

9–21 cm long, 11–27 mm diam. near base, 5–7 mm diam. near apex; flowers 4-lobed, 2.4–2.8 mm long, 2.7–3.2 mm wide, the sides sigmoid; 8–14 flowers visible in principal spiral, 12–20 in alternate spiral; tepals matte, weakly punctate, minutely papillate; lateral tepals 1.5–1.8 mm wide, the inner margins convex; pistils slightly raised, green, tinged with purple in the area of stigma; stigma linear, 0.4–0.6 mm long, droplets appearing 4–5 days before stamens emerge; stamens emerging \pm rapidly from the base, inclined over the pistil; filaments exerted, ca. 0.3 mm long, 0.8 mm wide; anthers orange; thecae ellipsoid, scarcely divaricate; pollen orange, fading to white (B & K yellow 7/2.5). *Infructescence* 20–23 cm long, 3 cm diam., pendent; spathe usually persisting, green; berries pale yellow, greenish at tip, irregularly obovoid, 12–15 mm long, 7–9 mm diam.; mesocarp fleshy, with numerous raphide cells; seeds 2 per berry, pale tan, subglobose, weakly flattened, 5–6.5 mm long, 3.5–4.1 mm diam., ca. 2.5 mm thick, with a sticky appendage at both ends.

Anthurium halmoorei is restricted to western Mexico in the states of Nayarit, Jalisco, and Michoacán in seasonally very dry forests from 450 m to 1,000 m. It usually occurs on rocks on very steep slopes in forested areas.

This species is characterized by its generally oblanceolate or oblanceolate-elliptic blades with usually free-ending primary lateral veins; by its petiole which is acute abaxially; and especially by its ovate to ovate-elliptic spathe, green to purplish spadix, and greenish yellow mature berries.

Anthurium halmoorei is most easily confused with *A. schlechtendalii* subsp. *jimenezii*, which differs in having the petiole subquadrangular and usually flat abaxially, and in having a lanceolate spathe and red berries at maturity. The latter taxon occurs only in Guerrero and southern Oaxaca.

MEXICO: MICHOACÁN: Aguillilla, *McVaugh 24741* (MICH); Coalcomán de Matamoros, *Rzedowski 16707* (ENCB, MICH). NAYARIT: Tepic–Jalcocotán, at Km 15.5, Hwy. 28, 1,000 m, *Croat 45337* (CAS, F, K, MEXU, MICH, MO, SEL, WIS); E of Tepic–Navarrete road, Barranca, NW of Tepic, *Dressler 339* (MO, UC); Jalcocotán, *Gentry & Gilly 10734* (MEXU, US), *McVaugh 12140* (MICH), *Moore & Bunting 8692* (BH); 4 km SE of Pochotitán, 1,000 m, 21°37'N, 104°41'W, *Miller & Téllez 3163* (B, MO); Mirador El Águila, *McVaugh 15281* (MICH); NE of Santa María de Oro, *Feddema 703* (MICH); vic. Tepic, *Bates et al. 1554* (BH), *Dressler 1024* (UC), *Ferris 6816* (DS), *Lewis s.n.* (MICH). JALISCO: Mpo. Jalisco, El Tuito–Puerto Vallarta, *Anderson 6113* (ENCB, MICH); 3 mi. N of El Reflon on road to Tepic, *Norris & Taranto 12645* (CAS, MO); Autlán de Navarro, *McVaugh 10224* (MICH), *Wilbur 2289* (MICH); El Tuito–Puerto Vallarta, *Delgado 359* (MICH), *Hernández*

2608 (MEXU); S of San Pedro, *Koepfen & Iltis 593* (BH); Talpa de Allende, *McVaugh 23408* (MICH).

Anthurium hammelii Croat, Monogr. Syst. Bot.

Missouri Bot. Gard. 14: 109. 1986. TYPE: Panama. Bocas del Toro: 5 km ENE of Cerro Pate Macho, near Finca Serrano, NE of Boquete, 1,675 m, *Hammel 6160* (holotype, MO 2802252). Figures 148, 153.

Description based on dried material only. Epiphytic; stem 1 cm diam.; cataphylls subcoriaceous, 6 cm long, brown, persisting semi-intact; petioles 33–34 cm long, 4 mm diam., apparently subterete; geniculum 1 cm long; blades subcoriaceous, oblong to oblong-elliptic, acuminate at apex (the acumen flat, 15–20 mm long), obtuse at base, 30–31 cm long, 5.5–7 cm wide, broadest at or near middle, the margins weakly undulate; midrib convexly raised above, more prominently so below; primary lateral veins 9–11 per side, departing midrib at 60° angle, arcuate to the collective vein, raised above and below; interprimary veins few, almost as conspicuous as primary lateral veins; tertiary veins prominent above and below; collective vein arising from the base, less prominent than primary lateral veins, 2–4 mm from margin. *Inflorescences* erect, shorter than leaves; peduncle 28 cm long, 3 mm diam., slightly shorter than petiole, terete; spathe subcoriaceous, dark reddish purple, ovate-rounded, 8.5 cm long, 7 cm wide, broadest at or near middle, the apex round and minutely apiculate, the base cordate; stipe 1 cm long in front and back; spadix cream, cylindroid-ellipsoid, 2.1 cm long, 8 mm diam. midway, broadest at the middle; flowers rhombic, 1.5–2.4 mm long, 2–2.5 mm wide; 5–7 flowers visible in principal spiral; lateral tepals 1–1.5 mm wide, the inner margins rounded; pistils not emergent; stamens emerging well above tepals, then retracting to level of tepals, held in tight cluster above pistil; anthers 0.6 mm long, 0.6 mm wide; theca ovoid, scarcely divaricate. *Infructescence* not seen.

Anthurium hammelii is known only from the type collection made in Bocas del Toro, Panama, at 1,675 m in lower montane rainforest.

This species is distinguished by its leaves with the petiole longer than the blade, its oblong-elliptic blades, its large, ovate-rounded spathe, and cylindroid-ellipsoid, cream-colored spadix.

Anthurium hammelii is similar in overall appearance to *A. protensum* subsp. *arcuatum*, which differs in having proportionately shorter petioles, a much narrower spathe, and a more elongate, tapered spadix.

PANAMA. BOCAS DEL TORO: ENE of Cerro Pate Macho, near Finca Serrano, NE of Boquete, 1,675 m, *Hammel 6160* (MO).

Anthurium harlingianum Croat, sp. nov. TYPE:

Ecuador. Napo: between Lago Agrio and Baeza at Río Oyocachi, 1,620 m, 0°20'S, 77°55'W, *Croat 50290* (holotype, MO 2819231-32; isotypes, K, NY, QCA, RSA, USM). Figures 7, 16, 149, 150, 154, 155.

Planta epiphytica; internodia brevia, 3–5(6) cm diam.; cataphyllum lanceolatum unciniforme vel cucullato, persistens semi-intactum; petiolus 4.5–13 cm longus, 7–15 mm diam., adaxile uninervis, abaxile trinervis-quinque-nervis; lamina (32)50–90(150) cm longa, 18–40(60) cm lata, oblongo-oblancea; nervis primariis lateralibus 12–23 utroque. Pedunculus 21–50(100) cm longus, 3–6 mm diam.; spathe lanceolata, viridis usque ad marroninam, 6.5–22(40) cm longa, 1.5–4.5 cm lata; spadix erectus, purpureus pallescens usque ad atrasalmeneus, contractus, 10–25(47) cm longus, 4–7 mm diam. Baccae albae usque ad purpureae, oblongae, 7–8 mm longae.

Epiphytic; stem to 30 cm long; internodes short, 2.5–5(6) cm diam.; roots dense, ascending to spreading, whitish to green-gray, velutinous, to ca. 13 cm long, 3–6 mm diam.; cataphylls lanceolate and hook-shaped or cucullate, less often straight, subcoriaceous, short, to 7 cm long, persisting semi-intact. *Leaves* erect-spreading; petioles 4.5–13 cm long, 7–15 mm diam., D-shaped, obtusely angled with a medial rib adaxially, rounded to 3–5-ribbed abaxially; geniculum paler and moderately thicker than petiole, 1–2.5 cm long; sheath 2–10 cm long; blades coriaceous to subcoriaceous, broadly oblong-oblancea to ± elliptic, acute at apex, shallowly cordate to truncate, rarely acute to narrowly acute at base (usually in younger plants), (32)50–90(150) cm long, 18–40(60) cm wide, broadest above the middle, the margins broadly undulate; upper surface weakly glossy to matte, medium green, lower surface matte, slightly paler; midrib above obtusely raised at base, becoming acutely raised toward the apex, rounded to obtusely angled below; primary lateral veins 12–23 per side, departing midrib at 30–60° angle, ascending straight to the margin, becoming arcuate near the margin, convexly to acutely raised above, convexly raised below, slightly paler than surface above and below; tertiary veins prominulous and darker than surface below; collective vein arising from about the middle of the blade (more often absent), prominulous, 3–10 mm from margin. *Inflorescences* erect-spreading, shorter than leaves; peduncle 21–50(100) cm long, 3–6 mm diam., (2.6)4–6(11)× as long as petiole, green, sometimes tinged red-violet, terete; spathe erect-spreading to recurled, sometimes twisted,

subcoriaceous to coriaceous, green to violet-purple to maroon, lanceolate, 6.5–22(40) cm long, 1.5–4.5 cm wide, inserted at 50–70° angle on peduncle, acuminate at apex, acute at base; spadix dull salmon-pink to pale violet-purple (B & K purple 5/5), rarely greenish, sessile, slightly to moderately tapered, slightly to conspicuously curved, 10–25(47) cm long, ca. 9–10 mm diam. near base, 4–9 mm diam. midway, 2–4 mm diam. near apex, broadest at the base; flowers square to rhombic or 4-lobed, 1.6–2.5 mm long, 1.5–2.4 mm wide, the sides straight to sigmoid; 6–13 flowers visible in principal spiral, (5)8–16 in alternate spiral; tepals matte to weakly glossy, minutely papillate; lateral tepals (0.4)0.8–1.3 mm wide, the outer margins 2–4-sided, the inner margins straight to slightly rounded; pistils scarcely emergent to prominently raised, gray-green to purplish; stigma oblong-ellipsoid to slitlike, 0.3–0.6 mm long, reddish to violet-purple, darker than surrounding pistil; stamens emerging from the base of spadix, in a complete sequence, the laterals preceding the alternates by ca. 13–40 spirals, the 3rd stamen preceding the 4th by ca. 2–9 spirals; anthers yellow-red (B & K yellow-red 8/2.5), 0.4–0.6 mm long, 0.3–0.9 mm wide, inclined over the pistil; thecae broadly ovoid to ovoid-triangular, slightly or not divaricate; pollen creamy white, white when dried, the scent yeasty or like rotting fruit. *Infructescence* pendent; spathe persisting; spadix 16–28 cm long, 1.5–2.5 cm diam.; berries white to violet-red, 7–8 mm long; seeds 1–2 per fruit, oblong, 1.7–3 mm long, 1.3–2 mm wide, 0.8–1.4 mm thick, with a gelatinous appendage at both ends.

Anthurium harlingianum is endemic to the lower eastern slopes of the Colombian and Ecuadorian Andes at 440 to 1,800 m (mostly above 750 m), in areas of tropical wet, premontane wet, and wetter parts of tropical moist forest, where it is almost strictly epiphytic. It occurs in a broad arc from the Serranía de Macarena in Meta Dept. in southern Colombia, to the Province of Zamora-Chinchi in Ecuador. Probably also belonging to the same species are several Peruvian collections from the vicinity of Tingo María in Huánuco, and one each from Junín and Pasco. However, there is room for doubt, since these areas are well out of the normal range, and no collections are known from a large intervening area.

Anthurium harlingianum is distinguished by its generally large size, hook-shaped to cucullate cataphylls, erect-spreading inflorescences, and by its leaves which usually dry dark brown.

Anthurium harlingianum is closely related to