Cuban novelties in the genus Alsophila (Cyatheaceae)

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Abstract


Three new interspecific hybrids of Alsophila have been detected in Cuba: A. ×boytelii in the Sierra Maestra range, E Cuba; A. ×medinae in the Trinidad Mountains, Central Cuba; and A. ×fagildei in the Guantánamo province, E Cuba. They have spores of normal appearance and might therefore well be fertile, as suggested by the presence, in the Gran Piedra area, of a large population of A. ×boytelii; a full range of intermediates linking this hybrid with its parent species suggests the occurrence of backcrossing.

Introduction

Hybridisation is common in the tree fern family and has been reported many times (e.g. by Conant 1975, Knobloch 1975, 1976, 1986, 1995, Knobloch & al. 1984). Crossing between species often takes place in disturbed ecosystems but occurs in virgin forests, too (Conant 1975).

In order to prepare the Cyatheaceae account for the “Flora de la República de Cuba”, three new interspecific hybrids of Alsophila R. Br., recently detected, have to be described. Remarkably, all have spores of normal appearance and might therefore well be fertile. Their main morphological features, as compared with those of their presumed parent species, are summarised in Table 1, which also provides the Latin diagnoses needed to validate the names of the new taxa.

Alsophila ×fagildei Caluff & Shelton, nothosp. nova – Holotype: Caluff & Fagilde 2090 A-D (BSC). – Table 1.

[Alsophila minor (D. C. Eaton) R. M. Tryon × A. woodwardioides (Kaulf.) Conant].

Trunk erect, 0.3-1 m tall and 3-7 cm in diameter, stoloniferous at the base and occasionally producing adventitious buds, covered with persistent petiole bases and spines. Leaves 8-10, bipinnate-pinnatifid to bipinnate-pinnatisect; petiole 5-10(-40) cm long and 13-15 mm wide at the base, subcylindrical, brown to blackish purple, with 2-3 mm long spines, dull to shiny, scurfy to
### Table 1. Synopsis diagnóstica nothospecierum novarum generis Alsophilae earumque progenitorum.

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<td>0.5</td>
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<td>gradualis</td>
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<td>abrupta</td>
<td>desunt</td>
<td>ovato-lanceolatus</td>
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<td>≤ 0.4</td>
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<td>abrupta</td>
<td>desunt</td>
<td>ovato-lanceolatus</td>
<td>abrupta</td>
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<td>2-4</td>
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<tr>
<td>A. × medinae</td>
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<td>12</td>
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<td>abrupta</td>
<td>desunt</td>
<td>ovato-lanceolatus</td>
<td>abrupta</td>
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<td>20-30</td>
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<td>20-30</td>
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<td>desunt</td>
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<td>abrupta</td>
<td>30-50</td>
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<td>2-4</td>
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smooth, beset towards the base and in the adaxial furrow with linear, brown scales of 7-15 × 0.5-1 mm with paler and erose margin, sometimes also with some small curled hairs; blade with geniculate, “drop-type” vernation, 1.52-1.95 × 0.46-0.66 m, obovate-lanceolate, chartaceous to coriaceous, sometimes abruptly reduced below the apex, acuminate, truncate at the base when long-petiolate, or gradually narrowed into a base consisting of skeletal pinnae; rachis resembling the petiole in colour and indumentum, the adaxial furrow with linear to lanceolate, bicoloured scales, distally pubescent with rusty, translucid, flexuous hairs; pinnae alternate, perpendicular to the rachis or slightly oblique, in 35-45 pairs, oblong-lanceolate to ovate-lanceolate, short-acuminate, the basal ones 2-8 × 1.5-2.5 cm, occasionally with a 3-5 mm long petiolule, the middle ones sessile, 23-33 × 4-9 cm; costae brown to blackish purple, with one axillary, prominent and dark pneumathophore, scurfy, with crested, “acaroid” squamules and flat linear-lanceolate, bicoloured, dark centred scales up to 1 × 0.2 mm, medially pubescent with 0.5-0.8 mm long curled hairs and filamentous, whitish scales with one to several dark setae, distally beset with rigid but subflexuous, 0.8-1 mm long whitish hairs; pinnules in 30-41 pairs, 2.3-4.5 × 0.35-1.2 cm, varying from linear-spathulate, subentire to crenulate and obtuse to lanceolate-lobulate, short-acuminate and acute, the proximal with up to 1 mm long petiolule, the others sessile; costules with or without axillary pneumathophores, basally with flattened, bicoloured scales, medially with flattened and bulliform, whitish squamules, one to several dark setae and distally predominant, rigid, pluricellular uniseriate hairs, but glabrous adaxially; segments in 5-12 pairs, 2.5 × 1.5-3 mm, variably oblong, sometimes all reduced to mere lobe or creations but generally the basal pair larger, overlapping the costae, the following several pairs reduced and rounded, the next several pairs gradually enlarged, then again decreasing and eventually confluent in the acuminate pinnula apex, all rounded to subacute and with a usually revolute, entire to crenulate margin; segment midvein with bulliform, whitish scales, proximally sometimes with “acaroid squamules”, distally with rigid hairs, but glabrous adaxially; lateral veins in 2-6 pairs per segment, once or twice forked, glabrous or with rigid hairs and antrorse, fulvous to whitish glandular hairs, always glabrous adaxially; surface olivaceous to pale brown and glabrous above, brown to dark, with trichomidia and sometimes with rigid hairs brown underneath. Sori 1-2(-3) per segment, of unequal size in the same pinnule, those of proximal segments oval, 1.7 × 1.4 mm, those of distal ones solitary, 0.8-1 mm in diameter; receptacles either single, very wide, or a tightly united unequal pair, respectively 1.3-1.5 mm and 0.8-1.2 mm long; indusium cyathiform to urceolate, light brown, ± translucent, persistent, pubescent; receptacles usually included in the indusium; spores showing no signs of abortion.

Eponymy. – This new hybrid is dedicated to José Fagilde Celeiro, outstanding Cuban amateur botanist and excellent companion on many collecting trips and in various projects.

Specimens seen (all in BSC). – GUANTÁNAMO PROVINCE: Headwaters of Río Toa, reserve of Cupeyal del Norte, 500 m, two plants on the riverside, exposed, in montane rainforest, 27.8.1986, Caluff & Fagilde 2090 A-D; ibid., 600 m, one plant by the river, in shade, trunk 0.25 m tall, 27.8.1986, Caluff & Fagilde 2091 A-D; ibid., 500 m, two plants on the riverside, gallery forest, trunks 25-50 cm tall, with spines and stolons, 27.8.1986, Caluff & Fagilde 2093 A-D; ibid., 450 m, gallery forest, among the parent species, very rare, 27.8.1986, Caluff & Fagilde 2130 A-C; Arroyo Frío, Quibiján, Baracoa, 200 m, single plant in a Carapa guianensis wood, on ferrallitic soil, trunk 1 m tall, 31.3.1988, Caluff & Reyes 2681 A-D; gully near the hamlet of Viento Frío, Sierra del Purial, 550 m, submontane rainforest, a sterile plant, trunk upright, 30 cm tall, 20.4.1992, Caluff & Shelton 3084 A-E. – In the fern garden of Santiago de Cuba lives an individual of A. xfagildei collected at the type locality in 1988.

Distribution and habitat. – Endemic to Sierra de Moa and Sierra del Purial in the Guantánamo province, NE Cuba. In submontane rainforest near water courses and in gallery forest, on ferrallitic and metamorphic soil, in the undergrowth or partially exposed, at 200-550 m of altitude.
Note. – Cyathea xirregularis Brause, described from Hispaniola, was ascribed the same parentage, Alsophila minor × A. woodwardioides, by Conant (1975, 1983). Its true parentage, however, is A. woodwardioides var. hieronymi (Brause) Gastony × A. major Caluff & Shelton (2002). The latter, just described, has long been confused with A. minor, which in reality is an endemic of NE Cuba.

**Alsophila xboytelii** Caluff & Shelton, **nothosp. nova** – Holotype: Calaff & Couso 589 A-D (BSC). – Table 1. [Alsophila balanocarpa (D. C. Eaton) R. M. Tryon × A. woodwardioides (Kaulf.) Conant].

**Trunk** erect, up to 4 m high and 15 cm in diameter, occasionally stoloniferous at the base and producing aerial buds and branches, covered with persistent petiole bases and spines. **Leaves** 8-12, bipinnate-pinnatifid to bipinnate-pinnatisect; petiole 5-46 cm long and up to 1.5 cm wide at the base, brown to blackish purple, with up to 11 mm long spines, scurfy, beset towards the base and in the adaxial furrow with rigidly crested “acaroid” squamules and with linear, brown to blackish scales up to 20 × 1 mm tipped by a dark seta and with somewhat paler and slightly erose margin; blade 2.2-3.05 × 0.74-1 m, ovate-lanceolate, chartaceous to coriaceous, gradually or somewhat abruptly reduced toward the apex, gradually narrowed toward the truncate base; rachis brown to blackish purple, somewhat shiny, subglabrous, adaxially scurfy and with scales similar to those of the petiole and, in addition, with lanceolate, brown to blackish purple, pale-margined scales tipped by a dark seta; pinnae alternate, slightly oblique, in 24-37 pairs, oblong, narrowed to triangular-protracted, the proximal ones 8-18 × 1.4-3 cm, spaced by up to 30 cm, borne on a 1-2 cm long petirole, deflected in a plane perpendicular to the lamina, the middle ones 37-50 × 8-12 cm, sessile, spaced by 5-12 cm; costae similar to rachis in colour and indumentum but with axillary, prominent pneumathophores; pinnales alternate, sessile, in 37-50 pairs, 4-6 × 0.7-1 cm, oblong-lanceolate to triangular-protracted, short-acuminate to obtuse, entire or crenulate; costules often with axillary pneumathophores, with dark, lanceolate and brown, nearly bulliform scales, “acaroid” and light brown bulliform squamules as well as with rigid but subflexuous, 0.3-0.4 mm long whitish hairs that are distally more abundant, but glabrous adaxially; segments in 15-19 pairs, 3-6 × 2-3 mm, oblong to deltate, slightly oblique, obtuse to rounded, the base slightly widened, the margins entire, revolute, basal segments somewhat larger, overlapping the costa, occasionally shortly petiolulate, the following separate to within 1 mm or less from the costa; segment midvein with ± bulliform, light brown to whitish scales and one to several dark setae, proximally with occasional “acaroid” squamules, distally with scattered hairs similar to those of the costules and with antrorse, tawny to whitish glandular hairs, but glabrous adaxially; lateral veins in 4-9 pairs per segment, simple or once forked, with abundant antrorse glandular hairs and occasional rigid hairs, but glabrous adaxially; surface with antrorse glandular hairs below, glabrous above. Sori in 1-2(-4) pairs in the proximal third of each segment, close to the midvein; indusium deeply cyathiform, 0.8-1 mm in diameter, light brown, entire, persistent, with tiny glandular hairs on the margin and outer surface; receptacle large, exserted from the indusium; spores showing no signs of abortion.

**Eponymy.** – This new hybrid is dedicated to the memory of Fernando Boytel Jambú, outstanding Cuban investigator, who devoted many years of his life to the study and preservation of the botanical and historical values of the Gran Piedra.

**Specimens seen** (all but the last in BSC). – **SANTANDO DE CUBA PROVINCE:** Gullies below the Jardín La Gran Piedra, 900-1000 m, 19.10.1984, Caluff & Medina 702; summit of La Gran Piedra, 1150 m, 27.8.1984, Calaff & Medina 706; slope below the flying road from the coffee shop to the huts, Gran Piedra, 1000 m, 28.12.1984, Calaff & Medina 707 A-B; path within the Reserva Gran Piedra, 950 m, plant with numerous aborted croziers along the trunk and some malformed leaves with spiralled tips, perhaps a backcross with Alsophila woodwardioides, 28.12.1984, Calaff & Medina 708 A-B; Reserva Gran Piedra, cloud forest behind La Isabelica,
Distribution and habitat. – Endemic to the Sierra Maestra, SE Cuba; common in the Gran Piedra range and unfrequent in the Loma del Gato, Sierra del Cobre, the only localities from where it is known. In montane rainforest and cloud forest, in the undergrowth, at 900-1150 m of altitude.

Note. – Conant (1975, 1983) already interpreted this plant as resulting from the cross between Alsophila balanocarpa and A. Woodwardioides. Normally, A. × boytelii has well formed spores. The paternity of A. Woodwardioides was confirmed by Caluff (1985) following comparative field studies in the Gran Piedra range, where this hybrid, forming a large population, coexists with both its parents and may even be backcrossing with them, since a full range of intermediates exists between the hybrid and either parent.

Alsophila xmedinae Caluff & Shelton, nothosp. nova – Holotype: Caluff 1282 A-D (BSC); isotypes: HAC, HAJ. – Table 1.

Trunk erect, up to 2 m tall and 15 cm in diameter, retaining or shedding the petiole bases, spiny. Leaves up to 10, bipinnate-pinnatifid to bipinnate-pinnatisect; petiole 60-70 cm long and up to 1.5 cm wide at the base, straw-coloured to brown, with up to 8 mm long spines, scurfy with crested squamules, “acaroid” squamules and linear, brown scales, up to 12 × 1 mm with but slightly lighter margin and tipped by a dark seta; blade 2.2-2.5 × 0.62-0.85 m, ovate-lanceolate, herbaceous to papery, abruptly reduced below the apex, gradually narrowed towards the base and eventually truncate; rachis straw-coloured to brown, somewhat shiny, abaxially subglabrous, adaxially scurfy, with crested squamules, lanceolate bicoloured scales and linear, brown, pale-margined scales tipped by a dark seta dispersed throughout the adaxial furrow; pinnae alternate, perpendicular to the rachis or oblique, in 22-24 pairs, oblong to oblong-lanceolate, abruptly narrowed and acuminate, spaced by 5-7 cm, the proximal ones up to 12-21 × 3-5 cm, borne on a 4-15 mm long petiolule, the middle ones 31-42 × 5-9 cm, sessile; costae without or with inconspicuous axillary pneumathophores, their colour and indumentum similar to those of the rachis but distally scurfy and with uniseriate pluricellular, rigid, 0.8-1 mm long hairs; pinnules in 30-42 pairs, 3-5 × 0.6-0.9 cm, oblong-lanceolate, bluntly acuminate, the margin entire to crenulate; costules without axillary pneumathophores, their indumentum composed of crested squamules, “acaroid” squamules, flat lanceolate scales and, distally, rigid but subflexuous whitish, up to 0.3-0.5 mm long hairs; segments in 13-18 pairs, 3-5 × 1.5-2.5 mm, oblong to deltoid, obtuse to rounded, the base slightly widened and oblique, the margin entire to crenulate, flattened or slightly revolute, separate to within 1 mm from the costa, the basal segments somewhat larger and somewhat overlapping the costa; segment midvein with whitish bulliform scales, and flattened ones with one to several dark setae, furthermore with rigid hairs similar to those of the costules and with antrorse, tawny to whitish, scattered glandular hairs, but glabrous adaxially; lateral veins in 5-7 pairs per segment, simple or once forked, with antrorse glandular hairs, but glabrous adaxially; surface olivaceous and with some antrorse glandular hairs underneath, dark brown to blackish and glabrous above. Sori in 3-6 pairs spaced over the whole segment; indusium deeply cyathiform, 0.6-1 mm in diameter, light brown, somewhat translucent, entire, persistent, with occasional glandular hairs on the margin and outer surface; receptacle large, exserted from the indusium; spores showing no signs of abortion.

Eponymy. – This new hybrid is dedicated to the memory of Eduardo Medina Castillo, who in spite of his advanced age was the senior author’s untiring and enthusiastic companion on several years’ collecting campaigns.
Specimens seen (all in BSC). – **Sancti Spiritus province:** Arroyo Jesús Delgado, Cudina, Topes de Collantes, Alturas de Trinidad, trunk up to 2 m tall, several plants, gallery forest, 500-600 m, 24.4.1985, Caluff 1282 A-D; arroyo Titi el Mocho, Cooperativa de Producción Agropecuaria Amistad Cuba-Rumanía, La Chispa, Topes de Collantes, Alturas de Trinidad, several scattered, sterile plants, trunk up to 1.5 m tall, exposed, 27.3.1985, Caluff 1209 A-C. — **Cienfuegos province:** El Palomar, Cumanayagua, Alturas de Trinidad, 600 m, montane rainforest, several plants in woodland along the road, 28.4.1985, Caluff 1391 A-B; El Palomar, Cumanayagua, Alturas de Trinidad, 600 m, montane rainforest, 4 plants on a cliff by the river, 14.1.1986, Caluff 1871.

**Distribution and habitat.** – Endemic to Alturas de Trinidad, Central Cuba, in the environs of Topes de Collantes; to be looked for around the Pico San Juan in Cienfuegos province and in the Sierra Maestra of SE Cuba, where both parents also coexist. Montane rainforests and natural or degraded gallery forest, in the undergrowth and exposed, at 500-600 m of altitude.

**Note.** – *Alsophila xedinea* is morphologically intermediate between the only *Alsophila* species growing on the Alturas de Trinidad, *A. balanocarpa* and *A. cubensis*, which we accept to be its parent species.

**Discussion and conclusion**

The three newly described hybrids can, with a little practice, be distinguished in the field quite easily by the outline of the blade and number of pinnae. In Cuba, the genus *Alsophila* is represented by two very clear-cut species groups. The first consists of *A. balanocarpa*, *A. brooksii* (Maxon) R. M. Tryon, *A. minor* and *A. major*, with ovate-lanceolate to obovate-lanceolate leaf blades gradually narrowed toward the base and apex, and with 35-65(-100) pairs of pinnae. The second group comprises *A. cubensis* and *A. woodwardioides*, with more or less ovate leaf blades truncate at the base and abruptly reduced below the apex, and with but 14-20 pairs of pinnae. The three new hybrids all combine parents of the two different groups, and their intermediate characters in the dimensions of blades and pinnae, the outline of the blade and the number of pinnae is readily apparent.

**Acknowledgement**

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**References**


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