Two remarkable new Lindsaeas from South America

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Two remarkable new Lindsaeas from South America

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Abstract

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Two new South American taxa of the fern genus *Lindsaea* (Dennstaedtiaceae) are described: *L. phassa,* related to *L. taeniata* Kramer, from Peru, and *L.* × *improvisa,* a probable cross between the single-leaved *L. cyclophylla* Kramer and the bipinnate *L. divaricata* Kl., from Venezuela. Other hybrids in the genus are briefly discussed.

Key words: Fern genus *Lindsaea,* hybrids.

1. *Lindsaea phassa* Kramer, spec. nova.

Lindsaeae taeniatae Kramer similis, differt pinnulis lateralibus latioribus (2½–32½ × longioribus quam latis, nec 5–7½ ×), haud falcatis, apice obtusissimo ad acuto nec caudiformi-protracto.

Rhizome short-creeping, comparatively stout, ca. 2½ mm in diam.; scales fawn-coloured, narrowly triangular, long-acuminate, to ca. 2 mm long, to ca. 7-seriate at the base. Leaves close; petiole ca. 23–50 cm long, somewhat exceeding the lamina, stramineous with darker, scaly extreme base, approximately quadrangular in cross-section, at least adaxially sulcate. Lamina broadly ovate-elliptic, up to ca. 36 × 30 cm, herbaceous, medium green, bipinnate with a conform terminal pinna; primary rachis like the petiole. Pinnae 2–4 to a side, subopposite to alternate, obliquely ascending, oblong, 16 × 6–28 × 7 cm, the terminal often the broadest, subsessile, acute to abruptly caudate-acuminate. Pinnules spreading, subcontiguous or the more distal ones somewhat overlapping, ca. 12–20 to a side; larger pinnules asymmetrically rhombic, resembling the profile of a bird's (e.g., a pigeon's: Greek *φάσσα*) wing, 32–41 mm long, 9–14 mm wide, 2½–3½ × as long as wide, very obtuse to acute; inner margin straight, touching the rachis and almost or quite parallel to it; posterior margin spreading and somewhat concave in the basal ½ or ⅓, straight and ascending in the apical part; anterior margin concave in the distal part, straight in the basal part or throughout; basal anterior pinnule ± strongly reduced. Upper pinnules abruptly reduced, the uppermost about 2/5 the size of the largest, free. Terminal pinnule triangular with asymmetrically hastate base, (sub)acutely caudate, ca. 40 × 12–20 mm. Veins ± immersed, evident in fresh material acc. to collector; costa diagonal, distinct to near apex; lateral veins lax, free, once to three times forked. Sori

continuous, also around the pinnule apex, only the cauda of the terminal pinnule partly non-soriferous and with faintly sinuate margin; indusium very narrow, 0.2–0.3 mm wide, entire, not reaching the margin by about 3–4× its own width. Spores trilete, hyaline, smooth. ca. 18 µm in diam.
Type: Peru; Dpto. Loreto. R. Ampiyaco, vic. of Pucaurquillo, terrestrial in primary forest, E. Wade Davis 849 with Etta Turner, D. McKenna and J. Ruiz, 13 March 1981 (UC, holo); Fig. 1.

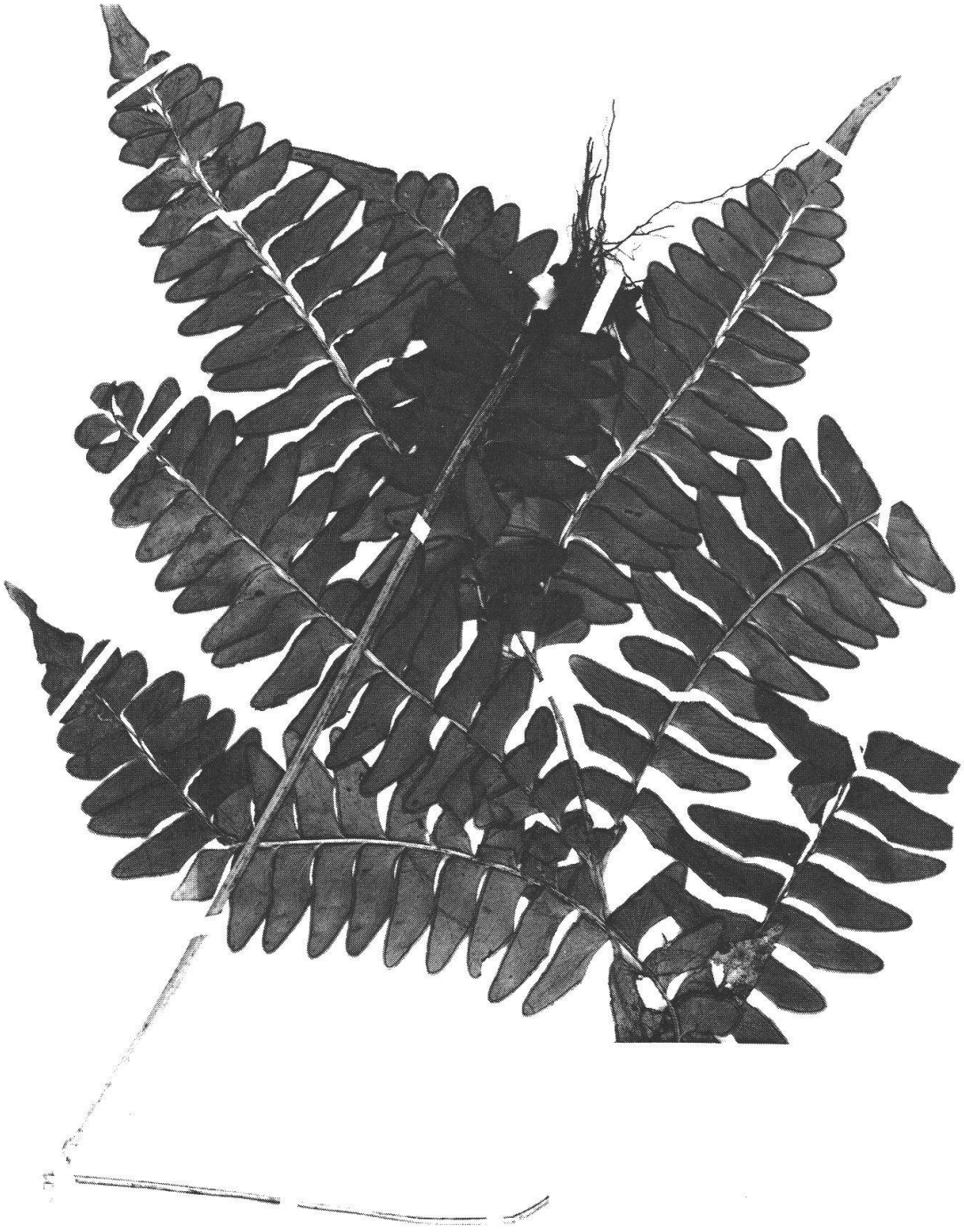

Fig. 1.

Paratypes: Peru; Dpto. Loreto. Prov. Maynas, Yanamono Explorama Tourist Camp halfway between Ineliana and mouth of R. Napo; non-flooded forest on rather fertile soil, H. van der Werff, R. Vásquez and N. Jaramillo 9869, 9914, July/Aug. 1988 (MO, not seen; Z).

This is a distinctive species with large, diagonally costate, only basally dimidiate pinnules with a relatively broad, obliquely ascending, protracted distal portion. In the key to the neotropical species of *Lindsaea* (Kramer 1957) it will run to *L. taeniata* Kramer, now known from Colombia, Ecuador, and Brazil (Acre); but this has much more elongate and considerably narrower, ±falcately upcurved pinnules. Vaguely similar are forms of *L. quadrangularis* Raddi ssp. *antillensis* Kramer (1957; see also Kramer 1978) and of *L. arcuata* Kunze with somewhat protracted pinnule apices, but these have considerably reduced distal pinnules that are confluent with the terminal segment; they were placed in a different section than *L. taeniata* (Kramer 1957).

2. An unusual new intersectional hybrid from the Guayana Highland

Among the many interesting specimens of neotropical *Lindsaea* received by the author through the courtesy of, i.a., the Missouri Botanical Garden, St. Louis, U.S.A., there was a collection that very soon proved not to be assignable to any described taxon. Its irregular morphology pointed to hybrid origin; closer inspection confirmed this suspicion.

The plant(s) (Fig. 2A, B) – both the MO specimen and the Z duplicate may be parts of the same plant – has a short-creeping rhizome; three leaves are extant. Their dissection pattern is striking: the lamina is either simply pinnate or paucijugate-bipinnate; the pinnules are of variable size, some, particularly the terminal one, being cleft (not basally lobed, as is often found in the present genus). The outline of the pinnules, something between flabelliform and dimidiate-subovate, is unlike anything found in a neotropical species but is somewhat reminiscent of the Old World *L. orbiculata* (Lam.) Mett. ex Kuhn, particularly var. *orbiculata* (see, e.g., Kramer 1971, Fig. 15). The terminal pinnule is broadly triangular, much more obtuse than in any other species with a triangular leaf or pinna apex. Most spores are abortive, but a smaller number of well-formed, hyaline, monolete spores are present besides. It is not uncommon in a hybrid to find some normally developed spores beside a majority of abortive ones (see, e.g., Reichstein 1981). The conclusion is that the specimen must have originated through hybridization between a bipinnate and a much less dissected taxon, and that at least one of these must have monolete spores. Among the eight neotropical taxa with monolete spores, *L. cubensis* Underw. & Maxon, *L. macrophylla* Kaulf., *L. quadrangularis* Raddi ssp. *quadrangularis,* and the three species of section *Tropidolindsaea* are extralimital. *L. pallida* Kl. has a sharply dentate sterile margin and a gashed indusium, characters of which no traces can be found in the plant under discussion. The only species left is *L. cyclophylla* Kramer, whose lamina is simple, reniform or circular, apically completely rounded (see Kramer 1957, Fig. 90, 91, and Wagner 1952, Fig. 9H) which would fit very well with what was said above about the shape of the divisions of the lamina of the new hybrid. *L. cyclophylla* is widespread and not too rare in the Guayana Highland. The other parent species cannot be so readily determined, several species occurring in the area being possible candidates. In the author's opinion the most likely is *L. divaricata* Kl.; it has very dark leaf axes and an abaxially faintly bi-angular petiole, like the present hybrid. The rhizome scales do not provide any diagnostic characters. If the presumed derivation is correct, we

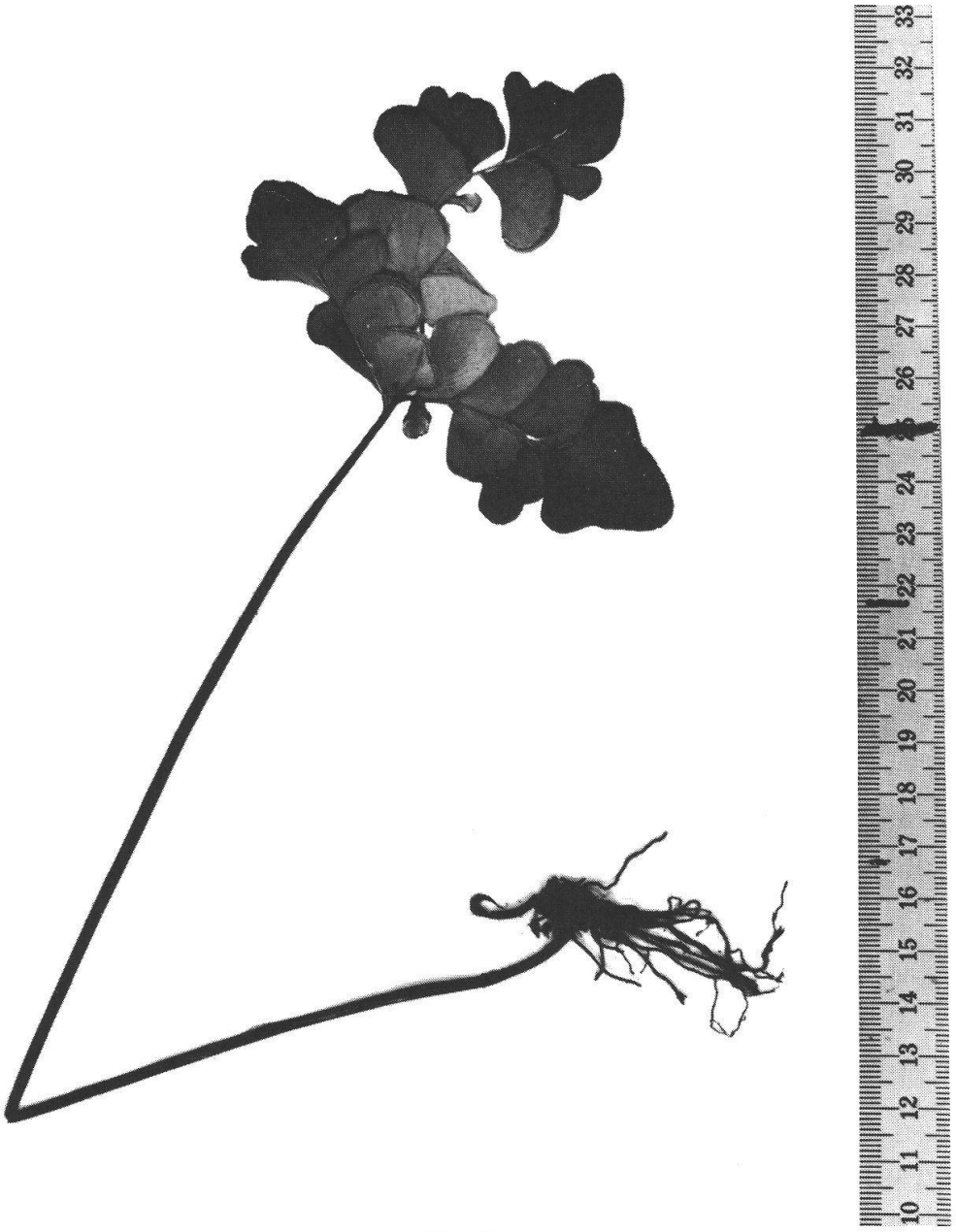

Fig. 2a.

may state that the following characters must have come from *L. cyclophylla:* very broad and obtuse apices of (parts of) the lamina, monolete spores, and strongly intramarginal sori; and from *L. divaricata:* the shape of the petiole and a compound lamina with comparatively large terminal divisions. Characters shared with both parents would be the dark leaf axes, the herbaceous texture, the free veins, and the continuous sori with narrow, subentire indusia.

***Lindsaea* × *improvisa* Kramer, hybr.nova.**

Inter L. cyclophyllam et L. divaricatam interposita et probabiliter derivata ab iis parentibus. Petiolus obscurus, abaxialiter indistincte biangularis; lamina herbacea, sim-

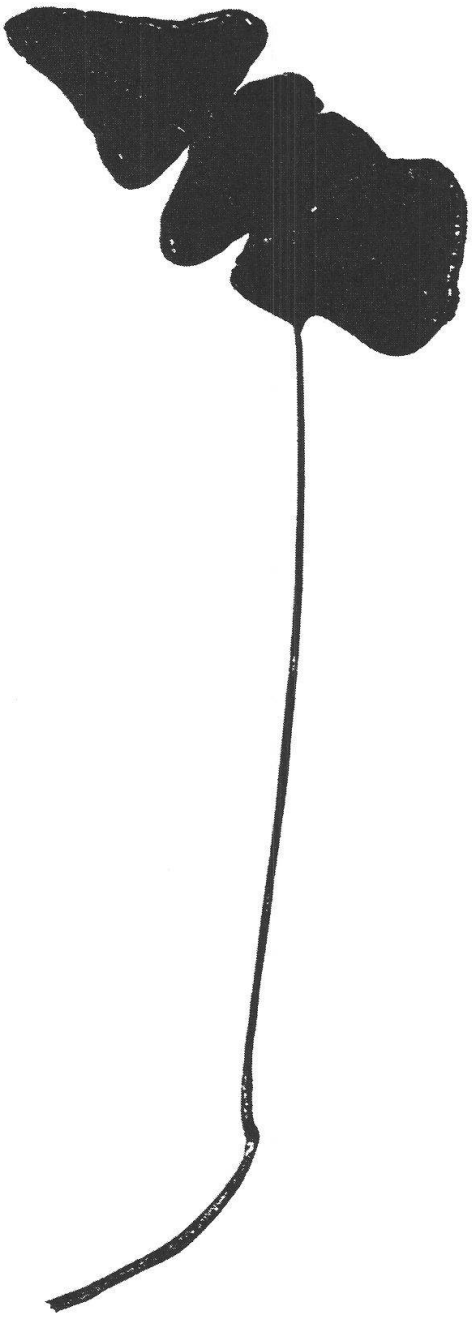

Fig. 2b. *Lindsaea* × *improvisa* Kramer Isotype ca. 2/3 × .

pliciter pinnata vel paucijugato-bipinnata, pinnulis magnitudine irregulari, lateralibus subdimidiato-subflabellatis, terminalibus subflabellato-subtriangularibus, latissimis et obtusissimis, saepe ± fissis. Venae dichotomo-furcatae, liberae, sat crebrae, immersae; pinnula terminalis subecostata. Sori valde intramarginales, continui praeter eos pinnularum terminalium; indusium angustum, ca. 0.5 mm latum, margine integro vel sinuato, marginem pinnulae interstitio duplo latiore non attingens. Sporae plurimae abortivae sed nonnullae normaliter efformatae, hyalinae, monoletae.

Type: Venezuela; Edo. Bolívar. Gran Sabana, junction of R. Karaurin and R. Asadon, ca. 10 km s.w. of Karaurin Tepuí. Along small, intermittent stream in forest; alt. 900–1000 m. R. Liesner 23785 (MO, holo, Z, iso).

Discussion

Interspecific hybrids are uncommon, but not unknown, in the genus *Lindsaea;* even an intergeneric hybrid, *Lindsaea* × *Odontosoria* (*Sphenomeris*), was recently found in Hawaii (W. H. Wagner, Jr., personal comm.; specimen in Z). A perfectly intermediate hybrid in section *Crematomeris, L. meifolia* (H.B.K.) Mett. ex Kuhn × *L. pendula* Kl., was described as *L.* × *dissecta* Kramer (1957); a probable hybrid of *L. ovoidea* Fée and *L. virescens* Sw. remained unnamed (Kramer 1957, 1963). It now seems likely that what was treated as *L. heterophylla* Dryander (Kramer 1971, 1972) is heterogeneous, being partly the hybrid *L. ensifolia* Sw. × *L. orbiculata* (Lam.) Mett. ex Kuhn (as indicated by field observations by W. H. Wagner, Jr., and the present author in South China), partly an as yet unnamed species in its own right. The latter was named *L. beddomea* by Ghosh and Dixit (1980, 1983), but this name was not validly published as it cannot be typified; it is also linguistically incorrect. A few more possible hybrids were referred to in passing by Kramer and Tindale (1976).

Except for the unnamed putative hybrid *L. ovoidea* × *L. virescens,* the parent species of all these hybrids belong to the same sections within the genus. This is not true for *L.* × *improvisa, L. cyclophylla* being classed in section *Haplolindsaea, L. divaricata* in section *Lindsaea.* The morphology of the two presumptive parent species is also more disparate than that of any one of the other hybrids. Such hybrids between very unlike species sometimes have a more or less constant, intermediate morphology, e.g. *Asplenium* × *kentuckiense* McCoy (Wagner 1954) and *Polystichum* spp. (Vida and Reichstein 1975); in others it strongly vacillates, e.g., in *"Phyllitis"* (*Asplenium*) *hybrida* (Meyer 1965), *Asplenium ebenoides* R. R. Scott (Wagner 1954), *Pteris* × *otaria* Beddome (Walker 1958), and *„Pleuroderris"* (*Tectaria*) *michleriana* (D. C. Eaton) Maxon (Meyer 1965, Wagner, Wagner and Gómez 1978). The hybrid *Lindsaea* under discussion is represented by too little material but seems to fall between the two extremes.

The hybrids discussed above underscore once more that in the Lindsaeoid ferns genera based on the dissection pattern of the lamina alone are quite artificial; such generic lines were rather recently still drawn by, e.g., Ching (1959) and Sehnem (1972).

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