broadest in the lower half, the acumen inrolled, 4–8 mm long, acute to narrowly acute at base; spadix dark red, cylindroid to slightly tapered, sessile or stipitate to 5 mm, erect, straight or slightly curved, 5.5–12 cm long, 5–10 mm diam.; flowers (dried) rhombic, 1.6–1.7 mm long, 1.2–1.5 mm wide, the sides jaggedly sigmoid to straight; 8–11 flowers visible in principal spiral, 5–8 in alternate spiral; tepals semiglossy, minutely papillate, lateral tepals 0.7–0.8 mm wide, the inner margins erose, the outer margins 2–3-sided; pistils yellow-brown on drying, smooth, lacking raphide cells, rounded at apex, not at all protruding above the tepals; stigma linear, ca. 0.3 mm long; stamens emerging from near the middle, inclined over and obscuring pistil at anthesis, held against the pistil post anthesis; anthers 0.4–0.6 mm long, 0.4–0.5 mm wide; thecae obovoid-oblong, weakly divaricate. *Infructescence* erect to pendent; spathe persisting, green; spadix ca. (7.5)12–16 cm long, 1.5–2 cm diam.; berries red, obovoid, 7–8 mm long, 5 mm diam.; seeds 1–2 per berry, broadly oblong to rounded, flattened on one side, 4.4–5 mm long, 3–3.5 mm diam., 1.5–2 mm thick, with a transparent, gelatinous appendage at base and dark gelatinous appendage at apex.

A member of series *Multinervia*, *Anthurium fasciale* occurs in Morona-Santiago, Napo, Pastaza, and Tungurahua provinces in Ecuador, at 970–1,600 m in premontane moist and very wet premontane forest life zones.

This species is distinguished by its rather long cataphylls which quickly weather to pale fibers, its abaxially rounded and adaxially flattened or medially ribbed petioles with sharply raised margins, and its oblong leaf blades drying green or yellowish with the primary lateral veins rather numerous, but unequal in prominence and ascending at a broad angle from the midrib. Another distinctive feature is the dark red spadix with exerted stamens.

A collection which may belong here (*Croat 50586*), made from a cultivated plant reportedly collected south of Puyo on the road to Macas, differs in having stamens not exerted and a relatively shorter peduncle (0.4× as long as the petioles), but agrees well with *A. fasciale* in other characters, including pistil color (on drying).

The type specimen and another Sodiro collection closely resembling it are unusual in having peduncles 16–25 cm longer than any other specimens.

Anthurium fasciale is likely to be confused only with *A. penningtonii*, also from high elevations on the eastern slopes of the Andes and also a member of series *Multinervia*. *Anthurium penningtonii* differs in having more elliptic leaf blades with more numerous, sharply raised primary lateral veins, and a more slender spadix.

This species is also similar to *A. soukupii*, ranging from southern Ecuador to Bolivia. It shares similar leaf blades and a similar weakly tapered spadix. *Anthurium soukupii* occurs at a higher elevation (2,200 to 2,400 m) and also differs in having a more or less triangular petiole and fewer flowers per spiral (7 or less). In addition, the dark-drying pistils of that species are densely marked with raphide cells and have prominently exerted styles. In contrast, the pistils of *A. fasciale* dry yellow-brown, with no raphide cells visible and are broadly rounded at the apex with the stigmas not at all protruding.

ECUADOR: MORONA-SANTIAGO: Valle de Calagras, 11 km E of San Juan Bosco, Descanso, 1,600 m, 3°02'S, 78°21'W, *Dodson et al. 10495a* (SEL). NAPO: Holín-Loreto, Km 32, 8 km W of Guamaní, 1,200 m, 0°43'S, 77°38'W, *Neill et al. 8624* (MO). PASTAZA: cultivated S of Puyo, road to Macas, *Croat 50586* (MO, QCA); Río Negro, Baños, *Croat 50587* (MO, QCA); Puyo-Diez de Agosto and Arajuno, 8.2 km NE of Diez de Agosto, 970 m, 1°37'S, 77°51'W, *Croat 59017* (AAU, B, BM, CM, GH, K, M, MO, QCA, RSA, US); Puyo-Baños, 5.7 km W of Shell, 1,070 m, 1°26'S, 78°09'W, *Croat 59073* (MO, QCA); 2 km NE of Mera, Hacienda San Antonio

de Baron von Humboldt, 1,100 m, 1°27'S, 78°06'W, *Palacios et al.* 58(MO); Mera, *Lugo* 25(S); Río Pastaza, Mera, *Lugo* 1117 (GB); El Topo, 1,250 m, 1°25'S, 78°10'W, *Harling* 3403 (S). TUNGURAHUA: Río Pastaza (Río Chambo), *Sodiro s.n.*, 8/1904 (G), *Sodiro s.n.*, 12/1906 (B).

Anthurium fatoense K. Krause, Notizbl. Bot. Gart. Berlin-Dahlem 11: 611. 1932. TYPE: Panama. Colón: Dos Bocas, Río Fato Valley, 40–80 m, *Pittier* 4227 (holotype, US). Figures 134–136.

Epiphytic; stem 10–60 cm long, 1–2 cm diam.; leaf scars obscured by root mass; roots dense, ascending to descending, numerous, pale green to white, smooth to very pubescent, short to elongate, usually tapered, 1–4 mm diam.; cataphylls subcoriaceous to coriaceous, oblong-lanceolate, 5–14.5 cm long, acute at apex with a subapical apiculum, pale yellow-green, sometimes tinged with red, drying medium brown, persisting semi-intact, soon deciduous. *Leaves* erect to spreading; petioles 2.5–9.5 cm long, 5–8 mm diam., sharply quadrangular to angularly D-shaped to occasionally subterete, flattened to broadly sulcate adaxially, sharply 1–3-ribbed or sometimes rounded abaxially, the surface minutely pale-speckled; geniculum paler and thicker than petiole, 0.7–1(2) cm long; blades subcoriaceous, oblong-oblongeolate to oblanceolate to oblong-ovate, long-acuminate at apex, acute to obtuse to narrowly rounded at base, 24–83 cm long, 6–26 cm wide, broadest at or above the middle, the margins weakly and broadly undulate; upper surface matte to glossy, medium green, lower surface semiglossy to glossy, paler, drying greenish to greenish brown; midrib flat at base, becoming sharply and narrowly raised toward the apex above, raised and sharply 2-ribbed or prominently convex-raised at base below, becoming convex to flat toward the apex; primary lateral veins 8–16 per side, departing midrib at 40–50° angle, arcuate-ascending, narrowly raised above, less so and darker than surface below; interprimary veins less conspicuous than primary lateral veins; tertiary veins obscure above, darker than surface below; collective vein arising from near the apex or absent, 2–9 mm from margin. *Inflorescence* erect-spreading to arching-pendent, shorter than or equaling leaves; peduncle 14–48 cm long, 2–6(9)× as long as petioles, green to reddish, weakly striate, terete to subterete, faintly ribbed; spathe spreading to reflexed, subcoriaceous, light green, sometimes tinged with purple, narrowly lanceolate, 5.5–9(13.5) cm long, 0.7–1.3(2) cm wide, broadest near base, in-

serted at 45–90° angle on peduncle, long-acuminate at apex (the acumen inrolled), obtuse to subcordate at base; spadix green to green tinged with red to pale reddish to reddish violet or purplish, oblong-cylindroid to long-tapered, 5–15 cm long, 4–10 mm diam. near base, 2.5–4 mm diam. near apex; flowers rhombic to weakly 4-lobed, 1.4–2.8 mm long, 1.8–3 mm wide, the sides smooth to jaggedly sigmoid; 5–9 flowers visible in principal spiral, 5–12 in alternate spiral; tepals matte to weakly glossy, minutely and densely papillate and pale punctate; lateral tepals 1.2–1.5 mm wide, the inner margins straight to broadly convex, somewhat erose, the outer margins 2–4-sided; pistils prominently to weakly raised, weakly glossy, papillate, green to white; stigma 0.4–0.5 mm long, brushlike; stamens emerging in slow progression from the base in a complete sequence, the laterals preceding the alternates by 6–34 spirals, the 3rd stamen preceding the 4th by 1–12 spirals, arranged in a circle around pistil; filaments translucent, 0.5 mm long, 0.4 mm wide; anthers yellow to white, 0.5–0.6 mm long, 0.5–0.8 mm wide; thecae broadly to oblong-ovoid, not divaricate; pollen yellow fading to white, sweet-scented. *Infructescence* spreading; spadix to 26 cm long, with berries scattered throughout; berries cream to greenish yellow or pale orange, oblong-ovoid to ovoid-ellipsoid, acute at apex, 4–7.8 mm long, 3.3–4.2 mm diam.; pericarp thickened; seeds 2 per berry, pale yellow with numerous pale, granular raphide cells on the surface, oblong-ovoid, slightly or not at all flattened, 2.6–3 mm long, 1.5–1.8 mm diam., 1–1.3 mm thick, with a transparent, gelatinous, sticky appendage.

Anthurium fatoense is known from southern Costa Rica and Panama, occurring principally on the Caribbean slope in wetter parts of tropical moist forest, as well as in tropical wet, premontane wet, and lower montane wet forest, from sea level to nearly 1,200 m. It also occurs on the Pacific slope in the Fortuna area of Chiriquí Province in Panama.

Anthurium fatoense is considerably variable in size of the leaves and inflorescences as well as in berry color. It is distinguished by its slender, erect, pointed roots, short, conspicuously sheathed petioles, green-drying blades, and its tapered, greenish spadix with the stamens closely clustered over the pistil, the latter being not at all apparent.

This species is most easily confused with *A. consobrinum*, but that species has prominently emergent pistils that emerge well ahead of the stamens and extend several millimeters above the stamens.