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Brittonia, Vol. 52, No. 1 (Jan. - Mar., 2000), 55-111.

Stable URL:
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Brittonia is currently published by New York Botanical Garden Press.

Monograph of the neotropical species of Lomariopsis (Lomariopsidaceae)

ROBBIN C. MORAN

Moran, R. C. (The New York Botanical Garden, Bronx, NY 10458-5126, U.S.A.). Monograph of the neotropical species of *Lomariopsis* (Lomariopsidaceae). Brittonia 52: 55–111. 2000.—This work provides a key, illustrations, descriptions, and distribution maps for the 15 species of neotropical *Lomariopsis*. In the Neotropics, the genus occurs in southern Florida, the Antilles, and Mexico to Bolivia and southern Brazil. Two groups of species can be recognized on the basis of heteroblastic leaf series: one (the "sorbifolia group") whose leaves become pinnate when 1–2 cm long, and another (the "japurensis group") whose leaves become pinnate when 15–40 cm long. Three species in the Antilles are unusual because the rachis apex aborts and the distalmost lateral pinna assumes the terminal position.

Key words: ferns, *Lomariopsis,* Lomariopsidaceae, Pteridophyta.

Moran, R. C. (The New York Botanical Garden, Bronx, NY 10458-5126, U.S.A.). Monograph of the neotropical species of *Lomariopsis* (Lomariopsidaceae). Brittonia 52: 55–111. 2000.—Este trabajo proporciona una clave, ilustraciones, descripciones, y mapas de distribución para las 15 especies neotropicales de *Lomariopsis*. En el Neotrópico, el género se distribuye en el sur de Florida, las Antillas, y México hasta Bolivia y el sur de Brasil. Con base en las séries heteroblásticas de las hojas se consideran dos grupos de especies: el "grupo sorbifolia" cuyas hojas son pinnadas cuando alcanzan 1–2 cm de longitud; el "grupo japurensis" tiene hojas pinnadas cuando miden 15–40 cm de largo. Las tres especies de las Antillas son extrañas porque el ápice del raquis aborta y la pinna lateral más distal se torna terminal en posición.

Introduction

Lomariopsis is one of six genera of Lomariopsidaceae, a family characterized by sterile–fertile leaf dimorphy, acrostichoid sori, and rhizomes with a broad, root-bearing ventral meristele (Holttum, 1978; Kramer, 1990). *Lomariopsis* can be distinguished from other genera in the family by long-creeping, high-climbing rhizomes, 1-pinnate leaves (except for *L. palustris* (Hook.) Mett. ex Kuhn, an African species with simple leaves), a terminal pinna that resembles the lateral ones, lateral pinnae jointed to the rachis, free veins that run parallel for most of their length, and light-colored cartilaginous pinna margins. The genus is pantropical.

Taxonomic History

Lomariopsis was founded by Fée (1845), who distinguished it from *Stenochlaena,* in which its species had been previously classified. Fée also included species now classified in *Teratophyllum,* a closely related genus of Lomariopsidaceae. For many years after Fée established the genus, however, most pteridologists continued to unite *Lomariopsis* (including *Teratophyllum*) with *Stenochlaena.* Smith (1875: 140) was an exception, and he cited *Acrostichum sorbifolium* L. as the type species (thus Holttum's (1932) later citation of *L. cochinensis* as the type species—a citation followed by Copeland (1947)—is illegitimate). *Loma-*

Brittonia, 52(1), 2000, pp. 55–111. ISSUED: 21 Mar 2000

riopsis and *Teratophyllum* were not clearly distinguished from each other until Underwood's (1906) treatment of the American species, but he treated both as sections of *Stenochlaena.* Holttum (1932) was the first to point out that *Stenochlaena* differed in many ways from these genera, and all pteridologists have subsequently maintained the three genera as distinct. Currently *Stenochleana* is placed in the Blechnaceae, and *Lomariopsis* and *Teratophyllum* in the Lomariopsidaceae.

Morphology

A synapomorphy that unites members of the Lomariopsidaceae is the broad ventral meristele of the rhizome (Bell, 1950; Holttum, 1966, 1978; Kramer, 1990). In *Lomariopsis* this meristele has a notch on its dorsal side (see Fig. 22B; Holttum, 1978: fig. 1C, E). This notch gives the impression that the broad ventral meristele was formed by fusion of two, once-distinct meristeles. A similar notch is absent in the other neotropical Lomariopsidaceae. In *Lomariopsis,* the ventral meristele—not the dorsal ones—gives rise to the roots.

As pointed out by Holttum (1940, 1978), there are two kinds of heteroblastic leaf series within *Lomariopsis,* and each defines a subgroup within the genus. In both subgroups, a young sporophyte's first few leaves are linear or narrowly cuneate. In the first group (the "sorbifolia group"), the leaves become pinnate when only 1–2 cm long, and the apex is small and relatively inconspicuous (see Figs. 8C–F, 22C). In the second group (the "japurensis group"), the first few become pinnate when much larger, generally 15–40 cm long, and the apex is large and conspicuous (Fig. 1). Another difference is that the pinnae on juvenile leaves of the "sorbifolia group" are usually lobed or dentate, whereas in the "japurensis group" they are entire. The neotropical species belonging to the "sorbifolia group" are *L. amydrophlebia, L. fendleri, L. jamaicensis, L. kunzeana, L. maxonii, L. recurvata, L. sorbifolia, L. underwoodii, L. vestita,* and *L. wrightii.* Those belonging to the japurensis group are *L. japurensis, L. latipinna, L. marginata, L. nigropaleata,* and *L. prieuriana.*

In most species of *Lomariopsis* the apical pinna is continuous with the rachis, not articulate like the lateral pinnae. In three species from the West Indies (*L. jamaicensis, L. underwoodii,* and *L. wrightii*) and two from Madagascar (*L. crassifolia* Holttum and *L. longicaudata* (Bonap.) Holttum), however, the rachis apex aborts and the distalmost lateral pinna assumes the terminal position. This false-terminal pinna is articulate to the rachis, thus indicating its true lateral origin. A small nubbin or rudiment that represents the aborted remains of the rachis apex can be seen at the base of this false terminal pinna (see Figs. 21C, D, 23A). It is unclear whether this is a synapomorphy between the West Indian and Madagascan species or has evolved independently in both groups.

Lomariopsis has a special set of veins (diplodesmic veins) supplying the sporangia, as do all genera of the Lomariopsidaceae (Kaur, 1974; Nayar, 1966).

The spores of *Lomariopsis* are typically smooth, winged or spiny (Tryon & Lugardon, 1991; Tryon & Tryon, 1982). The spores of more species need to be examined with the scanning electron microsope to determine whether there is any correlation with the infrageneric taxonomy or differences between closely related species.

Lloyd and Klekowski (1970) list *Lomariopsis sorbifolia* as having green spores. Its spores and those of other neotropical *Lomariopsis* sometimes appear pale olive-green under the dissecting microscope. Spore viability after dispersal appears to be extremely short (less than two or three weeks) for several species of *Lomariopsis* (pers. obs.). Short viability is a characteristic of green spores.

Chromosome Numbers

The chromosomes of six species of *Lomariopsis* have been counted worldwide, and from these counts the base number for the genus appears to be $x = 41$, agreeing with other genera of Lomariopsidaceae. The only American species that has been counted is *L. japurensis* (reported as *L.*

FIG. 1. Heteroblastic leaf development in *Lomariopsis nigropaleata,* typical of the "japurensis group." Top row, *Tuomisto 2415* (TUR); middle row, *Tuomisto 2429* (TUR); bottom row, *Tuomisto 4116* (TUR).

marginata) from Trinidad, and it was found to have $n = 41$ (Walker, 1985). An Asian species, *L. lineata* (C. Presl) Holttum (reported as *L. cochinchinensis* Fée, a synonym) was found to have $2n = 164$ (Roy & Manton, 1966), also based on 41.

From the base number of 41 there have been some striking aneuploid reductions. All of the four African species counted have fewer than $n = 41$ chromosomes. Manton (1959) found that *Lomariopsis guineensis* (Underw.) Alston had $n = 39$, a number later confirmed by Roy and Manton (1966) from repeated root-tip counts. Roy and Manton (1966) also counted the chromosomes of *L. palustris* (Hook.) Mett., *L. hederacea* Alston, and *L. rossii* Holttum, and found $2n = 78$, 32, and 62, respectively. The latter two species are also unusual in that their karyotype consists of a mixture of large and small chromosomes. Lovis (1977: 295–297) discussed these unusual numbers and concluded that the great range in variation in chromosome size of *L. rossii* and *L. hederacea* represent "an extent unequalled elswhere in the ferns." It can be readily seen how the base number of *L. guineensis* and *L. palustris* might be derived from 41 by means of two aneuploid reduction changes; however, a number as low as 16 could only be derived by drastic reorganization of the genome. Cytological work is greatly needed on the American species to determine whether similar cytological diversity exists.

Geography

Lomariopsis, with about 45 species worldwide, is pantropical with a few extensions into the subtropics (Holttum, 1978). Fifteen species (and no infraspecific taxa) are recognized here for the Neotropics (Table I); 10 species have been recognized for Africa (Holttum, 1940), 9 species on the islands in the Indian Ocean (Holttum, 1938, 1940), and 10 species in Asia, Malesia, Queensland, and the Pacific (Holttum, 1978).

In the Neotropics, *Lomariopsis* occurs from southern Mexico to Bolivia and southern Brazil and throughout the Antilles, with one species extending into southern Florida (Table II). The Antilles contain six species,

TABLE I

THE NEOTROPICAL SPECIES OF *Lomariopsis* AND THE COUNTRIES (OR ISLANDS) IN WHICH THEY OCCUR

1. *L. amydrophlebia*: Haiti, Dominican Republic, Puerto Rico
2. *L. fendleri*: Trinidad, Tobago, Venezuela, Colombia, Ecuador, Peru, Bolivia
3. *L. jamaicensis*: Jamaica
4. *L. japurensis*: Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Trinidad, French Guiana, Suriname, Guyana, Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil
5. *L. kunzeana*: United States, Cuba, Haiti, Dominican Republic, Puerto Rico
6. *L. latipinna*: Colombia, Ecuador, Peru
7. *L. marginata*: Brazil
8. *L. maxonii*: Costa Rica, Panama
9. *L. nigropaleata*: Colombia, Ecuador, Peru, Bolivia, Brazil
10. *L. prieuriana*: Panama, Trinidad, French Guiana, Surinam, Guyana, Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil
11. *L. recurvata*: Mexico, Belize, Guatemala, Honduras
12. *L. sorbifolia*: Jamaica, Haiti, Dominican Republic, Puerto Rico, St. Thomas, St. Eustatius, St. Christopher, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada
13. *L. underwoodii*: Cuba, Jamaica
14. *L. vestita*: Mexico, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia
15. *L. wrightii*: Cuba

all of which are endemic: *L. amydrophlebia, L. kunzeana, L. jamaicensis, L. sorbifolia, L. underwoodii,* and *L. wrightii* (although *L. kunzeana* is only nearly endemic because it occurs in southern Florida). The Antillean species belong to the "sorbifolia group" (see Morphology); the "japurensis group" is absent from the Antilles.

Mesoamerica harbors five species. One of them, *Lomariopsis japurensis,* is widespread in the region and throughout South America. *Lomariopsis prieuriana* is known from only one locality in eastern Panama. Three other species occur entirely or mostly in Mesoamerica: *L. maxonii, L. recurvata,* and *L. vestita.* The first is endemic to the mountains of Costa Rica and Panama at middle elevations. *Lomariopsis recurvata* occurs from southern Mexico to Honduras. *Lomariopsis vestita* extends from Belize to Colombia, where it occurs only on the western side of the Andes.

Besides *Lomariopsis vestita,* South Amer-

TABLE II

DISTRIBUTION BY COUNTRY (OR ISLANDS) OF THE NEOTROPICAL SPECIES OF *Lomariopsis*; ENDEMICS ARE IN BOLDFACE

United States: *kunzeana*
Mexico: *recurvata, vestita*
Belize: *japurensis, recurvata, vestita*
Guatemala: *japurensis, recurvata, vestita*
Honduras: *japurensis, recurvata, vestita*
Nicaragua: *japurensis, vestita*
Costa Rica: *japurensis, maxonii, vestita*
Panama: *japurensis, maxonii, prieuriana, vestita*
Cuba: *kunzeana, underwoodii,* ***wrightii***
Jamaica: ***jamaicensis,*** *sorbifolia, underwoodii*
Haiti: *amydrophlebia, kunzeana, sorbifolia*
Dominican Republic: *amydrophlebia, kunzeana, sorbifolia*
Puerto Rico: *amydrophlebia, kunzeana*
St. Thomas: *sorbifolia*
St. Eustatius: *sorbifolia*
St. Christopher: *sorbifolia*
Montserrat: *sorbifolia*
Guadeloupe: *sorbifolia*
Dominica: *sorbifolia*
Martinique: *sorbifolia*
St. Lucia: *sorbifolia*
St. Vincent: *sorbifolia*
Grenada: *sorbifolia*
Trinidad: *fendleri, japurensis, prieuriana*
Tobago: *fendleri*
French Guiana: *japurensis, prieuriana*
Suriname: *japurensis, prieuriana*
Guyana: *japurensis, prieuriana*
Venezuela: *fendleri, japurensis, prieuriana*
Colombia: *fendleri, japurensis, latipinna, nigropaleata, prieuriana, vestita*
Ecuador: *fendleri, japurensis, latipinna, nigropaleata, prieuriana*
Peru: *fendleri, japurensis, latipinna, nigropaleata, prieuriana*
Bolivia: *fendleri, japurensis, nigropaleata, prieuriana*
Brazil: *japurensis,* ***marginata,*** *nigropaleata, prieuriana*

ica has six species: *L. fendleri, L. japurensis, L. latipinna, L. marginata, L. nigropaleata,* and *L. prieuriana.* Three of these (*L. fendleri, L. japurensis,* and *L. marginata*) are widespread, and two (*L. nigropaleata* and *L. latipinna*) are primarily western Amazonian and in the foothills of the eastern Andes. The remaining species (*L. marginata*) is known only from coastal southeastern Brazil.

Lomariopsis provides two examples of the Mesoamerican–Chocó distribution (Moran, 1996). Plants with this distribution occur in Mesoamerica primarily on the wet Caribbean side and only on the western side of the Andes in South America. They do not occur on the eastern side of the Andes, even though suitable habitat is present there. *Lomariopsis vestita* shows this distribution, as does the small-scaled variant of *L. japurensis.* Apparently the Andes have blocked these plants in their eastward migration in South America.

Ecology

All species of *Lomariopsis* grow in wet forests, primarily at 0–1200(–1800) m. Most occur in the lowlands, although one (*L. maxonii)* regularly grows at middle elevations (800–1800 m).

The gametophytes grow on wet fallen branches, the bases of trees or saplings, and sometimes on the ground. The rhizomes of the young sporophytes gradually thicken as they climb trunks. Plants can climb to 10 m. The fertile fronds are borne only on the climbing portion of the rhizome. Nothing is known about phenology of fertile fronds or the environmental factors that foster their

production. Although the pinnae are articulate to the rachis, they do not seem to be shed, even in response to dryness.

Lomariopsis Fée

Lomariopsis Fée, Hist. Acrost. 10: 66. 1845. *Acrostichum* sect. *Lomariopsis* (Fée) Hook., Spec. Fil. 5: 241. 1864. *Lomariopsis* sect. *Eulomariopsis* Mett. ex Kuhn, Ann. Mus. Bot. Lugduno-Batavum 4: 294. 1869. *Stenochlaena* sect. *Lomariopsis* Underw., Bull. Torrey Bot. Club 33: 37. 1906. Type species: *Acrostichum sorbifolium* L. [= *Lomariopsis sorbifolia* (L.) Fée].

Rhizomes scaly, slightly flattened, long-creeping, climbing, rooting on the ventral side only, bearing 3–5(–6) rows of fronds on the dorsal side, the vascular system dorsiventral with a broad ventral meristele notched on the inner side and 1–5 dorsal meristeles, each meristele surrounded by a dark sclerenchymatous sheath; stipes decurrent on the rhizome, not jointed, scaly when young, containing up to 12 vascular bundles, the two adaxial bundles larger then the abaxial ones. *Blades* 1-pinnate, with a terminal "pinna" resembling the lateral ones; pinnae entire, jointed to the rachis, the joint often appearing as a faint dark line; veins free, simple or branched once near the base, parallel for most of their length, uniting with the (nonvascular) cartilaginous pinna margin; rachises flat to shallowly grooved adaxially, if grooved then the grooves interrupted (not continuous) at the rachis–costa juncture. *Fertile leaves* dimorphic, their pinnae narrower than those of the sterile; sori acrostichoid; spores smooth, spiny, granulate, minutely papillose, or winged, pale yellow to brown to pale olive-green. $x = 41$.

In the Neotropics, *Lomariopsis* might be confused with species in three other fern genera that have climbing rhizomes and dimorphic leaves. Two species of *Bolbitis* (*B. bernoullii* (Kuhn ex H. Christ) H. Christ and *B. lindigii* (Mett.) C. Chr.) resemble *Lomariopsis* in these characteristics, but they can be distinguished by net veins, pinnae continuous with (not articulate to) the rachis, herbaceous pinna margins, and a ventral meristele without a dorsal notch. *Polybotrya* is also similar but differs by having tapered and pinnatifid lamina apices, pinnae continuous with the rachis, and herbaceous pinna margins (Moran, 1987). Two climbing species of *Blechnum* (*B. ensiforme* (Liebm.) C. Chr. and *B. fragile* (Liebm.) C. V. Morton & Lellinger) might also be mistaken for *Lomariopsis*; however, they can be distinguished by pinnae broadly adnate to the rachis, strongly bicolorous rhizome scales, and tapered, pinnatifid lamina apices. *Polybotrya* and *Blechnum* can be further distinguished because they lack the broad, ventral meristele characteristic of the rhizomes of Lomariopsidaceae.

The juvenile leaves of the "japurensis group" of *Lomariopsis* resemble *Elaphoglossum* because they are simple and entire. They can be distinguished, however, by the cartilaginous margins of the laminae.

Key to the neotropical species of *Lomariopsis*

1. Apical pinna articulate to the rachis (Cuba and Jamaica).
   2. Pinnae 4–9 pairs, narrowly cuneate for half of their length or more, the apex abruptly caudate (Cuba) ..... 15. *L. wrightii*
   2. Pinnae 5–16 pairs, truncate, rounded, or broadly cuneate, the apex acuminate to tapered, acute.
      3. Pinna pairs 5–9; longest pinnae usually 2.5–3 cm wide; rhizome scales 1–3 mm wide (Jamaica) ..... 3. *L. jamaicensis*
      3. Pinna pairs 6–16; longest pinnae 1.5–2.5 cm wide; rhizome scales 0.5–1.5 mm wide (Jamaica, Cuba) ..... 13. *L. underwoodii*
1. Apical pinna continuous with the rachis (Cuba, Jamaica, and elsewhere).
   4. Pinnae 1.5–9 cm wide, 1–21 pairs; juvenile leaves not pinnate until 15–40 cm long; spores smooth or spiny.
      5. Rhizome scales dark brown to black.
         6. Rhizome scales 1–2.5 mm long; laminae not or only slightly reduced basally; pinna bases cuneate; spores spiny (w. Amazonia from Colombia to Bolivia, Brazil) ..... 9. *L. nigropaleata*
         6. Rhizome scales 2–10 mm long; laminae reduced basally or (in the Guianas) only slightly

so; pinna bases broadly rounded to cuneate; spores smooth (Guatemala to the Guianas and Bolivia) ..... 4. *L. japurensis*

5. Rhizome scales reddish or tawny to dull orange or reddish brown.
7. Pinnae 1.6–4 cm wide, 9–21 pairs (coastal se. Brazil) ..... 7. *L. marginata*
7. Pinnae (3.5–)4–10 cm wide, 1–6(–7) pairs (e. Panama to the Guianas and Bolivia, Amazonian Brazil).
8. Pinnae (3.5–)4–6 cm wide, pairs 3–6(–7), the basal pair sessile or nearly so, the stalk (when present) to 3 mm long (e. Panama to the Guianas, Colombia to Bolivia, Amazonian Brazil) ..... 10. *L. prieuriana*
8. Pinnae 6–10 cm wide, pairs 1–5, the basal pair with a stalk (3–)4–15 mm long (Amazonian Colombia, Ecuador, and Peru) ..... 6. *L. latipinna*

4. Pinnae 1–3 cm wide, 10–35 pairs; juvenile leaves pinnate when 2 cm long or longer; spores smooth, winged, minutely papillose, or granulate.
9. Laminae of large leaves cuneate; basal pinnae less than 4 cm long.
10. Pinnae cuneate, the margins serrulate throughout (sharply dentate on small leaves); basal pinnae acute to acuminate; rhizome scales pale brown (s. Florida, Cuba, Puerto Rico, Hispaniola) ..... 5. *L. kunzeana*
10. Pinnae truncate to subtruncate or very broadly cuneate, the margins entire and becoming crenulate-serrulate apically; rhizome scales whitish, stramineous, or pale orangish.
11. Fertile pinnae 1.5–3 mm wide (Mexico to Colombia) ..... 14. *L. vestita*
11. Fertile pinnae 3–6 mm wide (Trinidad, Tobago, Venezuela to Bolivia) ..... 2. *L. fendleri*
9. Laminae of large leaves widest basally or nearly so; basal pinnae more than 4 cm long.
12. Pinnae cuneate.
13. Pinnae stalked.
14. Pinnae entire or nearly so but often serrulate apically; rhizome scales whitish or dark reddish; pinnae 8–20 cm long (Costa Rica and Panama) ..... 8. *L. maxonii*
14. Pinnae serrulate throughout (sharply dentate on small leaves); rhizome scales pale brown; pinnae 4–11 cm long (s. Florida, Cuba, Puerto Rico, Hispaniola) ..... 5. *L. kunzeana*
13. Pinnae sessile or nearly so.
15. Rachis exalate or narrowly alate distally; pinnae 8–20 cm long (Mexico to Honduras) ..... 11. *L. recurvata*
15. Rachis narrowly alate to strongly marginate throughout; pinnae 5–9.5 cm long (Puerto Rico and Hispaniola) ..... 1. *L. amydrophlebia*
12. Pinnae truncate to broadly rounded.
16. Pinna pairs (12–)20–30; fertile pinnae 3–6 mm wide (Trinidad, Tobago, Venezuela to Bolivia) ..... 2. *L. fendleri*
16. Pinna pairs 12–20; fertile pinnae 2–4 mm wide (Mexico to Honduras, Hispaniola, Puerto Rico, Lesser Antilles).
17. Pinnae parallel-sided for much of their length, the bases equilateral; spores smooth (Hispaniola, Puerto Rico, Lesser Antilles) ..... 12. *L. sorbifolia*
17. Pinnae usually widest near the middle, the bases often slightly inequilateral; spores irregularly winged (Mexico to Honduras) ..... 11. *L. recurvata*

1. LOMARIOPSIS AMYDROPHLEBIA (Sloss. ex Maxon) Holttum, Bull. Misc. Inform. Kew 1939: 617. 1940. *Stenochlaena amydrophlebia* Sloss. ex Maxon, J. Wash. Acad. Sci. 14: 141. 1924. TYPE: PUERTO RICO. Sierra de Naguabo, Río Icaco and adjacent hills, 465–720 m, 30 Jul–5 Aug 1914, *Shafer 3510a* (HOLOTYPE: NY, PHOTOS: GH, US ex NY, fragm. US ex NY). (Fig. 2)

Rhizome scales 5–8 mm long, brown to brownish orange, narrowly lanceolate, spreading. *Leaves* 25–80 cm long; petioles to 20 cm long, ⅓–¾ the length of the laminae, non-alate to narrowly alate; laminae not or only slightly reduced basally, the apical pinna continuous with (i.e., not articulate to) the rachis; pinnae 5–9.5 × 1.2–1.6 cm, pairs 11–26, alternate, slightly ascending, oblong, the apices acute and entire or nearly so, the bases subequilateral (slightly reduced on the basiscopic side), cuneate, sessile or nearly so; rachises narrowly alate to strongly marginate throughout. *Fertile pinnae* 2–3 mm wide; paraphyses absent; annular cells ca. 20; spores minutely papillose.

Distribution and habitat.—Lomariopsis amydrophlebia occurs in Haiti, Dominican Republic, and Puerto Rico, where it grows on limestone rocks and tree trunks in wet forests, at 300–950 m. I have not seen a

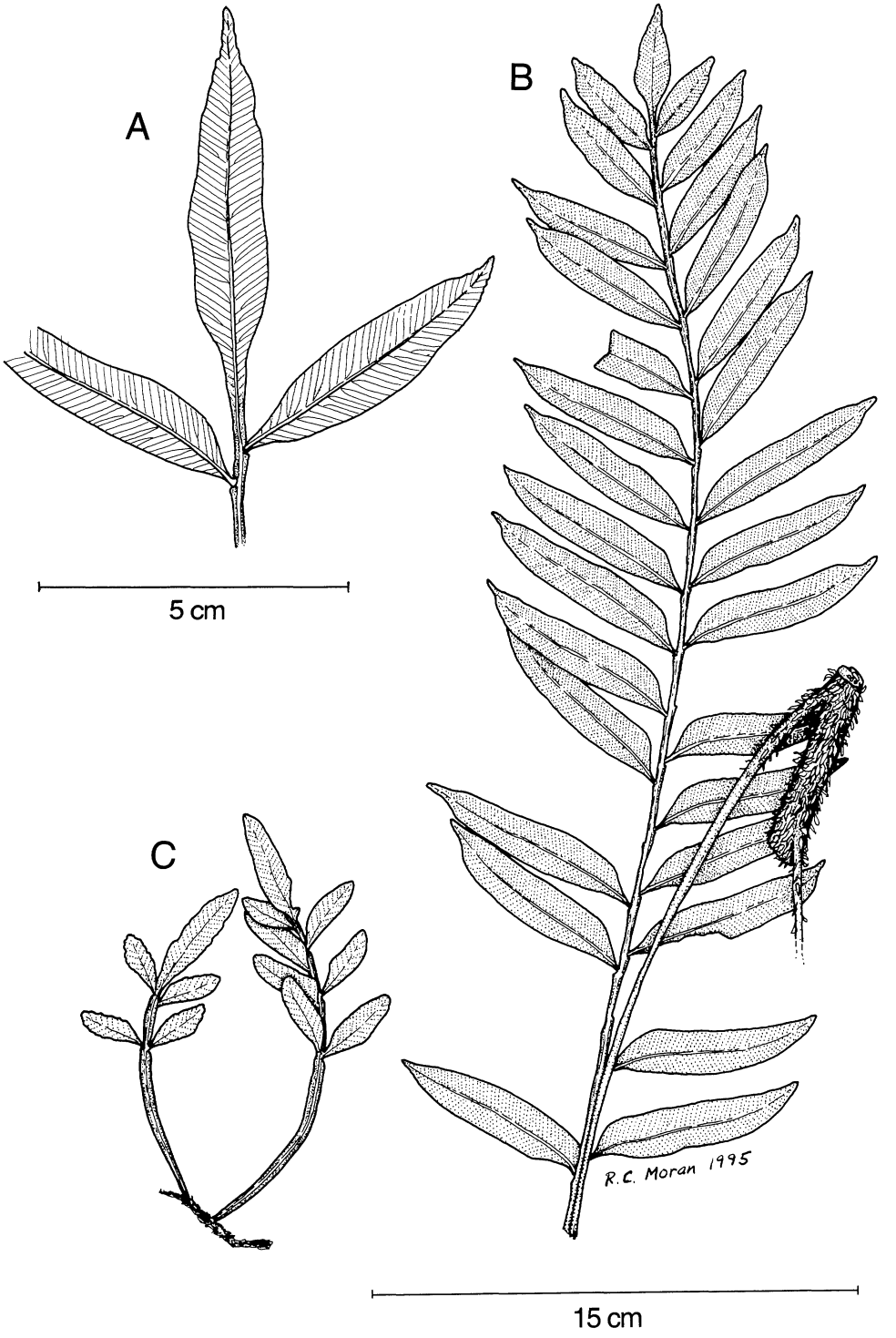

FIG. 2. *Lomariopsis amydrophlebia.* **A.** Lamina apex, showing continuous (not articulate) terminal pinna. **B.** Leaf and portion of rhizome. **C.** Juvenile leaves. (A, B, *Woodbury s.n.,* US; C, *Britton & Hess 2294,* NY.)

specimen of *L. amydrophlebia* from Jamaica, but Proctor (1985) cites a specimen from that country (*Proctor 5658,* IJ), pointing out that the record needs confirmation.

Lomariopsis amydrophlebia is characterized by brown to brownish orange rhizome scales, non-alate to narrowly alate petioles, small (only 5–9.5 cm long) cuneate pinnae, and laminae with the terminal segment continuous with (not articulate to) the rachis. The latter characteristic distinguishes the species from three others in the Antilles (*L. jamaicensis, L. underwoodii,* and *L. wrightii*) that have the terminal pinna articulate to the rachis.

Lomariopsis amydrophlebia has several character tendencies useful for identification. Although other species of *Lomariopsis* have narrowly winged or nonwinged rachises and petioles, in this species the wing is often well-developed. The lamina is thicker than most species in the genus, and its juvenile leaves are widest at the base (Fig. 2C), not cuneate as in other species of the sorbifolia group (Fig. 22C).

Additional specimens examined. HAITI. Massíf du Nord, St. Louis du Nord, Morne Baron, 900 m, *Ekman 3888* (BM, S, US).

DOMINICAN REPUBLIC. Barahona, Noche Buena, *Fuertes 1044c* (B, photo US ex B).

PUERTO RICO. Sierra de Naguabo, Barrio de Maizales, 950 m, 9 Mar 1914, *Britton & Hess 2294* (NY); Mun. de Patillas: Sierra de Cayey, Carite Forest Reserve, ca. Km 20 on Rd. 184, 770–780 m, *Proctor 39401* (US); Sierra de Luquillo, *Sintenis 1761* (B, P), *1762* p.p. (B), *1795* (BM, GH, K); Sierra de Naguabo, *Sintenis 5463* (B); Quebrada Grande, El Verde, s.d., *Woodbury s.n.* (NY); Mun. de Cayey, Carite Forest Reserve, 1 km S of intersection of Rd. 179 with Rd. 184, 750 m, s.d., *Woodbury s.n.* (US); Guavate, 5 Oct 1966, *Woodbury s.n.* (NY).

2. LOMARIOPSIS FENDLERI D. C. Eaton, Mem. Amer. Acad. Arts n.s., 8: 195. 1860. *Stenochlaena fendleri* (D. C. Eaton) Underw., Bull. Torrey Bot. Club 33: 595. 1907. TYPE: VENEZUELA. Aragua: Prope Coloniam Tovar, *Fendler 335* (HOLOTYPE: YU–n.v.; ISOTYPES: G, GH, K, MO, NY, fragm. B). (Fig. 3)

Stenochlaena angusta Underw., Bull. Torrey Bot. Club 33: 594. 1906. TYPE: COLOMBIA. Santa Marta: Jordan, creeping on tree trunks to 15 ft or more, rare in deep forest, 1200–1400 ft, May 1898, *H. H. Smith 1051* (HOLOTYPE: NY; ISOTYPES: GH, MO, US).

Rhizome scales 5–10 mm long, whitish, narrowly lanceolate to linear, spreading. *Leaves* 30–50(–60) cm long; petioles 3–20 cm long, $\frac{1}{10}$–$\frac{1}{3}$ the length of the laminae; laminae widest basally (at least on large leaves); pinnae 6–12 × 1.2–2 cm, pairs (12–)20–30, alternate to subopposite, patent, oblong to lanceolate, entire or becoming serrate apically, equilateral or nearly so, truncate to broadly rounded (rarely in some specimens from the Chocó region narrowly rounded), sessile or nearly so, the apices acute to acuminate; rachises narrowly winged or marginate distally. *Fertile pinnae* 3–6 mm wide; paraphyses absent or present and consisting of uniseriate scales; annular cells 13–16; spores crested.

Distribution and habitat.—Lomariopsis fendleri occurs at 100–1600 m in wet forests, from Trinidad to Colombia to Bolivia (Fig. 4).

Lomariopsis fendleri is characterized by whitish rhizome scales, numerous (typically 20–30) usually truncate pinnae, and, at least in large leaves, laminae broadest basally. It resembles *L. vestita* but can usually be distinguished by its broader leaf bases and longer petioles. For further comparison, see *L. vestita.*

Several specimens from the western side of the Andes in Colombia and Ecuador (*Barbosa 6454, Lægaard 52465, Moran 6022,* and *Taylor 1257 & 1291*) are atypical in having fewer pinna pairs (13–18) and narrowly rounded pinna bases. None of these specimens has fertile leaves. They are tentatively included here as *Lomariopsis fendleri.* Further research might reveal them to be a different species.

Lomariopsis fendleri varies in the amount of scales on the rachis and in the length of the petiole. The specimens from Trinidad, Venezuela, and northern Colombia have inconspicuously scaly to glabrate rachises, whereas specimens from elsewhere have conspicuously scaly rachises. Actually, the density of the scales is about the same, but in the southern specimens the scales are larger and more conspicuous. Throughout the range of the species, individuals can be found with petioles $\frac{1}{10}$ to $\frac{1}{3}$ the length of the laminae. The short-petiolate form, with petioles $\frac{1}{10}$ to $\frac{1}{4}$ the length

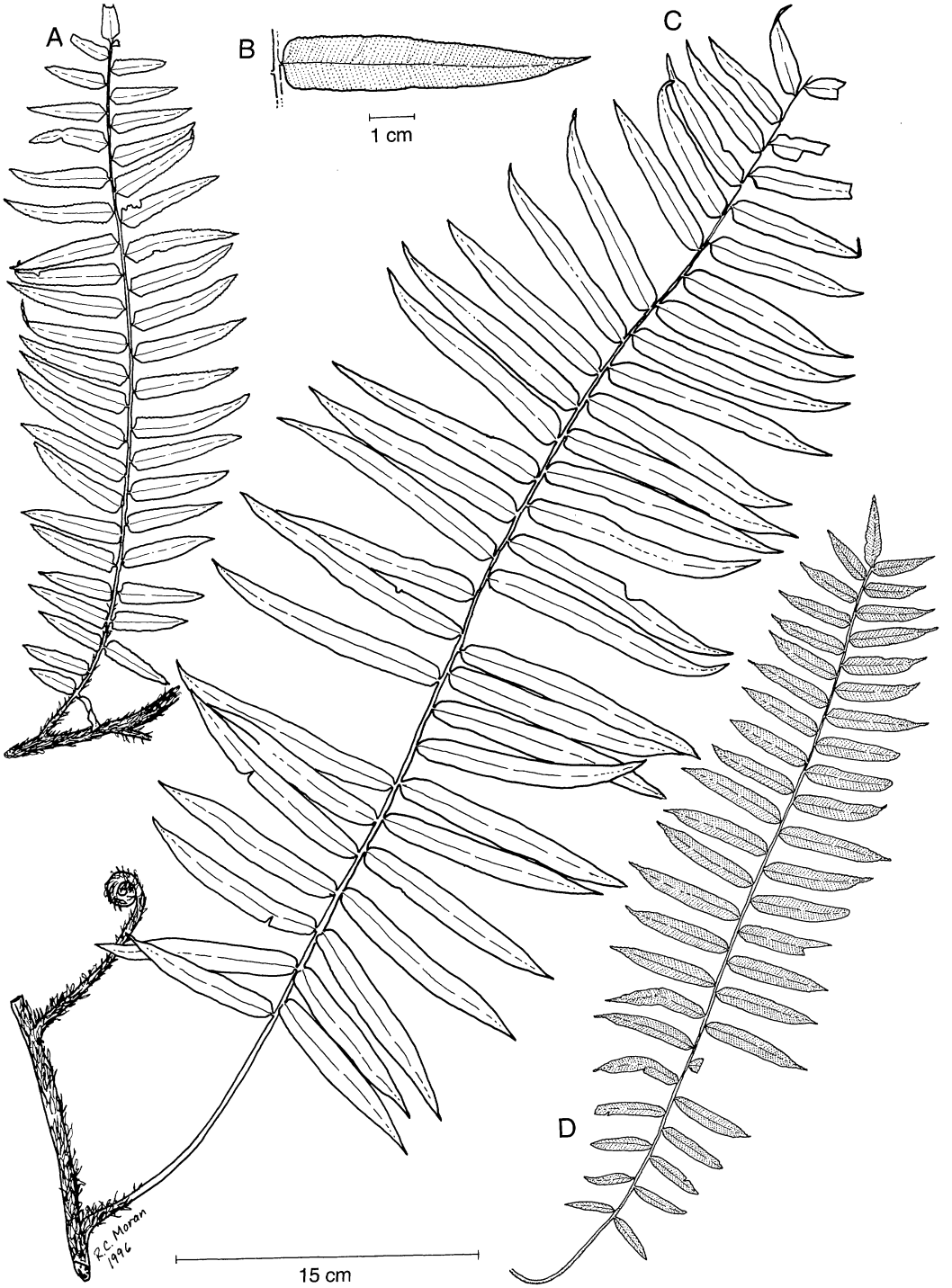

FIG. 3. *Lomariopsis fendleri*. **A.** Sterile leaf (*Moran 3657,* MO). **B.** Pinna (*Steyermark 89224,* NY). **C.** Sterile leaf (*Fendler 121,* NY). **D.** Sterile leaf from a plant slightly less reduced basally (*Smith 1051,* NY).

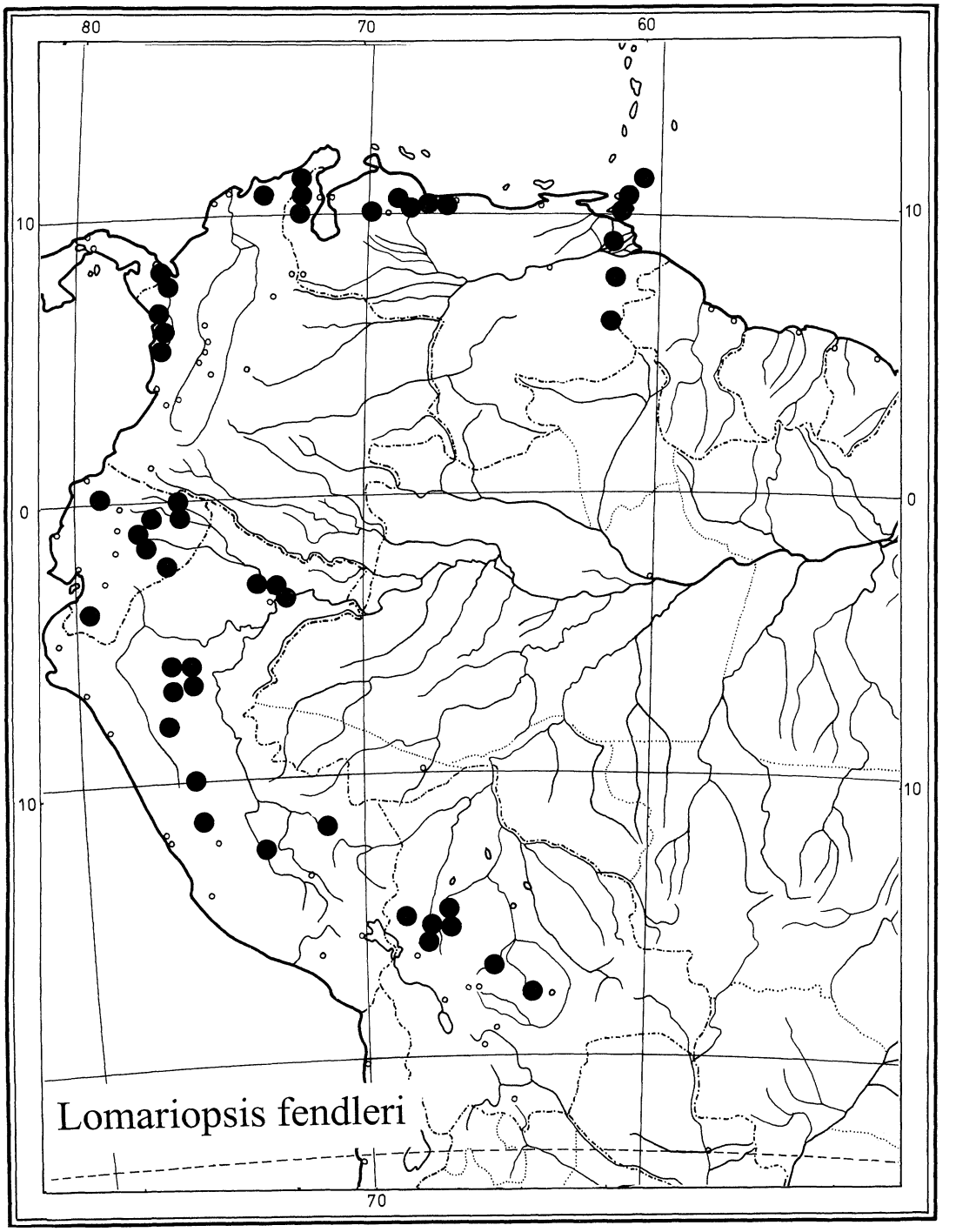

FIG. 4. Distribution of *Lomariopsis fendleri*.

of the lamina, predominates in western Amazonia. The most distinct form of *L. fendleri* is shown by plants from western Amazonia with short petioles and conspicuously scaly rachises, which look quite different from the type from northern Venezuela, but the two forms are connected by numerous intermediates.

Additional specimens examined. TRINIDAD. St. George, Blancheiseuse Rd., near 5 mi post, 150 m, 10°40′N, 61°18′W, *Barnard et al. 466* (MO); Mt. Tamana, 18 Apr 1920, *Britton et al. 1940* (GH, NY, US); Heights of Aripo, 16 Mar 1921, *Britton & Freeman 2334* (NY); Ortoire River, Guayaguayare rd., 25 Mar 1921, *Britton et al. 2545* (G, GH, K, NY, US); Maracas rd. to waterfall, *Broadway 5357* (MO); Blancheiseuse rd., near 9 mi post, *Broadway 6291* (BM, K, MO); Guayaguayare, Pilote rd., *Fay 609* (BM); without locality, 1877–1880, *Fendler 121* (B, BM, G, GH, K, MO, NY, P, UC, US); Mt. Tucuche, 1 Sep 1947, *Friend 200* (NY); Aripo, *Hart 6262* (B); Maracas, *Hombersley 63* (BM, US); behind reservoir, Mt. St. Benedict, 200 m, *Jermy 10982* (BM); Arima–Blancheiseuse rd., *McCallum 48* (BM); Aripo Cave trail, 600 m, 9 Jul 1984, *Mickel 9523* (NY); Arima, Naranjo Estate, 200 m, *Tronsdell 46* (K); Tacarigua Ward, Maracas Falls, *Walker T10754* (BM).

TOBAGO. Without locality, *Broadway 3887* (P); lot 42 near Caledonia, *Broadway 4545* (P, US); Windsor Forest heights, above King's Bay, *Broadway 4900* (BM, K, US); Morne d'Or, *Eggers 5854* (B); 5.5 mi post on Roxborough–Parlatuvier rd., 420 m, *Jermy 11285* (BM); above Parlatuver, *Sandwith 1909, 1913* (K); Lambean Hill, *Sandwith 1652* (K).

VENEZUELA. **Aragua:** Parque Nacional, Dos Riitos, 600 m, *Killip & Lasser 37757* (US); Parque Nacional Henri Pittier, 1100 m, *Oberwinkler & Oberwinkler 14692* (M); Parque Nacional, La Cumbre, 1100 m, *Williams & Alston 197* (BM, F). **Bolívar:** SE-facing escarpment, E of Cerro El Picacho, N of Las Nieves and Las Chicharras, 45 km N of Tumeremo, vic. of Deborah, altiplanicie de Nuria, 600–650 m, 5–8 Feb 1961, *Steyermark 89111* (NY), *89224* (MO, NY, US); Km 134, headwaters of Río Cuyuni, NE of Luepa, 1300 m, 23 Apr 1960, *Steyermark & Nilsson 494* (NY). **Carabobo:** San Estebán, behind Puerto Cabello, 200 m, *Alston 6121* (BM); Mun. autónomo Mara, cuenca hidrográfica del Río Morán, 12 Apr 1991, *Diaz & Ortega 164* (NY); arriba de Los Tanques y La Toma, entre Quebrada 2 y Quebrada de los Verros, S de Borburata, 750–900 m, *Steyermark & Steyermark 95251* (US). **Delta Amacuro:** Eleanor Creek, 1896, *Rusby & Squires 364* (B, BM, F, GH, K, NY, US). **Yaracuy:** caserio de quebrada seca, *Aristeguieta & Pannier 1838* (P, US); Sierra de Aroa, Cerro Tigre, 10 km E of Aroa by air, 10°26′N, 68°49′W, 800–1000 m, *Liesner & González 9695* (MO, UC); area limítrofe entre los estados Lara y Yaracuy, distritos Urdaneta y Bolívar respectivamente, Fila Azul y Hda. El Jaguar, 10°33′N, 68°56′W, 700–900, *Ortega & Smith 2389* (UC); Dtto. Bruzual, Mt. de María Lionza, Quebrada Quibayo, 10°06′–07′N, 69°55′W, 250–1000 m, *Steyermark et al. 125046* (UC). **Zulia:** Dtto. Mara, alrededores del Puesto "El Bosque" de la Guardia Nacional, 10°47′N, 72°40′W, 1450–1600 m, *Bunting et al. 12125* (MO, UC); Serranía de Perijá, Cano Indio, 10°52′N, 72°29′W, 250 m, 10 May 1983, *Luteyn 9240* (NY). **Depto. Unknown:** Vic. of Cristobal Colón, 5 Jan–22 Feb 1923, *Broadway 742* (GH, NY, US).

COLOMBIA. **Chocó:** Mun. de Acandí, Corregimiento de San Francisco (Bahía Triganá), vereda Coquital, Triganá, 08°21′N, 77°08′W, 50–200 m, 2–4 Apr 1990, *Arbeláez & Churchill 438* (NY); Alto Río Jurubidá, cerca de las bocas de la quebrada Munduquera, 06°05′N, 77°10′W, 160 m, *Barbosa 6454* (MO); Mun. de Acandí, vereda Coquital, 150–250 m, 24 May 1989, *Fonnegra et al. 2915* (NY), *2887* (NY); Mun. de Acandí, Corregimiento de Unguía, Reserva Indígena Cuna de Arquía, 100 m, *Forero et al. 1939* (MO, US); Cabita Bay, Cape Corrientes, *Taylor 1257* (UC); Porto Utria, 14 Feb 1934, *Taylor 1291* (NY, US). **Goajira:** 25 km SW of Carraipia, 800 m, 26 Aug 1944, *Haught 4325* (NY, US). **Santa Marta:** Santa Marta, 1898–1899, *H. H. Smith 1031A* (NY).

ECUADOR. **Morona-Santiago:** Pachicutza, Km 140 on rd. from Loja to Cualaquiza, 03°37′S, 78°34′W, 26–27 Apr 1973, *Holm-Nielsen et al. 4612* (AAU, NY, UC). **Napo:** Between Ríos Napo and Tena, 8 km SE of Tena, 30 Sep 1960, *Grubb et al. 1700A* (BM, NY, US); Hollín–Loreto rd., Km 32, 34 km S of rd., 00°35′S, 77°25′W, 1200 m, 25 Jan 1991, *Moran & Rohrbach 5155* (MO, UC). **El Oro:** 11 km W of Piñas on new rd. to Santa Rosa, 850 m, *Dodson et al. 9102* (MO, US). **Pastaza:** Río Pastaza, between Destacamento Chiriboga and Apachi Entza, 02°20′S, 76°55′W, 285 m, *Øllgaard et al. 35199* (AAU, MO, US); Chapetón on Río Bobonaza, Shiuna, N of river, 01°38′S, 77°42′W, 450 m, *Øllgaard & Navarrete 1392* (AAU). **Pichincha:** NE of Vicente Maldonado, Reserva de ENDESA, 00°06′N, 79°02′W, 600 m, 7–10 Jul 1984, *Lægaard 52465* (AAU, NY), 6 Apr 1996, *Moran et al. 6022* (AAU, NY, QCA, QCNE, TUR). **Sucumbíos:** Río Wai si ayá, a northern tributary to Río Aguarico, 6 km upriver from San Pablo, 00°15′S, 76°21′W, 300 m, *Brandbyge & Asanza C. 32695* (AAU, MO); Parque Nacional Yasuní, Añangu, 00°31′S, 76°23′W, 270 m, 16 Jun 1982, *Luteyn et al. 8496* (NY), 30 May 1982, *Øllgaard et al. 39094* (AAU, MO, US), *39178* (AAU, MO), *39208* (AAU).

PERU. **Cuzco:** Río Mapitunuari, Cordillera Vilcabamba, 12°38′W, 73°40′W, 800 m, *Dudley 10189* (GH). **Junín:** E of Quimirí Bridge, near La Merced, 800–1300 m, 1–3 Jun 1929, *Killip & Smith 23908* (F, NY, US). **Loreto:** Prov. Maynas, Paleta, Río Napo, 03°01′S, 73°21′W, 122 m, *Flores 366* (AAU); Puerto Arturo, lower Río Huallaga below Yurimaguas, 135 m, 24–25 Aug 1929, *Killip & Smith 27792* (NY); Balsapuerto, lower Río Huallaga basin, 150–350 m, 28–30 Aug 1929, *Killip & Smith 28430* (NY), *28653* (NY, US); Prov. Maynas, 50 km downriver from Iquitos, Explorama lodge at Yanamono, 26 Jun 1984, *Moran 3657* (MO, UC), *van der Werff et al. 9856* (MO, UC); Prov. Maynas, near lodge of Explorama Tours at Río Sucusari, 03°10′S, 72°52′W, *Tuomisto et al. 5831* (TUR); lower Río Huallaga, Santa Rosa, Yurimaguas, 155–210 m, *Williams 4860* (F), *5080* (F, US); Puerto

Arturo, Yurimaguas, *Williams 5082* (F). **Madre de Dios:** Parque Nacional del Manú, Cocha Cashu Biological Station, *Foster P-84-43* (AAU, UC); Prov. Manu, Manu Park, Cocha Cashu uplands, vic. of Calpa guacamayas, 11°45′S, 71°00′W, 400 m, *Núñez 6020* (F, MO). **San Martín:** Tingo María, 625–1100 m, *Allard 20889* (GH, US); Km 28 of Tarapoto–Yurimaguas rd., 06°27′S, 76°19′W, 750–800 m, 23 Sep 1986, *Knapp & Mallet 8399* (AAU, F, MO, NY); Prov. Mariscal Caceres, Dtto. Tocache Nuevo, desembocadura del Río Tocache, 400 m, *Schunke V. 3569* (F, US); Prov. Mariscal Caceres, Dtto. Tocache Nuevo, Quebrada de Santa Rosa de Cachiyacu, 500–700 m, *Schunke V. 7609* (F, MO); Mt. Guayrapurima, near Tarapoto, 1856, *Spruce s.n.* (K).

BOLIVIA. **Beni:** Prov. Ballivián, 25 km from Yucumo on Yucumo–Quiquibey rd., Pilón Lajas, 15°17′S, 67°04′W, 950 m, *Fay & Fay 2775* (LPB, MO, US); Prov. General Ballivián, 12 km por el camino maderero, SW del Km 12 Yucuao–Rurrenabaque, 15°04′S, 67°07′W, 450 m, *Kessler et al. 10767* (UC). **Cochabamba:** Prov. Chapare, Parque Nacional, Carrasco, cavernas del Repechón, 550 m, *Kessler et al. 8324* (UC). **La Paz:** Prov. Nordyungas, Polo-Polo, near Coroico, 1100 m, *Buchtien 305* (BM), Oct–Nov 1912, *Buchtien 3354* (F, G, K, NY); Prov. J. Bautista Saavedra M., Pauji-Yuyo, entre Apolo y Charanzani, 15°02′S, 68°29′W, 1450 m, *Kessler et al. 9880* (UC); Prov. Sud Yungas, Alto Beni, Sapecho, Colonia Tarapaca, 05°32′S, 67°21′W, 612 m, *Krömer et al. 49* (UC); Prov. Nordyungas, Caranavi, próximo a Río Coroico, 600–700 m, *Windisch 2488* (AAU), *2489* (AAU). **Santa Cruz:** Prov. Ichilo, 4 km arriba del Campamento Macunuco, *Kessler et al. 8693* (UC). **Depto. Unknown:** Lower Río Cocos, 100 m, 1901–1902, *Williams 1190* (NY); Isapuri, 500 m, 2 Oct 1901, *Williams 1203* (NY, US); San Raphael, 900 m, 1801–1802, *Williams 1189* (NY, UC, US).

3. LOMARIOPSIS JAMAICENSIS (Underw.) Holttum, Bull. Misc. Inform. Kew 1939: 614. 1940. *Stenochlaena jamaicensis* Underw., Bull. Torrey Bot. Club 33: 595, figs. 13, 14. 1907 ["1906"]. TYPE: JAMAICA. Vic. of Mandeville, 600 m, 16 Jun 1904, *Maxon 2566* (HOLOTYPE: NY; ISOTYPE: US). (Fig. 5)

Rhizome scales 5–10 × 1–3 mm, pale reddish brown, lanceolate, spreading. *Leaves* 30–50 cm long; petioles 10–20 cm long, ¼–⅓ the length of the laminae; laminae not or slightly reduced basally, with the apical pinna articulate to the rachis; pinnae 9–17.5 × 2.5–3 cm, pairs 5–9, alternate to subopposite, patent to ascending, lanceolate-oblong to elliptic oblong, the margins finely crenulate, cuneate basally, staked, the stalks 1–4 mm long, the apices acuminate; rachises strongly marginate throughout. *Fertile pinnae* 0.5–0.8 cm wide; paraphyses absent; annular cells 13–16; spores minutely spiny.

Distribution and habitat.—Lomariopsis jamaicensis is endemic to Jamaica where it occurs at 75–750 m. It grows in forested areas over limestone and occasionally on boulders, although the latter needs verification.

Lomariopsis jamaicensis resembles *L. underwoodii*; the small leaves of the two can be difficult to distinguish. *Lomariopsis jamaicensis* tends to have fewer pinnae pairs (5–8), wider pinnae (2.2–3 cm), and wider rhizome scales (2–3 mm). Unlike *L. underwoodii,* the apex usually aborts and appears as a small stub or partially developed pinna. A lateral pinna assumes the terminal position (Fig. 5E).

Additional specimens examined. JAMAICA. Mandeville, 26–30 Apr 1910, *Crawford 671* (NY); Manchester, 5 Nov 1891, *Day s.n.* (NY, P); Middlesex County, St. Ann Parish, limestone gully, Castle Daly, *Hennewell 15219* (GH); St. Ann Parish, along tramline from Reynolds Mine area to the coast, *Howard & Proctor 14057* (GH); Hollymount, Mount Diablo, 750 m, 25–27 May 1904, *Maxon 2214* (NY, US), *2217* (NY); Harford and adjoining properties, near Priestman's River, 75–300 m, 9 Jun 1904, *Maxon 2512* (NY, P, US); Fern Gully, St. Ann, 200–300 m, 23 Jul 1926, *Maxon 10359* (US), 10384 (GH, NY); Union Hill and vic., N slopes of Mount Diablo, 400–750 m, 24 Jul 1926, *Maxon 10402* (GH, NY, US); St. Elizabeth, Cooks Bottom, N of Ipswich, 400–450 m, 31 Mar 1920, *Maxon & Killip 1463* (GH, NY, US); Glenburnie Mt., Westmoreland, *Orcutt 7673* (K, UC); without locality, *Parkhurst 1696* (MO); Trelawny Parish, Cockpit country ca. 5 miles N of Quick Step, above Aberdeen Post Office, *Proctor 4091* (US); Manchester Parish, Marshalls Pen, 2.25 mi NW of Mandeville, 700 m, *Proctor 16069* (GH); Hanover Parish, interior summit slopes of Dolphin Head, 500–600 m, *Proctor 16660* (MO, U); Westmoreland Parish, Teague Gully, 300–400 m, *Proctor & Mullings 22047* (U); Mansfield, near Bath, 2–4 May 1903, *Underwood 2782* (NY), 4 May 1903, *Underwood 2825* (NY); Westmorland Parish, Cho-Cho Gully, *Walker T2468* (BM).

4. LOMARIOPSIS JAPURENSIS (Mart.) J. Sm., Hist. Fil. 140. 1875. *Acrostichum japurensis* Mart., Icon. Pl. Crypt. 86, t. 24. 1834. *Olfersia japurensis* (Mart.) C. Presl, Tent. Pterid. 234. 1836. *Stenochlaena japurensis* (Mart.) Griseb., Fl. Brit. W. Indies 676. 1864. TYPE: COLOMBIA. Vaupés: Río Japurá, s.d., *Martius s.n.* (HOLOTYPE: M?–n.v.; ISOTYPE: L, PHOTOS: GH, NY, US ex L). (Fig. 6)

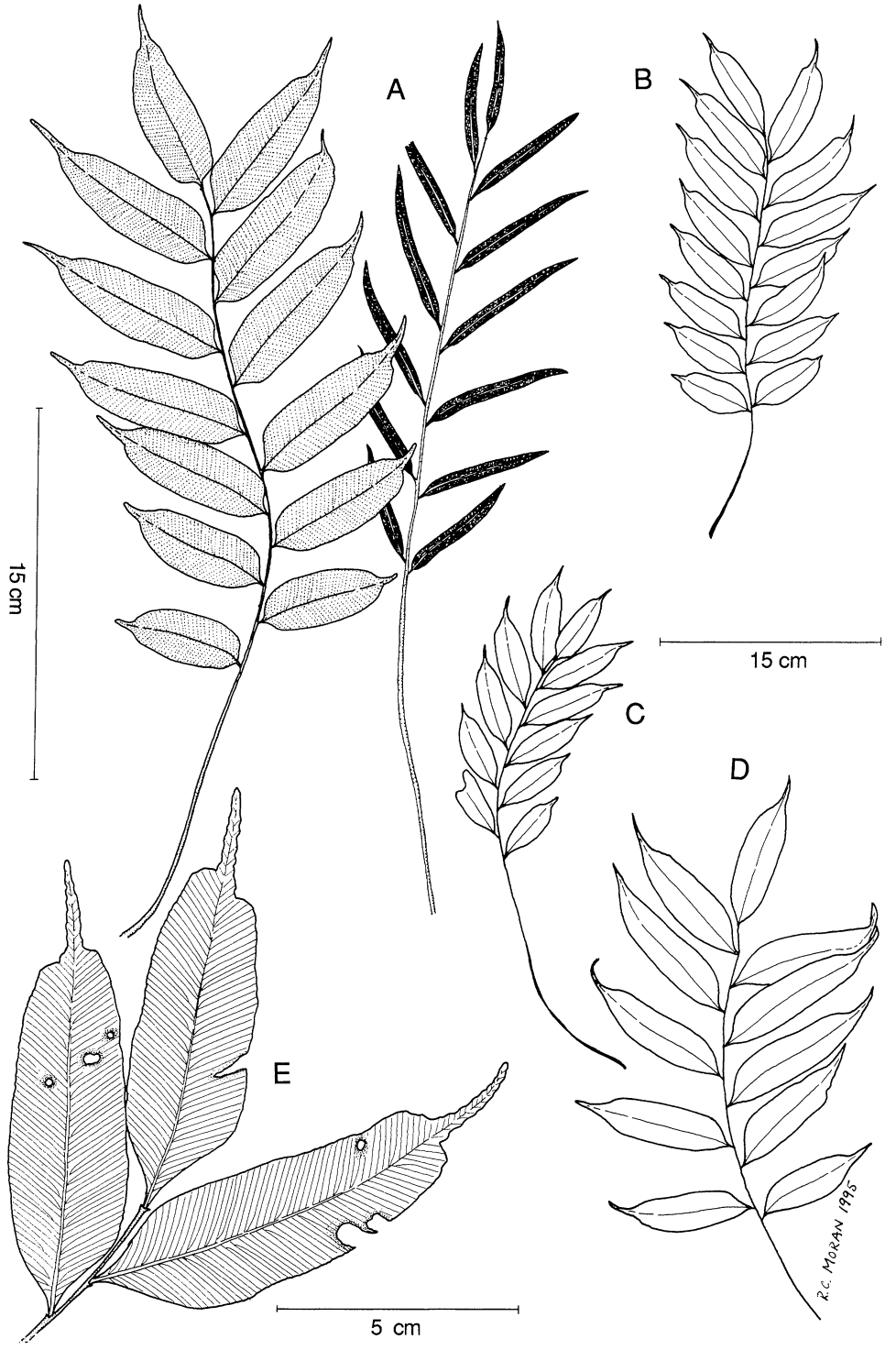

FIG. 5. *Lomariopsis jamaicensis.* **A.** Sterile and fertile leaves. **B–D.** Sterile leaves. **E.** Leaf apex; note the terminal pinna articulate to the rachis. (A–C, E, *Day s.n.,* NY; D, *Maxon 10402,* US.)

Lomariopsis phlebodes (Kunze) Fée, Mém. Foug. 2: 66. 1845. *Acrostichum phlebodes* Kunze, Linnaea 9: 33. 1835. TYPE: PERU. Loreto: Maynas, s.d., *Poeppig 2326* (HOLOTYPE: LZ–destroyed; ISOTYPE: B?; fragm. NY ex V).

Rhizome scales 2–10 mm long (2–5 mm long in Mesoamerica and South America on the western side of the Andes; 4.5–10 mm long elsewhere), dark brown to black, narrowly lanceolate to linear, entire to sparsely ciliate, somewhat spreading or (in Mesoamerica and western Andes) mostly apressed. *Leaves* to 105 cm long; petioles 8–30 cm long, 1/10–1/4 the length of the laminae; laminae reduced toward the base or (in the Guianas) only slightly so; pinnae 14–22 × 2.8–5 cm, pairs (6–)8–12(–16), alternate to subopposite, patent, lanceolate to oblong, entire, the base broadly rounded to cuneate, occasionally excavate basiscopically, sessile or short-stalked, the stalks (when present) to 3 mm long, the apices acuminate; rachises not alate. *Fertile pinnae* 1–2 cm wide; paraphyses usually present, when present consisting of branched hair-like scales; annular cells 12–15; spores smooth, very pale yellowish. $n = 41$ (Walker, 1985).

Distribution and habitat.—Lomariopsis japurensis is the most widespread species in the Neotropics, occurring from Guatemala to the Guianas and Bolivia (Fig. 7). It grows in wet forests, at 0–700 m.

Lomariopsis japurensis can be distinguished from the other American species by rhizome scales that are dark brown to blackish and narrowly lanceolate to linear. See *L. marginata, L. nigropaleata,* and *L. preiuriana* for comparisons with those species.

Lomariopsis japurensis varies geographically in the degree of lamina base reduction and length of the rhizome scales. In Mesoamerica and Amazonia, the base of the lamina is reduced with the basal pinnae usually less than one-third the length of the longest medial ones (Fig. 6C–F). The reduced basal pinnae are often broadly elliptic. Plants from the Guianas tend to have less reduced laminae with the basal pinnae usually more than half the length of the longest medial ones (Fig. 6A, B). As to rhizome scales, plants from Mesoamerica and the western side of the Andes in Colombia and Ecuador have rhizome scales 1–5 mm long, whereas those from Amazonia and the Guianas measure 4.5–10 mm long. Thus, plants from the three regions—Mesoamerica and the western Andes, Amazonia, and the Guianas—have distinctive characteristics, but because no other morphological characteristic correlates, they are all considered part of a single, variable species.

Stork 1194 (UC) (Costa Rica. Limón: Bananito, 30 m) is probably a hybrid between *Lomariopsis japurensis* and *L. vestita,* as suggested by its several intermediate characteristics. The pinnae are intermediate in size, shape, and number (ca. 19 pairs) between those of the two putative parents. Its rhizome scales are blackish like those of *L. japurensis,* but the petiole is winged distally like that of *L. vestita.* The lamina tapers gradually toward the base and resembles that of *L. vestita.* Although the specimen has a fertile leaf, the sporangia are too young to determine whether the spores are aborted. If this plant is a hybrid, then it represents a cross between the "japurensis" and "sorbifolia" groups of *Lomariopsis.*

Lomariopsis japurensis apparently also hybridizes with *L. nigropaleata* as evidenced by one specimen from Ecuador (Napo: Parque Nacional Yasuní, Km 51 on oil rd. starting at Pompeya, ca. 0.5 km S of Río Bogi, 00°44′S, 76°29′W, 200 m, 14 Apr 1996, *Moran et al. 6160,* AAU, NY, QCA, QCNE, TUR). This specimen has the lamina reduced toward the base as in *L. japurensis,* but small appressed scales as in *L. nigropaleata.* The fertile fronds on the specimen are too young to determine whether the spores are aborted.

Additional specimens examined. BELIZE. Toledo Dist., vic. of San José, 6.7 mi N of Columbia Forest Station, *Croat 24393* (MO); Toledo Dist., Columbia Forest Reserve, 6 mi S of Cabro, upper Río Grande drainage area, 300 m, *Proctor 36095* (BM); Banana bank, vic. of Cockscomb, *Schipp 107* (F).

GUATEMALA. **Alta Verapaz:** Cubilquitz, Sep 1901, *von Türckheim 425* (P), 8043 (NY, US). **Petén:** Dolores, Km 77 on Santo Toribio rd., *Contreras 2271* (US); La Cumbre, on Pusila Rd., 17 Aug 1976, *Lundell & Contreras 20199* (MO, NY).

HONDURAS. **Atlántida:** Lancetilla Valley, near Tela, 20–600 m, *Ames 94* (US), *Standley 54172* (F, US), *55597* (US); Ceiba, 110 m, 21 Jan 1917, *Dyer A230a* (NY, US). **Colón:** Clawra, *Spinden 50* (US).

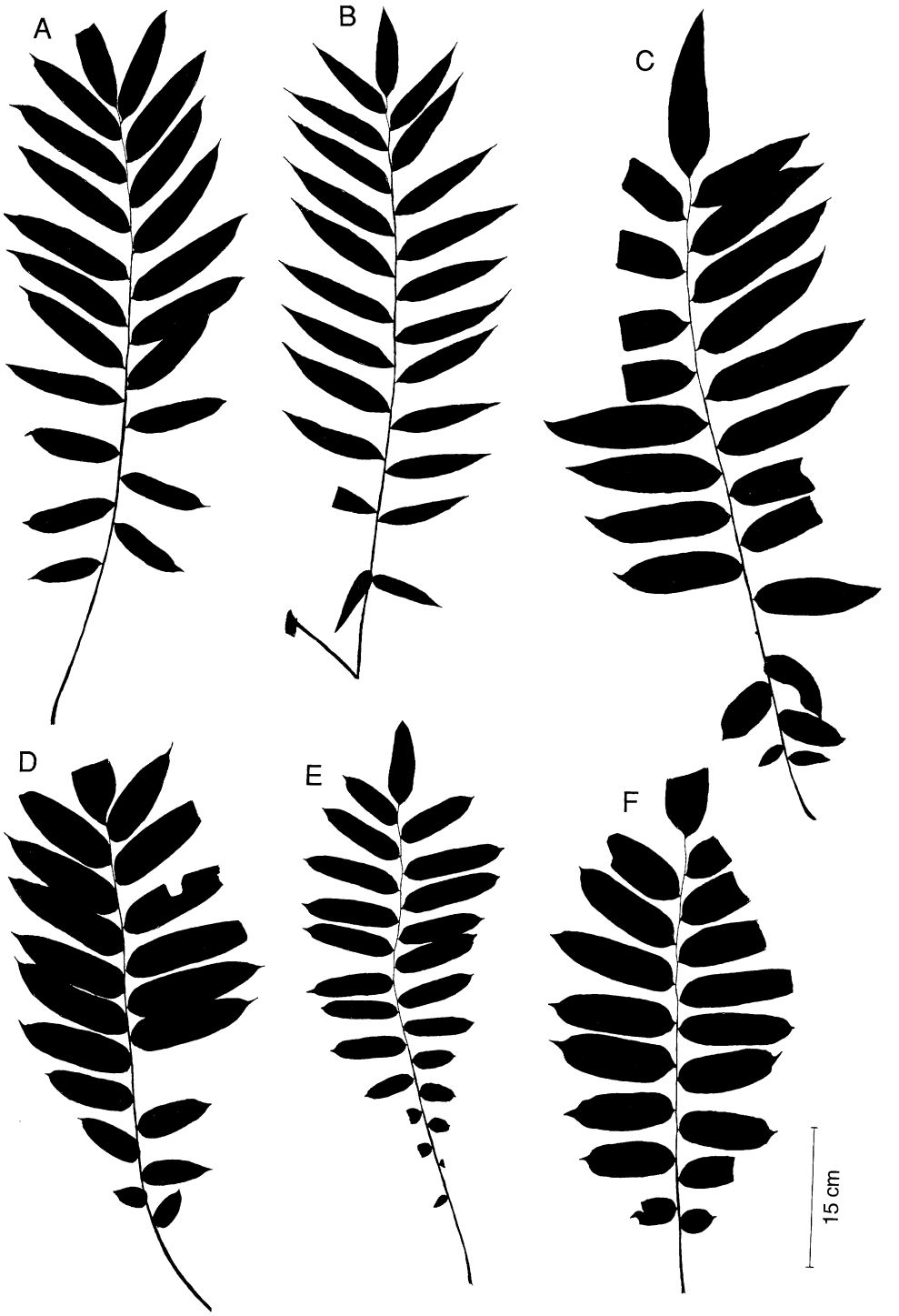

FIG. 6. Sterile leaves of *Lomariopsis japurensis*. **A.** Collector unknown (NY). **B.** *Mell 204* (US), Guyana. **C.** *Smith et al. 1686* (US), Peru. **D.** *Scamman 7181* (GH), Costa Rica. **E.** *Pipoly et al. 15228* (MO), Colombia. **F.** *Lewis et al. 11940* (MO), Peru.

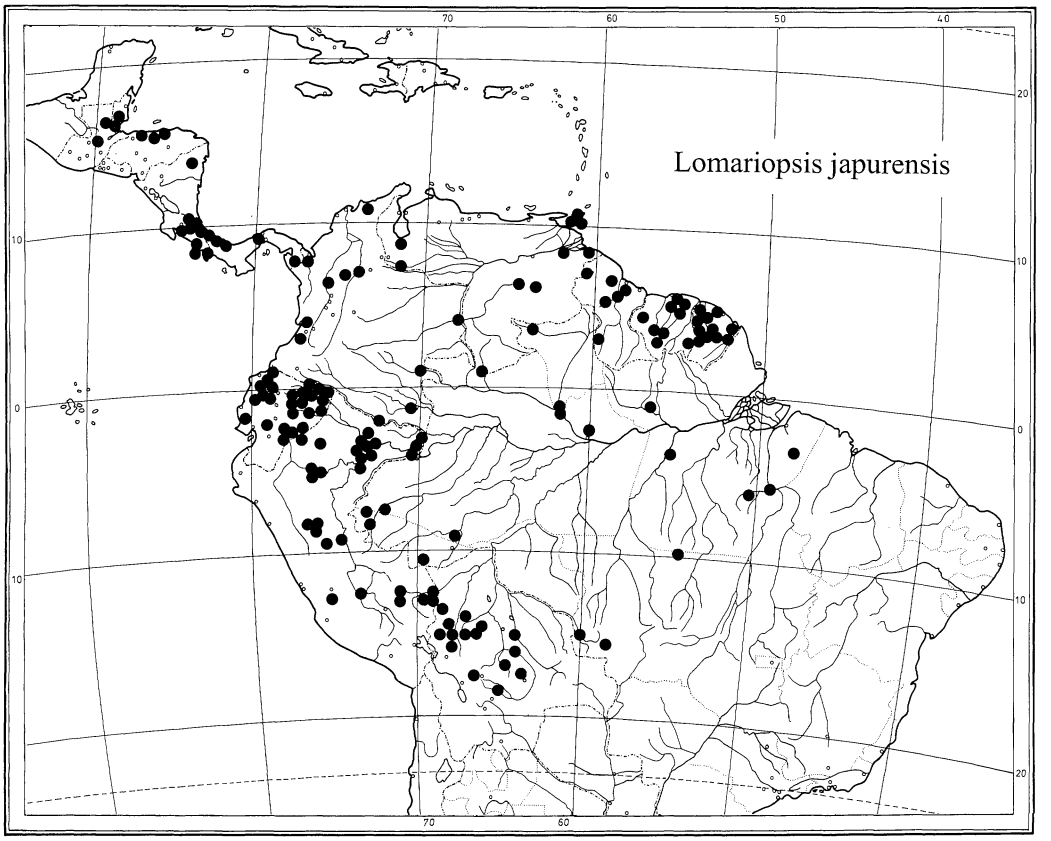

FIG. 7. Distribution of *Lomariopsis japurensis*.

Prov. Unknown: Cerros Peña Blanca, *Gómez 6858* (CR).

NICARAGUA. **Zelaya:** 12 km E of Rosita, near Río Ocunhuas, *Neill 4481* (CR).

COSTA RICA. **Cartago:** Turrialba, 600 m, 24–26 Apr 1906, *Maxon 184* (NY, US); along Río Indio de Gatun, ca. 0 m, *Maxon 4819* (US), Feb 1911, *4823* (GH, NY, US); near Turrialba, slope of Río Reventazón, behind Inst. Interamericano de Ciencias Agrícolas, 600 m, 23 Mar 1967, *Mickel 2110* (NY), 20 Aug 1967, *3371* (NY). **Heredia:** Finca La Selva, OTS field station, *Grayum 2560* (MO); Río Puerto Viejo at jct. with the Sarapiquí, 100 m, *Scamman 7491* (GH), *8034* (GH). **Limón:** Cantón de Talamanca, camp by the Río Lari, 09°26′N, 83°03′W, 300 m, *Bittner 1357* (B); Pandora, Río Estrella, 50 m, *Rossbach 3599* (GH); Los Diamantes, U.S.D.A. rubber plant station, 300 m, *Scamman 6036* (GH); La Lola, near Río Madre de Dios, *Scamman 7181* (GH, US); Suerre y Dos Bocas, *Shank & Molina 4252* (EAP, US). **Puntarenas:** Airfield 4 mi W of Rincón de Osa, 30 m, *Burger & Stolze 5403* (F); E of Santa Marta, Finca El Edén, R 2, 400 m, *Gómez 22945* (MO, UC); Carara Reserve, between guard station and Quebrada Bonita, 09°47′N, 84°36′W, 40 m, *Grayum & Warner 5713* (CR, F, MO, UC, US); Osa Peninsula, Corcovado Natl. Park, 0–2 km W of park headquarters at Sirena, 0–200 m, *Hammel & Kernan 16659* (CR), *Liesner 2925* (MO); Golfito, Playa Cacao, 08°37′N, 83°11′W, 70 m, *Herrera 7138* (CR); Corcovado Natl. Park, 08°29′N, 83°36′W, 10–50 m, *Kernan 741* (CR), *Merz 415, 552* (CR); Osa Peninsula, 50–600 m, 21 Mar 1967, *Mickel 1967* (NY); Cantón de Golfito, Valle de Coto Colorado, 08°37′N, 83°11′W, 50–130 m, *Rojas 1170* (CR); Cabagra, *Tonduz 6553* (CR, US); Playa Blanca, Golfo Dulce, *Valerio 352* (CR, F).

PANAMA. **Bocas del Toro:** Boca Chica, *Correa A. et al. 3596* (US); orillas del Changuinola, Corriente Grande, *Correa A. et al. 3910* (US); near Laguna de Chiriquí, *Hart 45* (US). **Canal Area:** Near Frijoles, *Killip 2905* (US); near Topía River, *Killip 2900* (US). **Chiriquí:** Burica Peninsula, 8 km W of Puerto Armuelles, 50–150 m, *Croat 21952* (MO, US); without locality, *Hart s.n.* (K). **Darién:** Cana, 480 m, *Croat 38016* (MO). **Prov. Unknown:** Without locality, 1859–1861, *Hayes 4* (B, BM, GH, NY, US).

TRINIDAD. Maracas waterfall, 10 Apr 1920, *Britton et al. 1652* (K, NY, US); Talparo, 6 Mar 1921, *Britton et al. 2163* (US); Oropuche local rd. via Valencia, *Broadway 6166* (K); Maracas, near the Falls, *Broadway 6705* (MO, S); without locality, *Crüger 1159* (B); without locality, 1877–1880, *Fendler 106*

p.p. (C, B, G, GH, MO, NY, P, UC, US); Turure Ward, Mt. Harris, off Cunapo Southern Rd., 120 m, 30 Jul 1963, *Jermy 2561* (MO, NY); Aripo Cave trail, 600 m, 9 Jul 1984, *Mickel 9531* (NY).

FRENCH GUIANA. St. Jean du Maroni, *Benoist 1286* (P); Rivière Kourouaï, 04°15′N, 51°58′W, 1 m, *Billiet & Jadin 5842* (MO); Saül, Monts La Fumée, 03°37′N, 53°12′W, 200–400 m, 4 Oct 1982, *Boom & Mori 1853* (NY), 14 Oct 1982, *2089* (NY); Pied du Piton Rocheux Remarquable Haut de la Crique Armontabo, *Cremers 7103* (P, Z); River Mana, Saut Dalles, *Cremers 7225* (Z); Région de Paul Isnard, SW du Citron, pied du Mont Décou Décou, *Cremers 7884* (Z); Montagne de l'Inini, extrèmité NW, 03°30′40″N, 53°36′W, 670 m, 14 Aug 1985, *Cremers 8895* (NY, Z); Haute Crique Nouciri, affleunt de l'Oypaock N Camopi, Inselberg ENE du Grand Croissant, *Cremers 8294* (Z); Bassin de l'Oyapock, Crique Gabaret, 03°55′N, 51°48′W, 5 m, *Cremers 9880* (Z); village Boni de Loca, Bassin du Maroni, Lawa, 03°50′N, 54°12′W, 1 May 1986, *Fleury 195* (NY, US); Régina, E plateau of Mt. Tortue, 11 km WNW of Approuague River, 04°18′N, 52°22′W, 200–450 m, 12 Jun 1988, *Feuillet 9946* (NY); Yaroupi River, tributary of the l'Oyapock, at the foot of Saut Tainoua, *de Granville 438* (U, US); Tumuc Humac, near Surinam border, *de Granville 1487* (P, U); Montagne de la Trinité, sommet NE, 120 m, 6 Feb 1984, *de Granville 6576* (B, G, U, US, Z); Mt. Galbao, 03°37′N, 53°17′W, 180 m, *de Granville 8473* (B); Saul, Route de Bélizon, N of Eaux Claires, 03°37′N, 53°12′W, 23 Sep 1995, *Heald & Yahr 42* (NY); Bassin du Sinnamary, 05°13′N, 52°57′W, 5 m, *Hoff et al. 165* (Z); without locality, *Leprieur 63* (G); without locality, *Melinon 432* (P); Saül, Mt. Galbao trail to Cambrouze, 03°37′N, 53°12′W, 200–300 m, 15 Sep 1989, *Mori et al. 20924* (NY); Saut Parare, Arataye River, 04°02′N, 52°42′W, 0 m, 24 Sep 1992, *Riéra 1512* (NY); Crique Inini, *Sauvain 80* (Z); Maripa, 8 May 1985, *Sauvain 344* (B, NY); 1.5–2 km de Saül, Crique Limonade, *Windisch 5258* (AAU).

SURINAME. Mapane Forest Camp 8, *Bierhorst S93* (GH); Boven–Tapanahony, Awalapé Creek, *Elburg 8815* (U); Emmaketen, 250 m, *Daniëls & Jonker 1298* (U); Mt. Bakhuis, along Kabalebo River near airstrip, *Florschütz & Maas 2324* (U); lower Saramacca River, Jarikaba creek, between Uitkijk and Groningen, *Kramer & Hekking 2176* (U); without locality, *Hostmann 188* (K); 2 km S of Juliana Top, 13 km N of Lucie River, 03°36′–41′N, 56°30′–34′W, 300 m, 11 Aug 1963, *Irwin et al. 54689* (MO), *54692A* (NY); without locality, *Kuyper 913* (US); Suriname River, Jandékreek, Feb 1954, *Lindeman 4448* (MO, NY, U); Dist. Para, *Lindeman 15288* (U); Perica River, *Narain 13831* (U, Z); Jodensavanne–Mapanekreek area, *Lindeman 5250* (US), *Schulz 9900* (MO, U, Z); SE Suriname, Anapaike, upper Tapanahoni River, *Terpstra 14* (U); Dist. Brokopondo, Suriname River, S of Kabelstation, *van Donselaar 1090* (U); near airport on Olelemari River, 03°06′N, 54°33′W, *Wessels Boer 1033* (U).

GUYANA. Coyorunie Creek, *Appun 179* (K); NW Kanuku Mtns., tributary of Nappi creek, 03°23′N, 59°30′W, 150–200 m, 14 Feb 1993, *Hoffman 3779* (NY); Demerara River, *Jenman s.n.* (K); Mt. Raywa, *Jenman s.n.* (K); Potaro River, *Jenman 1462* (K); Essequibo River, *Jenman s.n.* (K); Kartabu Point, Cuyuni River, 5 Aug 1933, *Mell & Mell 204* (NY, US); Río Cuyuni, Absaio Landing, *Richards 819* (K); without locality, *Schomburgk 1673* (B).

VENEZUELA. **Amazonas:** Depto. Río Negro, 1.5 km E of Cerro de La Neblina Base Camp on Río Mawarinuma, 00°50′N, 66°10′W, 2–3 Dec 1984, *Liesner 17449* (MO, NY, UC, US). **Apure:** Dtto. Paéz, 25 km by car E of El Nula, 07°14′N, 71°45′W, *van der Werff & González 4690* (MO). **Bolívar:** Quebrada Acarabisi, limites con la Zona de Reclamación, *Aymard et al. 951, 959* (UC), *961* (Z); limites con el T.F. Delta Amacuro, 36 km NW de El Palmar, 08°25′N, 62°00′W, 350 m, 11 Mar 1987, *Aymard C. 5248* (AAU, MO, NY, UC); Pto. Akarabisí, Río Cuyuní, *Stergios & Aymard 2789* (UC); Río Tonoro, arriba de la quebrada del Tueno 06°04′N, 63°42′W, 175 m, *Stergios 10405* (MO); campamento Las Pavas, Salto Para, Río Caura, ca. 06°10′N, 64°25′W, 230–280 m, *Steyermark & Dunsterville 113095* (GH, MO). **Delta Amacuro:** Depto. Antonio Diaz, 12 km S de San José de Amacuro, 08°28′N, 60°27′W, 0 m, Feb 1987, *Fernández 3912* (MO, NY, US), *3914* (MO, NY). **Mérida:** 15 km from El Vigía, 130 m, *Vareschi & Pannier 1662* (US).

COLOMBIA. **Amazonas:** Mun. Leticia, Parque Nacional Natural Amacayacu, Trocha de Matamatá a Amacayacu, 03°47′S, 70°15′W, 100 m, *Pipoly et al. 15228* (MO), *Pipoly & Murillo 15482* (MO); Parque Nacional Natural Amacayacu, Quebrade de Agua Pudre, 1.5 km NE de desembocadura sobre el Río Amacayacu, 03°47′S, 70°15′W, 200–220 m, *Pipoly 16187* (MO); Río Caqueta, Monochoa, caserio Huitoto–Nipode, 25–30 km from Araraccuara, *Sastre & Raichel D. 5031* (G). **Antioquia:** Bendix site, Río León, *Cain 76* (US); Mun. Remedios, Sitio Otú, 3 km del Corregimiento Santa Isabel, Vereda Los Lagos, 11 km de Remedios, 06°56′N, 74°45′S, 820 m, 14 Jul 1987, *Callejas et al. 4704* (MO, NY); Mun. Anorí, Corregimento de Providencia, Tirana Creek, 400–700 m, 24 Oct 1972, *Soejarto 3476* (F, NY). **Cauca:** Río Micay, brazo Noanamito, El Chachajo, 2–5 m, *Cuatrecasas 14245* (US). **Chocó:** Truando Falls, *Schott 86* (F, NY). **Magdalena:** San Pablo, 8 Sep 1852, *Holton 21* (K, NY); Santa Marta, 22 May 1898, *H. H. Smith 2697* (K, NY). **Sur de Santander:** Magdalena Valley, between Sogamoso and Colorado Rivers, vic. of Barrancabermeja, 100–500 m, *Haught 1331* (GH, UC, US). **Valle:** Río Calima, La Trojita, 5–50 m, *Cuatrecasas 16381* (AAU, US). **Vichada:** La región de Amanaven, Río Guaviare, 250 m, *Molina & Barkley s.n.* (US).

ECUADOR. **Chimborazo:** Huigra, Hda. de Licay, 8 Sep 1918, *Rose & Rose 22611* (GH, US); Sacramento Distr., SW part of prov., 02°10′S, 79°W, 1100 m, *Wiggins 11114* (US). **Esmeraldas:** Zapallo Grande, along Río Cayapa, 00°48′N, 78°54′W, 200 m, *Barfod et al. 48125* (AAU); 35 km W of Quininde, Bilsa Biol. Station, 00°21′N, 79°44′W, 400–600 m, 28 Mar–11 Apr 1995, *Clark & Troya 595* (NY); Río Cayapa, Zapallo Grande, 00°48′N, 78°54′W, 100 m, *Kvist & Asanza 40333* (AAU, MO); 32.5 km from Santo Domingo de los Colorados on rd. to Esmeraldas, 285 m, *Ellenberg 3047* (GH); Río Bolborde, a tributary to Río San Miguel in the upper Cayapa River system,

00°40′N, 78°53′W, 300 m, *Kvist et al. 48284* (AAU); Lita–San Lorenzo rd., 5.9 km from Lita, 7 Feb 1991, *Moran & Rohrbach 5340* (MO). **Los Rios:** Cantón Vinces, Jauneche Forest, between Mocachi and Palenque on Estero Peñafiel, *Dodson et al. 7099* (F, MO, US), *8786* (MO); Río Palenque Biol. Station, Km 56 on Quevedo–Santo Domingo rd., 150–220 m, 15 Jul 1972, *Evoy 17* (NY); Pichilingue Exp. Station Preserve, 75 m, 2 Aug 1962, *Játiva & Epling 293* (NY, UC, US); Centinela ridge, 20 km E of Patricio Pilar, 600 m, *van der Werff et al. 12393* (MO, QCNE). **Morona-Santiago:** Trail along Río Inimkis, 3 km NE of Inimkis village toward foothills of Cordillera Cutucú, 02°23′S, 78°06′W, 900 m, *Øllgaard & Navarrete 1451* (AAU). **Napo:** San Pablo de los Secoyas, 00°15′S, 76°21′W, 300 m, 17 Aug 1980, *Asanza C. 32923* (AAU, MO), 5 Aug 1980, *Brandbyge 32440* (AAU, MO, NY); Jatun Sacha Biol. Station, 8 km E of Misahuallí, 01°04′S, 77°36′W, 400 m, *Fay & Fay 2783* (MO, UC); 80 km upriver from Nuevo Rocafuerte, 225 m, *Foster 3799* (F, US); Cantón Tena, Río Blanco community, headwaters of Río Huambuno, 6 km NNW of Ahuano, 01°00′S, 77°40′W, 440 m, *Kohn 1015* (MO); 1.1 km E of Río Conejo on rd. to Lago Agrio, 11.4 km W of Lago Agrio, 340 m, 31 Mar 1972, *MacBryde & Dwyer 1395* (NY); Río Napo and Río Huambuno jct., 01°00′S, 77°30′W, 450 m, *Marles EE52* (F, MO); at Río Suno, 3 km W of Río Napo, 00°42′S, 77°10′W, 400 m, *Holm-Nielsen & Jeppesen 879, 914* (AAU, C); Río Cuyabeno, between Puerto Montúfar and Río Aguas Negras, 00°08′S, 75°58′W, 220 m, *Holm-Nielsen 21348* (AAU); Río Huamuno, 20 km E of Puerto Mishualli, 01°01′S, 77°30′W, 450 m, 28 Jun 1986, *Miller et al. 2300* (MO, NY); Parque Nacional Yasuní, Río Tiputini, 00°04′S, 76°28′W, 200, 10 Apr 1996, *Moran et al. 6021, 6061, 6098, 6133* (AAU, NY, TUR); Río Napo, at mouth of Río Huambuno, 3 km downstream from Campana Cocha, 00°55′S, 77°25′W, 350 m, *Neill et al. 7734* (MO); 8 km rio abajo de Puerto Misahualli, por el Río Napo y 1.5 km S, 01°04′S, 77°36′W, 450 m, *Palacios 452* (AAU, F, GH, K, MO, UC); Río Tiputini, W of Puerto Colón, 00°38′S, 76°42′W, 350 m, *Øllgaard 98959* (AAU); upper Río Tiputini, 2 canoe-hours from bridge on Coca-Auca oilfield rd., 00°43′S, 76°57′W, 300 m, *Øllgaard & Blasco 99049* (AAU); Río Aguarico, Shushufindi, 244 m, *Vickers 76* (F). **Pastaza:** Ceilán, Pica from Ceilán to Río Cononaco on N side of Río Curaray, 01°36′S, 75°40′W, 200 m, *Brandbyge & Asanza C. 31652* (AAU, MO); Río Papyacu at Río Curaray, 01°29′S, 76°42′W, 235 m, *Holm-Nielsen et al. 22623* (AAU); Chapetón on Río Bobonaza, Shiuna, N of river, 01°38′S, 77°42′W, 450 m, *Øllgaard & Navarrete 1398* (AAU); Río Bobonaza, between Huagracachí and Cachitama, below Montalvo, 02°20′S, 76°43′W, 300 m, *Øllgaard et al. 34608, 34637* (AAU); Río Pastaza, between Destacamento Chiriboga and Apachi Entza, 02°20′–32′S, 76°55′–77°08′W, *Øllgaard et al. 35206* (AAU); oil exploration camp Chichirota, Río Bobonaza, 02°22′S, 76°40′W, 300 m, *Øllgaard et al. 35267* (AAU, GH). **Pichincha:** Km 170–175 on rd. Santo Domingo–Quindindé, 300 m, *Acosta S. 13814* (F); 2 km W of Santo Domingo, 300 m, 30 Oct 1961, *Cazalet & Pennington 5201* (B, K, NY, UC, US); Colorado community "Congoma Grande," 23 km on Santo Domingo–Puerto Limón rd., 00°21′S, 79°22′W, 100 m, *Kvist 40163* (AAU), *Kvist & Holm-Nielsen 40020, 40223* (AAU), *40229* (AAU, MO); ca. 15 km from Santo Domingo, behind Brasilia a Toachi, along Río Toachi, 600 m, 12 Jan 1984, *Moran 3549* (MO); Saguangal, Hda. Conquista, water catchment forest reserve 2 km S of Hda., 00°14′N, 78°47′W, 800 m, *Øllgaard et al. 1080* (AAU, QCA), *1134* (AAU, QCA); Carretera Quito–Puerto Quito, 10 km al N de la carretera principal, Reserva Forestal ENDESA, 650–700 m, 00°05′N, 79°02′W, 15 Aug 1984, *Rios et al. 63* (AAU, F, MO, NY); near Naranjito, *Rimbach s.n.* (P); Carretera Quito–Puerto Quito, Km 113, 00°05′N, 79°02′W, 800 m, *Rodríguez et al. 291* (AAU). **Morona-Santiago:** Taisha, 500 m, 2 Feb 1962, *Cazalet & Pennington 7642* (BM, NY, UC); Macuma, on the Macuma River, S of Chiquaza, 700 m, *van der Werff 680* (U). **Sucumbíos:** Río Cuyabeno, 2 km upstream from Puerto Bolívar, 00°06′S, 76°10′W, 300 m, *Brandbyge et al. 33683* (AAU, MO); Lagunas de Cuyabeno, 00°01′S, 76°11′W, *Brandbyge et al. 36144* (AAU, MO); Cantón Aguarico, Parque Nacional Yasuní, Lagunas de Garza Cocha, 01°01′S, 75°47′W, 200 m, *Cerón & Gallo 4915, 5094* (MO, UC), *5096* (MO); Parque Nacional Yasuní, Pozo petrolero Daimi, 00°55′S, 76°11′W, 200 m, *Cerón & Hurtado 4211* (MO, UC); Añangu, Río Napo, 00°31′–32′S, 76°23′W, 260–350 m, *Lawesson et al. 39511* (AAU); Lago Agrio Cantón, Reserva Cuyabeno, Río Aguarico, comunidad indígena Cofán del Zábalo, 230 m, 00°22′S, 75°45′W, 230 m, *Palacios et al. 9522* (MO, UC).

PERU. **Ayacucho:** Río Apurimac Valley, near Kimpitriki, 400 m, 10–11 May 1929, *Killip & Smith 22871* (NY, US). **Cuzco:** Prov. La Convención, Hda. Luisiana, Apurimac River, 12°30′S, 73°40′W, 710 m, *Dudley 11571* (GH). **Huánuco:** Tingo María, 760 m, *Ellenberg 2374* (U), *Stork & Horton 9472* (F, K, UC); Pachitea, Codo de Pozuzo, 09°40′S, 75°25′W, *Foster 9376* (MO); Cucharas, cerca de Tingo María, 500 m, *Woytkowski 1803* (GH). **Loreto:** Prov. Maynas, Río Yubineto, tributary of Río Putumayo, 01°S, 72°20′W, 150 m, *Barrier 377* (MO); near mouth of Río Napo, *Croat 20141* (MO, UC); Lagunas, along Río Huallaga, *Croat 17847* (MO, UC); Quebrada Tahuayo above Tamishiyaco, *Croat 19859* (MO, UC); Río Mamón near Río Nanay, *Croat 19927* (MO); Prov. Maynas, Región Loreto, 73°16′W, 122 m, *Flores 23* (AAU), 117 (AAU); Prov. Maynas, Yanamono Explorama Tourist Camp, 130 m, *Gentry et al. 72192* (MO), 26 Jun 1984, *Moran 3646* (AAU, MO, NY, UC), *Pipoly et al. 13927* (MO), 30 Jul 1988, *van der Werff et al. 9861* (F, NY), *9942* (MO, UC), *9949* (AAU, MO, UC); San Antonio, on Río Itaya, 110 m, 18 Sep 1929, *Killip & Smith 29313* (US), 100 m, *Killip & Smith 29525* (F, NY); Puerto Arturo, lower Río Huallaga below Yurimaguas, 135 m, 24–25 Aug 1929, *Killip & Smith 27909* (NY, US); Soledad, Río Itaya, 110 m, 20–22 Sep 1929, *Killip & Smith 29702* (K, NY, US); Santa Rosa, lower Río Huallaga below Yurimaguas, 135 m, 1–5 Sep 1929, *Killip & Smith 28978* (NY, US); Prov. Loreto, Pampa Hermosa, Río Corrientes, 1 km S of jct. with Río Macusari, 03°15′S, 75°50′W, 160 m, *Lewis et al. 10689* (MO); Puranchim, Río Sinchiyacu,

02°50′S, 76°55′W, 200 m, *Lewis et al. 11940* (MO); Prov. Maynas, Dtto. Indiana, Sacarita de la quebrada de Yanayacu, 90 m, *McDaniel & Rimachi Y. 25671* (MO), 30 Dec 1982, *McDaniel & Rimachi Y. 26557* (NY); Dtto. Las Amazonas, Explornapo Camp, cerca de Sucusari, Río Napo, 03°20′S, 72°55′W, 100–140 m, *Pipoly et al. 13735, 14326* (MO); Zapote, Alto Purus, *Rivier 17, 18* (GH); Gamitanacocha, Río Mazán, 100–125 m, 22 Feb 1935, *Schunke V. 306* (F, GH, MO, NY, UC); Prov. Maynas, tourist lodge of Amazon Selva Tours at Río Momón, 03°40′S, 73°20′W, *Tuomisto 2520, 2598* (TUR); Prov. Maynas, 5 km NW of Gen Gen at Río Momón, 03°37′S, 73°17′W, *Tuomisto 3084* (TUR); Prov. Maynas, Explorama Tours at Río Sucusari, 03°10′S, 72°52′W, *Tuomisto et al. 5722, 5725, 5751* (TUR); Prov. Maynas, Alpahuayo, field station of IIAP, ca. 26 km along Iquitos–Nauta rd., 130 m, *van der Werff et al. 10210* (AAU, F, MO); Maynas Prov., Habanillo, Km 67 carretera Iquitos–Nauta, 04°30′S, 73°30′W, 130 m, *Vásquez et al. 11210* (MO); Prov. Maynas, Indiana, Reserva Explorama, 03°28′S, 72°50′W, 106 m, *Vásquez & Jaramillo 13165, 13702* (MO); Puerto Arturo, *Williams 5262* (F); Caballo-Cocha on the Amazon River, *Williams 2254* (F). **Madre de Dios:** Prov. Tambopata, Tambopata Nature Reserve, 30 air km or 70–80 river km SSW of Puerto Maldonado, 12°49′S, 69°17′W, 260 m, 14 Apr 1980, *Barbour 4766* (MO, NY); Tambopata Reserved Zone, 12°50′S, 69°17′W, 15 Mar 1988, *Bell et al. 88-180* (US); Parque Nacional del Manú, Cocha Cashu Biol. Station, *Foster P-84-11* (AAU), *P-84-88* (MO); Prov. Manu, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, 12°35′S, 71°18′W, 650–700 m, *Foster et al. 10756* (MO); Prov. Manu, Atalaya, Hda. Amazonia, 2–3 km W of village, across Río Alto Madre, 12°55′S, 71°12′W, 500–600 m, *Foster & Wachter 7439* (MO); 39 km SW of Puerto Maldonado, Río Tambopata and Río La Torre, 12°50′S, 69°20′W, *Smith et al. 1686* (US); Prov. Tambopata, Las Piedras, Cusco Amazónico, 12°29′S, 69°03′W, 200 m, *Timaná & Rubío 2059* (MO), *Timaná & Jaramillo 2418, 2633, 2862* (MO); Tambopata, Río Piedras, 350 m, *Vargas C. 18688* (Z). **San Martín:** Prov. Mariscal Cáceres, Tocache Nuevo, quebrada de Cachiyacu, 600–700 m, *Schunke V. 8518* (F, MO, UC). **Ucayali:** El Sacramento, 98 km S of Pucallpa, *Ellenberg 2533* (U).

BOLIVIA. **Beni:** Prov. Yacuma, Campamento Campo Monos, por el Río Curiraba, 14°38′S, 66°04′W, 195 m, *Acebey A. 34* (UC); Prov. Ballivián, Río Colorado, Collegio Técnico Agropecuario de Río Colorado, 15°00′S, 67°10′W, 235 m, *Fay & Fay 2061, 2077* (MO); Prov. Ballivián, Km 35 on Yucumo–Rurrenabaque rd., Agricultural-Technical High School at Río Colorado, 14°15′S, 67°05′W, 235 m, *Fay & Fay 2642* (LPB, MO, UC), *2674* (LPB, MO), *2693* (MO); Prov. Moxos, 15°10′S, 66°37′W, 260 m, *Fay & Fay 2798* (LPB, MO, US); Prov. Yacuma, Beni Biosphere Reserve, El Gran Meandro, E of Río Maniqui, 20 km below San Borja, 17°47′S, 66°33′W, 250 m, *Foster & Ribera 12309* (LPB); Prov. Ballivián, 12 km por el camino maderero, SW del Km 12 Yucuao–Rurrenabaque, 15°04′S, 67°07′W, 450 m, *Kessler et al. 10703* (UC); Prov. Vaca Diez, Riberalta 14 km sobre la carretera a La Paz y desviando 11.5 km hacia la Comunidad Berlin, *de Michel & Capra 2488* (LPB); Prov. Yacuma, Estación Biol. Beni, 250 m, *Moraes R. 1029* (LPB, MO); Prov. Ballivián, 50 km de San Isidro, Jul 1978, *Rolleri 86* (NY); Prov. Ballivián, Km 38 carretera Yucumo–Rurrenabaque, terreno del Colegio Técnico Agropecuario en Río Colorado, 14°50′S, 67°05′W, 7–14 Apr 1989, *D. N. Smith et al. 12884* (AAU, F, LPB, MO, NY, UC). **Cochabamba:** Todos Santos, Río Chapare, 160 km, 600 m, *Adolfo 80* (US); Prov. Carrasco, Projecto Valle del Sacta, 241 km W of Santa Cruz, 17°12′S, 64°43′W, 290 m, *Fay & Fay 2342* (F, LPB, MO, UC, US); Prov. Chapare, 1 km de la Caverna Repechon hacia Villa tunari, 500 m, *Kessler et al. 8372* (UC); Prov. Chapare, Hotel el Puente, 2 km SE de Villa Tunari, 300 m, *Kessler et al. 8413* (UC). **La Paz:** Limite con Beni, Prov. Sud Yungas, Río Quiquibey, 320 m, *Beck 8042* (LPB); Alto Madidi, 13°35′S, 68°46′W, 280 m, *Gentry & Estensoro 70517* (MO, UC); Prov. Franz Tamayo, 42 km W y 1 km N of Rurrenabaque, 14°25′S, 67°55′W, 330 m, *Helme 210* (AAU); Prov. Abel Iturralde, Río San Antonio, 46 km de Ixiamas a Alto Madidi, 13°38′S, 68°26′W, 300 m, *Kessler et al. 11101* (UC); Prov. J. Bautista Saavedra M., Pauji-Yuyo, entre Apolo y Charanzani, 15°03′S, 68°29′W, 900 m, *Kessler et al. 10166* (UC). **Pando:** W bank of Río Madeira opposite Penha Colorada, 20 Nov 1968, *Prance et al. 8705* (NY). **Santa Cruz:** Prov. Ichilo, Santa Cruz 130 km NW linea recta, puente Río Yapacaní, 35 km hacia Puerto Grether, 250 m, *Beck 6583* (F, LPB); Prov. Velasco, Los Fierros, 14°33′S, 60°55′W, 200 m, 20 Aug 1996, *Jardim et al. 3338* (NY); Prov. Ichilo, 1.5 km arriba del campamento Manucu, *Kessler et al. 8633* (UC); Prov. Ichilo, Parque Nacional Amboro, Quebrada Yapoje, above confluence with Río Saguayo, 17°34′S, 63°44′W, 400 m, 13 Dec 1989, *Nee 38129* (NY); Prov. Ichilo, Parque Nacional Amboro, 17°40′S, 63°44′W, 500 m, 19 Jan 1988, *Nee 36000* (LPB, MO, NY); Río Japacani, 400 m, 9 Mar 1926, *Steinbach 7502* (B, F, G, GH, K, MO, NY, S, U, US, Z). **Prov. Unknown:** Río Chimate, 600 m, 10–14 Apr 1926, *Tate 512* (NY); Tumupasa, 600 m, 8 Jan 1902, *Williams 1192* (GH, NY, US); San Buena Ventura, 400 m, 23 Nov 1901, *Williams 1196* (GH, NY).

BRAZIL. **Acre:** Mun. Canamar Amazona, N of Cruziero do Sul, downstream along Río Jurua, 07°37′S, 72°36′W, 150 m, *Croat 62534* (MO, UC); Mun. Assis Brasil, basin of rio Purus, upper rio Acre, Seringal São Francisco, 10°56′S, 69°45′W, 26 Mar 1998, *Daly et al. 9817* (NY); Cruzeiro do Sul, rio Moa between Igarapé Iprianga and Aquidabã, 18 Apr 1971, *Prance et al. 12055* (K, NY, UC); rio Juruá between Mundurucus and Tatajuba, 13 May 1971, *Maas et al. P12886* (NY, US), *Prance et al. P12886* (UC). **Amazônas:** Near Manaus, *Berg 290* (U); Rio Negro between Rio Branco and town of Moura, 11 Nov 1971, *Prance et al. 16273* (NY); Linda vista, rio Purus, *Traill 1394* (K); rio Juruá, *Ule 5757* (G). **Mato Grosso:** Matto do Curupira, *Lindman 2991* (K); Pará–Matto Grosso border, Cachimbo hills, Cachimbo airfield, 400 m, *Hemming 26* (K); Serra Ricardo Franco, 15°S, 60°W, 400 m, *Windisch 1506* (AAU), *1897* (B, GH); Mun. de Jaurú, Dtto. de Taquaruçú, rio Jaurú, 15°15′S, 58°45′W, 350 m, *Windisch 6693* (AAU, US). **Pará:**

BR-230, Transamazon Hwy., near EMBRAPA Station, at Km 23 on Altamira–Itaituba rd., 30 Oct 1977, *Berg & Prance BG767* (K, NY); Mun. Paragominas, Pará, 27 Oct–7 Nov 1929, *Killip & Smith 30631* (NY, US); Serra dos Carajás, 8.5 km W of AMZA camp N-1 on rd. to Rio Itacaiúnas, 05°59′S, 50°20′W, 250 m, 21 May 1987, *Sperling et al. 5789* (GH, NY); Serra dos Carajás, 2 km W of camp ECB on the ferrovia, 47 km W of BR-150, 05°35′S, 49°15′W, 150 m, 28 Jun 1982, *Sperling et al. 6388* (NY); cataractas of Aripecurú River, *Spruce 569* (K, P); without locality, *Spruce 27* (K); rapids of Porteira, Rio Trombetas, *Traill 1395* (GH, K). **Roraima:** Between Maitá (03°20′N, 63°24′W) and Paramiteri Indian village, 03°25′N, 63°03′W, 20 Feb 1971, *Prance et al. 10637* (K, NY, UC); rio Negro between rio Branco and Moura, *Prance et al. 16273* (K, NY). **State Unknown:** Without locality, *Luschnath 16* (B); without locality, *Sellow 137* (B).

5. LOMARIOPSIS KUNZEANA (Underw.) Holttum, Bull. Misc. Inform. Kew 1939: 617. 1940. *Olfersia kunzeana* C. Presl (nom. nud.), Tent. Pterid. 235. 1836. *Stenochlaena kunzeana* Underw., Bull. Torrey Bot. Club 33: 196. 1906. TYPE: CUBA. **Holguín:** Prope villam Monte Verde dictam, Jan–Jul 1859, *Wright 973* (HOLOTYPE: NY; ISOTYPES: B, G, GH, K, MO, S, U, US). (Fig. 8)

Rhizome scales 2–5 mm long, pale brown, lanceolate, spreading. *Leaves* to 70 cm long; petioles to 17 cm long, 1/7–1/2 the length of the laminae; laminae strongly to slightly reduced at the base, with larger leaves tending to have less reduced bases, usually oblanceolate, with the apical pinna continuous with (not articulate to) the rachis; pinnae 4–11 × 1–1.5(–2) cm, pairs 10–23, alternate, patent, narrowly lanceolate, serrulate throughout (strongly and sharply dentate on small leaves), the base cuneate, equilateral, at least the proximal pairs stalked, the stalks 2–6 mm long, the apices gradually tapered; rachises marginate to narrowly winged. *Fertile pinnae* 4–8 mm wide; paraphyses absent; annular cells 14 or 15; spores smooth, very pale yellowish to hyaline.

Distribution and habitat.—Lomariopsis kunzeana occurs at 0–800 m in the forests and hammocks of southern Florida and the Greater Antilles (Fig. 9). In Florida it is rarely epiphytic and tends to grow on limestone, particularly in sinkholes. Its gametophytes, which are elongate or ribbon-shaped and irregularly branched, often grow among the rhizome scales of mature plants (James H. Peck, pers. comm.).

Lomariopsis kunzeana is characterized by serrulate pinnae that are narrowly cuneate and gradually tapered to the tip (Fig. 8G). Most specimens have cuneate laminae, although this also occurs in related species, especially on juvenile leaves. The juvenile leaves of *L. kunzeana* have strongly and sharply dentate pinnae (Fig. 8C, D).

Additional specimens examined. UNITED STATES. **Florida:** Dade Co., N of Old Cutler Rd. and E of 67th Ave., Sudlum Rd. near U.S. Plant Introduction Station, *Darling s.n.* (US); 12 mi S of Cutler, Ross's hammock, Nov–Dec 1903, *Eaton 677* (NY, US), 12 Nov 1906, *Small & Carter 2383* (NY); 1 mi W of Naranja, Timm's Hammock, *Correll 6088* (US); Hammock, Coconut Grove, Snapper Creek, *Rodham s.n.* (NY); Dade Co., Hammocks, Long Key (Everglades), 10 Feb 1916, *Small 7346, 7488* (NY); E end of Long Key, Everglades, 30 Apr 1917, *Small 8126* (US); between Cutler and Longview Camp, near the homestead rd., 9–12 Nov 1903, *Small & Carter 856* (NY), *1157* (NY, US).

CUBA. **Havana:** Near Managua, *Earle 694* (BM, US); near San Antonio, *van Hermann 832* (US). **Matanzas:** Vic. of Matanzas, Valley of the San Juan River, *Britton et al. s.n.* (NY). **Holguín:** Santiago de Cuba, Loma del Gato and environs, Sierra Maestra, El Cobre, 750 m, *Clément 851* (BM); Grande Grimpante, 1000 m, *Clément 1295* (C); Cayo Rey, Mayarí, *Clément 2962* (GH, US); Sierra de Nipe, near Río Piloto in manacales, *Ekman 3215* (B, G, S); Las Ninfas, Guantánamo, *Hioram 1473* (US); La Prenta, Guantánamo, 300 m, *Hioram 2438* (P); La Perla, 6 Aug 1913, *León 3851* (NY); Las Nuifas, 28 Dec 1907, *Hioram & Btiste 1478* (NY); Josephina, N of Jaguey, Yateras, 575 m, 23 Apr 1907, *Maxon 4124* (GH, NY, US), 24 Apr 1907, *4157* (GH, NY, S, US), 3 May 1907, *4419* (BM, GH, NY, S, US); Farallones of La Perla, N of Jaguey, Yateras, 540–585 m, 2 May 1907, *Maxon 4396* (NY, US); Posesión de Starck, SE of Jaguey, Yateras, 450–525 m, *Maxon 4419* (GH, M, US); Gorge of the Río Yamuri, 7 Dec 1910, *Shafer 7823* (GH, K, NY, P, US); S of Jaguey, Yateras, 420–510 m, 24 Apr 1907, *Maxon 4168* (NY, US); Gorge of the Río Yamuri, 7 Dec 1910, *Shafer 7866* (GH, NY, US); La Perla, 600–660 m, 6–18 Feb 1911, *Shafer 8896* (GH, NY), *8901* (GH, K, NY, US); Sevilla estate, near Santiago, Baracoa to Jiquarito Mt, 700 m, 17 Sep 1906, *Taylor 473* (NY). **Pinar del Río:** Sierra del Rosario, *Alain 2738* (US); Baños San Vicente, 12–16 Sep 1910, *Britton et al. 7435* (NY, US); region of the Mogotes, Sierra de la Gúazasa, 9 Jun 1923, *Ekman 16617* (B, NY, S); near El Guama, *Palmer & Riley 118* (US), 24 Mar 1900, *392* (BM, NY, US); Sierra de Anafe, *Wilson 11353* (US). **Prov. Unknown:** Carmen hill near Guines Cave "del Marques," *León 450* (US); W Cuba, Santa Catalina, *Caldwell & Baker 7080* (GH, US); near Limonas, 1822, *Peoppig s.n.* (B, BM, M, photo MO ex L).

HAITI. Dept. du Sud, Morne de la Hotte, 800 m, *Ekman 88* (B, S); Massíf du Nord, 750 m, *Ekman 8225*

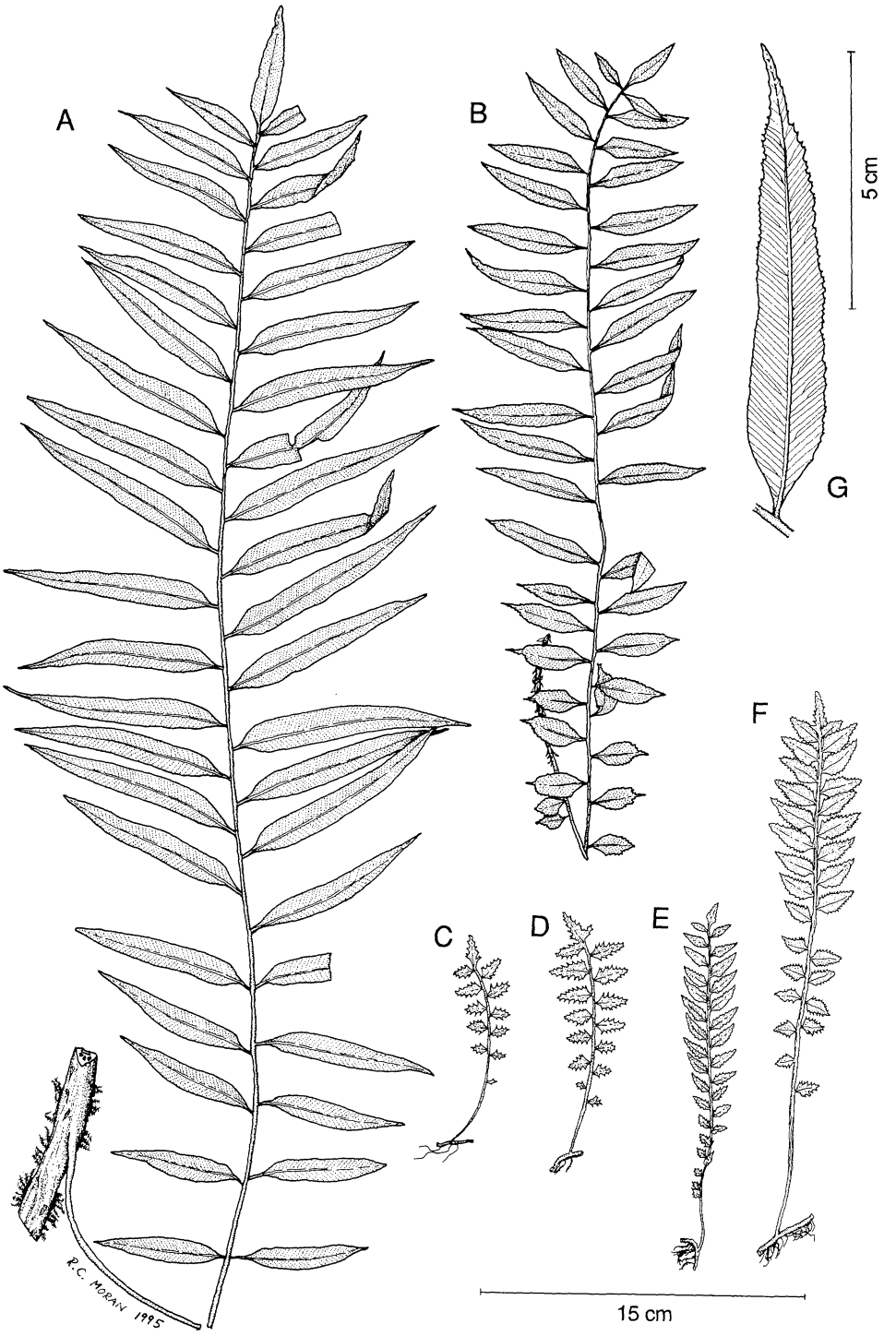

FIG. 8. *Lomariopsis kunzeana*. **A, B.** Sterile leaves (*Maxon 4491*, US). **C–F.** Heteroblastic leaf series (*Maxon 4124*, US). **G.** Pinna (*Maxon 4491*, US).

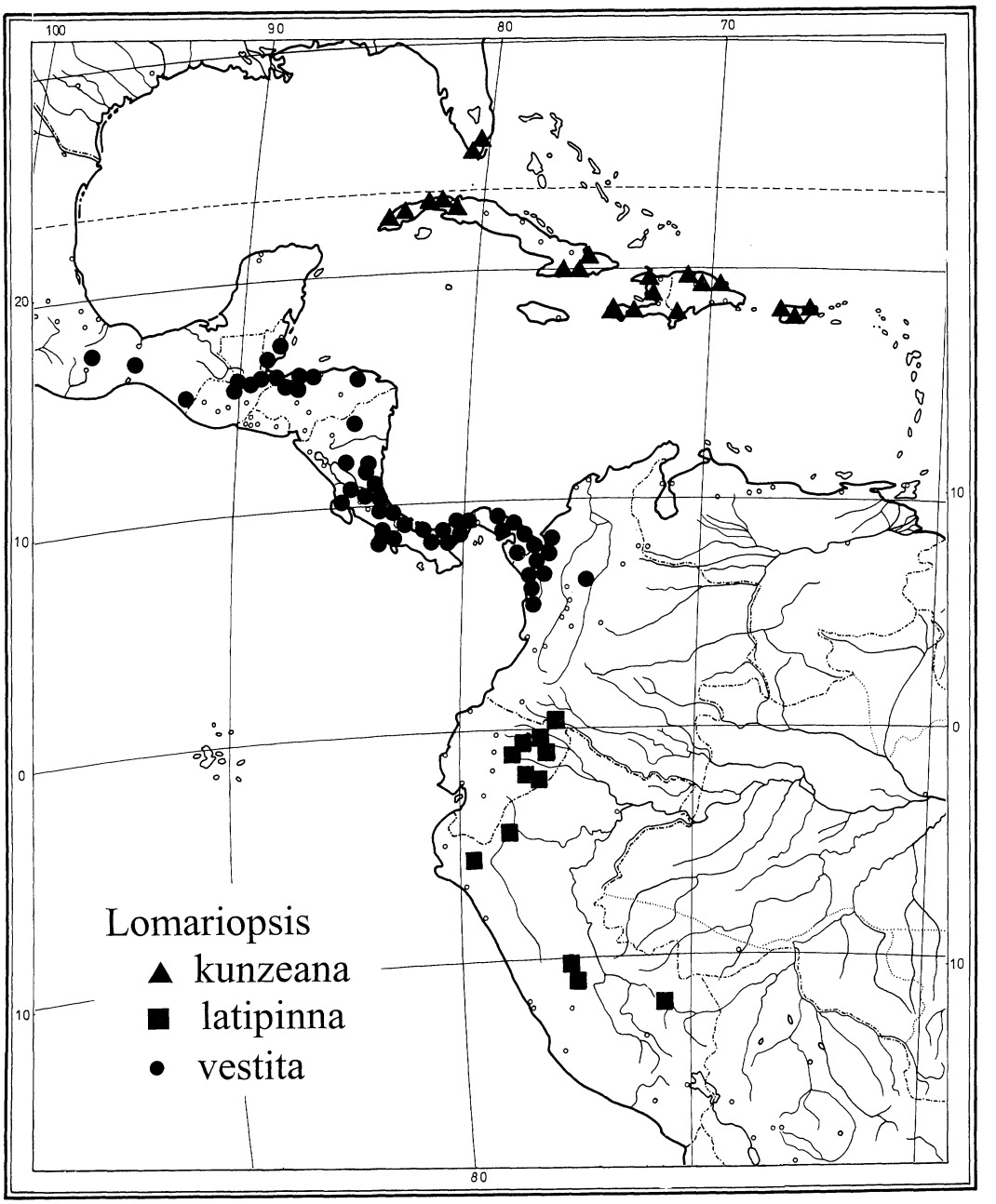

FIG. 9. Distribution of *Lomariopsis kunzeana, L. latipinna,* and *L. vestita.*

(C, S); 8295 (K); Massíf de la Hotte, western group, Dame-Marie, Montagniac, 600 m, *Ekman 10313* (B, BM, US); River Glace, 750 m, *Holdridge 2191* (GH, US); Dept. du Nord, Marmelade, 800 m, *Leonard 8312* (US), 25 Aug 1903, *Nash 833* (NY); Camp no. 5, Plaisance, to Gonaives, 550 m, 11 Aug 1905, *Nash & Taylor 1492* (NY); Massíf de la Hotte, Morne Rochelois, 2.8 km W de Maragoane, 18°24″N, 72°13″W, 900 m, 25 Jan 1984, *Zanoni et al. 28649* (NY).

DOMINICAN REPUBLIC. **Barahona:** Jaccao, 200 m, *Eggers 2604* (G, K, M); "Los Morones," 2–4 km up Río Baoruco, 18°05′N, 71°07′W, 40–100 m, 19 May 1981, *Zanoni et al. 13471* (NY). **El Seibo:** Los Haitises, Caseta de Guardaparques en Monte Bonito,

Parque Nacional Los Haitises, 19°00′N, 69°30′W, 200 m, 6 Aug 1985, *Zanoni et al. 35428* (NY). **Puerto Plata:** Cafemba, near Puerto Plata City, near seashore, *Jiménez 4368* (US). **Samaná:** 3.5 km E del Pueblo de Las Terrenas, un sitio llamado "Callejón," 19°18′N, 69°30′W, 150 m, 3 Nov 1981, *Zanoni & Mejía 17654* (NY); Prov. Espaillat, Colonia de Jamao, Moca, *Ekman 12572* (S, US); Península de Pamaná, Sánchez, 300 m, *Ekman 14827* (C, G, GH, S); Nochebuena, 1800 m, *Fuertes 1044* (G, GH, NY, P, U); without locality, *Fuertes 795* (G); Cordillera Septentrional, en La Cumbre, el paso en la carretera Moca–Jamao al N, 19°31′N, 70°30′W, 800 m, 17 Feb 1987, *Zanoni et al. 38167* (NY).

PUERTO RICO. Vic. of Utuado, 7–10 Mar 1915, *Britton 5215* (NY); near Caño Grande, *Gundlach 1424* (B); Finca Álvarez, near San Juan, *Hioram s.n.* (M); Bayamós, near San Juan, 7 Feb 1912, *Hioram s.n.* (NY, U, US); without locality, *Cowles 276* (US); Km 68 on Utuado–Arecibo rd., *Sargent 3107* (US); Lares, Mirasol, *Sintenis 6134* (M, P, US); rd. from Utuado to Arecibo, 13 Jul 1901, *Underwood & Griggs 843* (NY, US).

6. LOMARIOPSIS LATIPINNA Stolze, Fieldiana, Bot. n.s. 27: 107. 1991. TYPE: PERU. Junín: Prov. Chanchamayo, "Pichanaki" (Dtto. Pichanaqui), 700 m, 11 Mar 1986, *van der Werff et al. 8626* (HOLOTYPE: UC; ISOTYPES: F, GH, MO, NY; photo, F ex UC). (Figs. 10, 11)

Rhizome scales 6–8 mm long, tawny to dull orange, lanceolate, ciliate. *Leaves* to 70 cm long; petioles 7–22 cm long, ⅓–½ the length of the laminae; laminae not or scarcely reduced at the base; pinnae 6–10 cm wide, pairs 1–5, alternate, patent, elliptic to lanceolate, entire, the base cuneate, stalked, the stalks (3–)4–15 mm long, the apices acute or subacute; rachises not alate. *Fertile pinnae* 1.6–2.3 cm wide; paraphyses absent; annular cells (12–)14(–16); spores spiny, pale yellowish.

Distribution and habitat.—Lomariopsis latipinna grows in the rain forests of western Amazonia (Fig. 9), at 200–500(–700) m.

Lomariopsis latipinna has the widest pinnae (6–10 cm) of any species in the genus. Other distinctive characteristics are its tawny to dull orange rhizome scales, cuneate pinna bases, and few (1–5) pinna pairs. Its fresh pinnae are thicker and somewhat fleshy compared to similar species such as *L. japurensis* and *L. nigropaleata.* Another difference is that its juvenile leaves are slightly falcate (Fig. 11A) whereas in the other two species they are straighter (Fig. 1).

Lomariopsis latipinna might be confused with *L. prieuriana,* which has similarly colored rhizome scales and cuneate pinnae. *Lomariopsis prieuriana,* however, differs by narrower (3.5–6 cm wide) pinnae and generally more pinna pairs (3–7).

Additional specimens examined. COLOMBIA. **Putumayo:** Río San Miguel, en el afluente izquierda Quebrada de la Hormiga, 290 m, *Cuatrecasas 11077* (US).

ECUADOR. **Napo:** Reserva Biol. Jatun Sacha, 8 km al E de Misahuallí, 01°04′S, 77°36′W, 450 m, *Cerón 1275* (MO, UC); Parque Nacional Yasuní, Pozo petrolero Daimi 2, 00°55′S, 76°11′W, 200 m, *Cerón & Hurtado 4005* (UC); Añangu, Parque Nacional Yasuní, 00°32′S, 76°22′–23′W, 300 m, *Korning & Thomsen 47088* (AAU); Añangu, Parque Nacional Yasuní, 00°31′–32′S, 76°23′W, 260–350 m, *Øllgaard et al. 38846* (AAU, GH, UC), *38850* (AAU, UC), *39168* (AAU); Añangu, NW corner of Parque Nacional Yasuní, along SEF line, near Tiputini, 300 m, *Øllgaard 57074* (AAU); Upper Río Tiputini, ca. 2 canoe-hours from bridge on Coca-Auca oilfield rd., 00°43′S, 76°57′W, 300 m, *Øllgaard & Blasco 99048* (AAU). **Pastaza:** Río Bobonaza, below Montalvo (Limón), 02°07′S, 76°55′W, 300 m, *Øllgaard et al. 34529* (AAU); Río Bobonaza, between oil exloration camp Chichirota and Destacamento Cabo Pozo, 02°25′S, 76°39′W, 300 m, *Øllgaard et al. 34856, 34862* (AAU). **Sucumbíos:** Dureño on Río Aguarico, *Pinkley 510* (GH).

PERU. **Amazonas:** Bagua, behind Parcelación Monterrico, 81 km NE of Chiriaco, 13 km SW of bridge over Río Nieva, 04°45′S, 77°58′W, 200–300 m, *Knapp & Alcorn 7592* (MO). **Junín:** Prov. Chanchamayo, "Pichanaki" (Dtto. Pichanaqui), 700 m, 11 Mar 1986, *van der Werff et al. 8625* (MO, UC). **Lambayeque:** Puerto Nazareth, 5 km to Olmos, 295 m, *Ellenberg 3452* (GH). **Madre de Dios:** Parque Nacional del Manú, Cocha Cachu Biol. Station, *Foster P-84-112, P-84-119* (UC). **Pasco:** Prov. Oxapampa, Puerto Laguna, 10°18′S, 75°10′W, 400–450 m, *D. N. Smith 8212* (UC), *8412* (MO).

7. LOMARIOPSIS MARGINATA (Schrad.) Kuhn in Decken, Reis Ost-Afr. Bot. 3(3): 22. 1879. *Lomaria marginata* Schrad., Gel. Anz. 1824: 871. 1824. *Stenochlaena marginata* (Schrad.) C. Chr., Index Filic. 624. 1906. TYPE: BRAZIL. Minas Gerais[?], Capitania, s.d., *von Neuwied s.n.* (HOLOTYPE: BR–n.v., fragm. B, PHOTO US ex BR). (Fig. 12)

Lomaria scandens Raddi (non Willd., Sp. Pl. 5: 293. 1810), Opusc. Sci. Bol. 3: 290. 1819. *Lomaria fraxinifolia* Raddi, Pl. Bras. 1: 51, t. 73. 1825. New name for *L. scandens* and so based on the type of that name. TYPE: BRAZIL. Rio de Janeiro, s.d., *Raddi s.n.* (HOLOTYPE: FI–n.v.).

Lomariopsis erythrodes (Kunze) Fée, Mém. Foug.

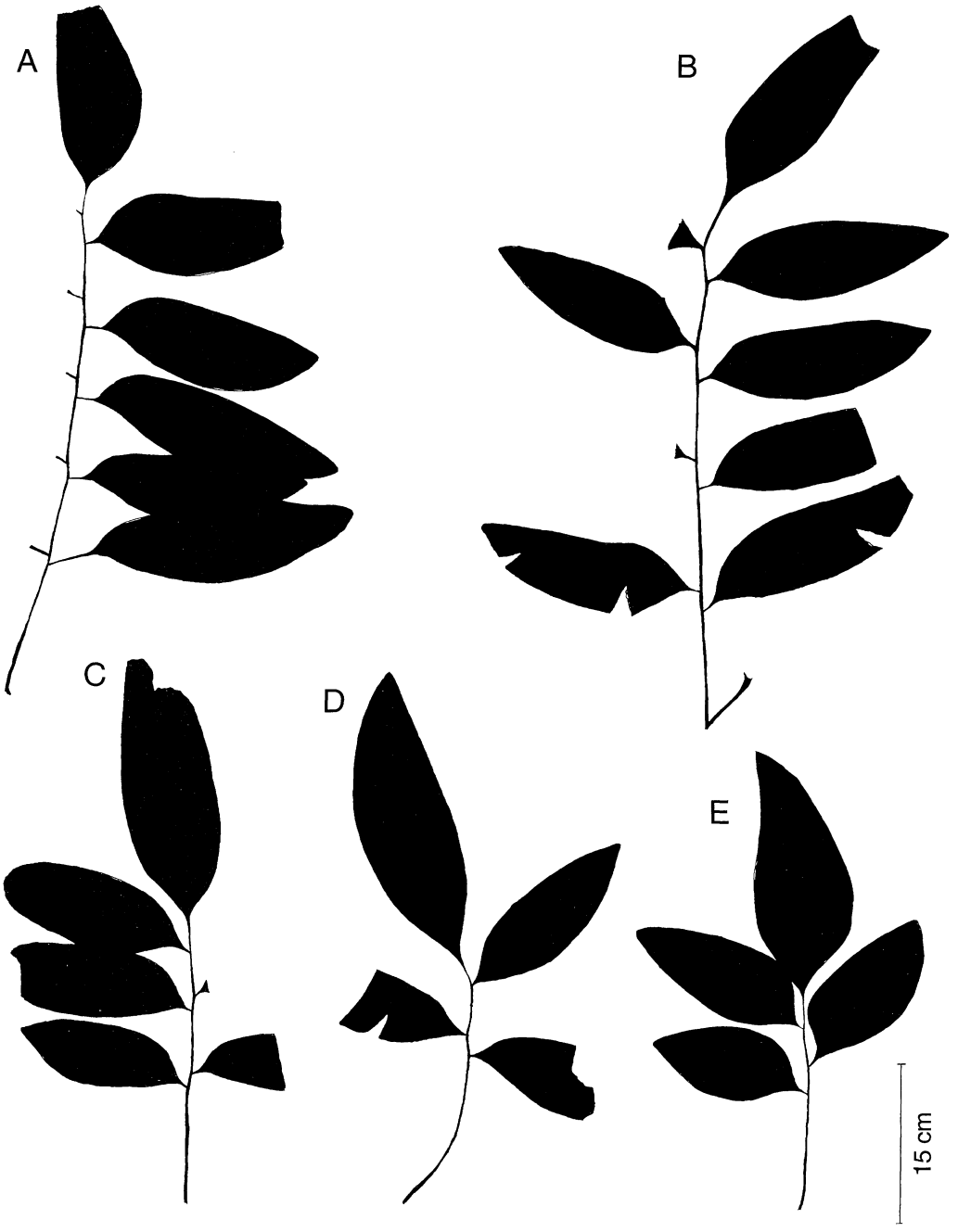

FIG. 10. Sterile leaves of *Lomariopsis latipinna*. **A.** *Van der Werff et al. 8626* (MO), Peru. **B.** *Øllgaard et al. 57074* (AAU), Ecuador. **C.** *Øllgaard & Blasco 99048* (AAU), Ecuador. **D.** *Korning & Thomsen* 47088 (AAU), Ecuador. **E.** *Cerón M. 1275* (UC), Ecuador.

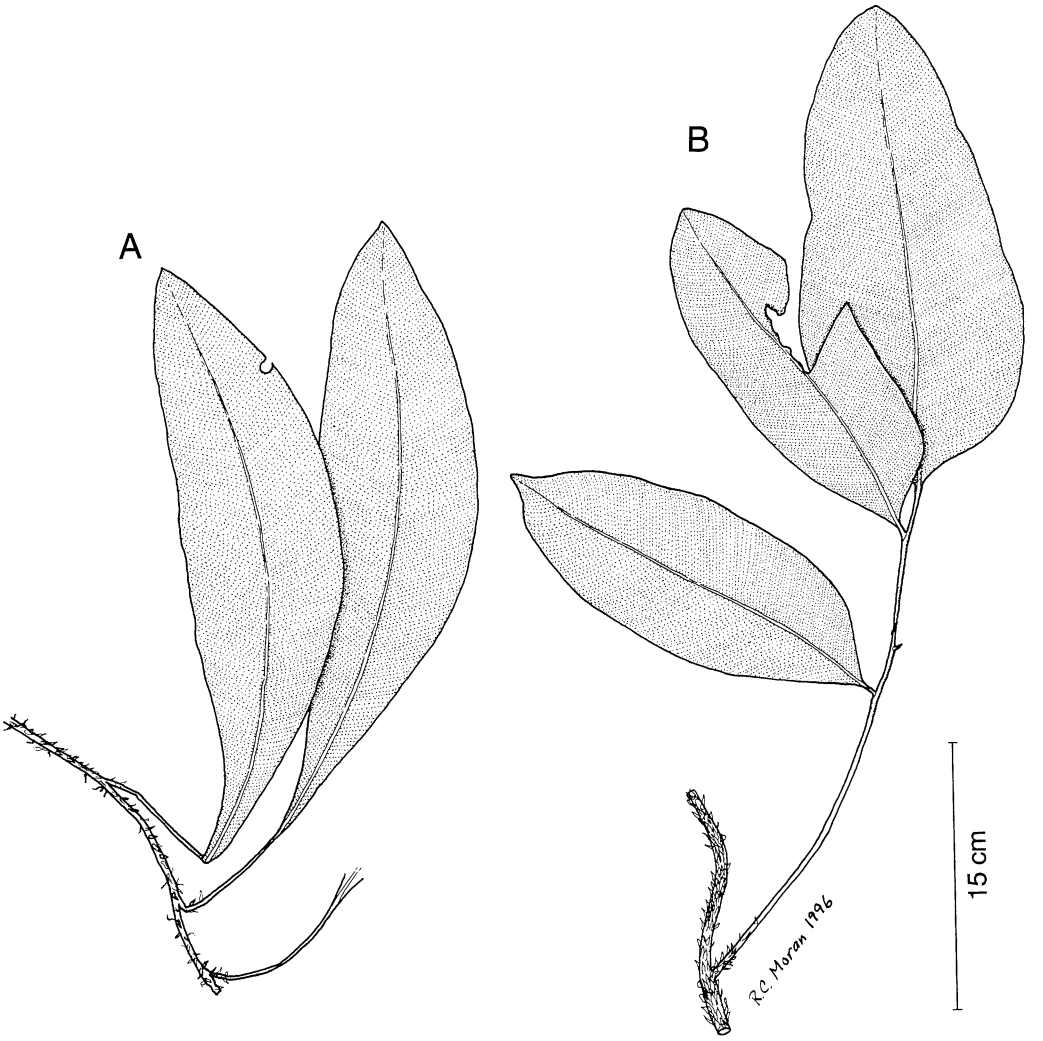

FIG. 11. *Lomariopsis latipinna.* **A.** Simple, juvenile leaf (*Foster P-84-112,* UC). **B.** Mature leaf (*Øllgaard 38846,* AAU).

2: 67. 1845. *Acrostichum erythrodes* Kunze, Flora 22(1): Beibl. 46. 1839. *Stenochlaena erythrodes* (Kunze) Underw., Bull. Torrey Bot. Club 33: 595. 1906. TYPE: BRAZIL. Bahia: Ilheos, 1839, *Martius 366* p.p.; (HOLOTYPE: B; ISOTYPES: BM, G, GH, K, M, MO, NY).

Lomariopsis elongata Fée, Mém. Foug. 2: 67. 1845. TYPE: BRAZIL. Bahia: "Ad Cruz de Casma," s.d., *Luschnath 19* (HOLOTYPE: P; ISOTYPE: B).

Lomariopsis speciosa Klotzsch ex Holttum, Bull. Misc. Inform. Kew 1939: 620. 1940. TYPE: BRAZIL. Location unknown, s.d., *Sellow 370* (HOLOTYPE: B; ISOTYPE: K, fragm. NY ex B).

Lomariopsis lanceolata Klotzsch ex Holttum, Bull. Misc. Inform. Kew 1939: 618. 1940. TYPE: BRAZIL. Location unknown, s.d., *Sellow s.n.* (HOLOTYPE: B, fragm. NY ex B).

Rhizome scales 4–10 mm long, dull or slightly lustrous, reddish brown (but blackened at point of attachment), often with a whitish tinge or silky luster, narrowly lanceolate, sparsely ciliate, ascending to slightly spreading. *Leaves* to 110 cm long; petioles 10–30 cm long, ⅕–⅓ the length of the laminae; laminae slightly reduced at the base; pinnae 9–21 × 1.6–4 cm, pairs 9–21, alternate to subopposite, patent, narrowly

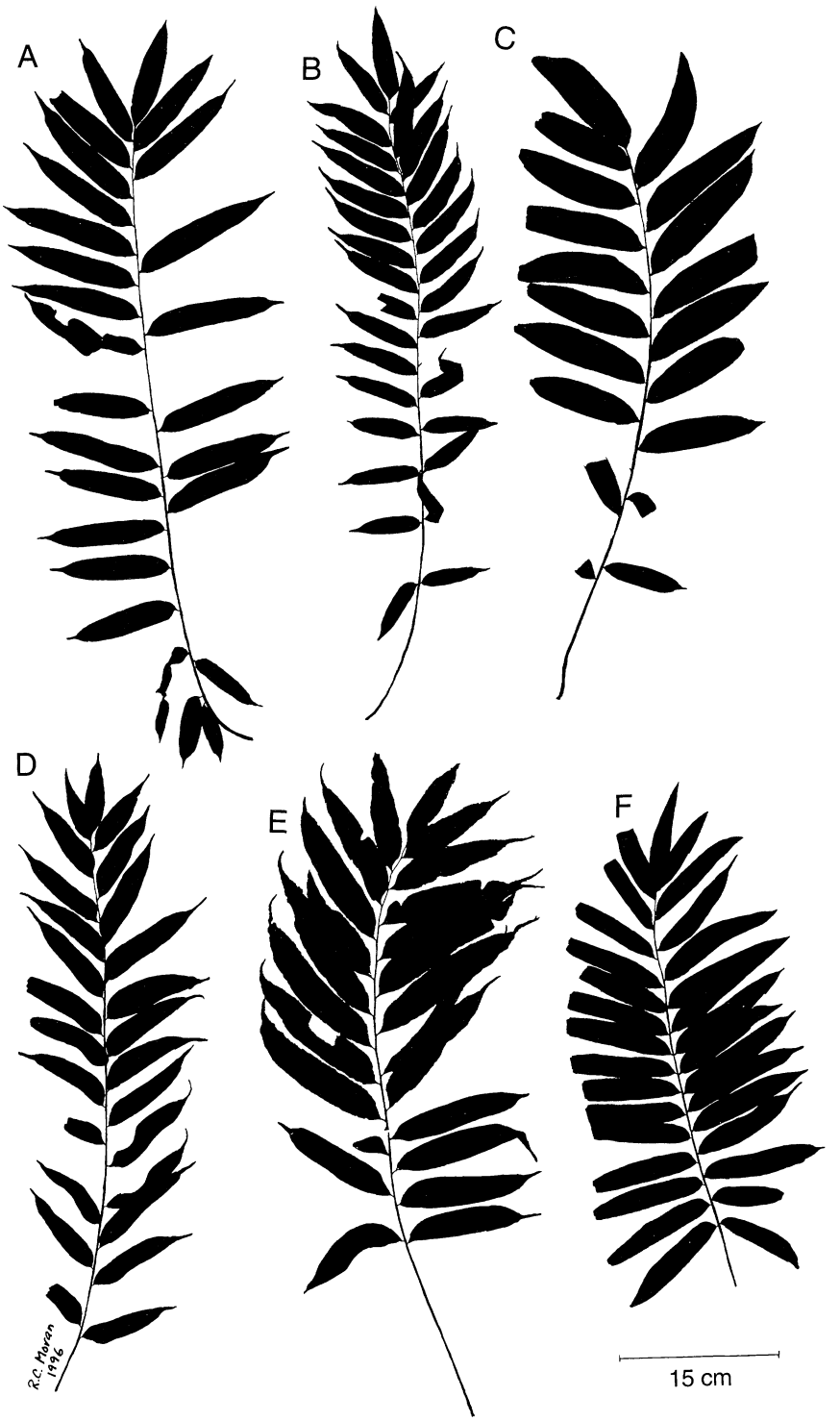

FIG. 12. Sterile leaves of *Lomariopsis marginata*. **A.** *Martius 366* (BM). **B.** *Luetzelburg 13743* (M). **C.** *Luschnath 86* (P). **D.** Collector unknown (Z). **E.** *Smith & Klein* 7573 (E). **F.** *Duarte 73471* (G).

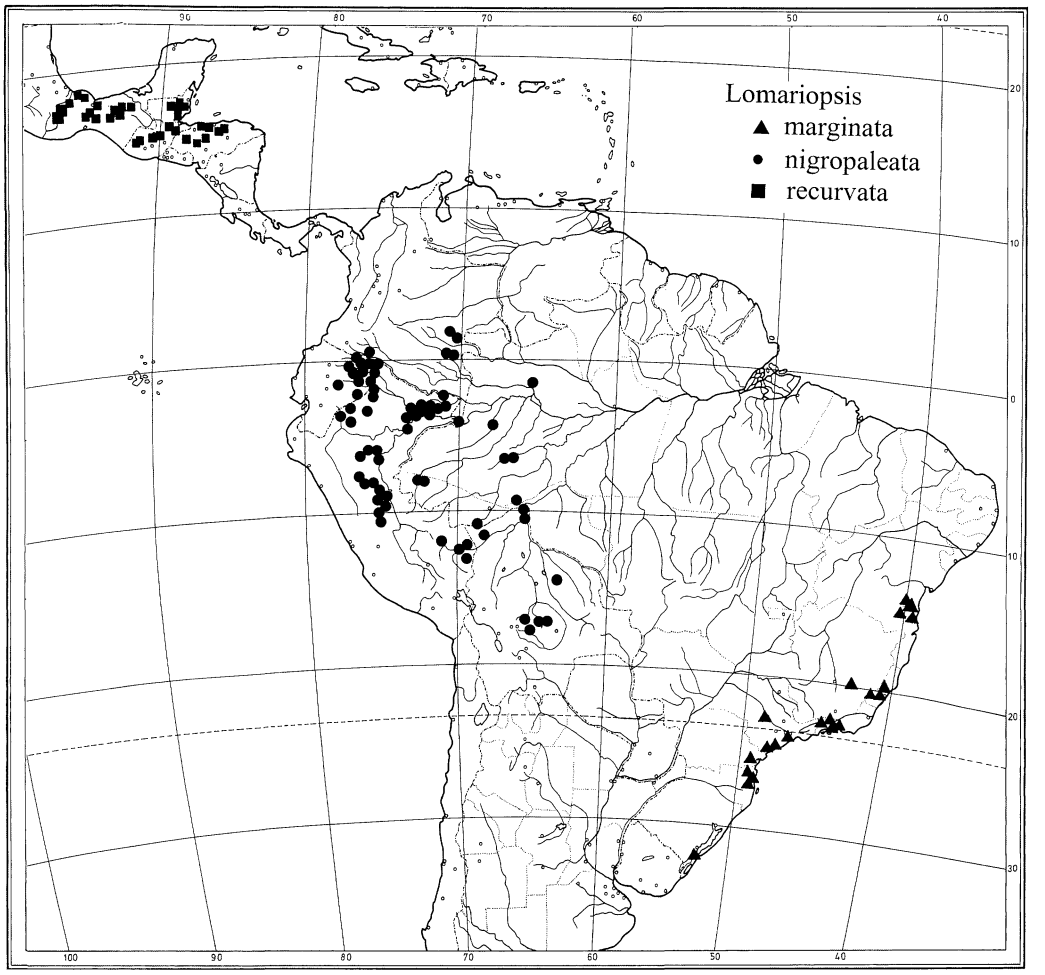

FIG. 13. Distribution of *Lomariopsis marginata, L. nigropaleata,* and *L. recurvata.*

lanceolate, entire, the base broadly rounded to narrowly cuneate, occasionally excavate basiscopically, sessile or nearly so, the stalk (when present) to 2 mm long, the apices acuminate to tapered; rachises not alate. *Fertile pinnae* 0.7–2 cm wide; paraphyses absent; annular cells 13–15(–21); spores spiny, very pale yellowish to hyaline.

Distribution and habitat.—Lomariopsis marginata is the only species in the genus in coastal Brazil (Fig. 13). It occurs at 250–1300 m.

Lomariopsis marginata can be distinguished from the other American species by the combination of reddish brown rhizome scales and larger number of pinna pairs (usually 10–20). The rhizome scales usually have a whitish, silky luster due to cells that turn whitish with age (especially toward the apex of the scale). This color and luster is absent in the other species with reddish rhizome scales (i.e., *L. latifolia* and *L. prieuriana*).

Lomariopsis marginata resembles *L. japurensis* and cannot be distinguished if a specimen lacks a rhizome or complete lamina. The best way to distinguish *L. japurensis* is by its rhizome scales that are narrower and darker, never with a whitish tinge or lustre as in *L. marginata.* The two species have similarly shaped pinnae, but *L. marginata* has more pinna pairs, typically 10–

20, whereas *L. japurensis* has only 8–12. The laminae of *L. marginata* are broadest at the base or nearly so, not reduced to small, elliptic pinnae less than one-third as long as the longest medial ones, as in all specimens of *L. japurensis* except those from the Guianas (see the discussion of this characteristic under *L. japurensis*). The spores of *L. marginata* are spiny, whereas those of *L. japurensis* are smooth.

The many names placed here in synonymy deserve mention. The type of *Lomariopsis erythrodes* agrees well with the holotype of *L. marginata* and can be placed in synonymy with confidence. The types of *L. speciosa* and *L. lanceolata,* however, appear slightly different from the type of *L. marginata,* but I consider them to be small forms of *L. marginata* with cuneate and broadly rounded pinna bases, respectively. *Lomariopsis elongata* has narrow, elongate pinnae with rounded bases, but this also is part of the variation within *L. marginata,* as evinced by numerous intermediates and even single plants bearing leaves with both cuneate and rounded bases (as seen in the many sheets of *Handro 2192*). Despite the tremendous variation of these specimens, all have the definitive characteristics of the species: reddish brown rhizome scales and large number of pinna pairs.

See Morton (1973) for a full discussion of the nomenclatural history of *Lomariopsis marginata* and its synonyms.

Additional specimens examined. BRAZIL. **Bahia:** Mun. de Una, Reserva Biol. do Mico-Leão (IBAMA), 15°09′S, 39°05′W, 24 Jan 1996, *Amorim et al. 1920* (NY); without locality, *Blanchet 2217* (G), *3938* (C, P); Ilheos, *Blanchet 2514* (G); Castenovo, *Blanchet 2517* (G); Mun. de Almadina, Ibitupã, Serra do Sete Paus, ca. 12 km da entrada, Fazendo Cruzeiro do Sul, 14°44′S, 39°41′W, 578 m, 26 Feb 1997, *Jardim et al. 969* (NY); without locality, *Luschnath 16* p.p. (B), *86* (B, GH, P); Mun. Uruçuca, nova estrada que liga Uruçuca á Serra Grande, a 28–30 km de Uruçuca, 1 May 1979, *Mori 11757* (NY); Rodovia Jequié–Itabuna, entre Jequié e Ubatam, *Shepherd et al. 4509* (F); Mun. Uruçua, 7.3 km N of Serra Grande on rd. to Itacaré, 14°25′S, 39°01′W, 7 May 1992, *Thomas et al. 9204* (NY). **Espirito Santo:** Rod. BR-262, Mun. Muniz Freire, *Hatschbach & Silva 48616* (UC, US); Mun. Domingos Martins, Corrego do Cavalo, *Hatschbach & Zelma 49970* (UC); Mun. Santa Teresa, Valsugana Velha, Estação Biológica de Santa Lúcia, bacia do Rio Timbuí, 19°58′S, 40°32′W, 550–800 m, *Fernández et al. 3064* (MO). **Minas Gerais:** Marliéria, Parque Florestal do Rio Doce, trilha do Vinhático, *Salino 2158* (AAU). **Paraná:** BR-2, Ribeirão de Cedro á 90 km de Curitiba, *Pabst 6748* (F). **Rio de Janeiro:** Tijuca, *Alston & Brade 8976* (BM); Organ Mtns., *Gardner s.n.* (K); without locality, *Goldi 9* (P, Z); Serra Estrella near Petropolis, Cortisso, 1300 m, *Luetzelburg 13011* (M); Serra dos Orgaõs, Pereira, 1200 m, *Luetzelburg 13743* (M); Serra dos Orgaõs, Gruta Paulo Emilio, *Luetzelburg 13743a* (M); Serra dos Orgaõs, Itamaraty, *Luetzelburg 13885* (M), 18950 (M, UC); without locality, *Miers 22* (K, M); without locality, *Riedel s.n.* (C); Serra de Monte Serrat, *Schwacke 14299* (G, GH); without locality, *Weddell 733* (US). **São Paulo:** Lageados, *Brade 5837* (S, UC); Iguape, Mar 1922, *Brade 8222* (NY), *8223* (US); São Paulo, Agua Funda, in the Botanical Garden, 23 Dec 1971, *Handro 2192* (GH, K, NY, US); Mun. de Sete Barras, Fazenda Intervales, base de Saibadela, trilha do Quilombo, *Salino 2028* (AAU); Rio Grande, 1905, *Wacket 160* (NY, S, UC). **Santa Catarina:** Reserva florestal dos Pilões, 250 m, 21 Nov 1950, *Duarte et al. 3195* (F, G, MO, NY); Mun. Itapoá, Reserva Volta Velha, 26°09′S, 48°39′W, 21 Apr 1994, *Labiak 104* (NY); Itapocá, *Hansch 406* (US); Hammonia, *Luederwaldt s.n.* (SP-21163); Itajaí, Morro da Ressacada, *Reitz & Klein 1522, 2938* (US); Peroba, Arananguá, 50 m, *Reitz C485* (BM); Pilões Palhoça, 250 m, *Reitz & Klein 3294* (US); Morro do Antão, 250 m, *Sehnem 3088* (B, GH, M); Horto Florestal, *Smith & Klein 7573* (US); Mun. Brusque, Azambuja, Brusque, 27°06′S, 48°54′W, 35–135 m, *Smith & Reitz 6125* (MO, US); Itajahy, *Ule 182* (P); Blumenau, *Veireck 47* (M); locality not clear, *Ule 262* (P); Rio Grande, *Wacket 302* (M). **Prov. Unknown:** without locality, *Glaziou 3554* (C); "S Brazil," 1899, *Reineck s.n.* (Z); without locality, *Martius 366* p.p. (P); without locality, *Sellow 370* (B).

8. LOMARIOPSIS MAXONII (Underw.) Holttum, Bull. Misc. Inform. Kew 1939: 617. 1940. *Stenochlaena maxonii* Underw., Bull. Torrey Bot. Club 33: 599. 1906. TYPE: COSTA RICA. Cartago: La Palma, 1450–1550 m, 6–8 May 1906, *Maxon 411* (HOLOTYPE: NY; ISOTYPE: US). (Fig. 14)

Lomariopsis latiuscula (Maxon) Holttum, Bull. Misc. Inform. Kew 1939: 617. 1940. *Stenochleana latiuscula* Maxon, Contr. U.S. Natl. Herb. 10: 502. 1908. TYPE: COSTA RICA. Limón: Valley of the Reventazón, Juan Viñas, 1000 m, 22 Apr 1903, *Cook & Doyle 208* (HOLOTYPE: US; PHOTOS: F, NY ex US).

Rhizome scales 7–10 mm long, whitish to dark reddish, lanceolate to linear, ascending-spreading. *Leaves* 30–100 cm long; petioles 8–25 cm, ⅓–½ as long as the lamina, not winged; laminae not or only slightly reduced basally, the apical pinna continuous with (i.e., not articulate to) the rachis; pinnae 8–20 × 1–3 cm, pairs 12–20, alternate,

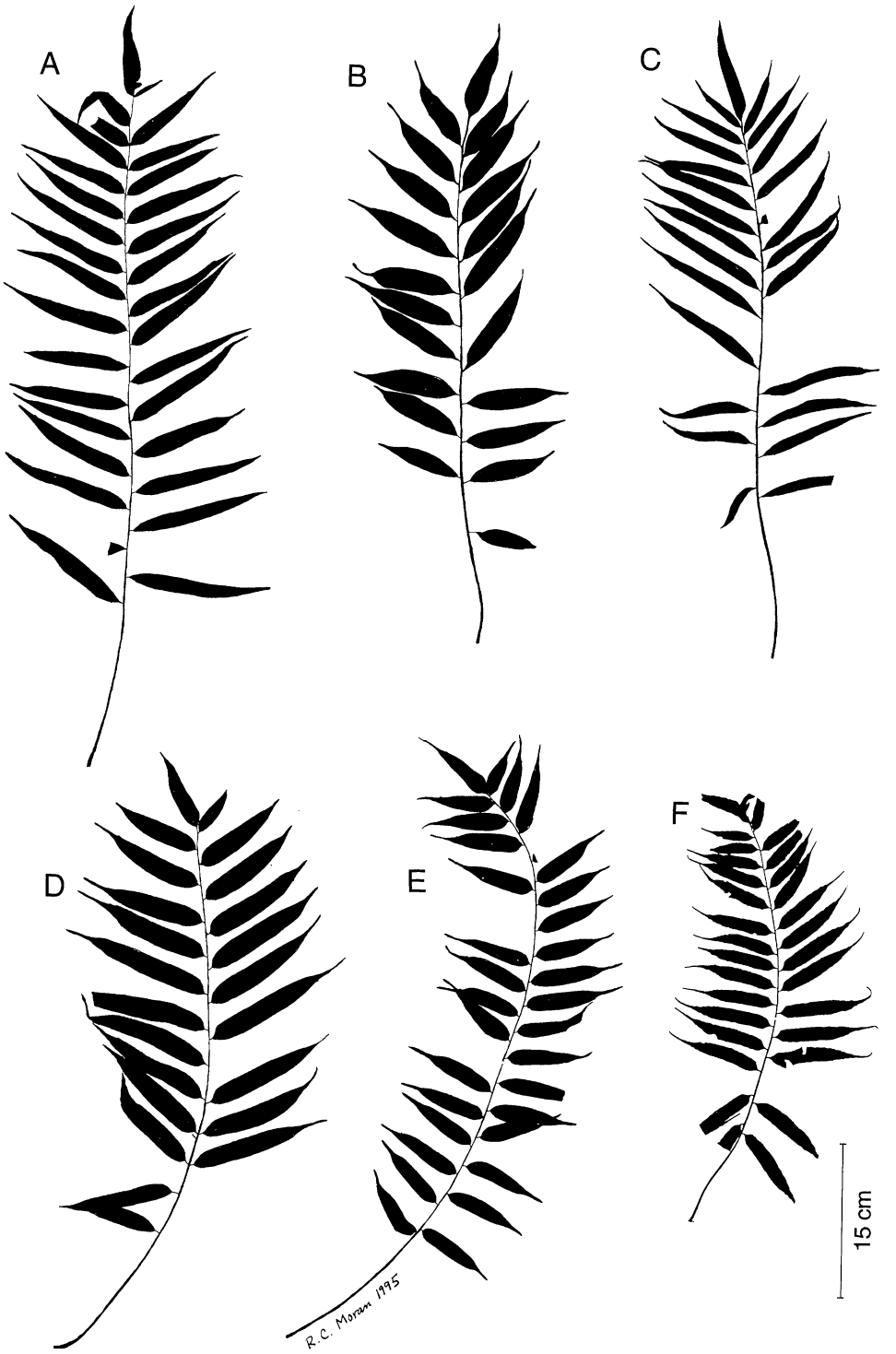

FIG. 14. Sterile leaves of *Lomariopsis maxonii*. **A.** *Maxon 5256* (US). **B.** *Maxon 411* (US). **C.** *Cornman 1099* (US). **D.** *Scamman 7720* (GH). **E.** *Tonduz 17585* (US). **F.** Collector unknown (F).

stalked, the stalks to 5 mm, lanceolate to oblong, broadly rounded to narrowly cuneate basally, entire or nearly so but often serrulate apically, the apices acuminate to attenuate; rachises marginate or narrowly alate distally; paraphyses absent. *Fertile pinnae* 4–10 mm wide; annular cells 14 or 15; spores crested.

Distribution and habitat.—Lomariopsis maxonii grows in the wet montane forests of Costa Rica and Panama, at 800–1800 m.

Lomariopsis maxonii resembles *L. recurvata* in leaf size and pinna shape (cf. Figs. 14, 19) but differs by 4–10 mm wide (vs. 2–4 mm wide) fertile pinnae that are stalked (vs. sessile). A less constant difference is that *L. maxonii* has rhizome scales that tend to become reddish, whereas in *L. recurvata* they are always whitish or pale orangish. Another tendency is that the pinnae of *L. recurvata* are often slightly more inequilateral basally, with the basiscopic side narrower and more excavate compared to the acroscopic side, which is broader and more rounded. In contrast, *L. maxonii* has more equilateral pinnae. The only two characters that consistently separate them, however, are those of the fertile pinna. These two species and *L. sorbifolia* form a closely related group.

A specimen from Vara Blanca de Sarapiquí, Costa Rica (Mar 1938, *Skutch 3682,* MO) is normal in all respects except that it has an aborted rachis apex, a characteristic typical of three West Indian species: *L. jamaicensis, L. underwoodii,* and *L. wrightii.* Its duplicate sheet at NY, however, has a normal, non-aborted apex.

Additional specimens examined. COSTA RICA. **Alajuela:** Reserva Forestal de San Ramón, Río San Lorenzito, 10°12′53″N, 84°36′28″W, 800–1000 m, *Angulo 614* (INB), *Bittner 1685, 1995* (CR), *Herrera Ch. et al. 342* (AAU, MO, UC); vic. of Finca Peñas Blancas, E slope of Cerros Centinelas, Monteverde Reserve, 10°18′N, 84°47′W, 1300–1450 m, *Grayum 5377* (MO, UC); Monteverde Reserve, 1600 m, 10°15′N, 84°50′W, *Hennipman et al. 6660, 6624* (U, Z), *Rojas 1842* (CR, INB); Monteverde, Estación La Casona, sendero Orquideas, 10°20′N, 84°44′W, 1000 m, *Martínez 410* (INB), *412* (CR), same locality but sendero Saíno y Caye, *Carballo 537* (INB); 11 km N of San Ramón, 1000 m, 28 Jul 1967, *Mickel 2982* (NY, US); Santa Elena de Zapote, Cantón San Carlos, 1475 m, 18 Jan 1939, *A. R. Smith 1504* (NY); Zarcero, *Smith F32* (F, MO), *48/306* (US); La Palma de San Ramón, 1700 m, *Stork 448* (UC); forests of Santiago, near San Ramón, 1500–1800 m, *Tonduz 17585* (G, P, S, US). **Cartago:** Reserva de Tapantí, 1300–1800 m, Nov 1982, *Gómez 18908* (MO, NY, U, UC); along tributary of Quebrada Casa Blanca, Tapantí, 1350 m, *Grayum & Sleeper 3685* (MO); 22 km E of Turrialba, above Platanillo, 1200–1450 m, 22 Aug 1967, *Mickel 3397* (NY); Tapantí, 1380 m, *Rojas 189, 212* (US); Cantón de Paraiso, Estación de Biol. Tropical Río Macho, 09°46′N, 83°52′W, 1600 m, *Rojas 133, 410, 596, 1099, 1578* (INB); San Juan del Norte, 1200 m, *Scamman 7721* (GH). **Guanacaste:** Reserva Santa Elena, 09°44′N, 82°55′W, 1600–1700 m, *Bittner 2299* (AAU); Volcán Cacao, Rancho Herold, *Chacón 2152* (CR); Parque Rincón de La Vieja, Liberia, del Mirador siguiendo la Fila al Volcán Santa María, 10°46′N, 85°49′W, 1100–1300 m, *Herrera Ch. 1444* (MO); Cantón de Liberia, Parque Nacional de Guanacaste, Estación Cacao, 10°55′N, 85°28′W, 1100 m, *Rojas 3069* (INB). **Heredia:** Parque Nacional Braulio Carrillo, between Río Peje and headwaters of Río Sardinal, 10°15′N, 84°05′W, 1200–1300 m, *Grayum 7822* (MO); Vara Blanca de Sarapiquí, N slope of Central Cordillera, between Poás and Barba volcanoes, 1525 m, *Skutch 3682* (K, MO, NY, S, US); N of San Isidro, Cerro de las Caricias, 200–2400 m, *Standley & Valerio 52043* (GH, US). **Limón:** Cantón de Talamanca, cuenca superior del Río Dapari, 09°24′N, 83°05′W, 1200 m, *Herrera Ch. 5263* (CR, MO). **Puntarenas:** Cantón de Golfito, Parque Nacional Corcovado, Península de Osa, Estación Los Patos, sendero Sirena, 08°34′N, 83°31′W, 200 m, *Aguilar 3316* (INB); Monteverde, 10°18′N, 84°48′W, 1520 m, *Almeda 5387* (CR), *Azofeita* 72 (CR, INB), *Bittner 2299* (CR), *Dryer 111, 371* (MO), *Fiedler 52* (UC), *Ingram & Ferrell-Ingram 1849* (CR), *Jiménez M. 1180* (F), *1249* (CR, F), *Kennedy 508* (F), 17 May 1992, *Moran & Moran 5839* (MO); biol. station at Finca Wilson, 5 km S of San Vito de Java, 1100–1200 m, *Mickel 3065* (NY); Wilson Botanical Garden, 5 km S of San Vito, 08°46′N, 82°55′W, 1200 m, 1 Mar 1990, *Moran 4172* (MO), *Evans & Bowers 3052* (MO), *Kress 94-4875* (CR); Cantón de Coto Brus, Zona Protectora Las Tablas, Las Alturas de Cotón, Estación Biol. Las Alturas, sendero a Cerro Echandi, 08°57′N, 82°50′W, 1600 m, *Rojas 701* (INB); Parque La Amistad Cafrosa, 08°54′40″N, 82°47′19″W, 1200 m, *Saborio 68* (CR, F); Monteverde Reserve, Sendero Nuboso, *Zogg & Gassner 12105, 12181, 12182* (Z). **San José:** Canaán, 1300 m, *Kupper 1092* (M); La Palma on rd. to La Hondura, *Scamman 7720* (GH, US); vic. of El General, 1040 m, Nov 1936, *Skutch 2910* (GH, K, MO, NY, US); along unnamed N fork of Río Zurquí, 10°04′N, 84°01′W, 1500–1600 m, 18 Jan 1986, *A. R. Smith et al. 1660* (MO, UC), *1670* (UC).

PANAMA. **Chiriquí:** Boquete, *Cornman 985* (UC, US), *1099* (US); Palo Santo, 3 mi N of Volcán, 1500 m, 19 Feb 1971, *Croat 13557* (F, MO, NY); NW side of Cerro Pando, *Croat 15922* (MO); "Ojo de Agua," vic. of Santa Clara, betwen Volcán and Río Sereno, 08°51′N, 82°45′W, 1520 m, 17 Jun 1987, *Croat 66314* (AAU, MO, NY, UC); along rd. between Fortuna Lake and Chiriquí Grande, 4.5–5 km N of dam, 08°43′N, 82°17′W, 1100–1135 m, *Croat & Grayum 59971* (MO,

UC); valley of Río Quebrada, above El Boquete, 1650 m, 8 Feb 1918, *Killip 5123* (NY, US); near dam site, lower slopes of Cerro Fortuna, 1150 m, *Knapp & Vodicka 5563* (MO); vic. of El Boquete, 1000–1300 m, 2–8 Mar 1911, *Maxon 5256* (NY, US); without locality, Apr 1858, *Wagner s.n.* (M); Dtto. Bugaba, Santa Clara, 08°50′N, 82°44′W, *van der Werff & Herrera Ch. 7314* (MO, UC). **Darién:** Cerro Sapo, 5 km S of Garachiné, 07°59′N, 78°25′W, 600–800 m, *Hammel et al. 14851* (MO).

9. LOMARIOPSIS NIGROPALEATA Holttum, Bull. Misc. Inform. Kew 1939: 618. 1940. TYPE: PERU. Loreto: Florida, Río Putumayo, at mouth of Río Zubineta, 200 m, Mar–Apr 1931, *Klug 2082* (HOLOTYPE: US; ISOTYPES: BM, F, GH, K, MO, NY, S). (Fig. 15)

Rhizome scales 1–2.5 mm long, lustrous black with a narrow reddish margin (this often abraded and therefore absent), ovate to lanceolate, sparsely ciliate, appressed. *Leaves* to 100 cm long; petioles 10–30 cm long, ⅕–⅓ the length of the laminae; lamina not or only slightly reduced toward the base, with the apical pinna continuous with the rachis (i.e., not articulate); pinnae 13–21 × 3.2–5.5 cm, pairs 5–10, alternate, patent, elliptic to lanceolate, entire, the base cuneate, occasionally excavate basiscopically, at least the proximal pairs stalked, the stalks (2–)3–6 mm long, the apices acuminate to abruptly narrowed and subcaudate; rachises not alate. *Fertile pinnae* 0.7–1.6 cm wide; paraphyses absent; annular cells 13–15; spores pale yellowish spiny, the spines numerous, about ½ the length of the spore.

Distribution and habitat.—Amazonian Colombia, Ecuador, Peru, Bolivia, and Brazil (Fig. 13). It grows on clay and sandy soils, at 180–500(–800 m).

Lomariopsis nigropaleata is characterized by appressed, black, shiny, 1–2.5 mm long rhizome scales—the smallest scales of any species in the genus. It might be confused with *L. japurensis,* with which it sometimes grows and hybridizes (see *L. japurensis*). The two can be separated by several characteristics. The easiest to observe is the size and habit of their rhizome scales, which are longer (4.5–10 mm) and slightly spreading in *L. japurensis.* Their laminae also differ: in *L. nigropaleata* the lamina generally has fewer pinna pairs (5–10) and is only slightly reduced toward the base (Fig. 15), whereas in *L. japurensis* the lamina generally has more pinna pairs (6–16) and is often reduced toward the base (Fig. 6). The spines on the spores of *L. nigropaleata* are long and dense and can be easily seen with only 30× magnification, whereas *L. japurensis* has smooth spores. The spiny spores of *L. nigropaleata* are illustrated in Tryon & Tryon, 1982 (fig. 94.14) and Tryon & Lugardon, 1991 (fig. 198.2).

Additional specimens examined. COLOMBIA. **Amazonas:** Mun. La Pedrera, Inspección de Santa Isabel, Parque Nacional Natural Cahuinarí, Estación Biol. Puerto Barbados, 01°28′N, 70°46′W, 300 m, *Pipoly et al. 12871* (MO); 12 km from Leticia on rd. to Tarpacá, 200 m, *Soejarto & Cardozo 729* (GH). **Putumayo:** Oreto (Indian pueblo) on Río Oretopungo, tributary of Río Putumayo, 450 m, *Ewan 16774* (BM, UC). **Vaupés:** Mitú, *Barclay et al. 629* (GH); Río Pacoa, tributary of Río Apaporis, 00°20′N, 71°20′W, 300 m, 7–12 Feb 1952, *Schultes & Cabrera 15306* (GH, NY, US); Río Apaporis, Soratama, above mouth of Río Kananarí, 00°05′N, 70°40′W, 300 m, *Schultes & Cabrera 16055* (GH, US); Río Kuduyarí, tributary of Río Vaupés, 01°15′N, 70°05′W, 200 m, *Schultes & Cabrera 20024* (US); Río Macu-Parana, *Silverwood-Cope 25* (GH).

ECUADOR. **Morona-Santiago:** Misión Bomboiza, 03°29′S, 78°34′W, 800 m, 23 Apr 1973, *Holm-Nielsen et al. 4278* (AAU, K, MO, NY). **Napo:** Añangu, S bank of Río Napo, 95 km downstream from Coca, 00°32′S, 76°23′W, 300 m, 19 Jun–4 Jul 1985, *Balslev et al. 60530* (AAU, MO, NY); Lagunas de Cuyabeno, NE part of the first lake, 00°01′S, 76°11′W, 300 m, *Brandbyge et al. 36043* (AAU); Payamino, Reserva Florística El Chuncho, 5 km NW de Coca, 00°30′S, 77°01′W, 250 m, *Cerón & Palacios 2369* (AAU, MO, UC, US); confluence of Quiwado and Tiwaeno Rivers, *Davis & Yost 952* (GH); Sendero La Hormiga, 25 Apr 1981, *Jaramillo 8461* (NY); Añangu, NW corner of the Parque Nacional Yasuní, 00°32′S, 76°22′–23′W, 300 m, *Korning & Thomsen 47102* (AAU); Añangu, Río Napo, 00°31′–32′S, 76°23′W, 260–350 m, *Lawesson et al. 39399, 39439* (AAU); Río Lagarto Cocha, 2 hours upstream from Río Aguario, 00°32′S, 75°15′W, 190 m, *Lawesson et al. 44370* (AAU); Parque Nacional Yasuní, Río Tiputini, 1 km E of biol. station, 00°04′S, 76°28′W, 200 m, 10 Apr 1996, *Moran et al. 6053* (AAU, NY, QCA, QCNE, TUR); Aguarico Cantón, Yasuní Natl. Park, Laguna Jatun Cocha, near mouth of Río Yasuní, 01°00′S, 75°25′W, 180 m, *Neill & Rojas 9926* (MO, UC); Añangu, Parque Nacional Yasuní, 00°31′–32′S, 76°23′W, 260–350 m, 30 May–21 Jun 1982, *Øllgaard et al. 38858* (AAU, UC), *38867* (AAU, F, GH, NY, UC, US), *39165, 57114* (AAU); Upper Río Tiputini, ca. 2 canoe-hours from bridge on Coca-Auca oilfield road, 00°43′S, 76°57′W, 300 m, *Øllgaard & Blasco 99057* (AAU). **Pastaza:** Lorocachi, 2–4 km S of military camp, 01°38′S, 75°58′W, 200 m,

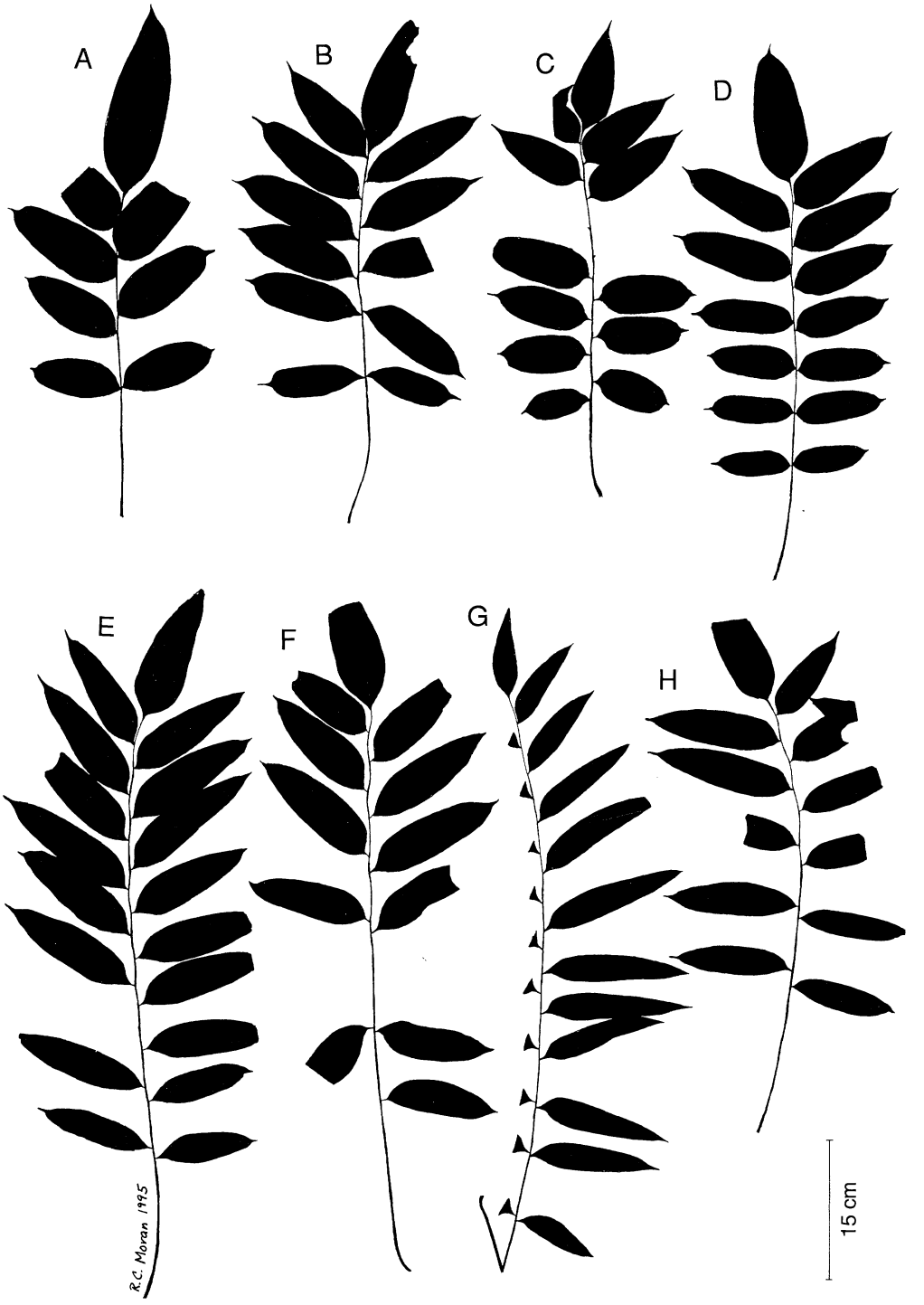

FIG. 15. Sterile leaves of *Lomariopsis nigropaleata*. **A.** *Killip & Smith 28794* (US), Peru. **B.** *Pipoly 13568* (MO), Peru. **C.** *Spruce 4738* (G), Peru. **D.** *Vásquez & Jaramillo 16560* (MO), Peru. **E.** *Brandbyge 36043* (AAU), Ecuador. **F.** *Salik 7272* (MO), Peru. **G.** *Øllgaard et al. 38867* (AAU), Ecuador. **H.** *Tuomisto 2416* (TUR), Peru.

24 May 1980, *Brandbyge & Asanza C. 30624, 30692, 31475* (AAU, MO); Lorocachi, on path to Lagartococha, 01°38′S, 75°58′W, 200 m, *Brandbyge & Asanza C. 30887* (AAU, MO); Curaray, Valle de la Muerte, 01°25′S, 76°52′W, 240 m, *Holm-Nielsen et al. 22448* (AAU); Lorocachi, E del campamento militar, Río Curaray, 01°38′S, 75°58′W, 200 m, *Jaramillo et al. 31385* (AAU, MO); Río Bobonaza, oil exploration camp Chichirota, 02°22′S, 76°40′W, 300 m, 26 Jul 1980, *Øllgaard 35267* (AAU, NY, UC). **Sucumbíos:** Reserva Faunística Cuyabeno near Pto. Bolívar at confluence of Río Tarapui and Río Cuyabeno, 00°05′S, 76°10′W, 300 m, *Balslev 4788* (AAU, NY); Lago Agrio Cantón, Reserva Cuyabeno, 00°01′S, 76°14′W, 230 m, *Palacios et al. 8968* (MO); Reserva Faunística Cuyabeno, 1 km N of Laguna Grande, 00°00′, 76°12′W, 265 m, *Balslev et al. 84415* (AAU), *Poulsen 78095, 78713, 78832* (AAU), *78976* (AAU, TUR), *79831* (AAU), *80460* (AAU, TUR), *80969* (AAU).

PERU. **Amazonas:** Prov. Condorcanqui, Distr. El Cenepa, Comunidad de Mamayaque, Río Cenepa, 04°31′S, 78°11′W, 300 m, 26 Jan 1997, *Vásquez et al. 22321* (MO). **Huánuco:** Ridge E of Tingo María, 800 m, *Allard 21499* (GH); Tingo María, *Asplund 12723* (S); Prov. Pachitea, Dtto. Honoria, Bosque Nacional de Iparia, 1 km arriba del pueblo de Tournavista a unos 20 km arriba de la confluencia con el Río Ucayali, 300–400 m, *Schunke V. 1288* (F, GH), 19 Dec 1966, *1371* (F, GH, NY, US); Prov. Pachitea, Dtto. Puerto Inca, Bosque Nacional de Iparia, a lo largo del Río Pachitea 85 km en distancia lineal de la confluencia con el Río Ucayali, 400–500 m, 9 Dec 1968, *Schunke V. 2843* (F, G, GH, NY, US). **Junín:** Cahuapanas, on Río Pichis, 340 m, 20–21 Jul 1929, *Killip & Smith 26754* (NY, US); Prov. Chanchamayo, Pichanaki, Rodal semillero de Kimiridi, 700 m, 11 Mar 1986, *van der Werff et al. 8616* (MO, UC). **Loreto:** 17 km SW of Iquitos, *Croat 18395* (F, G, MO, UC); Altura Tuta Pishco on Río Napo, *Croat 20278* (MO); Río Napo near entrada de Isla Inayuga, *Croat 20537* (MO); región Loreto, 122 m, *Flores 73, 93, 139* (AAU); Río Corrientes at Ecuador border, between Teniente Lopez and Puesto Avanzado, 280–350 m, *Gentry et al. 19086* (F); Río Ampiyacu, Pucuarquillo, *Hahn & Tredwell 76* (MO); Yurimaguas, lower Río Huallaga, 135 m, 23 Aug–7 Sep 1929, *Killip & Smith 27671* (NY); Balsapuerto, lower Río Huallaga basin, 150–350 m, 28–30 Aug 1929, *Killip & Smith 28594* (NY, US); Santa Rosa, lower Río Huallaga below Yurimaguas, 135 m, 1–5 Sep 1929, *Killip & Smith 28823, 28794* (NY, US); Mishuyacu, near Iquitos, 190 m, Apr 1930, *Klug 1134* (F, NY, US); Alto Amazonas, 6 km W of Sarameriza (Río Maranón), 04°45′S, 77°20′W, 170 m, *Knapp et al. 7622* (F, MO); Prov. Loreto, Droissa oil pumping station, 02°45′S, 76°10′W, 250 m, *Lewis et al. 10954* (MO); Alto Amazonas Prov. Washintsa and vic., Río Huasaga, Achual Jívaro, 03°20′S, 76°20′W, 185 m, *Lewis et al. 11127* (MO); 2 km S of Pinsha Cocha, Río Morona, 04°20′S, 77°20′W, *Lewis et al. 12351* (MO); Prov. Maynas, Dtto. Las Amazonas, Explornapo Camp, Inventario MacArthur, ca. de Sucusari, a lo largo del Río Napo, 03°20′S, 72°55′W, 100–140 m, *Pipoly et al. 13315, 13317, 13568, 13591, 14169, 14504, 14528, 14627* (MO), *Gentry et al. 74356* (MO); Prov. de Ramón Castilla, 3 km S of Huanta, 03°17′S, 71°51′W, *Tuomisto et al. 5201, 5203* (TUR); Prov. Loreto, 1.5 km E of rd. to Iquitos at Km 10 from Nauta, 04°28′S, 73°34′W, *Tuomisto et al. 4116, 4437* (TUR); Prov. Maynas, close to tourist lodge of Amazon Selva Tours at Río Momón, 03°40′S, 73°20′W, *Tuomisto et al. 2494, 2496, 2497, 2610, 2611, 2614* (TUR); Maynas Prov., ca. 2 km S of Mishana at Río Nanay, 03°52′S, 73°24′W, *Tuomisto et al. 2858* (AAU), same locality but 1.5 km S of Mishana, Tuomisto et al. *1215, 2015, 2066, 2312, 2318, 2412, 2413, 2414, 2415, 2416, 2421, 2423, 2424, 2429, 2430, 2485, 2740* (TUR); Prov. Maynas, Explorama Tours at Río Sucusari, 03°10′S, 72°52′W, *Tuomisto et al. 5728* (TUR); Prov. Maynas, 7 km E of oil palm plantation at Río Manití, 03°38′S, 72°56′W, *Tuomisto et al. 4714* (TUR); Prov. Maynas, Yanayacu, afluente derecho del Río Manatí, 03°45′S, 72°55′W, 110 m, *Vásquez & Jaramillo 11152* (F, MO); Prov. Maynas, Quebrada Sucusari, 03°20′S, 72°55′W, 130 m, *Vásquez & Jaramillo 11799* (MO); Maynas Prov., Iquitos, Allpahuayo, Estación Experimental del Instituto de Investigaciones de la Amazonía Peruana (IIAP), Quebrada Brashico, 04°10′S, 73°30′W, 150–180 m, *Vásquez & Jaramillo 16560* (MO). **Madre de Dios:** Prov. Tambopata, ca. 30 km SSW of Puerto Maldonado, at Río La Torre (Río D'Orbigny) and Río Tambopata, 12°49′S, 69°17′W, 260 m, *Barbour 4802* (MO); Prov. Manu, Cerro de Pantiacolla, Río Palotoa 10–15 km NNW of Shintuya, 12°35′S, 71°18′W, 650–700 m, *Foster 10756* (LPB, US); Tambopata Nature Reserve, jct. of Ríos La Torre and Tambopata, 12°50′S, 69°17′W, 250 m, *Gentry et al. 58157* (MO); El Pilar, 250 m, *López M. 4611* (GH); Prov. Tambopata, entre Concepción y Lago Sandoval, 350 m, *Vargas C. 18560* (GH). **Pasco:** Prov. Oxapampa, Palcazu Valley, Iscozacin, 10°12′S, 75°15′W, 380 m, *Foster et al. 7827* (F, MO); Prov. Oxapampa, Valle del Palcazu, Río Palcazu, Iscozacin, camino a Villa America, 400 m, *León 708* (F); Prov. Oxapampa, Quebrada Castilla, comunidad sobre el Río Omaiz afluente del Río Chuchaurras y E del Río Palcazu, *León & Young 1049* (MO); Prov. Oxapampa, Palcazu Valley, Iscozacin, above PEPP Project Camp, 29 May 1984, *Salick 7071* (F, MO, NY), *7072* (F), 6 Apr 1985, *7272, 7257* (MO, NY); Prov. Oxapampa, trail between Iscosacin and Villa America, 10°11′S, 75°15′W, 350–400 m, 29 Nov 1982, *D. N. Smith 2835* (AAU, F, MO, NY). **Puno:** Río Távara base camp, 13°21′S, 69°40′W, 400 m, 17 May 1992, *Gentry et al. 76684* (MO, NY, UC). **San Martín:** E of Tingo María, 625–1100 m, *Allard 20872* (US); Lamas, Santa Rosa de Davidcillo, trail to Tioyacu, E of rd., Km 72 Tarapoto–Yurimaguas rd., 06°15′S, 76°17′W, 200–250 m, *Knapp 8239* (MO), 22–23 Apr 1986, *Knapp & Mallet 7156* (MO, NY), *7921* (MO); Lamas, Convento, trail to Neuvo Lamas, Km 68 of Tarapoto–Yurimaguas rd., 06°16′S, 76°17′W, 200 m, 26 Apr 1986, *Knapp et al. 7230* (AAU, F, MO, NY); Tarapoto, *Spruce 4738* (B, G, K, P, US). **Ucayali:** Prov. Coronel Portillo, Bosque Nacional von Humboldt, 08°45′S, 75°05′W, 350 m, *Diaz et al. 729* (MO, US).

BOLIVIA. **Beni:** Cachuela Esperanza, *Meyer 154* (Z). **Cochabamba:** Prov. Carrasco, de Villa Tunari, 62 km hacia Puerto Villarroel "Parque Litoral," cerca de

Ivirgarzama, 400 m, *Beck 1522* (F, LPB); Prov. Carrasco, Projecto Valle del Sacta, 241 km W of Santa Cruz, 17°12′S, 64°43′W, 290 m, 23 Oct 1991, *Arroyo P. 86* (NY, USZ), *Fay & Fay 2301* (LPB), *Kessler et al. 8760* (UC), 17 Jul 1994, *Moran 5885* (AAU, LPB, MO, NY, USZ, UC). **Pando:** 3 km above Abuna, W bank of Río Madeira, *Prance et al. 8390A* (K, MO, U, US); ca. 20 km S of Río Manuripi on rd. to Chivé, 11°58′S, 68°35′W, 12 Aug 1982, *Sperling & King* 6604 (GH, LPB, NY). **Santa Cruz:** Prov. Nuflo de Chávez, Perseverancia, 14°45′S, 63°45′W, 13 Sep 1990, *Frey & Kramer 749* (LPB, NY, Z).

BRAZIL. **Acre:** Cut-off to Esperança on Brasiléia–Assis Brasil rd., 6 km from Brasiléia, 5 Nov 1980, *Lowrie et al. 726* (F, NY, US); Cruzeiro do Sul, rios Juruá and Moa, Estrada Alemanha, 14 Apr 1971, *Prance 11882* (NY). **Amazônas:** Mun. de Maraã, rio Japurá, near Maraã, Lago Maraã, 01°51′S, 65°36′W, 4–5 Dec 1982, *Plowman et al. 12174* (F, NY, US); basin of rio Purus, rio Cunhuá at Deni Indian village, 06°43′S, 66°47′W, 28 Nov 1971, *Prance et al. 16478* (K, NY); Mun. Cruziero do Sul, Cerro do Sul a Tarauacá, Km 40, 14 Sep 1985, *Rosas et al. 334* (NY); rio Juruá, Miry, *Ule 5757* (B, K). **Rondônia:** São Lorenço mines, 09°33′S, 65°06′W, 26 Nov 1968, *Prance et al. 8897* (NY).

10. LOMARIOPSIS PRIEURIANA Fée, Mém. Foug. 2: 66, t. 25, f. 1. 1845. *Acrostichum prieuriana* (Fée) Klotzsch, Linnaea 20: 429. 1847. *Stenochlaena prieuriana* (Fée) Underw., Bull. Torrey Bot. Club 33: 599. 1906. TYPE: FRENCH GUIANA. Without locality, s.d., *Leprieur s.n.* (HOLOTYPE: P; ISOTYPES: B, BM, K). (Figs. 16, 17)

Rhizome scales 4–10 mm long, reddish to orangish (occasionally blackened at point of attachment), lanceolate, ciliate, spreading. *Leaves* to 110 cm long; petioles 10–40 cm long, ⅓–¾ the length of the laminae; laminae widest at base or only slightly reduced; pinnae 13–24(–30) × (3.5–)4–6 cm, pairs 3–6(–7), alternate to subopposite, patent, broadly to narrowly elliptic, entire, the base cuneate, occasionally excavate basiscopically, sessile or nearly so, the stalks (when present) to 3 mm long, the apices acuminate; rachises not alate. *Fertile pinnae* 0.7–2 cm wide; paraphyses often present, consisting of branched, reddish, hair-like scales; annular cells 13–15; spores spiny, the spines ½ to as long as the spores.

Distribution and habitat.—Lomariopsis prieuriana grows in wet forests at 20–1500 m and is widespread in tropical South America (Fig. 18).

Nearly all the specimens of *Lomariopsis prieuriana* examined for this study were originally identified as *L. japurensis*; however, *L. prieuriana* can be readily distinguished from *L. japurensis* by its elliptical pinnae with narrower bases, fewer (typically 3–6) pinnae pairs, dark reddish to orangish rhizome scales, and generally more paraphyses mixed among the sporangia. In contrast, *L. japurensis* tends to have oblong or lanceolate pinnae with a more variable base shape, more (typically 8–12) pinna pairs, blackish rhizome scales, and rarely any branched paraphyses among the sporangia. Another difference is that *L. prieuriana* has spiny spores, whereas those of *L. japurensis* are smooth. *Lomariopsis prieuriana* also resembles *L. latipinna,* which see for comparison.

Although the pinna shape of *Lomariopsis prieuriana* is fairly uniform compared to other species of *Lomariopsis,* some variation exists. Three specimens from the eastern Andes of Ecuador (*Moran & Rohrbach 5131,* MO, UC; *Øllgaard 98035,* AU; *Stübel 923,* B) have greatly elongated, oblong pinnae (Fig. 16D) and are slightly scalier than typical *L. prieuriana.* They might represent a new species, but more specimens are needed to assess the variation. *Lomariopsis prieuriana* also shows geographic variation in the rhizome scales. Plants from Panama, Colombia, and western Amazonia have bright red, broad rhizome scales; and plants from the Guianas, southern Venezuela, and central Amazonia have somewhat darker and narrower ones.

Additional specimens examined. PANAMA. **Darién:** E slope of Cerro Pirre, 07°55′N, 77°40′W, 500–1000 m, *Hamilton & Stockwell 1509* (MO); Pirre Massíf, Alturas de Nique, above Cana mine, 07°45′N, 77°40′W, 1250–1500 m, *McPherson 12202* (MO); Cerro Pirre Massíf, ridge trail up from Cana, 700–900 m, 5 May 1990, *Moran 5080* (F, GH, MO, NY, UC, US); summit of knoll above Cana, 800 m, *Stern et al. 522* (G, GH, MO, UC, US).

TRINIDAD. E of Sangre Grande, 10 Apr 1921, *Britton 2839* (GH, NY); Talparo, *Britton et al. 2163* (GH); without locality, *Fendler 106* (G, K, MO); La Grimté, *Germain 47* (P); Cumuto Rd., *Hombersley 84* (BM, US); Oropouche local rd., *Hombersley 371* (BM); Asa Wright Nature Centre, 7 mi N of Arima, 400 m, 1–18 Jul 1984, *Mickel 9455* (NY); without locality, *Purdie s.n.* (K).

FRENCH GUIANA. Inini River, Mont de l'Inini, 03°28′N, 52°36′30″W, *Cremers et al. 8788* (U); l'Inini Mt., extreme NW, 03°30′40″, 53°36′W, 550–670 m, *Cre-*

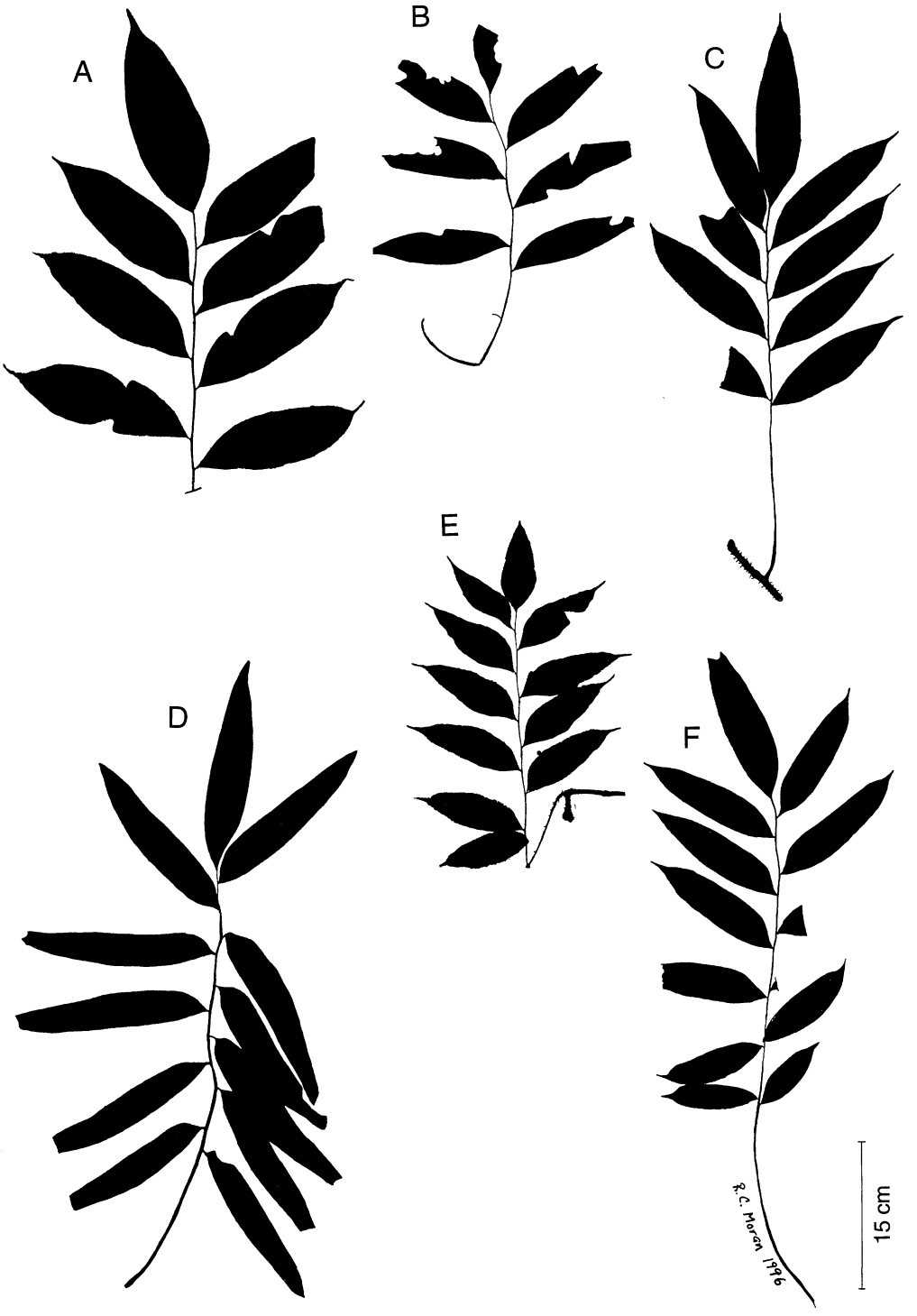

FIG. 16. Sterile leaves of *Lomariopsis prieuriana.* **A.** Collector unknown (BM). **B.** *Leprieur s.n.* (K), French Guiana (isotype). **C.** *Collector unknown 1494* (Z), French Guiana. **D.** *Stübel 923* (B), Ecuador. **E.** *Britton 2839* (NY), Trinidad. **F.** *Hombersley 24* (US), Trinidad.

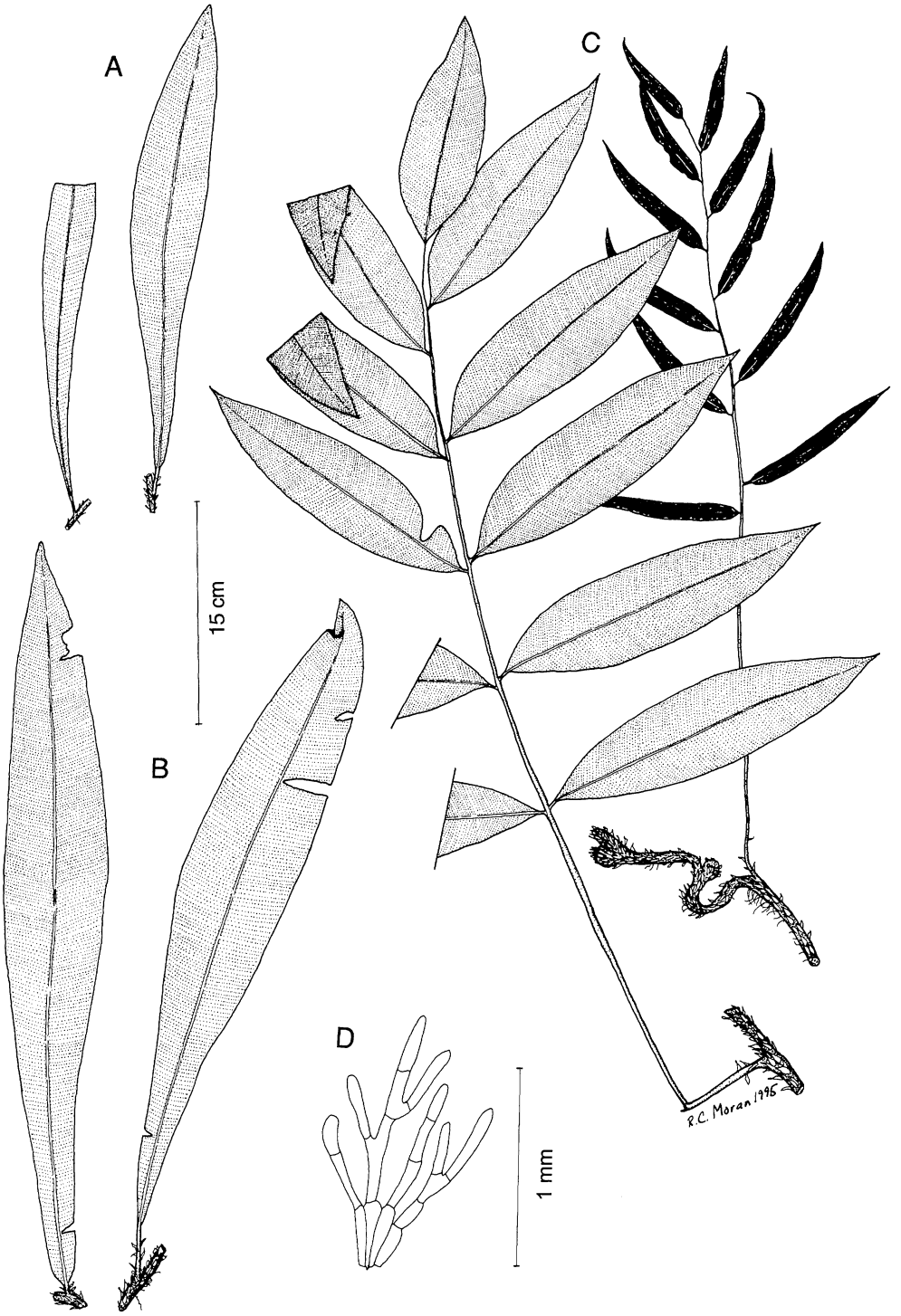

FIG. 17. *Lomariopsis prieuriana.* **A, B.** Juvenile leaves. **C.** Sterile and fertile leaves. **D.** Highly dissected scale from the abaxial surface of the fertile lamina. (A, B, *Moran 5080,* MO; C, D, *Haught 1291,* US).

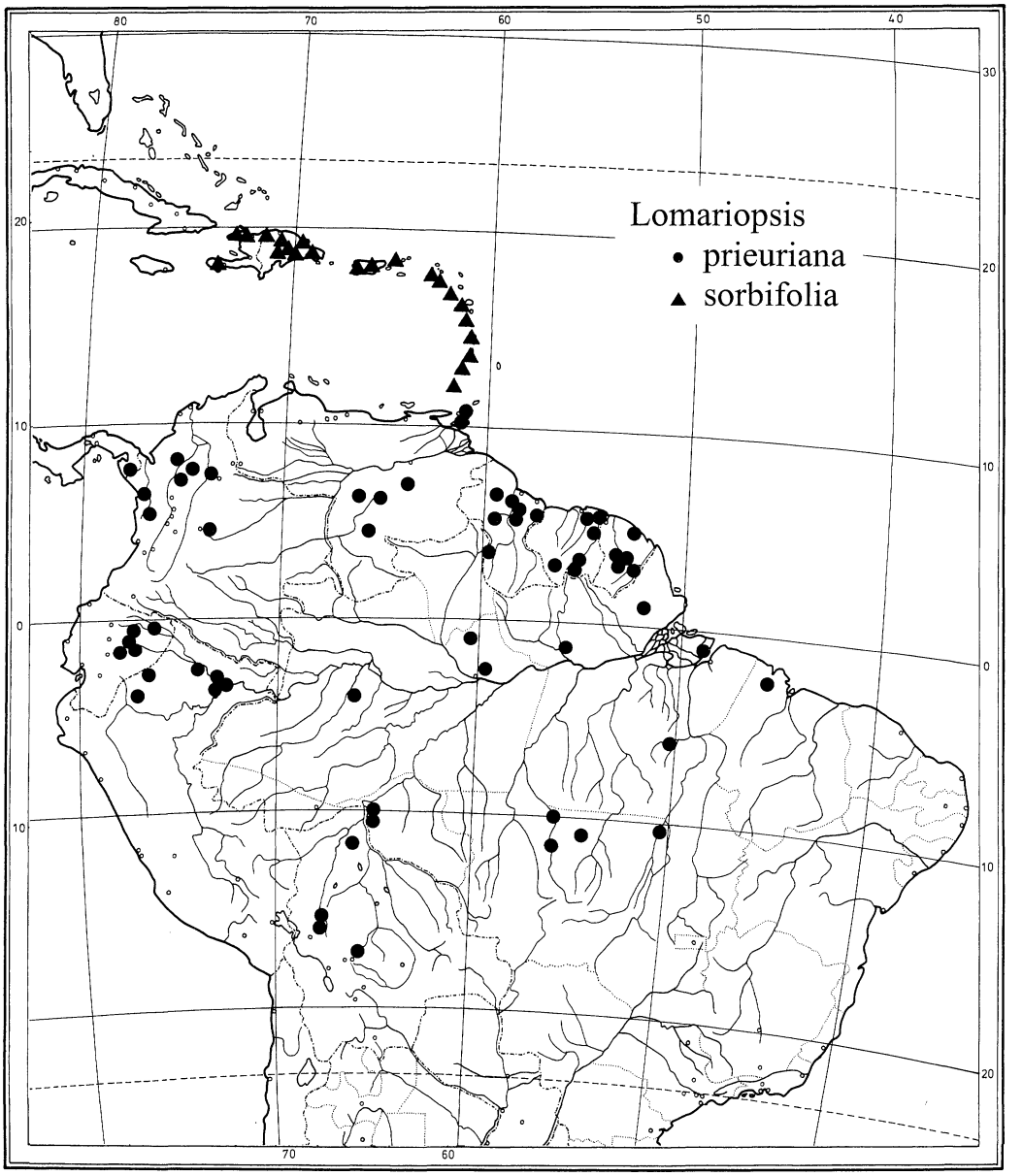

FIG. 18. Distribution of *Lomariopsis prieuriana* and *L. sorbifolia*.

mers et al. 8895 (U); Mt. Atachi Bacca, Région de l'Inini, 03°33′N, 53°55′W, 450 m, *Cremers et al. 10229* (B, US); Ouaqui River, Saut Macaqe, *de Granville B.4914* (Z); Saül, *de Granville B.5082* (Z); Montagne de la Trinité, sommet NE, *de Granville 6341* (U, Z); Mt. Galbao, Secteur Est, 03°36′N, 53°17′W, 700 m, 8 Jan 1986, *de Granville 8473* (NY), *8790* (US, Z); Cayenne, 1866, *Jelski s.n.* (BM); Saul, Eaux Claires, 03°37′N, 53°12′N, 200–400 m, 1 Nov 1992, *Mori et al. 22738* (NY); Acarouany, *Sagot 217* (P); without locality, *Sagot 712* (BM, G, P); Eau Claire, near Saül, 200 m, 11 Aug 1993, *van der Werff & George 12975* (MO, NY); 1.5–2 km de Saül, Crique Limonade, *Windisch 5259* (AAU).

SURINAME. Langs Tossodreek, *Florschütz 488* (U); Lely Mtns., SW plateaus, 550–710 m, 23 Sep 1975, *Lindeman et al. 233* (K, NY, U, US, Z), *307* (AAU, EAP, F, MO, NY, U, Z), *468* (U); Joden Savanne–Mapane Cr. area, *Kramer & Hekking 2680* (U); Dist. Maraowinje, Ricanau-mijn bij Moengo, *Kramer & Hekking 3122* (U); Paloemeu, *Lewis s.n.* (US); Su-

riname River, Jodensavanne–Mapane Cr. area, *Lindeman 4001* (U, US), *5250* (U); Mt. Matoury, La Mirande, Ile de Cayenne, *Oldeman 2911* (P, U); Gwetapu, *Sauvain 405* (Z); without locality, *Schomburgk 1652* (B); Marowijne Dist., Paloemeu, jct. of Palomeu and Tapanahony Rivers, 15 Feb 1961, *Tryon 5665* (GH, NY, US, Z); confluence of Paloemeu and Tapanahoni Rivers, 03°20′N, 55°27′W, *Wessels Boer 1167, 1241* (U).

GUYANA. Cuyounie Creek, *Appun 128* (K); Cuyuni River, *Bartlett 8334* (K); Makanria Creek, Essequibo River, *Fanshawe M302* (BM); Demerara, 1897, *Jenman s.n.* (K, NY); Mt. Raywa, 1897, *Jenman s.n.* (NY); Potaro River, Sheenabowa, 1897, *Jenman 1461* (K, NY); Corentyne River, 1897, *Jenman 383* (K); Rupununi Distr., between Kuyuwini Landing and Kassikaityu River, 02°00′N, 59°15′W, 150–250 m, 23 Oct 1992, *Jansen-Jacobs et al. 3065* (NY); Mabura Hill, 05°19′N, 58°38′W, 100–200 m, *Maas et al. 5892a* (Z); Kartabu Point, Cuyuni River, *Mile 204* (GH); Essequibo River, Moraballi Creek, near Bartica, near sea level, *Richards 306* (BM, K), *758* (K); Labbakalra Creek, Tiger Creek, Essequibo River, *Sandwith 1200* (BM, K); NW slopes of Kanuku Mtns., in drainage of Moku-moku Cr. (Takutu tributary), 150–400 m, 31 Mar–16 Apr 1938, *A. C. Smith 3477* (GH, NY), *3540* (GH, K, NY).

VENEZUELA. **Amazonas:** Santa Rosa de Tencua, Río Ventuari, 150 m, *Lister 122* (K). **Bolívar:** Mun. Raul Leoni, Hato La Vergarena, 3 km E del Río Aro, 06°50′N, 63°52′W, 330 m, Mar 1987, *Fernández 4115* (NY); Mun. CEDENO, cabeceras de Río Túriba y Caño, 45 km E de Pijiguaos, 06°34′N, 66°23′W, 800 m, *Fernández & Sanoja 5903* (MO); Río Nichare (tributary to Río Caura), between mouth of Nichare and Caño Sarrapio, 06°04′N, 65°02′W, 250 m, *Horner et al. 178* (MO).

COLOMBIA. **Antioquia:** Planta Providencia, 26 km S and 23 km W by air of Zaragoza, in valley of Río Anorí between Dos Bocas and Anorí, 07°13′N, 75°03′W, 400–700 m, *Shepherd 411* (B, U). **Bolívar:** Norosi–Tiquisio trail, Lands of Loba, 150–600 m, *Curran 137a* (US). **Chocó:** Trail to Miniquía E of Puerto Mutis (Bahía Solano), 20–120 m, *Lellinger & de la Sota 44* (US); Mojarras de Tadó, 8.5 km E of Istmina, 150–250 m, *Lellinger & de la Sota 390* (US). **Córdoba:** Ayapel, Hacienda Corinto, *Leguízamo 450* (MO). **Cundinamarca:** Cordillera Oriental, Mesa Negra, Gazaguan Valley, 6 km NW of Medina, *Grant 10453* (US). **Santander:** Magdalena Valley, between Sogamoso and Colorado Rivers, vic. of Barranca Bermeja, 100–500 m, *Haught 1291* (GH, UC, US).

ECUADOR. **Napo:** Hollín–Loreto rd., 32 Km mark, 3–4 mi S of rd., 00°35′S, 77°25′W, 1200 m, 25 Jan 1991, *Moran & Rohrbach 5131* (MO, UC); rd. Cotundo–Loreto, 38 km from jct. with rd. Baeza-Tena, 00°53′S, 77°39′W, 1250 m, *Øllgaard 98035* (AAU); Añangu, Parque Nacional Yasuní, 00°31′–32′S, 76°23′W, 260–350 m, *Øllgaard et al. 39168* (AAU). **Pastaza:** Baños de Pintuc, *Stübel 923* (B); Pastaza Cantón, Pozo Villano 2 de Arco, 2 km del pueblo de Villano, 01°25′S, 77°20′W, 400 m, *Tipaz et al. 491* (M).

PERU. **Loreto:** Prov. Maynas, C. Nueva Paleta, Río Napo, 03°01′S, 73°21′W, 122 m, *Flores 348, 353, 363* (AAU); Prov. Maynas, Llanchama, 02°27′S, 73°51′W, 122 m, *Flores 277* (AAU); Prov. Alto Amazonas, Andoas, Río Pastaza near Ecuador border, 02°48′S, 76°28′W, 210 m, *Gentry et al. 29748* (MO); Prov. Maynas, 5 km NW from Gen Gen at Río Momón, 03°37′S, 73°17′W, *Tuomisto et al. 3240, 3368* (AAU, TUR), *3369, 3370* (TUR); Explorama Tours at Río Sucusari, 03°10′S, 72°52′W, *Tuomisto et al. 5788* (TUR). **San Martín:** Roija Prov., rd. Roija–Pedro Ruiz, 1450 m, *van der Werff 15554* (UC).

BOLIVIA. **Beni:** Prov. of Vaca Diez, Chácobo village Alto Ivon, 11°45′S, 66°02′W, 200 m, 5 Dec 1983, *Boom 4089* (LPB, NY), 13 Apr 1984, *5020* (NY). **Cochabamba:** Prov. José Carrasco Torrico, 147 km antigua carretera Cochabamba–Villa Tunari, 1100 m, *Kessler et al. 7950* (UC), Km 141, *Kessler et al. 7736* (UC). **La Paz:** Prov. Sud Yungas, Alto Beni, Sapecho, Colonia Tupiza, 15°32′S, 67°21′W, 650 m, *Acebey A. & Jiménez I. 81* (UC); Nordyungas, Polo-Polo near Coroico, 1100 m, *Buchtien 3596* (GH, UC, US); Prov. Sud Yungas, Alto Beni, Sapecho, Concesión de la Cooperativa Sapecho, 15°32′S, 67°20′W, 610 m, *Krömer et al. 8* (UC); Caranavi, Bacia do Río Coroico, 600–700 m, *Windisch 2487* (AAU).

BRAZIL. **Amapá:** Rio Araguari, Serra do Navío, 8 Aug 1961, *Pires et al. 50316* (NY). **Amazônia:** Mun. de Manaus, 80 km NNE of Manaus, Dtto. Agropecuário da SUFRAMA, BR-174, Km 64, Fazenda Esteio, 02°25′S, 59°49′W, 50–125 m, 28 Jan 1992, *Nee 42338* (NY), 24 Jun 1992, *42873* (MO, NY); Manaus–Caracarai hwy, Km 160, 20 Feb 1974, *Steward et al. P20392* (NY). **Maranhão:** Mun. de Monção, basin of the Rio Turiaçu, Ka'apor Indian Reserve, 4 km NW of Urutawy, 11–12 Feb 1985, *Balée & Ribeiro 592, 756, 761, 763, 778a* (NY), 9 May 1985, *940* (MO, NY); Mun. Santa Luzia, rd. to Rio Mutum, Fazenda Agripec-Varig, *Silva et al. 1003* (F, NY, UC, US); Mun. Santa Luzia, Fazenda Cacique, entrance 83 km W of Santa Inez and 13 km E of Entrocamento on BR-222, 03°50′S, 46°04′W, *Taylor E1085* (K, MO, NY, US). **Mato Grosso:** Fazenda Geo-Acu, Colider-MT, 26 Mar 1983, *Salino 312* (GH); Mun. de Alta Floresta, 50 km da Alta Floresta, ca. 10°S, 56°W, *Windisch 4771* (AAU, UC); Mun. de Santa Teresinha, estrada de acesso a Fazenda Tapirapê à BR-158, 5 km do acampamento da destilaria Usina Tapirapê, 10°40′S, 51°20′W, *Windisch 5993* (AAU); Mun. de Marcelândia, Vila Atlântica, córrego Arara (bacia Rio Araguaia), 11°10′S, 54°45′W, 300–350 m, *Windisch & Oliveira 6421* (AAU); Mun. de Porto dos Gaúchos, Serra dos Caiabis, 40 km W of Porto Atlântico, Rio Teles Pires, 11°40′S, 56°08′W, 400 m, *Windisch & Oliveira 6478* (AAU). **Pará:** Serra dos Carajás, "Azul" near camp at Serra Norte, 22 km NW, then 10–15 km SW, 05°59′S, 50°28′W, 8–12 Dec 1981, *Daly et al. 1824* (GH, MO, NY, US); Cafezal, NE of Belém, Rio do Pará, 00°25′S, 48°25′W, *Fosberg 29301* (US); Mun. de Oriximiná, caminho para os Campos do Ariramba, varzea entré Serra Fé em Deus e a Serra da Preciosa, 70 m, 9 Jun 1980, *Martinelli 6830* (NY); Mun. Paragominas, Belém–Brasília Hwy. (BR-010) 17 km S of Ligação do Pará, near Km 1509, 2 Mar 1980, *Plowman et al. 9445* (F, NY). **Rondônia:** Mun. Guajara Mirim,

6 km NE of Guajara Mirim, then 2 km E on gravel rd., 10°43′S, 65°15′W, 175 m, 9 Apr 1987, *Nee 34684* (F, GH, K, MO, NY, US); trail N of Rio Madeira from 2 km below confluence of Rio Abunã, 12 Nov 1968, *Prance et al. 8350* (NY).

11. LOMARIOPSIS RECURVATA Fée, Mém. Foug. 2: 68, t. 28. 1845. *Stenochlaena recurvata* (Fée) Underw., Bull. Torrey Bot. Club 33: 600. 1907 ("1906"). TYPE: MEXICO. Tabasco: Teapa, s.d., *Linden s.n.* "Herb. Delessert et Mus. Paris" (HOLOTYPE: P, PHOTOS: NY, US, fragm. NY). (Fig. 19)

Lomariopsis mexicana Holttum, Bull. Misc. Inform. Kew 1939: 617. 1940. TYPE: MEXICO. Hidalgo[?]: Forêt vierge de Potrero, 19 Aug 1865, *Hahn 56* (HOLOTYPE: P, fragm. NY).

Rhizome scales 7–15 mm long, whitish, stramineous, or pale orange, lanceolate to linear, ascending and slightly spreading. *Leaves* 30–80 cm long; petioles 10–25 cm, ⅓–½ as long as the lamina, not winged; laminae widest at the base or only slightly reduced, the apical pinna continuous with (i.e., not articulate to) the rachis; pinnae 8–20 × 1–2.7 cm, pairs 12–20, alternate, sessile or nearly so, lanceolate to oblong, usually widest near the middle, sometimes slightly falcate basally, the bases often slightly inequilateral, rounded to narrowly cuneate, the apices acuminate to attenuate, subentire to minutely crenulate to serrulate; rachises exalate or narrowly alate distally; paraphyses absent. *Fertile pinnae* 2–4 mm wide; annulus cells 14 or 15; spores irregularly crested.

Distribution and habitat.—Lomariopsis recurvata occurs from southern Mexico to Honduras (Fig. 13). It grows in wet forests, at 0–1200 m.

Lomariopsis recurvata is characterized by whitish to pale orangish rhizome scales, laminae not or only slightly reduced toward the base, and fertile pinnae 2–4 mm wide. It closely resembles *L. maxonii* of Costa Rica and Panama, which differs by its wider (4–10 mm wide) fertile pinnae and its stalked pinna bases.

The shape of the pinna base in *Lomariopsis recurvata* varies greatly. *Lomariopsis mexicana* was initially described from a plant with broadly rounded pinna bases (Fig. 19D). This shape, however, intergrades with the opposite extreme: the narrowly cuneate bases such as seen in the type of *L. recurvata* (Fig. 19A). Intermediate plants are represented by *Breedlove & Smith 21675, Cowan 3934, Dorantes 2908, Jones et al. 3070,* and *Mickel 7171.* Because the shape of pinna base varies tremendously and no other characteristics distinguish the extremes, *L. mexicana* is placed here in synonymy.

Additional specimens examined. MEXICO. **Chiapas:** Mun. Berriozábal, 13 km N of Berriozábal, 900–1000 m, 2 Nov 1971, *Breedlove & Smith 21675* (F, MO, NY), *Breedlove 35427* (MO); Javalinero, Palenque, *Matuda 3652* (GH, US); Río Leche, 25 Mar 1933, *Mell 2035* (NY, US); Ruina Palenque, 150 m, *Saiki M-229* (F, Z); San Cristóbal de las Casas, *Schmid 512* (Z). **Oaxaca:** Rt. 185, 35.5 km S of rd. to Jesús Carranza, 150 m, *Cruden 1114* (UC); Mun. Santa María Chimalapa, 8 km N de Santa María por la vereda a Río Verde, 16°57′N, 94°41′W, 350 m, 28 Oct 1985, *Hernández G. & González L. 1752* (NY); Mun. Santa María Chimalapa, W del Paseo Lagarto del Río del Corte, ca. 5 km NE de Santa María, 16°56′N, 94°41′W, 180 m, *Hernández G. 2286* (NY); Dtto. Tuxtepec, Chiltepec and vic., 200 m, *Martínez-Calderón 866* (US); Dtto. Ixtlán, 29 km S of Valle Nacional, 80 km N of Ixtlán de Juárez, *Mickel 6395* (UC, US); Dtto. Ixtlán, 76 km N of Ixtlán de Juárez on Rt. 175, 5 km S of Vista Hermosa, Campamento La Esperanza, 20 Sep 1973, *Mickel 7171* (NY, UC, US). **Tabasco:** Slope of Cerro Las Campanas, 3 km E of Teapa, 50 km S of Villahermosa, 50–100 m, *Conrad et al. 2821* (MO); Mun. Tacotalpa, 3 km E del Ejido Lázaro Cárdenas, 50 m, *Cowan 2073* (MO); Mun. Tacotalpa, Cerro del Madrigal, Km 7 E Tacotalpa hacia Tapijulapa, *Cowan 3934* (UC); Tabasco, *Rovirosa 3120* (MO). **Veracruz:** 0–3 km del camino plan de arroyos Río Alegre, Hidalgotitlan, 140 m, *Dorantes 2908* (MO); near San Andrés Tuxtla, near Cerro Tapalcapan and Cerro Mastagaga, NW of Catemaco, *Dressler & Jones 142* (GH); Mun. Minatitlán, near Estación Tancochoapan, W of San José del Carmen, *Gilly & Hernández X. 50* (US); Mun. Catemaco, Basura, cerca de Sontecomapan, 100 m, 5 Aug 1965, *Rzedowski 20373* (NY); La Yunta, 100 m, *Ross 1112* (M, P); Mun. Catemaco, rd. from Catemaco to Sontecomapan, 5 km N of jct. with rd. around Lago Catemaco, 8 km (by air) NE of Catemaco, 18°29′N, 95°04′W, 510 m, *Schatz & Nee 238* (F); Fortuño, Coatzacoalcos River, 30–50 m, *Williams 8419, 8547, 8900* (F, US). **State Unknown:** Prope Masta, 26 Apr 1889, *Rovirosa 468* (NY, US).

BELIZE. **El Cayo:** Without locality, *Cambell 5* (K); vic. of La Flora at Río de la Flor, 6 mi S of Grano de Oro, 600–700 m, *Croat 23800* (MO); mi 41 on Humming Bird Hwy, *Gentle 9154* (F, S, US); Valentin, Jun–July 1936, *Lundell 6221, 6283* (NY, US); Middlesex, *Schipp 884* (F, US). **Toledo:** Columbia Forest Reserve, vic. of forest camp ca. 6 mi S of Cabro, in upper Río Grande drainage, 300 m, *Proctor 36138* (BM); Aguacate, 40 m, *Whitefoord 1571, 1572* (BM).

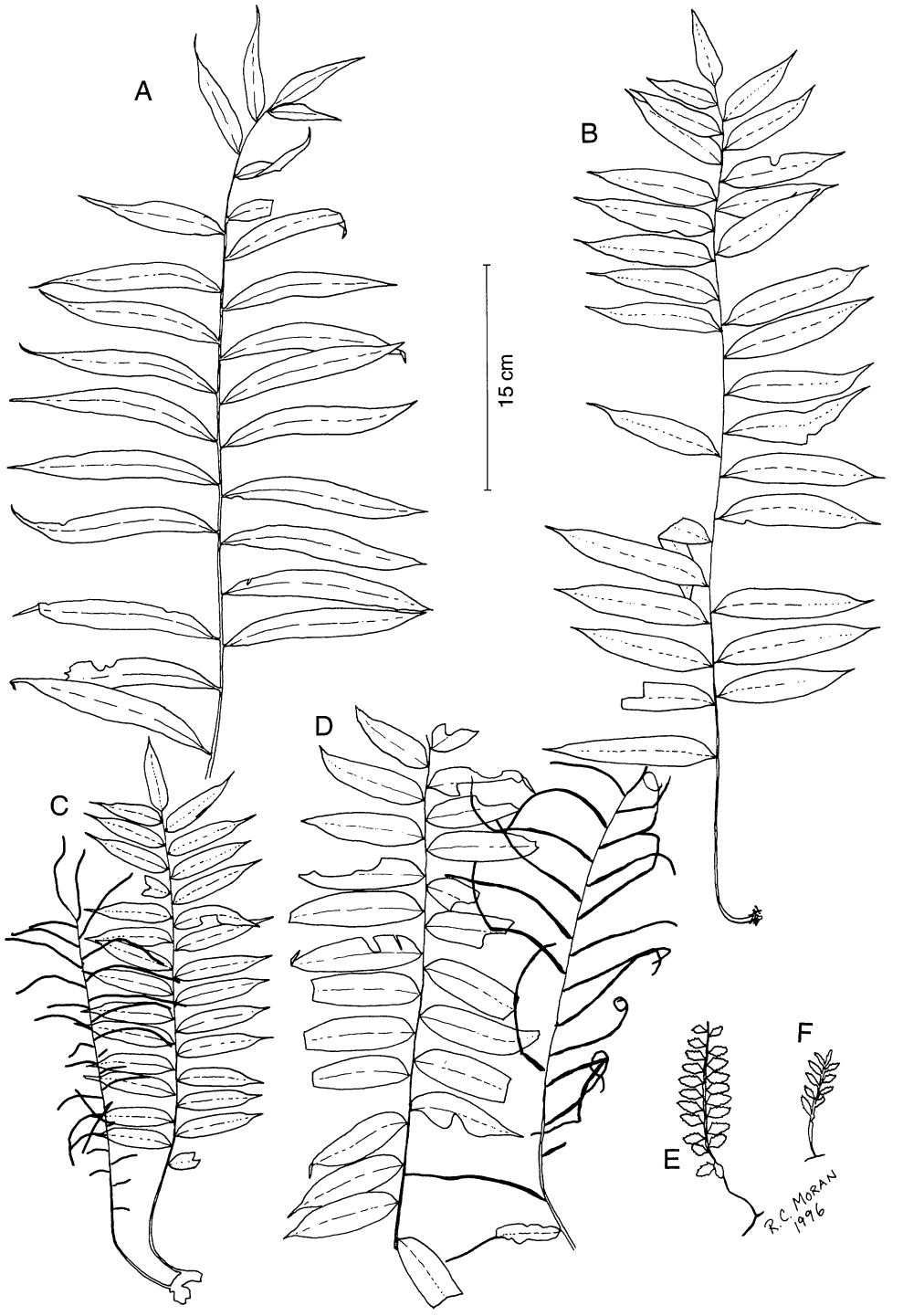

FIG. 19. *Lomariopsis recurvata.* **A.** Sterile lamina with unusually narrowed pinna bases (*Linden s.n.,* P; type of *L. recurvata*). **B.** Sterile leaf (*Rovirosa 3120,* MO). **C.** Fertile and sterile leaves (*Matuda 3652,* US). **D.** Fertile and sterile leaves (*Hahn 56,* P, type of *L. mexicana*). **E.** Juvenile leaf (*Rovirosa 468,* NY). **F.** Juvenile leaf (*Steyermark 33817,* F).

GUATEMALA. **Alta Verapaz:** Cubilquitz, 350 m, Aug 1907, *von Türckheim 1901* (F, GH, M, MO, NY, P, US); Pansamala, 1300 m, *von Türckheim 1129* (US). **Izabal:** 2–5 km S of Izabal, 20–200 m, 15°15′N, 89°00′W, 0–600 m, 24 Apr 1966, *Jones et al. 3070* (NY); between Virginia and Lago Izabal, Montaña del Mico, 50–100 m, *Steyermark 38747* (F). **Petén:** Dolores, between Km 77 and 78 on Santo Toribio rd., *Contreras 2136* (US); ca. 1 km S of Lacondon, *Contreras 3517* (US); Tikal National Park, Tikal, near Aguada Las Cucas, *Lundell 16902* (US); W and NW of Chinajá, between Río Chinajá and 6 mi W of Río San Román, 50–70 m, *Steyermark 45480* (F, US). **Quezaltenango:** Along old rd. between Finca Pirineos and Patzulín, 1200–1400 m, *Standley 86647* (F); lower S-facing slopes of Volcán Santa María de Jesús and Calahuaché, 1300–1500 m, *Steyermark 33817* (F); high barranco along Río Samalá, between Santa María de Jesús and Calahuaché, 1200–1300 m, *Steyermark 33888* (F). **Dept. Unknown:** Finca Panamá, *Brenckle 47-203* (UC); Los Andes, *Brenckle 203* (US).

HONDURAS. **Atlántida:** Lancetilla Valley, near Tela, 20–600 m, *Standley 53206* (F, NY), *54853* (US); Lancetilla, Tela area, *Steeves & Ray 383* (GH, U); hills above Lacetilla, 800 m, 15 Jul 1934, *Yuncker 4587* (F, MO). **Colón:** Clawra, *Spinden 47* (US). **Comayagua:** El Achote, above plains of Siguatepeque, 1350 m, 26 Jul 1936, *Yuncker et al. 6094* (F, GH, K, MO, NY). **Santa Bárbara:** S bank of Lake Yojoa, *Hazlett 674* (F). **Yoro:** Urraco to Guaymas, 15–60 m, *Ames 29* (US); 35 km S of La Ceiba on rd. to Olanchito, 930 m, *Madison 713* (GH).

12. LOMARIOPSIS SORBIFOLIA (L.) Fée, Mém. Foug. 2: 69. 1845. *Acrostichum sorbifolium* L., Sp. Pl. 1069. 1753. *Onoclea sorbifolia* (L.) Sw., Syn. Fil. 112. 1806. *Lomaria sorbifolia* (L.) Kaulf., Enum. Fil. 151. 1824. *Olfersia sorbifolia* (L.) C. Presl, Tent. Pterid. 234. 1836. *Stenochlaena sorbifolia* (L.) J. Sm., J. Bot. (Hooker) 4: 149. 1841. *Chrysodium sorbifolium* (L.) Luerss., Fil. Graeff. 71. 1871. *Polybotrya sorbifolia* (L.) Keyserl., Polyp. Herb. Bunge 32. 1873. *Stenochlaena sorbifolia* (L.) Underw., Bull. Torrey Bot. Club 33: 600. 1906 (non Smith, J. Bot. 4: 149. 1841) (LECTOTYPE, designated by Proctor, 1977: Petiver, Pterid. Amer. t. 9, fig. 8. 1712 [based on a plant from Martinique]). (Fig. 20)

Lomaria longifolia Kaulf., Enum. Fil. 153. 1824. *Stenochlaena longifolia* (Kaulf.) J. Sm., J. Bot. 3: 402. 1841. TYPE: Plumier, Traité Foug. Amér. t. 117. 1705.

Lomariopsis sorbifolia var. β *caudata* Fée, Mém. Foug. 2: 70. 1845. TYPE: GUADELOUPE. Collector not cited (HOLOTYPE: P?; possible ISOTYPE or HOLOTYPE: RB?).

Rhizome scales 5–10 mm long, whitish to very pale orangish, narrowly lanceolate to linear, spreading. *Leaves* 30–75 cm long; petioles 10–25 cm long, ¼–½ the length of the laminae; laminae widest at the base or slightly reduced, oblong, the apical segment continuous with (not articulate to) the rachis; pinnae 6–15 × 1.2–2(–2.5) cm, pairs 12–20, alternate to subopposite, patent, oblong, parallel-sided for most of their length, entire or serrate-crenate toward the apex, equilateral, broadly rounded, sessile or nearly so, the apices acute to acuminate; rachises narrowly winged throughout or marginate distally. *Fertile pinnae* 2–3 mm wide; paraphyses absent; annular cells 13–15; spores smooth, pale olive-green or very pale yellowish.

Distribution and habitat.—This species occurs in the Antilles and is the only species of *Lomariopsis* in the Lesser Antilles (Fig. 18). It occurs in wet forests, at 100–900 m.

Lomariopsis sorbifolia is characterized by whitish to very pale orangish rhizome scales, laminae (at least in large specimens) widest or nearly so at the base, pinnae parallel-sided for most of their length, and the apical segment continuous with (not articulate to) the rachis. It resembles *L. recurvata* of Central America and *L. kunzeana* of the Greater Antilles. It can be distinguished from these by pinnae parallel-sided for most of their length. In contrast, the pinnae of *L. recurvata* are slightly curved-falcate or unequal basally (Fig. 19), and those of *L. kunzeana* are widest just above a cuneate base and then taper to the apex, the effect being one of a narrowly lanceolate pinna (Fig. 8A, B, G).

Additional specimens examined. HAITI. Massíf de la Hotte, western group, Tiburón, valley of River Tiburón, at La Roche Percée, 150 m, *Ekman 10573* (BM, G, K, US); vic. of St. Louis du Nord, *Leonard & Leonard 14156* (GH, US); Petit Borgne, 15 Aug 1903, *Nash 468* (NY, US).

DOMINICAN REPUBLIC. **El Seibo:** La Mina, sect. El Jovero, Miches, *Julia & Jiménez 5798* (GH). **Espaillat:** Moca, Colonia de Jamas, 800 m, *Ekman 19579* (US). **La Vega:** Piedra Blanca, 200–500 m, *Allard 13492* (US). **Puerto Plata:** Cordillera Septentrional, Puerto Plata, Loma Isabel de Torres, 700 m, 2 Mar 1930, *Ekman 14374* (K, NY, S, US). **Samaná:** Vic. of Laguna, Samaná Peninsula, chiefly on Pilón de Azúcar, 100–500 m, *Abbott 263* (GH, NY, US), *409*

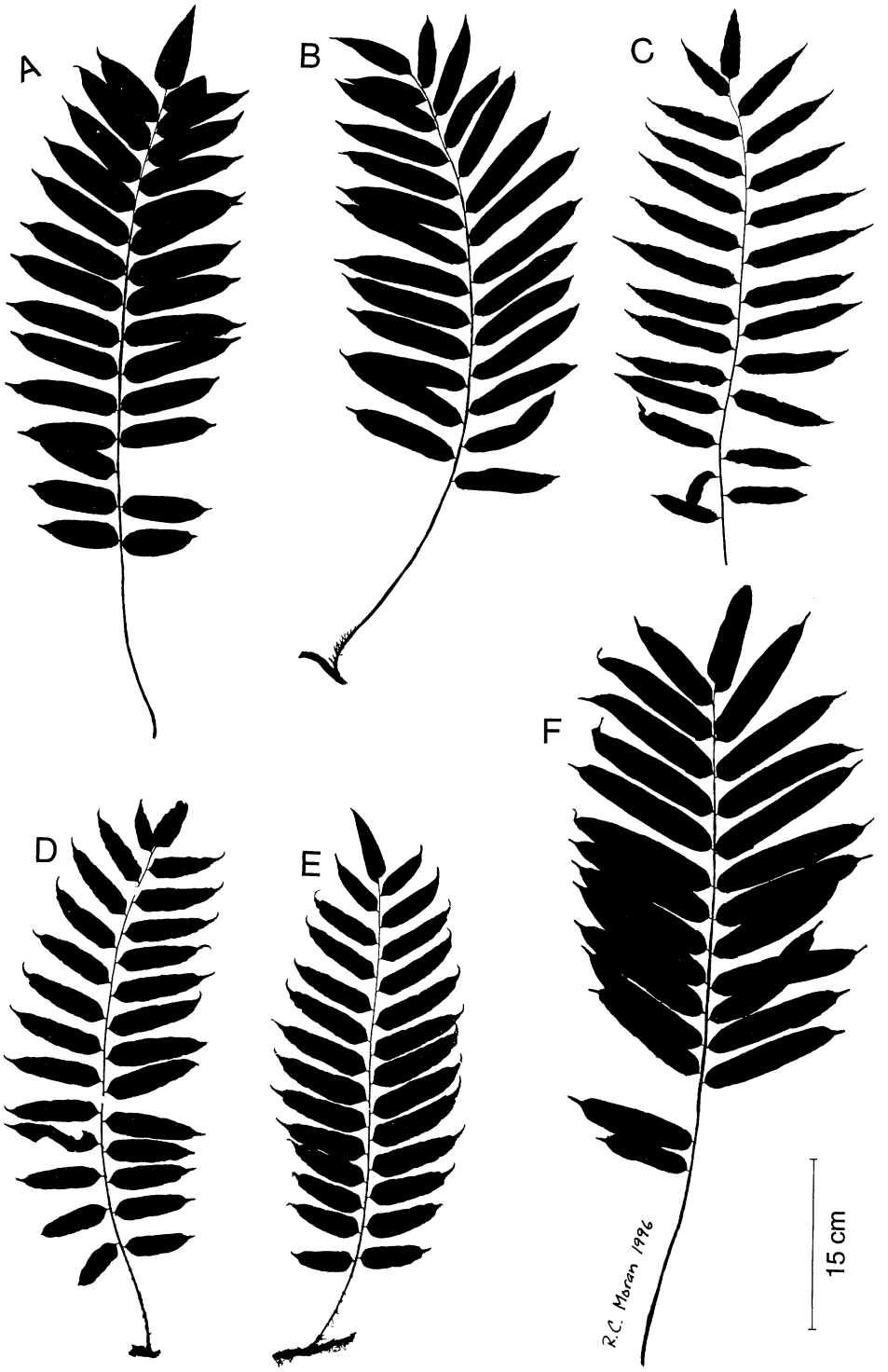

FIG. 20. Sterile leaves of *Lomariopsis sorbifolia*. **A.** *Faldman s.n.* (P). **B.** *Questal 931* (US). **C.** Collector unknown (K). **D.** *Proctor 21632* (U). **E.** *Proctor 21632* (GH). **F.** *Duss 1698* (P).

(US); Old Heart River (Jato Viejo), Samaná Peninsula, 300 m, *Abbott 1362* (US); Península de Samaná, Laguna, 150 m, *Ekman 15174* (K).

PUERTO RICO. Near Florida, 30 Jan 1906, *Britton 8532* (GH, NY); Mun. San Narciso, 900 m, 6–8 Feb 1923, *Britton & Britton 7298* (NY, US); Mount Morales, near Utuado, 19 Mar 1906, *Britton & Marble 1084* (NY, US); Yauco, *Garber 99* (GH); Río Piedras, *Hioram 329* (US); Pueblo Viejo, *Hioram 331* (US); Camuy, Montañas Guarionex, Barrio Piedra Gorda, Rd. 496, km 2.5 (2 km W of intersection with Rd. 486), 180–200 m, 12 Nov 1983, *Proctor 39708* (NY, US); Mun. Maricao, Barrio Maricao Afuera, along Río Maricao above Criadero de Peces, 460 m, *Proctor 39803* (US); Mun. de Hatillo, Barrio Bayaney, Cueva de la Catedral, near intersection of Rds. 129 & 134, 220–250 m, *Proctor 40672* (US); Sierra de Naguabo, Río Icaco and adjacent hills, 465–720 m, 30 Jul–5 Aug 1914, *Shafer 3510* (NY, US); Sierra de Luquillo, *Sintenis 1762* p.p. (B, GH, K, P, US); Barrio del Pasto, *Sintenis 2871* (B, G); Mirasol, *Sintenis 6134* (P, US); without locality, *Wydler 242* (G).

ST. THOMAS. No collector or number (P).

ST. EUSTATIUS. Without locality, 1906, *Boldingh 453* (B, K, NY, U), *470* (U); 1885, *Suringar s.n.* (US).

ST. CHRISTOPHER. Without locality, 1889, *Berkley s.n.* (NY); Nine Turn Gut, 400 m, *Box 261* (BM); Olivees Mtns., 700 m, *Box 400* (BM); field estate, 8 Sep–5 Oct 1901, *Britton & Cowell 454* (NY); Wingfield ravine, 200–300 m, *Proctor 19246* (GH).

MONTSERRAT. Without locality, *Beard 30* (B); Olveston (Duberry), Centre Hills, ca. 400 m, *Proctor 18903* (GH, U, US); without locality, 600 m, 16 Feb 1907, *Shafer 568* (NY, US).

GUADELOUPE. Bains-Taunes, 1897–1898, *Duss 4139* (NY, US); Fumée, 1936, *Feldmann s.n.* (P), *Rodríguez 3891* (P); without locality, *Husnot 306* (B, BM, K, M, P), *L'Herminier 15* (B, K), *76* (P); Trois Riviers, 100 m, *Questel 431* (US).

DOMINICA. Point Lolo, 3.4 mi past bridge over Layou R., on rd. to Pont Cassé, 400 m, *Chambers 2522* (MO, NY, US); Syndicate Estate, SE of Portsmouth, 600 m, *Ernst 2071* (GH, US); Morne Colla Anglais, 610–732 m, 10–23 Aug 1938, *Hodge 99* (GH, NY), *1039* (GH); Lisdara, 457 m, 27–30 Mar 1940, *Hodge 2401* (GH, NY, US); slopes of Fon Pays, W ridge of Morne Diablotin, *Hodge & Hodge 2855* (GH); St. Peter Parish, Espagnol R. Ravine, Syndicate Estate, 550 m, *Lellinger 583* (GH, US), *Robinson s.n.* (US); Trois Pitoris, 1903, *Lloyd 743, 744* (NY, US); Mt. Diablotin, 1903, *Lloyd 869* (NY); Laiou, *Ramage s.n.* (B); without locality, *Richard s.n.* (P).

MARTINIQUE. La Grand Anse, 400–600 m, 1877, *Duss 1698* (B, NY, P, US); without locality, *Garnier 333* (B).

ST. LUCIA. Mahaud and Soufriére, 350–500 m, *Benl & Benl s.n.* (M); Roseau, Milette Ridge, 450 m, *Box 499* (US); between Barre de l'Isle and Morne La Combe, 300 m, *Proctor 21632* (GH, U).

ST. VINCENT. Without locality, 1862, *Chuckly s.n.* (B); Petit Bordel, *Eggers 6866* (B, C); valley of N fork of Cumberland River, 400–600 m, *Morton 5544* (US); without locality, *H. H. Smith & Smith 608* (B, BM, GH).

GRENADA. Mt. St. Catherine, 900 m, *Eggers 6192* (B); without locality, 9 Dec 1890, *Sherring 21* (B, K, US).

13. LOMARIOPSIS UNDERWOODII Holttum, Bull. Misc. Inform. Kew 1939: 614, figs. 1, 2. 1940. TYPE: JAMAICA. Without locality, 1874–1879, *Jenman s.n.* (HOLOTYPE: NY). (Fig. 21)

Rhizome scales 4–10 × 0.5–1.5 mm, reddish brown, lanceolate, ciliate, spreading. *Leaves* to 80 cm long; petioles 10–20 cm long, ⅕–½ the length of the laminae; laminae reduced toward the base (sometimes in large leaves only slightly so), with a terminal pinna articulate to the rachis or incompletely developed; pinnae 6–15.5 × 1.5–2.5 cm, pairs 6–16, alternate to subopposite, patent, lanceolate to oblong, entire throughout or serrate apically, the base cuneate, slightly excavate basiscopically, sessile or nearly so, the stalks (when present) to 2 mm long, the apices acuminate or gradually tapered; rachises strongly marginate distally and often throughout. *Fertile pinnae* 0.3–0.5 cm wide; paraphyses absent; annular cells 16–23; spores minutely granulate.

Distribution and habitat.—Lomariopsis underwoodii occurs in Cuba and Jamaica where it grows in wet forests on rocky, wooded hillsides and forested slopes, at 400–1200 m.

Lomariopsis underwoodii is characterized by its terminal pinna articulate to the rachis, oblong pinnae, and 6–16 pinna pairs. The apex of the rachis often does not fully abort and can be seen as an incompletely developed pinna (Fig. 21C, D). This character will usually distinguish it from the similar *L. jamaicensis,* which differs further by generally wider (2.2–3 cm) pinnae and fewer (5–8) pinna pairs.

Proctor (1985) used the number of annulus cells to distiguish *Lomariopsis underwoodii* from *L. jamaicensis*; however, I find that this character varies in *L. underwoodii* and cannot be used to separate it from *L. jamaicensis.*

Additional specimens examined. CUBA. **Holguín:** Loma San Juan, 900 m, *Hioram 6998* (US); Loma del Gato and vic., Cobre Range of Sierra Maestra, 1000 m, *León et al. 10385* (US).

JAMAICA. Moneague, 1 Mar–7 Apr 1908, *Britton*

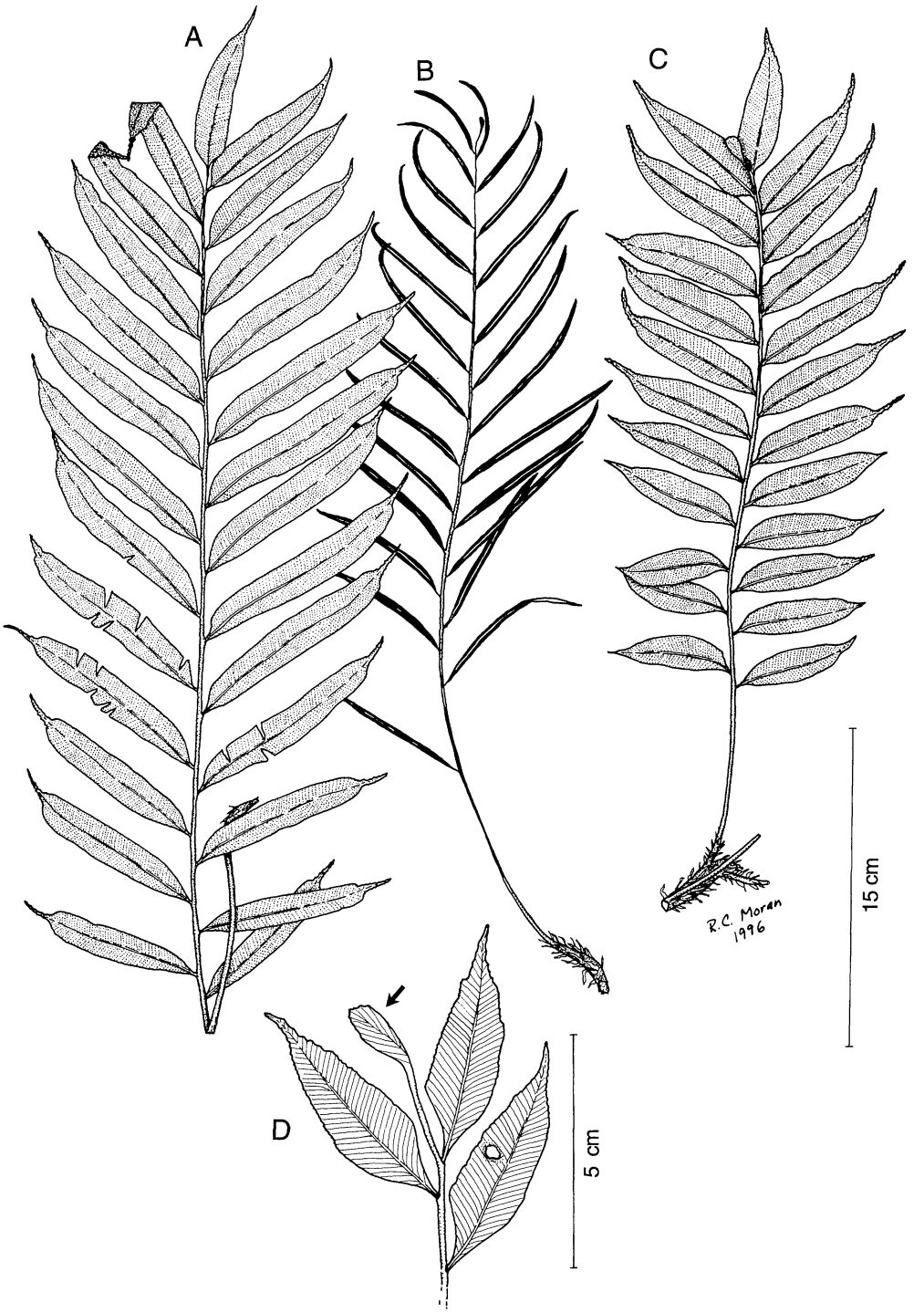

FIG. 21. *Lomariopsis underwoodii.* **A, B.** Mature sterile leaves. **C.** Fertile leaf. **D.** Leaf apex. The arrow points to the partly developed terminal pinna; the distalmost lateral pinna, which is articulate to the rachis, has nearly assumed a terminal position. (A, B, *Wilson s.n.,* K; C, *Maxon 9224,* US; D, *Underwood 2866,* NY.)

730 (NY); Second Breakfast Spring, *Harris 7727* (B, BM, K); Hollymount, Mt. Diabolo, 750 m, 8 May 1903, *Maxon 1904* (NY, US), *2217, 2252* (US); near Troy, 600–660 m, *Maxon 2828* (US); St. Thomas, upper southern slopes of Gossamer Peak, 750–900 m, 14 Jun 1926, *Maxon 9222* (GH, NY, US); without locality, 1843, *Purdie s.n.* (K, NY); Mabess River, below Venegar Hill, 100 m, 9 Feb 1903, *Underwood 1242* (NY); Second Breakfast Spring, below Tweedside, 600 m, 16 Feb 1903, *Underwood 1609* (NY); Tweedside 600–1000 m, 10–13 Apr 1903, *Underwood 2038* (NY); near Troy, 400–700 m, 7–11 May 1903, *Underwood 2866, 2887* (NY, US); Cockpit Country, 13–18 Sep 1906, *Underwood 3305* (NY, US); without locality, 600 m, *Hart 333* (US); Mabess River, 1200 m, *Watt 104* (P, US); without locality, *Wilson 750* (BM, K, photos US ex BM & K).

14. LOMARIOPSIS VESTITA E. Fourn., Bull. Bot. Soc. France 19: 250. 1872. *Stenochlaena vestita* (E. Fourn.) Underw., Bull. Torrey Bot. Club 33: 600. 1907 ("1906"). TYPE: NICARAGUA. Chontales: 600 m, Jun 1870, *Lévy 476* (HOLOTYPE: P; ISOTYPES: G, K). (Fig. 22)

Lomariopsis pittieri (H. Christ) H. Christ, Prim. Fl. Costaric. 3: 9. 1901. *Acrostichum pittieri* H. Christ, Bull. Soc. Bot. Belgique 35: 243. 1896. *Stenochlaena pittieri* (H. Christ) Diels, Nat. Pflanzenf. 1(4): 251. 1899. SYNTYPES: COSTA RICA. Heredia: Puerto Viejo, a sou confluent avec le Sarapiquí, Apr 1892, *Pittier 6931* (CR, P, US); Forêts du Yurquin, 50 m, *Pittier & Tonduz 8581* (PHOTOS: BM, US ex BR); Forêts du Shirores, Talamanca, 100 m, s.d., *Pittier & Tonduz 9203* (CR, P, US; PHOTOS: BM, GH, US ex BR).

Rhizome scales 5–10 mm long, whitish to very pale orangish, narrowly lanceolate to linear, spreading. *Leaves* 30–75 cm long; petioles 2–8 cm long, 1/10–1/4 the length of the laminae; laminae oblanceolate, gradually reduced toward the base; pinnae 4–12 × 1–1.8 cm, pairs 20–35, alternate to subopposite, patent, oblong to oblong-lanceolate, entire to crenulate or serrate toward the apex, equilateral, truncate to subtruncate or very broadly cuneate, sessile or nearly so, the apices acute to acuminate or, in the highly reduced proximal pinnae, obtuse; rachises usually winged conspicuously throughout (this sometimes obscured in drying), or only marginate proximally. *Fertile pinnae* 1.5–3 wide; paraphyses absent; annular cells 13–16; spores crested.

Distribution and habitat.—Lomariopsis vestita occurs from s. Mexico to Colombia (w. side of the Andes) (Fig. 9). It occurs in wet forests, at 0–1000 m.

Lomariopsis vestita can usually be distinguished by oblanceolate laminae tapered toward the base to a short petiole. The reduced, proximal pinnae are often elliptical or shortly oblong and obtuse to acute apically. The species is further characterized by whitish to very pale orange rhizome scales, numerous (20–35) pairs of sessile pinnae, and often conspicuously winged rachises.

The laminae of *Lomariopsis vestita* vary in the amount of reduction toward the base, and this sometimes makes the species difficult to distinguish from *Lomariopsis fendleri,* which is not or only slightly reduced toward the base. The majority of specimens have laminae gradually tapered to a short petiole and proximal pinnae obtuse to acute. But several specimens, especially from the southern part of the range, have wider, less cuneate bases, and more narrowly acute proximal pinnae. These specimens resemble *L. fendleri,* with which *L. vestita* has sometimes been lumped (Smith, 1991; Tryon & Stolze, 1991; Tryon & Tryon, 1982). Examples of intermediate specimens are *Grayum et al. 1985* (MO; Costa Rica) and *McPherson 12263C* (MO, UC; Panama). The spores of these specimens appear normal (not aborted) and thus do not indicate hybridity. More work is needed to determine the nature of these intermediates, but for now it seems best to recognize two distinct species because the extremes are so different. A helpful character to separate the two species is the width of the fertile pinnae: those of *L. vestita* are 2–3 mm wide, whereas those of *L. fendleri* are 3–6 mm.

Additional specimens examined. MEXICO. **Chiapas:** Finca Mexiquito, 1913, *Purpus 6770* (BM, F, GH, UC), *6873* (B, BM, C, F, G, GH, MO, NY, UC, US, Z). **Oaxaca:** Mun. Santa María Chimalapa, Sierra del Mango, cabacera del Arroyo Carrizal, ca. 16 km ESE de Santa María, 16°53′N, 94°36′W, 450 m, *Hernández G. 2229* (NY); Dtto. Ixtlán, 29 km S of Valle Nacional, 80 km N of Ixtlán de Juárez, 500–600 m, 13 Aug 1971, *Mickel 6449* (NY); Mun. Matías Romero, lomas N del Arroyo Hamaca, 24 km S de Esmeraldas, 17°02′N, 94°43′W, 200 m, 2 Apr 1982, *Wendt 3822* (UC).

BELIZE. Toledo Distr., Maya Mtns., between Caraval and Union Camp, *Boutin & Schlosser 5093* (MO); Middlesex, 60 m, *Schipp 84* (NY, Z).

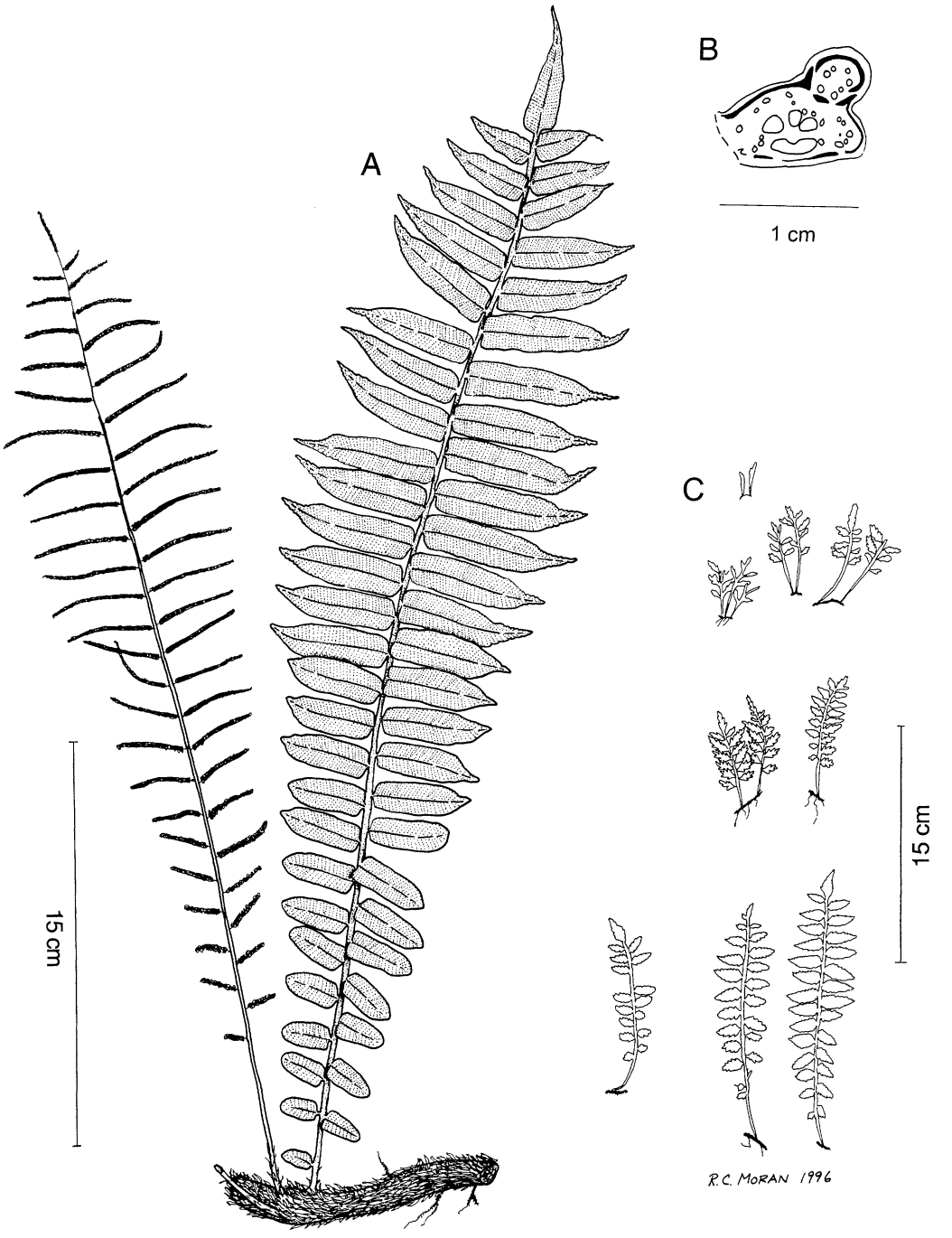

FIG. 22. *Lomariopsis vestita.* **A.** Fertile and sterile leaves (*Bunting & Licht 761,* F). **B.** Cross section of rhizome (*Moran 2154,* MO). **C.** Juvenile leaf series (*Whetmore & Woodworth 137,* GH).

GUATEMALA. **Alta Verapaz:** Chamá, 300 m, *Johnson 375* (US); vic. of Laguna Sapalá (Chajvovuch), 1 mi SW of Sibicté, 280 m, *Steyermark 44915* (F, US); Cubilquitz, 350 m, *von Türckheim 172* (G, GH, P, U), *8042* (B, K, US). **Izabal:** Escoba, W from Puerto Barrios, 0 m, 3 May 1939, *Standley 72897* (F, NY); between Virginia and Lago Izabal, Montaña del Mico, 50–500 m, *Steyermark 38813* (F, US); between Dartmouth and Morales toward Lago Izabal, Montaña del Mico, 35–135 m, *Steyermark 39045* (F); between Escobas and Montaña Escobas, across bay from Puerto Barrios, 1–100 m, *Steyermark 39277* (F); Cerro San Gil, along Río Frío, 50–75 m, *Steyermark 41585* (F, US), *41600* (F). **Prov. Unknown:** Ixcán, *Bernoulli & Cario 258* (P).

HONDURAS. **Atlántida:** Lancetilla Valley, *Chickering 139* (US); Campamiento Quebrada Grande, 10 km SW of La Ceiba, base of N slope of Pico Bonito, 15°42′N, 86°51′W, 80 m, *Liesner 26271* (MO); Lancetilla Valley, near Tela, 20–600 m, *Standley 53188* (F, US), *53206, 54853* (F); Lancetilla, Tela area, 30 Jul 1951, *Steeves & Ray 383* (NY, UC), *406* (GH, US); Tela, 50 m, *Dyer A237*. **Gracias a Dios:** 2 mi NW of Bulebar on 3rd N branch of Quebrada Tiro, tributary of Río Platano, 15°43′N, 84°50′W, 60 m, 22 Mar 1981, *Saunders 1085* (BM, F, NY). **Yoro:** Guaymas, 15–60 m, *Ames 42, 44* (US).

NICARAGUA. **Chontales:** Without locality, *Seemann 218* (K). **Zelaya:** Near Río San Juan at "El Relos," midpoint between El Castillo and Delta de San Juan, 0–50 m, *Bunting & Licht 761* (F); costado Oeste del Cerro La Pimienta, 13°44′N, 84°59′W, 800–1000 m, 16 Apr 1979, *Grijalva 382* (CR, NY, UC); Costado Sur del Cerro La Pimienta y N de Cerro El Hormiguero, 13°44′N, 84°59′W, 800–900 m, *Grijalva 298* (CR, UC); Cerro La Pimienta, 13°45′N, 84°59′W, 900–980 m, *Pipoly 5098* (CR, UC); Castillo el Viejo, 1893, *Schimk & Smith s.n.* (ISC); montañas de Esquipulas y Alemán, drenaje de Río Alemán, 150 m, *Shank & Molina R. 4785* (EAP, US); rd. to Colonia Yolaina, ca. 1.3 km SE of intersection with rd. between Nueva Guinea and Colonia Verdun, 11°40′N, 84°26′W, 180–200 m, 11–12 Feb 1978, *Stevens 6338* (CR, MO, NY, UC); Caño Costa Riquita, 1.8 km SW of Colonía Naciones Unidas, 11°43′N, 84°18′W, 150–180 m, 6–7 Nov 1977, *Stevens 4964* (CR, NY, UC). **Dept. Unknown:** Braggman's Bluff, *Englesing 195* (F, US).

COSTA RICA. **Alajuela:** Reserva Forestal de Arenal, Río Peñas Blancas, Quebrada Celeste, 10°18′N, 84°42′W, 850 m, *Bello 1953* (INB, MO); Monteverde Cloud Forest Reserve, 10°18′N, 84°44′W, 850–900 m, *Bello 4555* (INB), *Grayum 10199* (MO), *Hennipman 6702* (U); W of La Marina, 10°23′N, 84°23′W, 500 m, *Burger & Stolze 5047* (CR, F, GH), 19 May 1968, *Burger & Stolze 5067* (BM, F, MO, NY), *Williams et al. 29133* (F); rd. between Cañas and Upala, 10 km N of Bijagua, 200 m, *Croat 36482* (MO); Parque Rincón de La Vieja, Upala, Puesto Santa María, 10°46′N, 85°18′W, 900–1000 m, *Herrera Ch. 1595* (AAU, CR, MO, UC, US); Upala, 5 km S de Brasilia, 10°55′N, 85°20′W, 500 m, *Herrera Ch. 974* (CR, MO, UC), *1067* (CR, MO); NW of Volcán Arenal, 2 km NE of Tabacón, 500 m, *Lellinger 1647* (US); Llanura de San Carlos, between Los Chiles and Venecia, 200 m, *Molina R. et al. 17606* (F); 39 km N de Florencia y 2 km N de Santa Rosa, 30°40′N, 84°32′W, 100 m, *Pérez-García et al. 345* (CR, MO); Cantón de Upala, Cordillera de Guanacaste, Bijagua, Upala, Finca Zapote, 10°45′N, 85°04′W, 500 m, *Rojas 1271* (INB); Cantón San Carlos, Villa Quesada, 825 m, *Smith 1879* (F, US), *Scamman 7722* (GH); 2 km N of Bijagua, rd. to San Miguel, *Utley & Utley 3911* (F, MO). **Cartago:** SE near Turrialba, 3 km NE of La Suiza, *Lellinger 1411* (F, US); behind Instuto Interamericano de Ciencias Agrícolas, 600 m, 18 Jul 1967, *Mickel 2103* (NY); Chitaría, 550 m, 8 Aug 1982, *Moran 2154* (MO); Turrialba, 600 m, 24–26 Apr 1906, *Maxon 163* (NY, US), 20 Aug 1967, *Mickel 3373* (NY), *Scamman 6034* (GH), *7183* (GH, US); Pejivalle, 600–800 m, *Skutch 4662* (CR). **Guanacaste:** E slopes of Volcán Miravalles (Cerro La Giganta), 10°42′N, 85°7′W, 800 m, *Burger & Gentry 9120* (CR, F, MO); Cantón de Liberia, Parque Nacional de Guanacaste, Estación Cacao, 10°55′N, 85°28′W, 1100 m, *Chavarría 489* (INB), *Rojas 3070* (INB); Parque Nacional Rincón de La Vieja, SE slopes of Volcán Santa María, 10°47′N, 85°18′W, 900–1200 m, *Davidse et al. 23340* (CR, MO, UC); along Río Las Flores, between Quebrada Desprendimiento and Quebrada Sanguijuela, 10°40′N, 85°04.5′W, *Grayum et al. 4885* (CR, MO, UC); Parque Nacional Guanacaste, Estación Pitilla, Fila Orosilito, 11°02′N, 85°25.3′W, 1000 m, *Hammel 17468* (F, INB, MO), *Rojas 2975* (INB); ridge above Lago Arenal, 3 km N of Tilaran, *Opler 1084* (CR); Rincón de la Vieja National Park, S and E slopes of ridge SE of Quebrada Zopilote, SE slope of Volcán Santa María, 10°46.5′N, 85°18′W, 850–1000 m, 24 Jan 1986, *A. R. Smith et al. 1913* (AAU, CR, MO, NY, UC); vic. of Tilarán, 500–650 m, *Standley & Valerio 44316* (US); El Arenal, 485–600 m, *Standley & Valerio 45241* (US). **Guanacaste–Alajuela:** Slopes of Miravalles, above Bijagua, 1500 m, *Gómez et al. 19181* (MO, U); Laguna Cofey, *Ocampo S. 931* (CR). **Heredia:** Braulio Carillo National Park, 35 m, *Barcock A42* (K), A57 (K); Magasasay, cerca del Río Sardinal, 700 m, *Chacón G. 225* (CR); betwen Río Peje and Río Sardinalito, Atlantic slope of Volcán Barva, 10°18.5′N, 84°0.4′W, 480–520 m, *Grayum 6917* (CR, MO, UC); La Selva Field Station, 100 m, *Burger & Stolze 5829* (CR, F, GH), *Chacón G. 421* (F), 18 Feb 1981, *Folsom 9011* (NY), *Hammel 11135* (MO), *Lorence 1730* (MO), 16 Aug 1967, *Mickel 3522* (NY), *3545* (NY, UC), *Weber 6102* (GH, US); N of Puerto Viejo, 100–150 m, *Jiménez M. 3429* (CR, F); Puerto Viejo, *Pittier 7505* (B, CR, G, US, Z), *Stork 4836* (GH, UC, US); Tirimbina, 200 m, *Proctor 32134* (MO); Finca Holdridge, 100 m, *Rossbach 3694* (AAU), *Scamman 7492* (CR, GH), *7493* (CR, GH, US); Cerro Sardinal, 2–2.5 km N of Chilamate de Sarapiquí, 10°28′N, 84°04′W, 80–160 m, *A. R. Smith 1787* (CR, MO, UC). **Limón:** Cantón de Pococí, Llanuras de Tortuguero, Cuatro Esquinas, 10°30′N, 83°47′W, 40 m, *Araya* 860 (INB), *Rojas 1343* (INB); Santa Clara–Las Delicias, 500 m, *Biolley 10680* (CR, US); Cantón de Talamanca, 09°26′10″N, 83°03′00″W, 300 m, *Bittner 1354* (M); Finca Hundrisser, *Brade 267* (BM), Aug 1909, *306* (B, M, NY, UC); Plaines of San Carlos, 100 m, *Cook & Doyle 94* (US); Río Hondo, plains of Santa Clara, 100 m, *Cook &*

Doyle 536, 559 (US), *Cooper 10280* (CR, US; photo US ex BR); above Río Catarata between Bribri and Caribbean coast, 50–100 m, *Croat 43213* (MO); 3.5 air km S of Islas Buena Vista in the Río Colorado, 16 air km SW of Barra del Colorado, 10°39′N, 83°40′40″W, 10–120 m, *Davidse & Herrera Ch. 31009, 31130* (MO), *31183* (CR, MO); Finca Castilla, 30 m, *Dodge & Goerger 9502a* (MO, UC); N of Puerto Viejo, *Garwood et al. 850* (BM), *956* (BM, CR); riberas del Toro Amarillo, Guápiles, 75–200 m, *Gómez 6784* (CR); Las Brisas de Pacuarito, Siquirres, 300 m, *Gómez et al. 23412* (MO, UC); Siquirres, 80 m, *Kupper 129, 492* (M), *541* (CR, M); 3 km SW of Suretka, 70 m, *Moran 3110* (MO); beyond bridge over Río Parismina on Finca Siam, *Dodge & Goerger 9503* (MO); 6 km SW of Guápiles, 400 m, *Jiménez M. 2131* (F); SW of Siquirres, 1 km N of Guayacán, 700 m, *Lellinger 1439* (CR, US); Toro Amarillo, Guápiles, 350 m, *Lent 318* (F, GH), *Richards 5910* (BM); Cantón de Talamanca, Fila de Matama, La Bomba, Asunción, Aguas arriba de Río Banano, 09°54′N, 83°12′W, 400 m, *Rodíguez 560* (INB); Pandora, near Río Estrella, 40 m, *Rossbach 3616, 3617* (GH); Los Diamantes, USDA Rubber Plant Station, 300 m, *Scamman 6035, 7184* (GH); La Concepción, Llanuras de Santa Clara, 250 m, Feb 1896, *J. D. Smith 6942* (GH, K, NY, US), *6943* (B, BM, F, M, US); La Colombiana Farm of the United Fruit Co., 75 m, *Standley 36870, 36771* (US); Finca Montecristo, on the Río Reventazón below Cairo, 25 m, *Stanley & Valerio 48532* (US); Cerro Coronel, E of Laguna Danto, 10°41′N, 83°38′W, 20–170 m, *Stevens 24628* (CR, MO); Cerro Coronel, E of Río Zapote, 10°40′N, 83°40′W, 10–100 m, *Stevens 23969* (CR, MO), *24241* (MO); Estrella Valley, 6 mi from mouth of Estrella R., *Stork 4612* (UC); between Siquirres and Matina, 100 m, *Stork 1698* (UC); forests of Tuis, 650 m, *Tonduz 11328* (CR, US); Laguna de Tortuguero, 0 m, *Valerio 76* (US); Pococí Cantón, Cerro Tortuguero at Boca de Río Tortuguero, 50 m, *Worthington 13623* (NY). **Puntarenas:** Near airfield, 4 km W of Rincón de Osa, 08°42′N, 83°31′W, *Burger & Stolze 5474* (F); 10 mi SE of Rincón de Osa, 80 m, *Evans & Bowers 2801, 2802* (MO, U); Equinas Ridge, Osa Peninsula, 150–250 m, *Gómez 19684* (MO), *Kennedy 1983* (F, MO); ridge between Río Riyito (valley of Laguna Chocuaco) and Quebrada Banegas, S of Cerro Rancho Quemado, 7 km W of Rincón de Osa, 08°41′N, 83°32.5′W, 200–300 m, 26 May 1986, *Grayum et al. 7564* (CR, MO, NY, UC); Reserva Forestal Golfo Dulce, Osa Peninsula, Rancho Quemado, 08°42′N, 83°33′W, 250 m, *Hammel & Robles 16779* (CR, MO); near airfield, Rincón de Osa, 20–300 m, *Liesner 1724* (MO), *1745* (CR, MO); Rincón de Osa, 50 m, 15 May 1971, *Burch 4415* (NY), *4424* (MO), *Cufodonti 140* (MO), *Kennedy 1925* (MO); Osa Peninsula, 21 Mar 1967, *Mickel 1970, 1947* (NY); 9.5 km W of Rincón de Osa, 600 m, 16 Jul 1967, *Mickel 2727* (NY, UC), 17 Jul 1967, *2752* (NY); 15 km S of Tropical Science Center field station and S of Rincón de Osa, 150 m, 18 Jul 1967, *Mickel 2789* (US), *2791, 2792* (NY); Golfo Dulce and Río Térraba, 30 m, *Skutch 5259* (EAP, US). **San José:** Parque Nacional Braulio Carrillo, 600–700 m, *Chacón G. 317* (MO).

PANAMA. **Bocas del Toro:** Rd. from Fortuna Dam to Chiriquí Grande, 3 mi from continental divide, 08°47′N, 82°11′W, 650 m, 22 Sep 1984, *Churchill & Churchill 6218* (NY); Almirante, Jan–Mar 1928, *Cooper 208* (F); W del campamento Corriente Grande (IRHE), 200 m, *Correa A. 3666* (MO); Cerro Bracha, *Correa A. et al. 3099* (MO); Boca Chica, *Correa A. et al. 3593* (MO); rd. between Fortuna and Chiriquí Grande, 8.5 mi N of bridge over Fortuna Lake, 08°46′N, 82°14′W, 590 m, *Croat & Grayum 60164* (MO, UC), 5.3 mi N of bridge, 910 m, *Croat & Grayum 60473* (MO); above railroad station at Mi 7.5, 27 Jul 1971, *Croat & Porter 16366* (MO, NY); Laguna de Chiriquí, *Hart 6* (US); 13.2 rd. mi W of Chriquí Grande, 08°50′N, 82°15′W, 300 m, *McPherson 6742* (MO). **Canal Zone:** 12 mi S of Colón on Río Providencia, *Burch 3991* (MO); Barro Colorado Island, *Bailey & Bailey 144* (GH), *Chrysler 4838* (MO), *Croat 5193, 5316, 5475, 5778, 6527, 10216, 16512* (MO), *Ebinger 53* (US), *Foster 1924* (F), *Kenoyer 18* (US), *Shattuck 188, 378* (F, MO, US), *Standley 31254* (US), *41141* (C, US), *Starry 33* (F, MO), 11 Aug 1961, *Welch 19839* (MO, NY, US), 27 Jul 1929, *Wetmore & Woodworth 137, 146* (GH), 147 (NY), *148* (GH); W arm of Quebrada Salamanca, 70 m, 16 Dec 1934, *Dodge et al. 16985* (K, MO, NY), *Dodge & Allen 1763* (MO); near Frijoles, *Killip 2814* (US), *2910* (EAP, US); N of Frijoles, *Standley 27438* (MO, US); Río Indio de Gatún, 14 Feb 1911, *Maxon 4824* (GH, MO, US); headwaters of Río Chinilla, above Nuevo Limón, *Maxon 6879* (GH, US); N arm of Quebrada Salamanca, 70 m, *Steyermark & Allen 17063a* (MO, US); Parque Nacional Soberanía, camino del Oleoducto, *Vásquez 142* (MO). **Coclé:** El Valle de Antón, 1000 m, *Alston 8693* (BM, U, US); rd. to Coclosito, 12 mi from Llano Grande, 08°47′N, 80°28′W, 200 m, *Churchill et al. 3979, 4005* (MO); Cerro Pilón, 850 m, *Dwyer & Lallathin 8686* (MO); Alto Calvario, 600–800 m, *Folsom 3145* (MO), *3261* (CR, MO); El Copé, 08°45′N, 80°35′W, *Hamilton & Davidse 2698* (MO, UC); El Valle de Antón, along Río Indio trail, 500–700 m, *Hunter & Allen 331* (G, MO). **Colón:** Dtto. Porto Bello, stream on N slope of Río Gatún, 700 m, *Antonio 3798* (MO); Porto Bello, 5–200 m, *Maxon 5794* (F, US); Santa Rita Ridge, 09°24′N, 79°39′W, 20–22 km from Pan-American Hwy., 300 m, *Sytsma 1310* (CR, MO), 10 mi from Hwy., *Burch 4821* (MO); Río Guanche, 09°30′N, 79°39′W, 0–75 m, *Sytsma 1707* (MO). **Darién:** Río Chico, near Yaviza, *Burch 1117* (MO); 3 mi E of Santa Fé, *Burch 1967* (MO); Serranía de Pirre, above Cana gold mine, 600–1000 m, *Croat 37714* (MO); Parque Nacional Darién, Cerro Pirre base camp, E side of Río Paracida, 08°00′N, 77°48′W, 0–80 m, *Croat 68976* (MO, UC); upper gold-mining camp of Tyler Kittredge on headwaters of Río Tuquesa, 2 air km from Continental Divide, *Croat 27223* (MO); Upper Río Membrillo, 26–28 Apr 1967, *Duke 10900* (NY); trail between Paya and Palo de las Letras, *Stern et al. 193* (GH, MO, US); S of Garachiné near Pacific coast above Casa Vieja, W flank of Serranía Sapo, 07°58′N, 78°23′W, 300–500 m, *Hensold 1103* (F, MO); 112 mi from Bayano Dam Bridge, Canglón, 20 m, *Antonio 4542* (MO); W slope of Serranía de Pirre, below Cana mine, along old rd. to Boca de Cupe, 07°45′N, 77°40′W, 500 m, *McPherson 12263C*

(MO, UC). **Panamá:** Parque Nacional Altos de Campana, 08°40′N, 79°55′W, 800–900 m, *Correa A. & Montenegro 9677* (US); 2.4 mi beyond Cerro Jefe on rd. to Altos de Pacora, 800–1000 m, *Croat 22654* (MO); Río Pirre, 2–5 mi above El Real, *Duke 5094* (GH, MO); 8.2 mi from Pan-American Hwy. on El Llano–Cartí rd., 09°14′N, 79°00′W, 450 m, *Knapp 5927* (MO), *Knapp & Huft 4429* (MO), *Nee 10514* (MO); Dtto. Capira, Cerro Campana, 08°41′N, 79°54′W, 900 m, *van der Werff & Herrera Ch. 6181* (MO, UC), *Croat 22822* (MO); new rd. from El Llano to Cartí–Tupile, 200–500 m, *Liesner 688* (MO); Dtto. Panamá, Cerro Jefé, *van der Werff & van Hardeveld 6995* (MO); Altos de Pacora, 500–700 m, *Windisch 2173* (AAU). **San Blas:** El Llano–Cartí rd., Km 19.1, 09°19′N, 78°55′W, 350 m, *de Nevers et al. 6155* (MO, UC); Cerro Brewster, 09°18′N, 79°16′W, 850 m, *de Nevers et al. 5424* (MO); 23–29 km from Pan-American Hwy. on El Llano–Cartí rd., 09°22′N, 78°69′W, *Knapp 1867* (MO); Nusagandi, 09°18′N, 78°59′W, 350 m, *Paredes 745* (AAU). **Veraguas:** Trail to summit of Cerra Tute, 800–850 m, *Almeda 6473* (GH); 5 mi W of Santa Fé on rd. past Escuela Agrícola Alto Piedra, 800–1200 m, *Croat 23050, 25879* (MO), *Croat & Folsom 34061* (MO), *Antonio 3967* (MO), *Nee 9706* (MO); 15.6 km NW of Santa Fé, *Croat 27650* (MO); beyond Tres Brazos River, 11 km beyond Santa Fé, *Croat 25631* (MO); above Río Primero Brazo 5 mi NW of Santa Fé, *Liesner 814* (MO); Cerro Tute, 2 km N of Santa Fé, 08°31′N, 81°04′W, 900–1000 m, 5 Feb 1988, *Moran 4024* (MO); NW of Santa Fé, 450–550 m, *Mori & Kallunki 3839* (MO). **Prov. Unknown:** León Hill Station, *Hayes 379* (B, BM, K); El Vigía, *Killip 2652* (B, US).

COLOMBIA. **Antioquia:** Río León, Bendix site, *Cain 75* (US); near Guapá, 53 km S of Turbo, 50 m, *Haught 4682* (US); W of Quebrada Mercedes, E of Turbo, 200 m, *Haught 4971* (S, US). **Chocó:** Near Río Truando, 3–5 km above airport at Teresita, 18 May 1967, *Duke 11179*(1) (NY); 8 km from Puerto Mutis (Bahía Solano) along rd. to El Valle, 50 m, *Lellinger & de la Sota 129* (US); Río Mutatá, 3 km above its jct. with the Río El Valle, NW of Alto de Buey, 850 m, *Lellinger & de la Sota 146, 191* (US); 0.5–2.5 km N of the INDERENA camp on the Río Truando near Caserío La Terestia, 50–100 m, *Lellinger & de la Sota 530* (CR, US); Loma del Cuchillo, 15 km WSW of Chigorodó, 150–400 m, *Lellinger & de la Sota 641* (US); along Río Monomacho, tributary of Río Guale, Serranía de Darién, 8–10 km W of Acandí, 100–150 m, *Lellinger & de la Sota 679* (US). **Santander:** Puerto Berrio, between Carare and Magdalena Rivers, 100–700 m, *Haught 1650* (US).

15. LOMARIOPSIS WRIGHTII Mett. ex D. C. Eaton, Mem. Amer. Acad. Arts ser. 2, 8: 195. 1860. *Stenochlaena wrightii* (Mett.) Griseb., Cat. Pl. Cuba, 277. 1866. TYPE: CUBA. Holguín: Prope villam Monte Verde dictam, Jan–Jul 1859, *Wright 787* (HOLOTYPE: B; ISOTYPES: BM, K, P, S, U) [other specimens with the same number collected by Wright at unknown location in 1856–1857 are deposited at MO, NY, US]. (Fig. 23)

Rhizome scales 3–6 mm long, dull reddish brown, narrowly lanceolate, ciliate, spreading. *Leaves* 30–50(–60) cm long; petioles 15–25 cm long, ca. ½ the length of the laminae; laminae reduced basally, with a terminal pinna articulate to the rachis; pinnae 7.5–15 × 1.7–3 cm, pairs 4–9, alternate to subopposite, patent, oblanceolate, entire, equilateral or nearly so, narrowly cuneate for ½ their length or more, sessile, the apices abruptly caudate; rachises narrowly winged or marginate distally. *Fertile pinnae* 0.2–0.4 cm wide; paraphyses absent; annular cells 15–19; spores smooth, very pale yellowish.

Distribution and habitat.—Lomariopsis wrightii is endemic to the mountains of eastern Cuba where it grows at 200–1000 m.

Lomariopsis wrightii has distinctive caudate pinnae (Fig. 23). Unlike most other species in the genus, it has few (4–9) pinna pairs and the veins are often indistinct, obscured by the thick lamina. Another important characteristic is the apical pinna articulate to the rachis. The aborted remains of the rachis tip (or true apical pinna) can usually be seen as a small, dark, oblique, peg-like projection (Fig. 23A). The lamina apex will distinguish the species from all other American species except *L. jamaicensis* and *L. underwoodii.*

Additional specimens examined. CUBA. **Holguín:** El Sonador, Sierra de Moa, 800 m, *Alain 3236a* (US); Sierra de Nipe at base of Loma Mensura, *Ekman 3155* (B, S, US); Loma del Gato and vic., Cobre Range of Sierra Maestra, 1000 m, *León et al. 10385* (US); parte alta Río Lebisa, Sierra del Cristal, 600–800 m, *López F. 174* (US); Monte Verde, Yateras, 575 m, 29 Apr 1907, *Maxon 4300* (BM, GH, NY, S, US); Finca Las Gracias, Yateras, 500 m, 5 May 1907, *Maxon 4481* (NY, US); Navas to Camp Buena Vista, 650 m, 23 Mar 1910, *Shafer 4438* (GH, NY); La Perla to Pinales of Monte Verde, 660 m, 16 Feb 1911, *Shafer 8833* (NY, US). **Santiago:** Pinal de Santa Ana, 800 m, *Eggers 5178* (B, BM, P); El Yunque, Mt. Baracoa, Mar 1903, *Underwood & Earle 948* (NY); vic. of Baracoa, 1–7 Feb 1902, *Pollard et al. 220* (GH, MO, NY, P, S, US). **Prov. unknown:** La Prenola, Cueva del Muerto, 200 m, *Hioram & Maurel 2484* (GH, P, US).

Acknowledgments

I thank David B. Lellinger, John T. Mickel, Benjamin Øllgaard, Thomas A. Ranker, Alan

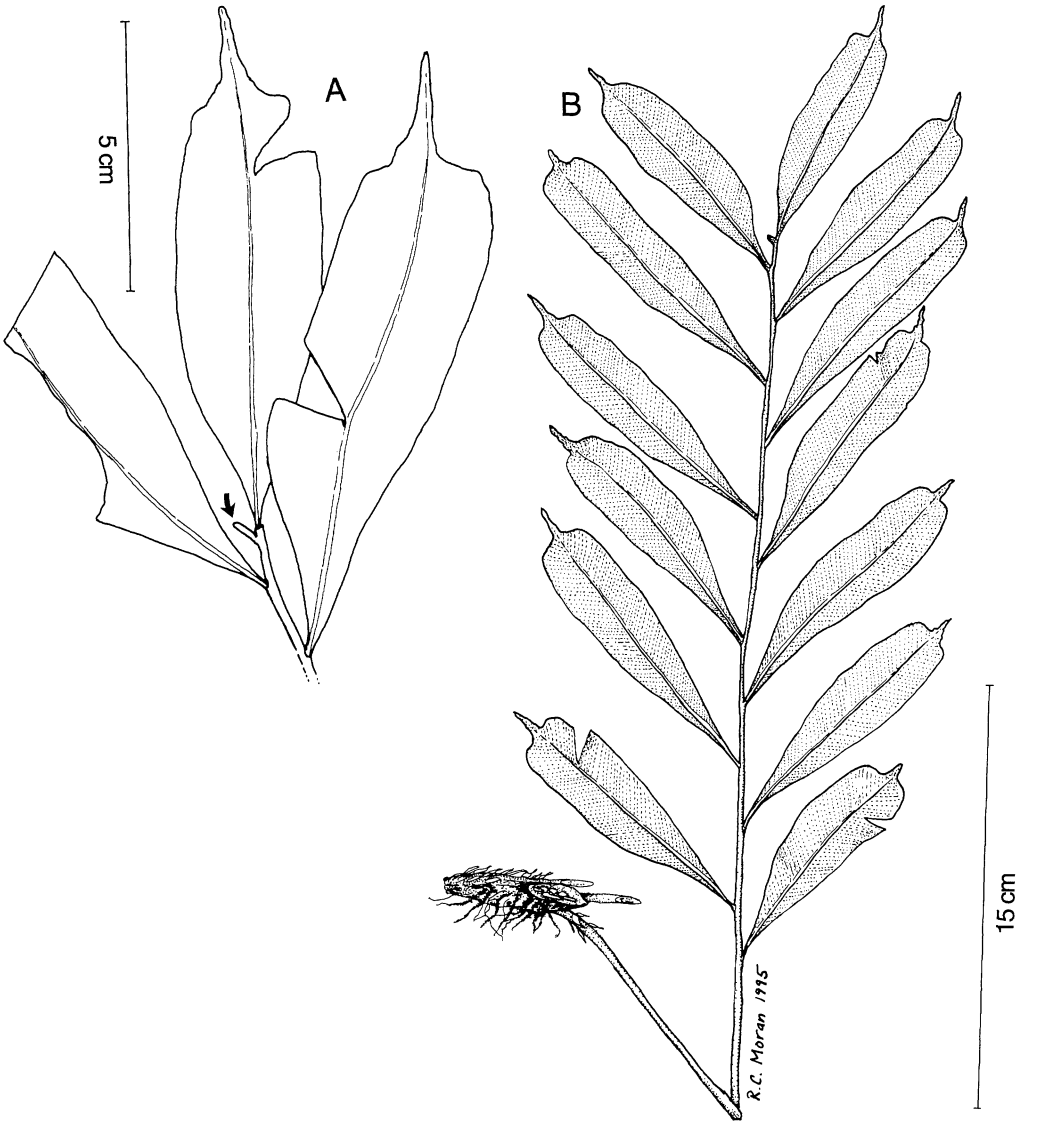

FIG. 23. *Lomariopsis wrightii.* **A.** Lamina apex. The arrow points to the aborted rachis apex beneath the false terminal pinna (*Underwood & Earle 948,* NY). **B.** Rhizome and leaf (*Maxon 4300,* GH).

R. Smith, and Thomas A. Zanoni for comments on various aspects of this work. Part of this work was done while I was Gæstelektor at the Department of Systematic Botany, Aarhus University, Denmark. I am grateful to the curators of the following herbaria for loans: B, BM, COL, CR, EAP, F, G, GH, IA, K, LPB, M, MO, NY, P, PORT, QCA, QCNE, R, RB, S, SP, UC, US, USC, Z.

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List of Taxa

1. *Lomariopsis amydrophlebia* (Sloss. ex Maxon) Holttum
2. *L. fendleri* D. C. Eaton
3. *L. jamaicensis* (Underw.) Holttum
4. *L. japurensis* (Mart.) J. Sm.
5. *L. kunzeana* (Underw.) Holttum
6. *L. latipinna* Stolze
7. *L. marginata* (Schrad.) Kuhn
8. *L. maxonii* (Underw.) Holttum
9. *L. nigropaleata* Holttum
10. *L. prieuriana* Fée
11. *L. recurvata* Fée
12. *L. sorbifolia* Fée
13. *L. underwoodii* Holttum
14. *L. vestita* E. Fourn.
15. *L. wrightii* Mett. ex D. C. Eaton

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The numbers in parentheses refer to the species numbers assigned in the taxonomic treatment; the numbers in boldface are types.

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