
New Species of Cyclanthaceae from Southern Central America and Northern South America

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ABSTRACT. Four new species of *Asplundia* and one of *Dicranopygium* are described and illustrated. *Asplundia allenii* is endemic to Panama, *D. tatica* is endemic to Costa Rica, *A. brunneistigma* is known from Costa Rica and Panama, *A. ceci* from Costa Rica to northern Colombia, and *A. albicarpa* from Costa Rica to Ecuador. *Asplundia stenophylla*, described originally from Costa Rica from sterile material and now known from Costa Rica to Ecuador, is here provided with a full description including staminate and pistillate flowers, as well as fruits.

Key words: *Asplundia*, Central America, Cyclanthaceae, *Dicranopygium*.

Over the course of the last 20+ years, collecting for the *Flora of Panama*, *Flora Mesoamericana*, and the *Manual de Plantas de Costa Rica* projects, as well as systematic collecting of large-leaved monocots by particular investigators, has given rise to the accumulation of numerous undescribed species of Cyclanthaceae from the region. Principally to make names available for the last-mentioned floristic project, the formal description of these species is here initiated.

All of the species of *Asplundia* Harling, described below, pertain to the subgenus *Asplundia*, characterized by asymmetrical and flat-topped staminate flowers, rather than symmetrical and concave as in subgenus *Choanopsis* (Harling, 1958). Although the great majority of species in subgenus *Asplundia* have leaves that are subtricostate to distinctly tricostate, three of the five species here described are unusual in having essentially unicostate leaves. Their obvious morphological similarity and certain relation to particular tricostate-leaved species is discussed. One species of *Dicranopygium* Harling subg. *Dicranopygium* is described. It is unusual (though not unique) among members of the genus for its very short and broad anthers.

***Asplundia albicarpa* Hammel, sp. nov.** TYPE: Costa Rica. San José: Parque Nacional Braulio Carrillo, Estación Carrillo, 400 m, 28 July 1985 (fl, fr), B. Hammel & J. Trainer 14253 (holotype, MO [2 sheets, MO-5609384 & MO-5609385]; isotypes, COL, CR, GB, INB, PMA, QCNE, US). Figure 1.

Asplundiae stenophyllae affinis sed differt laminis foliorum minoribus profunde bifidis cum segmentis latioribus minoribus profunde plicatis, floribus staminiferis majoribus cum staminibus pluribus et majoribus, floribus pistillatis cum tepalis in fructu longioribus, et stigmatibus in fructu conduplicatis.

Long-stemmed (1–2 m) climbing epiphyte and also often scandent terrestrial plant with conspicuous adventitious roots. Petiole (10–)19–52 cm long, the base dull green or often purple, the epidermis not brittle, with scant brown scales throughout, the sheath a thin, light brown and slightly fibrous soon caducous ribbon, the apex \pm terete. Leaf blades 30–52(–65) cm long, bifid from just over 1/3–2/3 of their length, decurrent on the petiole, unicostate, the lower surface with very scant light brown scales; leaf segments 4–11 cm wide, lanceolate, acuminate, shallowly plicate, the veins of the plicae not adaxially elevated. Peduncle during anthesis ca. 5 cm long, up to 7(–8) cm long in later stages, the epidermis like that of the petiole base. Spathes 3 or 4, the lowest attached below the middle, the others \pm evenly spaced above, the outer ones green to brown or “maroon,” the inner ones white, soon fibrous and caducous. Spadix at anthesis ca. 2.5–4(–5.5) \times 1.5 cm, cylindrical. Staminate flowers ca. 4 mm long, asymmetrical; receptacle ca. 2.5 mm wide, flat; perianth lobes 3 to 5, ca. 1–1.2 mm long, reaching to just above the base of the anthers; stamens ca. 40–50, the anthers 0.8–1 \times 0.5 mm, from conspicuous basal bulbs ca. 0.2 mm long. Pistillate flowers ca. 4 mm wide at anthesis, to ca. 10 mm wide in young fruiting stage; tepals 1–1.5 mm long and connate (at the base) at anthesis, 5–6 mm long and connate in young fruit (in dried mature fruit to 8 mm long and connate below the middle), broadly acute to rounded truncate,

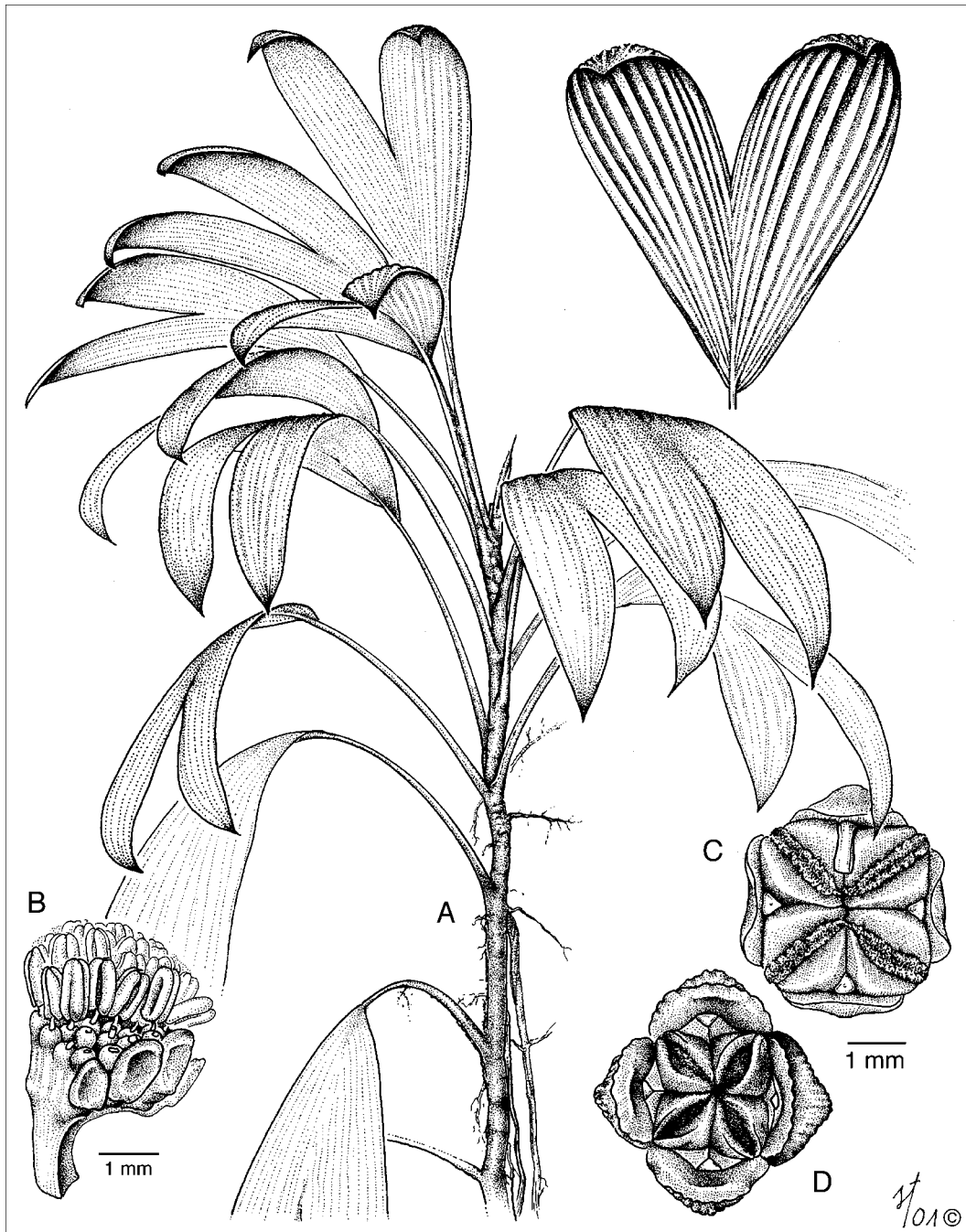


Figure 1. *Asplundia albicarpa* Hammel. —A. Habit with detail of leaf blade (upper right), lower surface. —B. Staminate flower. —C. Pistillate flower at anthesis. —D. Pistillate flower in fruit. (A–C from Hammel & Trainer 14253; D from Croat & Grayum 60250.)

equal to slightly surpassing the stigmas; styles lacking, the stigmas broadly ovoid to nearly quadrate, with the pubescent fertile part surrounded by sterile tissue that becomes conduplicately folded and

turned upward in fruit, wholly surrounded by the tepals. Fruiting spadix 4–7 × 2–2.5 cm, cylindrical; fruits green-white, sometimes tinged purple, the seeds 1–1.3 × 0.6 mm wide, flattened, orange.

Distribution. Very wet primary forest of central Costa Rica to Colombia and Ecuador, 200–1800 m.

Etymology. The epithet of this new species refers to the often greenish white color of the fruiting spadix, a somewhat unusual color for species of *Asplundia*, which are more often yellow-orange or dark green.

Discussion. This new species appears to be closely related to *Asplundia stenophylla*, which has leaves that are deeply and prominently plicate throughout, as well as narrower and more deeply bifid (*A. albicarpa* leaves are usually bifid only to about the middle and deeply plicate only at the base). The staminate flowers in *A. albicarpa* are somewhat larger with usually more and larger stamens, and the pistillate flowers have tepals that become longer and stigmas with a conduplicate folded sterile part in fruit. As indicated by the epithet, the fruits of this species are often white or greenish to yellowish white at maturity, whereas those of *A. stenophylla* appear to remain green or to become greenish yellow. Mature fruits of most Central American species of *Asplundia* known to the author are bright yellow, orange, or dull red at maturity. *Asplundia albicarpa* and *A. stenophylla* sometimes occur more or less sympatrically, as for example in Parque Nacional Braulio Carrillo in Costa Rica, in Chiriquí Province of western Panama, and at La Planada Reserve in southern Colombia.

In size and shape of the leaves, *Asplundia albicarpa* somewhat resembles *A. polymera* (Handel-Mazetti) Harling subsp. *reitzii* Harling of southeastern Brazil. That species, however, has more deeply bifid leaf blades and the stamens are about half as long and half in number, in addition to the pistillate flowers having tepals reduced to low wales.

Additional specimens (fl = flower, fr = fruit, otherwise sterile). COSTA RICA. **Alajuela:** Junto al Río Sarapiquí cerca del puente, camino a Colonia La Virgen del Socorro, Hammel et al. 17743 (CR, INB, MO). **Cartago:** 6 km N of La Suiza on the road to Pacayitas, Solomon 19227 (INB, MO). **Heredia:** Parque Nacional Braulio Carrillo, 8 km E of San Ramón, (fr), Loiselle 115 (MO); Estación El Ceibo, (fr), Aguilar & Hammel 29 (CR, INB, MO), Boyle 3108 (INB); Rara Avis, (fl), Vargas & Frazee 48 (INB); Atlantic slope of Volcán Barba, (fr), Grayum et al. 7776 (CR). **Limón:** N flank of Fila de Matama, (fr), Grayum 10975, 11054 (INB); Parque Nacional Braulio Carrillo, Estación Quebrada Gonzalez a Sendero Botarama, (fr), Hammel et al. 19090 (CR, INB, MO), Hurtado 93 (INB), (fr), A. Rodríguez et al. 1497 (CR, INB, MO), (fl), M. M. Chavarría et al. 206 (CR); Teleferico del Bosque, (fr), Hammel 19941 (INB), Hammel 19942 (CR, INB, MO). **San José:** Parque Nacional Braulio Carrillo, Estación Carrillo, (fr), L. D. Gómez et al. 22912 (MO); sendero La Montura, (fr), Hammel et al. 10839 (CR, INB). PANAMA. **Bocas del Toro:** For-

tuna Dam area, in forest along road to Chiriquí Grande, (fl, fr), Churchill 5532, 5866, 5878 (MO), (fr), Croat & Grayum 60250 (MO), (fr), Hammel & McPherson 14449, 14468 (MO), Hammel et al. 14676, 14693 (MO), (fr), McPherson & Aranda 10056 (MO). **Chiriquí:** along road to Fortuna dam site from Gualaca, (fr), Antonio 5097 (MO, PMA); Quebrada los Chorros, (fr), Churchill & Churchill 6071 (MO), (fr), Churchill & Churchill 6072 (MO, PMA, COL), (fr), Churchill & Churchill 6112, 6146 (MO); vicinity of Fortuna Dam, (fr), Croat 66568 (F, MO, PMA), (fr), Croat 67853 (GB, MO, PMA, US), (fr), Croat & Zhu 76315 (MO, PMA), (fr), Croat & Zhu 76343 (MO), (fr), McPherson 7282 (MO); slope NW of confluence of Río Horninto and Río Chiriquí (fr), Stevens 18350 (MO), (fr), Sytsma & Stevens 2203, 2225 (MO), (fr), van der Werff & van Hardeveld 6653 (MO), (fr), van der Werff & van Hardeveld 6869 (MO); Cerro Colorado mine area, Hammel & Trainer 14926 (MO). **Coclé:** above El Copé (fr), Croat 67507 (MO, PMA); on continental divide above town, Hammel 13648 (MO). **Darién:** Cerro Pirre, (fr), Duke & Elias 13799 (MO); slopes of Cerro Tacarcuna, (fr), Hammel et al. 16535 (MO). **Panamá:** vicinity of Cerro Jefe, (fr), Croat 35912 (MO), Hammel & Trainer 15029 (MO), (fr), Mori 7988 (MO), (fr), Witherspoon et al. 8284 (GB, MO); Cerro Brewster region, (fr), Hammel & de Nevers 13549, 13554 (MO), (fr), McPherson 7573 (MO). **San Blas (Comarca):** Cerro Obu, (fl), de Nevers et al. 8048 (MO), (fl), de Nevers et al. 8072, 8085 (MO). **Veraguas:** vicinity of Escuela Alto Piedra, (fr), Antonio 2965 (MO, F), (fl, fr), Croat 27605, 49018, 66994 (MO), (fr), Hamilton & Krager 3951-A (MO), (fr), Mori et al. 3916 (MO). COLOMBIA. **Chocó:** along road between Bolívar and Quibdó, near km marker 147, (fr), Croat 52095 (MO); Municipio de San José del Palmar, hoyo del Río Torito, (fr), Forero et al. 7335 (MO). **Nariño:** Reserva Natural La Planada, (fr), Benavides 8968 (MO), (fr), Gentry et al. 35176 (MO), (fl), Gentry et al. 55100 (MO). ECUADOR. **Carchi:** Cerro Golondrinas, Boyle et al. 1550, 1764 (MO). **Esmeraldas:** Reserva Etnica Awá, (fr), Aulestia et al. 315 (MO); Mataje village, (fr), Neill et al. 11773 (MO); Quinde, Bilsa Biological Reserve, (fr), Pitman & Bass 794 (MO, QCNE).

Several collections, all from the Chiriquí Province of Panama, have leaves of a length and fruits of a shape more like those of *A. albicarpa*, but width of the leaf segments and depth of the division more like *A. stenophylla*. These possible hybrids between those two species are cited below:

PANAMA. **Chiriquí:** vicinity of Fortuna dam, Croat 66580 (MO, PMA), Croat 67823 (MO), McPherson 7281 (MO).

Another possible hybrid with *A. albicarpa* involves, remarkably, the tricostate species *A. euryspatha* Harling. See also discussion under *A. stenophylla*. A population from near La Suiza, Turrialba, in Costa Rica seems to demonstrate a gradation in leaf and fruit morphology between *A. albicarpa* and *A. euryspatha*; an apparently intermediate specimen is cited below:

COSTA RICA. **Cartago:** de La Suiza de Turrialba rum-

bo a Pacayitas, (fr), *Hammel & Kennedy 21121* (CR, INB, MO).

Asplundia allenii Hammel, sp. nov. TYPE: Panama. Coclé: El Valle de Antón, vicinity Finca Tomás Arias, 600 m, 5 Aug. 1946 (fl & fr), *P. Allen 3623* (holotype, G; isotype, F). Figure 2.

Asplundia sleeperae valde affinis, ob tepalis pistilatis 3-lobatis et forma stigmatum, sed differt laminis foliis formose palmatipartitis (vice simpliciter bipartitis) cum pluribus segmentis veris, non laesione fortuita, et antheris longioribus.

Terrestrial plant, acaulescent or with a short, erect stem up to 50 cm long. Petiole 112–150 cm long, the base dull green in life, drying slightly to conspicuously reddish brown. Leaf blades 61–75 cm long, split at the middle ca. 2/3 their length but overall split into 25–30 divisions that reach up to 3 cm from the base, tricostate, the lateral costae running in the margin at the base, the surface lacking scales; leaf segments 2.5–5 cm wide, linear, narrowly acute to acuminate. Peduncle during anthesis ca. 10 cm long, at least 14 cm long in later stages. Spathes 4, the lowest one attached at about the middle, the others somewhat clustered apically, fibrous and soon caducous. Spadix at anthesis 3 × 1.5 cm, ellipsoid. Staminate flowers ca. 4 mm long, asymmetrical; receptacle 3–4 mm wide, flat; perianth lobes 5 to 7, ca. 1 mm long; stamens 30–40, the anthers 1–1.4 × 0.5 mm, from rather large basal bulbs. Pistillate flowers 3–5 mm wide at anthesis, 6–8 mm wide in young fruiting stage; tepals at anthesis ca. 1 × 2 mm, free, 3-lobed nearly to base, the lobes ca. 3 mm long in fruit, acute, free and shorter than the stigmas; styles ca. 1 mm long, free at anthesis, ca. 2 mm long and connate in the lower 1/2 in young fruit, the stigmas broadly ovate, not flanked by sterile tissue, slightly projecting between the tepals, distinctly grooved in young fruit. Fruiting spadix ca. 5 × 1.5 cm, cylindrical; fruits (immature) greenish white, the seeds ca. 1.5 × 0.8 mm, flattened, orange.

Distribution. This rare species is known from lowland forest (50–270 m) from four sites in middle to eastern Panama. It has been collected fertile only once from the region where it is most common (Río Boquerón and Río Guanche); it is found there in more or less open areas, in sandy soil along rivers and also on slopes in forest.

Etymology. This species is named for Paul H. Allen (1911–1963), longtime resident and botanist of the American tropics, collector of the first known specimen and, to date, the only known flowering collection of the species.

Discussion. Except for the very strikingly palmate-divided leaves with numerous, linear divisions, this species matches *Asplundia sleeperae* Grayum & Hammel quite closely, differing from it in fertile characters principally by the slightly longer anthers (0.7–1.2 mm in *A. sleeperae* vs. 1–1.4 mm in *A. allenii*). *Asplundia sleeperae* is now known from wet forests of Nicaragua to central Panama, from near sea level up to about 1200 m.

By virtue of its similarly 3-lobed pistillate tepals, as well as the shape of the stigmas, the much smaller *A. pittieri* (Woodson) Harling is also obviously related to the present new species. *Asplundia pittieri* is itself unique in the genus for having fruits that do not dehisce at maturity. In all other species known to the author, the stigmas and tepals form a unit that dehisces at the base, leaving the succulent mass of seeds on the spadix rachis. In *A. pittieri* these fruit “caps” remain fused, and the multiple “fruit” (the spadix) becomes engorged and nearly smooth at maturity, releasing the juicy, seed-laden contents more or less explosively when punctured, somewhat similar to species of *Dicranopygium*. *Asplundia pittieri* has a narrowly disjunct distribution, known in Costa Rica only from the wet forests of the southern Pacific slope (especially the Osa Peninsula) and then again in Panama from Coclé, Panamá, and San Blas Provinces. Some material from northwestern Colombia has also been tentatively identified as *A. pittieri* and *A. sleeperae*.

Numerous species of *Asplundia* have been described as having the lateral segments “secondarily split” into numerous lobes (cf. Harling, 1958, 1973), but the wording of descriptions and the dried specimens themselves have left considerable doubt as to whether or not these splits are actual lobes or merely random lacerations by physical damage to very broad-leaved species. Harling, in fact, implied that the latter is the case: “The leaf of the *schizophylla* type is, however, frayed and secondarily deeply cleft into many irregular lobes. Such lobation of old leaf blades is nothing remarkable, but a characteristic feature of many *Asplundia* species” (Harling, 1958: 235). With this new species I mean to leave no doubt: the divisions are developmental, perhaps brought about by differential growth, not lacerations from physical damage to leaves that would otherwise be only bifid. In fact, the identity of the species is dependent, in large part, upon this distinction. In southern Central America only one other species of *Asplundia* has similarly divided leaves, the epiphytic *A. aurantiaca* Harling, most certainly related to *A. dominguenensis* Harling and *A. gamotepala* Harling, all quite

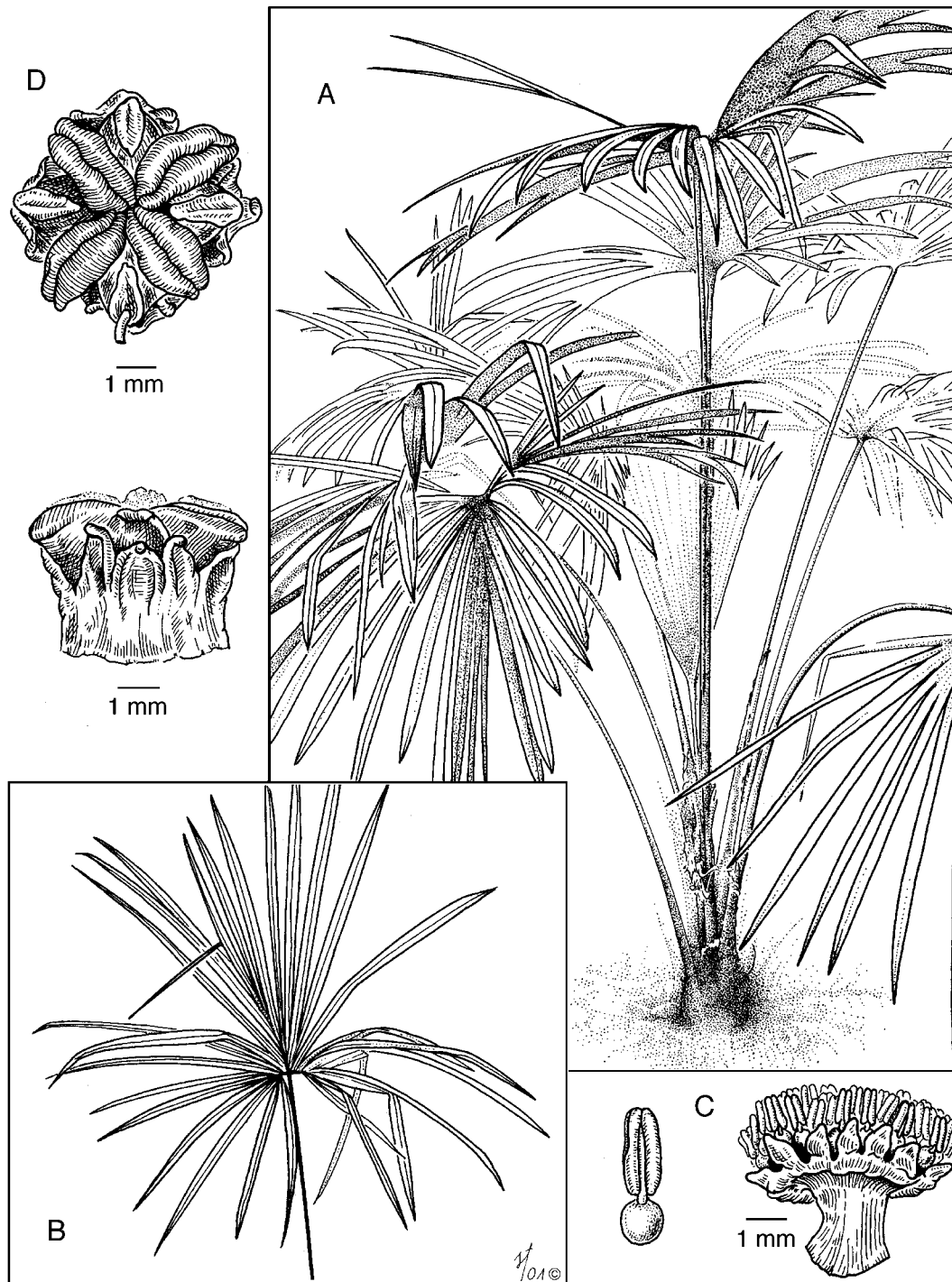


Figure 2. *Asplundia allenii* Hammel. —A. Habit. —B. Detail of leaf blade, lower surface. —C. Staminate flower with detail of stamen. —D. Pistillate flower at anthesis, top view, side view. (A, B from Hammel & Trainer 14773; C, D from Allen 3623.)

distinct from *A. allenii* (see also discussion under *A. cecii*).

Additional specimens. PANAMA. **Colón:** Río Guanche, ca. 5 km upstream from road to Portobello, *Hammel & Trainer 14773* (MO). **Darién:** Parque Nacional del Darién, Estación Rancho Frío, *Hammel et al. 16148* (MO), (fr), *Hammel et al. 16160* (MO). **Panamá:** Río Boquerón, (fr), *Dressler 4696* (GB), *Hammel & Kress 13405* (DUKE), *Hammel 16092* (MO).

***Asplundia brunneistigma* Hammel, sp. nov.**

TYPE: Costa Rica. Heredia: Parque Nacional Braulio Carrillo, primary forest between Río Pejo and Río Sardinalito, 700–800 m, 3 Apr. 1986 (fr), *M. Grayum 6709* (holotype, MO; isotypes, CR, GB, US). Figure 3.

Asplundiae peruviana valde affinis, ob stigmatibus late rotundatis ad aliquantum quadratis, epidermide petiolorum flava et rimosa, et laminis foliorum infra cum squamis brunneis, sed ab ea et speciebus affinibus differt habitu praecipue terrestri, foliis unicastalibus et vadosis bifidis.

Terrestrial or shortly climbing caulescent plant, the stem 1–2(–3) m long. Petiole 25–40 cm long, the base with yellowish tan, shiny and brittle epidermis, elsewhere with brown scales. Leaf blades 40–75 cm long, bifid 1/3–1/2(–2/3) their length, unicastate, narrowly acute to decurrent on the petiole, the surface (especially below along veins) with conspicuous brown scales; leaf segments 6–14 cm wide, broadly lanceolate, shortly acuminate. Peduncle during anthesis ca. 10 cm long, up to 15 cm long in later stages, the base with epidermis like that of the petiole base. Spathes 3 or 4, the lowest one attached below the middle, the others \pm evenly spaced above, their epidermis somewhat shiny and tan as in the petiole bases, but soon fibrous and caducous. Spadix at anthesis 3–5 \times 1.5–2 cm, cylindrical. Staminate flowers 5–7 mm long, asymmetrical; receptacle 3–4 mm wide, flat; perianth lobes 5–7, 1.5–2.5 mm long; stamens 25–35?, the anthers 1.0–1.5 \times 0.5 mm, from conspicuous basal bulbs ca. 0.5 mm long. Pistillate flowers ca. 7 mm wide at anthesis, to ca. 10 mm wide in young fruiting stage; tepals ca. 5 mm long and free to the base at anthesis, 6–7 mm long and free or connate to just above the middle, broadly acute to rounded, about the same height as the stigmas in young fruit; styles ca. 3 mm long and free at anthesis, ca. 7 mm long and connate to just above the middle in young fruit, the stigmas broadly ovate, wholly surrounded by the tepals, the sterile part conduplicately folded and turned upward, above the conspicuously reddish brown sulcus. Fruiting spadix 5–8 \times 2.5 cm, cylindrical; fruits orange, the seeds 1–1.2 mm long, 0.5 mm wide, flattened, orange.

Distribution. *Asplundia brunneistigma* is known only from mid-elevation (400–1000 m), very wet, primary forests of central Costa Rica to central Panama.

Etymology. The epithet “*brunneistigma*” refers to the brown fertile tissue (contrasting with the green sterile tissue) of the stigmas as seen in live material. Although that may not be particularly distinctive among *Asplundia* species, when I was first collecting these plants it seemed so and the name has stuck.

Discussion. *Asplundia brunneistigma* is easy to distinguish by its relatively long-stemmed, usually terrestrial to sometimes climbing habit, and the narrow, shallowly divided, unicastate leaves with yellow, cracking epidermis throughout the petiole bases. Although this species might seem to resemble *A. guianensis* Harling, as per Harling’s key (1958), examination of type material suggests otherwise. *Asplundia guianensis* does have a petiole with scant patches of shiny yellow and brittle epidermis, but it is otherwise quite unlike the present species (see discussion under *A. cecii*). Especially the structure of the stigmas in *A. guianensis*, being somewhat laterally flattened and without surrounding sterile tissue, is very unlike that of *A. brunneistigma*, which instead needs to be compared with *A. peruviana* Harling, *A. krukoffii* Harling, *A. venezuelensis* Harling, and *A. xiphophylla* Harling. All of these have the very same petiolar epidermis, bright yellow and cracking throughout (even in the sheath), brown scales abundant on the lower leaf surface and often also on the petiole and sheaths, as well as stigmas that are quadrate to broadly rounded, rather than laterally flattened at anthesis. From all, *A. brunneistigma* is distinct by the less deeply divided and always strictly unicastate leaf blades, as well as by its usually terrestrial (though long-stemmed) habit.

Asplundia brunneistigma is regularly infected by a gall-producing fly in the family Cecidomyiidae (Diptera). Their bright orange larvae, which affect the aerial roots, give rise to conspicuous globular galls (to ca. 1.5 cm), not seen on other Cyclanthaceae nearby. This and similar galls on the petioles of *A. euryspatha* are the only known records of galls on Cyclanthaceae (Paul Hanson, pers. comm.). Most of the fertile material known for this species is in fruit; the scant flowering material available is old, and thus it is difficult to determine the number of stamens.

Additional specimens. COSTA RICA. **Heredia:** Parque Nacional Braulio Carrillo, puesto el Ceibo, *Boyle 2883* (CR, INB, MO), *Boyle 3034* (INB, MO); between Río Pejo and Río Sardinalito, (fr), *Grayum & G. Herrera 7907* (CR,

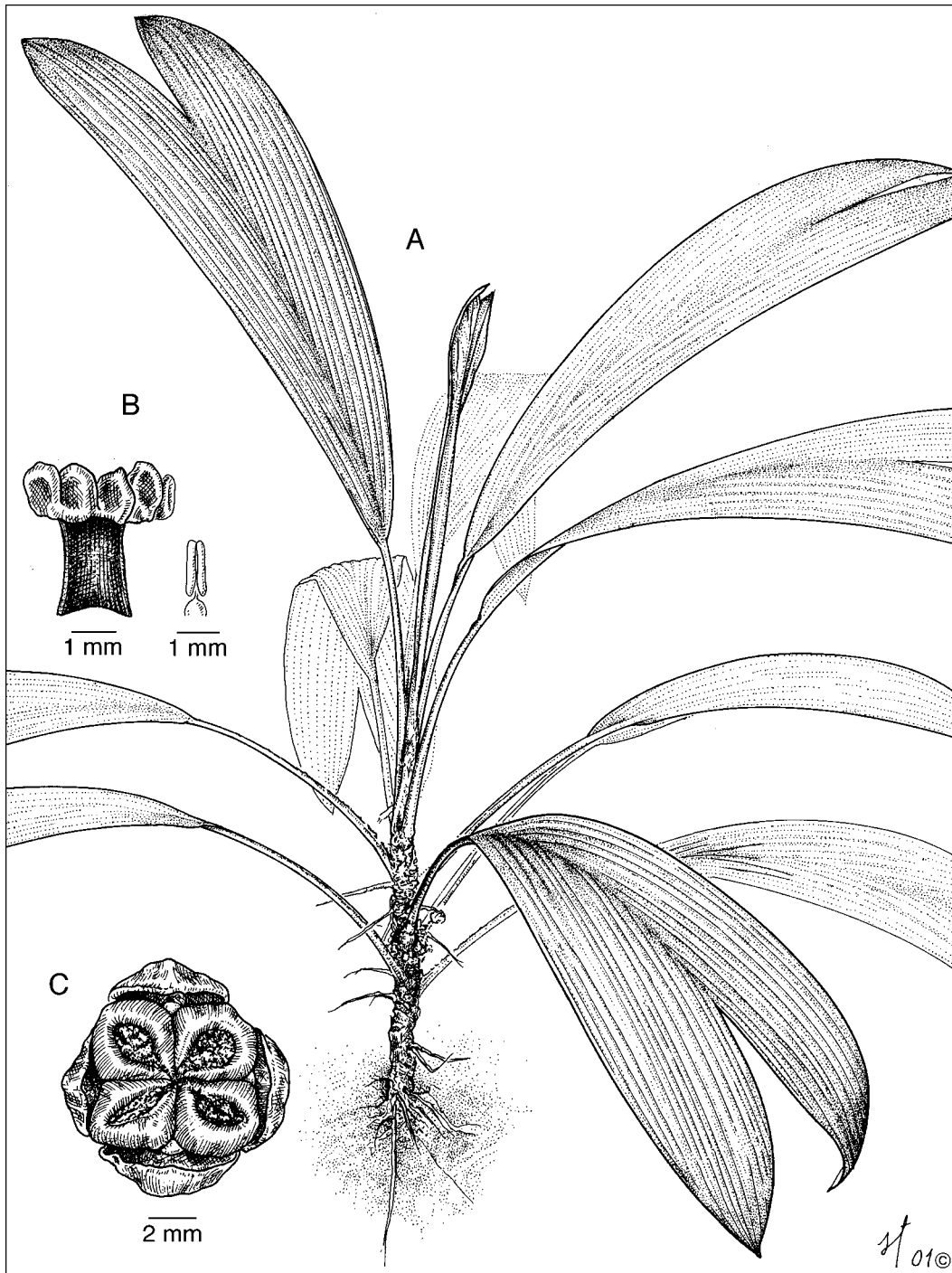


Figure 3. *Asplundia brunneistigma* Hammel. —A. Habit. —B. Staminate flower (stamens fallen) with detail of stamen. —C. Pistillate flower, young fruiting stage. (A from Hammel 22380; B, C from Hammel & Kress 13639.)

MO, F); SW of Horquetas on road to Plástico (Raras Avis), *Hammel 16710* (CR, INB). **Limón:** Quebrada Molinete, propiedad de Rainforest Aerial Tramway, (fr), *Hammel & Perry 19726* (CR, MO), (fr), *Hammel 19945* (CR, INB, MO), *Hammel 22380* (INB). PANAMA. **Coelé:** near continental divide above El Copé, (fr), *Hammel 1060* (MO), (fl, fr), *Hammel & Kress 11335, 13444, 13462* (DUKE), (fr), *Hammel & Kress 13447, 13639* (DUKE, MO). **Colón:** Santa Rita ridge, *Hammel et al. 14381* (MO). **Panamá:** Cerro Jefe, trail from end of road past Los Altos de Pacora, (fl), *Hammel & de Nevers 13572* (MO, PMA); in *Clusia* and *Colpotherinax* forest near radio tower, (fr), *Hammel & Trainer 15030* (MO).

Asplundia ceci Hammel, sp. nov. TYPE: Costa Rica. San José: Parque Nacional Braulio Carrillo, Estación Carrillo, 600 m, 28 July 1985 (fl & fr), *B. Hammel & J. Trainer 14260* (holotype, MO; isotypes, COL, CR, GB, PMA, US). Figure 4.

Asplundia sanctae-ritae et aliis speciebus valde affinis, ob floribus pistillatis dense crebris, stigmatibus lateraliter complanatis, et squamis badiis basium petiolorum, sed ab iis differt laminis foliorum parvioribus convexis, profundioribus bipartitis, cum costis lateralibus debilibus marginalibus, et praecipue pedunculo et infructescentia brevioribus.

Profusely branching and climbing plant (liana) or rarely terrestrial, the stem to 15 m or longer. Petiole 25–40 cm long, the base dull, not cracking, reddish brown (with dense scales), elsewhere with scattered reddish brown scales. Leaf blades 25–50 cm long, bifid 3/4–4/5 of their length, subtricostate, the lateral costae in the margin, broadly acute to the base, the surface (especially below along veins) with scant reddish brown scales; leaf segments 6–10 cm wide, elliptic to oblanceolate, markedly convex above and cuspidate. Peduncle during anthesis ca. 3 cm long, 4–5(–6) cm long in fruit, also with reddish brown scales. Spathes mostly 4, \pm evenly spaced above the middle, dark reddish brown, rigidly fibrous to almost woody, tardily caducous. Spadix at anthesis ca. 3–4 \times 1.5 cm, ellipsoidal. Staminate flowers ca. 5 mm long, asymmetrical; receptacle 2.5–3 mm wide, flat; perianth lobes 4 to 6, 0.8–1.2 mm long; stamens 30–35, the anthers 1–1.4 mm long, from small basal bulbs ca. 0.2 mm long. Pistillate flowers ca. 4 mm wide at anthesis, 7–9 mm wide in fruit; tepals ca. 2 mm long and free to the base at anthesis, 2.5–3 mm long and connate to just above the middle, broadly rounded to truncate and sometimes emarginate, same height as or slightly lower than the stigmas in fruit; styles ca. 2 mm long and fused at anthesis, 2.5–3 mm long in fruit, the stigmas narrowly elliptic, laterally compressed, slightly projecting between the tepals at anthesis, later laterally swollen with the fertile

part protruding. Fruiting spadix 4–6 \times 1.5–2.5 cm, ellipsoid; fruits green, the seeds 1–1.7 mm long, 0.6–0.7 mm wide, flattened, orange.

Distribution. This somewhat rare species is known from scattered localities in very wet, mid-elevation (500–900 m) primary forests from central Costa Rica to northwestern Colombia.

Etymology. I am pleased to honor Cecilia (“Ceci”) Herrera Chacón by naming this species after her. She came to us for an interview for the position of assistant to the Manual Project back in 1987, at the suggestion of her cousin, renowned Costa Rican plantsman, Gerardo Herrera. She has been with us, loyal, hard-working, and consistent, ever since. Thank you, Ceci. The epithet “ceci” is used as a noun in apposition with no Latin termination, as sanctioned by the *Saint Louis Code*, Article 23.1 (Greuter et al., 2000), and therefore not to be corrected (Art. 60.11).

Discussion. This copiously branching climber is easily recognized by its dark reddish brown stems, petiole bases, and spathes, and its small indistinctly subtricostate leaves, which, in life, are distinctly domed (convex), with the margin and tip curved down. With respect to the reddish brown stems and characters of the inflorescences (fibrous and leathery spathes) and flowers (especially the somewhat laterally compressed stigmas), among Costa Rican species it is most similar (and probably related) to *A. aurantiaca* and *A. sanctae-ritae* Galeano & Bernal. From those two, as well as from other related South American species, *Asplundia ceci* is distinct for its relatively small leaves with the lateral costae weakly developed and entirely in the margin, high climbing habit, and for the short peduncles and fruiting spadices. Overall this species looks most like *A. guianensis*, which also is said to be a rather high-climbing (to 7 m) liana. This latter species has similarly but even more weakly subtricostate leaves, traces of the reddish brown scales on various structures, and very similar pistillate flowers. The new species differs from *A. guianensis* by its somewhat smaller leaf blades with more widely divergent divisions, the shorter peduncles, and by the pistillate tepals being slightly shorter than, rather than surpassing, the stigmas in fruit. The spathe(s) of *A. guianensis* was said by the collector to be “whitish” while those of *A. ceci* are reddish brown. *Asplundia cabererae* Harling and *A. gamotepala* Harling may also share relationship by virtue of the reddish brown scales and the structure of the pistillate flowers, but both have much larger leaves, and longer peduncles (30–35 cm in the latter species). *Asplundia cabererae* also differs from *A.*

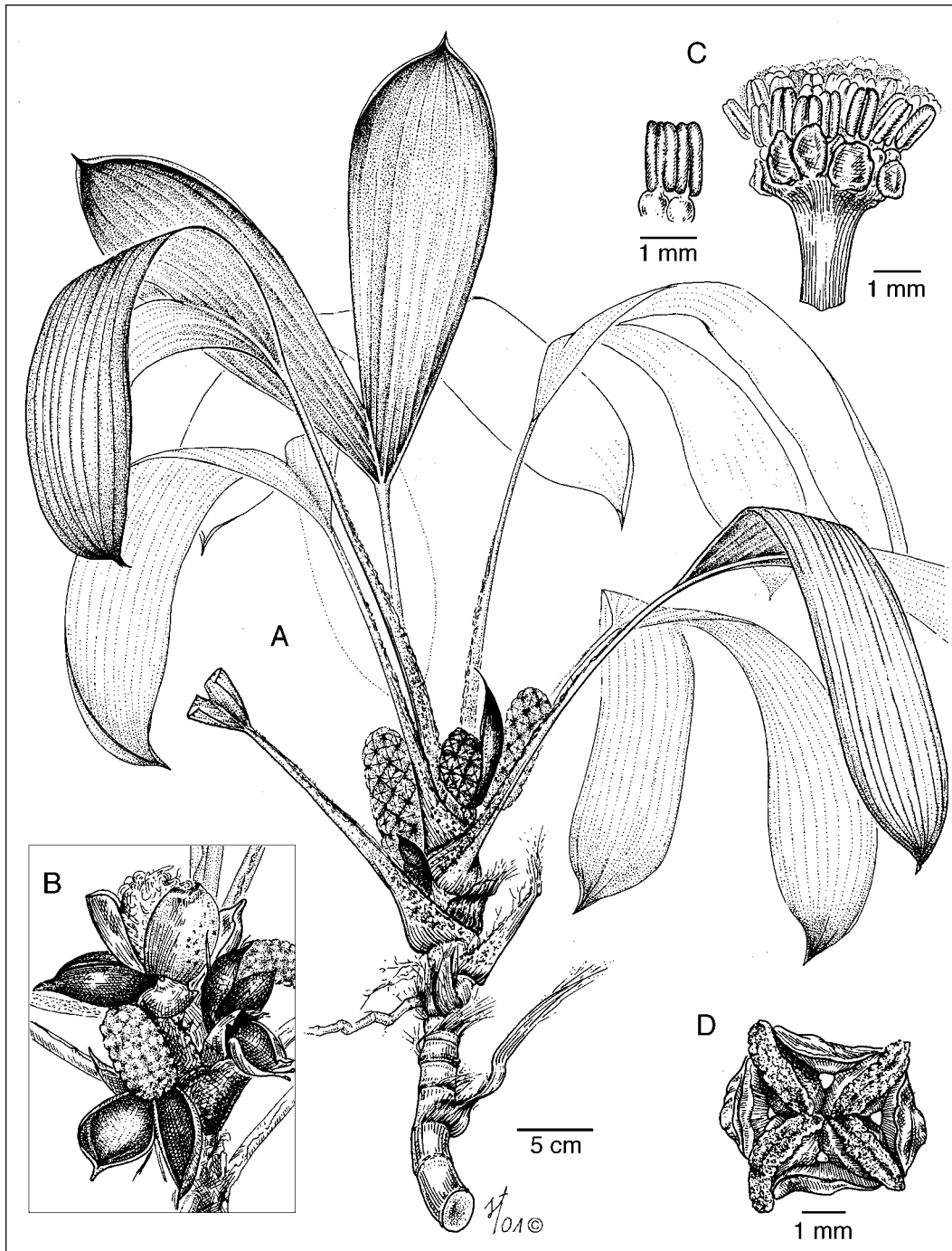


Figure 4. *Asplundia ceci* Hammel. —A. Habit. —B. Detail of inflorescences with spathes. —C. Staminate flower with detail of stamens. —D. Pistillate flower at anthesis. (All from Hammel 22378.)

ceci by virtue of the tepals of the pistillate flowers being free even in fruiting material. In summary, by reason of the reddish brown petiole bases and the structure of the pistillate flowers, *A. brunneis-*

tigma is most similar to *A. cabreræ*, *A. gamotepala*, *A. guianensis*, *A. pycnantha*, and *A. sanctæ-ritæ*, but differs from all of them by its much smaller and more deeply divided leaves with weak lateral costae

(wholly in the margin), as well as by the much shorter peduncle and infructescence. In addition, it can be separated from *A. pycnantha* by the fused styles, from *A. cabreræ* by the fused tepals, and from *A. guianensis* by the stigmas surpassing the tepals.

Additional specimens. COSTA RICA. **Heredia:** Parque Nacional Braulio Carrillo, puesto el Ceibo, *Boyle 2908* (INB, MO); between Río Peje and Río Sardinalito, (fl, fr), *Grayum 6697* (CR, F, MO, GB, US); Horquetas to Finca Plástico, (fl, fr), *Hammel & Robles 16692* (CR). **Limón:** Quebrada Molinete, propiedad de Rainforest Aerial Tramway, (fl, fr), *Hammel 22378* (INB); Parque Nacional Braulio Carrillo, Sendero Botarrama, (fl, fr), *Hammel 19082* (CR, INB), (fr), *Hammel & Troys 19953* (CR, INB, MO), *Lepiz 178* (INB); Río Sukút por el Río Urén, (fl), *Hammel et al. 17593* (CR, INB). **San José:** Parque Nacional Braulio Carrillo, Estación Carrillo, (fl, fr), *Hammel & Trainer 14250* (CR, F, MO, K), (fl, fr), *Hammel & Chacón 16053* (CR, MO). PANAMA. **Coclé:** El Valle de Antón, vicinity of La Mesa, (fl, fr), *Croat 67243* (MO, PMA, CAS). COLOMBIA. **Antioquia:** Municipio de San Luis, por la autopista Medellín–Bogotá, quebrada “La Mariola,” (fr), *Cogollo et al. 4947* (MO, JAUM), (fl), *Hoya & Hernandez 975* (MO, JAUM).

Because fertile material of *Asplundia stenophylla* has never been described, and because one of the new species here proposed (*A. albicarpa*) appears to be closely related to it, I here provide a complete description based on the abundant fertile material now known.

Asplundia stenophylla (Standley) Harling, Acta Horti Berg. 17: 43. 1954. *Carludovica stenophylla* Standley, Publ. Field Mus. Nat. Hist. Bot. Ser. 18: 130. 1937. TYPE: Costa Rica. Cartago: El Muñeco, *Standley 33829* (holotype, US).

Long-stemmed (up to 5 m) climbing epiphyte, or rarely terrestrial plant. Petiole 20–44 cm long, the base dull green or often purple, the epidermis not brittle, sometimes with scant brown scales throughout, the apex deeply grooved. Leaf blades (44–)50–77 cm long, bifid from 5/6–9/10 of their length, decurrent on the petiole, unicostate to faintly subtricostate, the lateral costae well in from the margin; leaf segments 2.5–6 cm wide, linear, long acuminate, deeply and permanently plicate throughout, the veins of the plicae adaxially raised. Peduncle during anthesis 4–7 cm long, up to 11 cm long in later stages. Spathes 3 or 4, the lowermost at about the middle, the others \pm clustered above, cream-colored, turning brown and soon caducous. Spadix at anthesis 3–4.5 \times 1–1.5 cm, cylindrical. Staminate flowers 3–3.5 mm long, asymmetrical; receptacle 2.5–3 mm wide, flat; perianth lobes 3–5, 0.5–1.1 mm long, reaching to the base of the anthers

or just above; stamens 30–42, the anthers 0.5–1 mm long, ca. 0.5 mm wide, from basal bulbs ca. 0.2 mm long. Pistillate flowers 4–5 mm wide at anthesis, to 11 mm wide in young fruiting stage; tepals 2–2.5 mm long and connate (at the base) at anthesis, 3.5–4 mm long and connate in young fruit (in mature fruit no longer, and connate to above the middle), acute to broadly so at anthesis, rounded truncate in later stages, equal to or slightly exceeded by (in later stages) the stigmas; styles essentially lacking (1 mm long at most), the stigmas broadly elliptic to ovoid quadrate with the pubescent fertile part flanked by sterile tissue that is only slightly raised in later stages, slightly protruding between the tepals or surrounded by (in later stages) the tepals. Fruiting spadix 5–9(–12 fide *Murphy 1172*) \times 1.5–3.5 cm, cylindrical; fruits green, sometimes tinged purple or brown, the seeds 1.2–1.5 mm long, 0.6–0.7 mm wide, flattened, orange.

Distribution. This species is quite common in very wet cloud forest from 1300 to 2200 m from Costa Rica to Ecuador.

Discussion. *Asplundia stenophylla*, until now described from only sterile material and distinctive because of its long, narrow, very deeply divided and deeply corrugated leaves, belongs to the subgenus *Asplundia*, where it appears to be closely related to *A. albicarpa*, described herein. It appears to be further distinct from *A. albicarpa* by virtue of its petioles being deeply grooved all the way to its apex, whereas those of the latter are nearly terete at the apex. *Asplundia stenophylla* is a perplexing species because in spite of having very narrow leaf blades, they are often indistinctly subtricostate, a situation usually found only in much broader-leaved species.

Specimens examined. COSTA RICA. **Alajuela:** Monte Verde Reserve, E slope of Cerros Centinelas, (fr), *Grayum 5366* (MO); 15 km NW of San Ramón, Cerro Azahar, (fr), *Liesner et al. 15586* (MO). **Cartago:** ca. 1–2 km above El Muñeco, (fl), *Luteyn 3235* (DUKE). **Limón:** Cordillera de Talamanca, Río Siní, (fr), *Davidse & Herrera 29111* (MO); Alto Lari, (fl), *Herrera 5197* (MO). **Puntarenas:** Cordillera de Talamanca, between Cerro Frantzius and Cerro Pittier, (fr), *Davidse et al. 28410* (MO); Río Bella Vista, NW of Las Alturas, (fl), *Davidse 24342* (MO); Monte Verde Reserve, Cerros Centinelas, (fr), *Grayum & Sleeper 3850* (MO); Sendero Pantanoso, (fr), *Haber ex Bello 5203* (MO); Sendero Río, (fl), *Hammel & Trainer 13783* (MO); Sendero Nuboso, (fl, fr), *Hammel 13854* (MO); Sendero Brillante, (fl), *Hammel & Zuchowski 13888* (MO); Las Alturas, (fr), *Murphy 1172* (DUKE, MO). **San José:** about 5 km NE of San Isidro de Heredia, (fl), *John & Kathy Utley 5081* (DUKE). PANAMA. **Bocas del Toro:** Cerro Colorado mine area, (fl), *Hammel & Trainer 14902* (MO). **Chiriquí:** Cerro Horqueta, (fr), *Blum & Dwyer 2669* (MO); near Cerro Pate Macho NE of Boquete, *Hammel et al. 11395* (MO); Boquete, Palo Alto area, (fl), *Hammel et al. 14388* (MO);

Finca Ojo de Agua, (fl), *Knapp 1589* (MO); Boquete, Cerro Horqueta, (fr), *Dwyer & Hayden 7729* (MO); Distr. Bugaba, Santa Clara, Hartmann's Finca, (fl), *van der Werff & Herrera 7125* (MO). COLOMBIA. **Nariño**: Reserva Natural La Planada, (fr), *Benavides 8918* (MO), *Hammel & Bernal 15800* (MO). ECUADOR. **El Oro**: Montaña Schicay, near Cachicarán, (fr), *Steyermark 54116* (F). **Pichincha**: Canton Quito, Chiriboga, carretera vieja Quito–Sto. Domingo, (fr), *Cerón & Iguago 8515* (MO), (fr), *Hammel & Trainer 15812* (MO), Santo Domingo to Quito, Tandapi, (fr), *Hammel & Trainer 15892* (MO); Reserva Orquideológica El Pahumma, (fl), *Suin et al. 397* (MO).

At several sites in Costa Rica this species appears to grade into something with very broad, conspicuously tricostate leaves. In these areas, fertile individuals of typical *A. stenophylla* can be easily found, but also common are fertile individuals, intermediate between that and distinctly tricostate, broad-leaved individuals. On close examination, the intermediately broad-leaved individuals are slightly different (mostly in terms of the staminate flowers) from both *A. stenophylla* and what appears to be the other parent (*A. euryspatha*) in a complex hybrid zone. Collections of the narrower-leaved, but distinctly tricostate, intermediate forms are cited here below and will be labeled “*A. stenophylla* prob. X *A. euryspatha*.”

Although cytology has been helpful in suspected cases of hybridity, e.g., in ferns and grasses, and one might suggest such a line of inquiry to pursue further these cases in *Asplundia*, my own attempts to get chromosome counts for Cyrtanthaceae have led only to frustration. It is not for lack of trying that the family is still very poorly known cytologically (see, e.g., Eriksson, 1995). Presently, so little is known that nothing can be said even about possible chromosome evolution at the generic level, let alone comparisons be made between species suspected of hybridization.

Probable hybrids with *A. euryspatha*. COSTA RICA. **Cartago**: Tapantí, tributary of Quebrada Casa Blanca, (fr), *Grayum 3612* (MO); between Paraíso and Turrialba, (fr), *Solomon 19206* (CR, MO); Cantón de El Guarco, Carretera Interamericana, entre Cangreja y Casamata, *Hammel 19811* (INB). **Heredia**: Parque Nacional Braulio Carrillo, Puesto El Ceibo, *Boyle 1381* (CR, MO). **Puntarenas**: Monte Verde, along Río Guacimal below lechería, (fl, fr), *Hammel & Trainer 13799* (CR, F, GB, MO, US); sendero brillante, (fr), *Hammel & Zuchowski 13889* (MO). **San José**: Cantón de Pérez Zeledón, km marker 105–116 Carretera Interamericana, (fr), *Hammel 18557* (CR, MO); km marker 117, 1750 m, (fr), *Hammel 19835* (CR, INB).

Dicranopygium tatica Hammel, sp. nov. TYPE: Costa Rica. Limón: Río Bananito, along small stream on Selva Bananito Lodge property, 300 m, 24 Mar. 2001 (fl & fr), *B. Hammel & J. F. Morales 22357* (holotype, INB; isotypes, COL, CR, MO). Figure 5.

Dicranopygium venezuelano similis, ob antheris parvis plus minusve sessilibus connectivis late triangularis insidentibus, sed differt floribus staminiferis asymmetricis cum tepalis et staminibus paucioribus, et segmentis foliorum multo angustioribus.

Short-stemmed terrestrial plant, often on rock cliffs along streams and in forest. Petiole 20–57 cm long, the base often dull purple, the sheaths falling \pm entire, not as fibers. Leaf blades 35–53 cm long, bifid to about 4/5 of their length, uncostate; leaf segments 1.5–2.5 cm wide, linear, long acuminate, deeply and closely plicate with ca. 5 ridges per cm (dried material). Peduncle during anthesis 10–13 cm long, up to 22 cm long in later stages. Spathes 3, 4–6.5 cm long, long acuminate, tinged dull purple. Spadix at anthesis 1–1.5 \times 0.8–1 cm, ovoid elliptic. Staminate flowers ca. 2 mm long, asymmetrical; receptacle 2 mm wide, flat; perianth lobes 5, 0.5–0.6 mm long, reaching to about the middle of the anthers; stamens 11–14, the anthers 0.5–0.8 mm long and about as wide, essentially without basal bulbs but the connective broadly triangular from about the middle down. Pistillate flowers ca. 2.5 mm wide at anthesis, 4–4.5 mm wide in young fruiting stage, the tepals ca. 1 mm long, free at the base at anthesis, ca. 2 mm long and free in young fruit, truncate, equal to the stigmas in height; styles ca. 0.5 mm long, the stigmas broadly ovate elliptic to rounded, wholly surrounded by the tepals. Mature fruiting spadix not known, but judging from the immature ones more than 2 cm long and ca. 1.5 cm wide, ovoid to cylindrical.

Distribution. So far this species is known only from the Caribbean lowlands of Costa Rica from the two nearby watersheds of Río Barbilla and Río Bananito at about 200–700 m elevation.

Etymology. *Tatica* is one of the many nicknames by which one of this species' early collectors, Gerardo Herrera, is fondly known among his colleagues and friends. Gerardo, who was also one of the Manual Project's early collectors, is renowned among those who know his collections, and is the stuff of legend among those who have been in the field with him. The epithet “*tatica*” is used as a noun in apposition.

Discussion. *Dicranopygium tatica* is unusual among congeners of southern Central America, not only for the long, linear leaf segments, but also for its very small anthers with basally broadened connectives. By way of the anther size, shape, and number, as well as characters of the pistillate flowers, the species seems to be related to *D. venezuelanum* Harling even though that species has symmetrical staminate flowers (with perianth lobes on

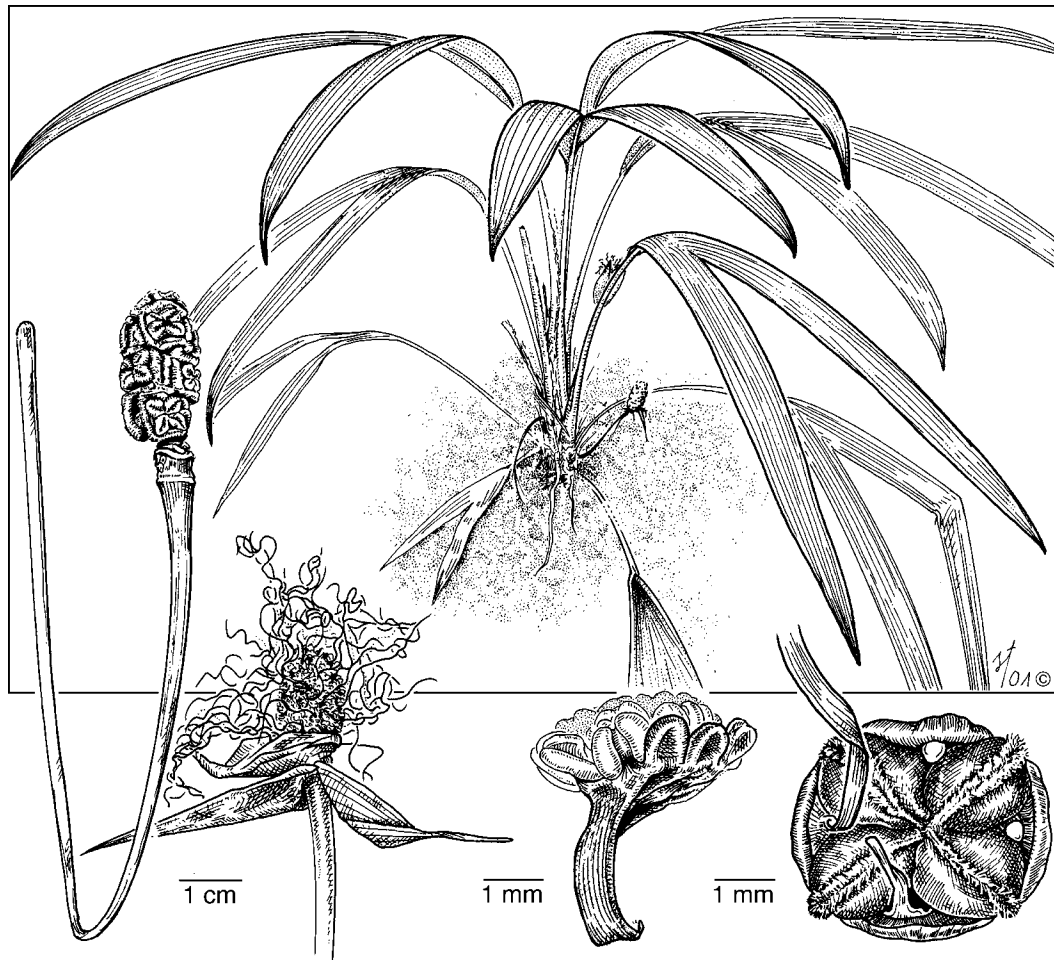


Figure 5. *Dicranopygium tatica* Hammel. Habit (in frame). Details, left to right: infructescence; inflorescence; staminate flower; pistillate flower (at anthesis). (All from Hammel 22357.)

all sides of the receptacle). The only other species, at least in Central America, with similar anthers is *D. harlingii*, which, however, has minute, nearly invisible staminate perianth lobes and only 5 to 8 stamens. The present new species is strikingly different vegetatively, for its long and narrow leaf segments, from all others with anthers of similar size and shape, and different also in details of the flowers.

Additional specimens. COSTA RICA. **Limón:** Cordillera de Talamanca, Río Barbilla, (fr), *Herrera et al.* 2298 (CR, MO); ridge between Río Dantas and Río Barbilla, (fl bud), *Grayum et al.* 8942 (MO).

Acknowledgments. This work was supported, in part, by funds from the National Science Founda-

tion through a grant (DEB-9300814) to the author and co-PI M. H. Grayum for the Manual de Plantas de Costa Rica project. I thank Silvia Troyo for her beautifully rendered line drawings.

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