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A classification for Blechnaceae (Polypodiales: Polypodiopsida): New genera, resurrected names, and combinations

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Abstract

The fern family Blechnaceae, with about 250 species, has traditionally comprised one large genus, *Blechnum*, plus seven to nine smaller genera, most with fewer than 10 species. Several phylogenetic analyses strongly suggest that *Blechnum* in the traditional sense is not a monophyletic group. We propose a new classification for the family, with three subfamilies and 24 genera. All genera are described and new combinations are provided, with an estimate of species number for each genus. We also provide a key for the identification of the genera.

Key words: *Blechnum*, eupolypods II, ferns, *Lomaria, Diploblechnum, Struthiopteris, Woodwardia*

Introduction

Blechnaceae is a subcosmopolitan fern family, comprising about 250 species and between five and nine genera as currently circumscribed (Kramer *et al.* 1990, Smith *et al.* 2006, Rothfels *et al.* 2012, Perrie *et al.* 2014). The plants are mostly terrestrial herbs, sometimes rheophytic, aquatic, arborescent, scandent, or even epiphytic (Sundue & Rothfels 2014, Rothfels *et al.* 2012). The family is characterized by creeping, ascending, or erect rhizomes, with non-clathrate scales; petioles with numerous vascular bundles forming a ring in cross section; fronds monomorphic to dimorphic; veins free to anastomosing; sori linear, generally parallel and adjacent to midveins, with introrse indusia (rarely exindusiate); sporangia pedicellate; spores reniform, monolete (Moran 1995a, Mickel & Smith 2004, Dittrich 2005). Blechnaceae has long been recognized as a family and is clearly monophyletic. The related family Onocleaceae could be merged with Blechnaceae since the former is sister to the latter, but we see no significant advantage in doing so. All broad molecular studies show this relationship, and in addition indicate strong affinities of Blechnaceae and Onocleaceae to Athyriaceae, Aspleniaceae, Thelypteridaceae, and Woodsiaceae (e.g., Hasebe *et al.* 1995, Schuettpelz *et al.* 2007, Rothfels *et al.* 2012).

Several classifications have been presented for Blechnaceae, including one by Kramer *et al.* (1990), who recognized nine genera: *Blechnum* L., *Brainea* J.Sm., *Doodia* R.Br., *Pteridoblechnum* Hennipman, *Sadleria* Kaulf., *Salpichlaena* J.Sm., *Steenisioblechnum* Hennipman, *Stenochlaena* Ching, and *Woodwardia* Sm. Others treating the family in a comprehensive way have been Copeland (1947), who recognized eight genera, and Pichi Sermolli (1977), with 12 genera. Tryon & Tryon (1982) admitted nine genera (only three in the New World), and Wang *et al.* (2013) treated eight genera in China. On the basis of recent phylogenetic studies showing *Blechnum* to be polyphyletic (Nakahira 2000, Cranfill 2001, Shepherd *et al.* 2007, Perrie *et al.* 2014), several authors have acknowledged that the family needed a new classification (Smith *et al.* 2006, Rothfels *et al.* 2012).

Aside from *Blechnum s.l.*, by far the most species-rich genus, the existing recognized genera are mostly rather small. Using concepts adopted by Kramer *et al.* (1990), *Doodia* comprises ca. 15 species (Smith *et al.* 2006), most of

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these distributed in Oceania (Parris 1972). *Woodwardia* contains about 14 species, which are largely confined to the northern hemisphere, in America and in Eurasia (Cranfill & Kato 2003). *Salpichlaena* has three endemic species in the Neotropics (Moran 1990, Giudice *et al.* 2008). Another small and rather isolated genus, *Stenochlaena*, comprises seven species in Africa and Asia (Holttum 1971, Chambers 2013). *Brainea* is monotypic (Kramer *et al.* 1990) and widely distributed in tropical Asia (Wang *et al.* 2013), while *Sadleria* comprises six species restricted to Hawaii (Palmer 1997). *Pteridoblechnum* and *Steenisioblechnum*, in Australia, have only one species each (Hennipman 1966, 1984, Kramer *et al.* 1990). *Stenochlaena* has been placed in Blechnaceae only recently by Lovis (1978) and Tryon & Tryon (1982); the genus has been treated in Pteridaceae or Stenochlaenaceae by some authors, e.g., Holttum (1954) and Ching (1978).

Several smaller genera are better studied: these include *Woodwardia*, revised by Cranfill (2001) and Cranfill & Kato (2003), *Brainea* (Kramer *et al.* 1990), *Doodia* (Parris 1972), *Sadleria* (Palmer 1997), *Salpichlaena* (Giudice *et al.* 2008), *Stenochlaena* (Holttum 1971, Chambers 2013), and a recent segregate, *Telmatoblechnum* (Perrie *et al*., 2014).

Blechnum, on the other hand, is treated in many floras and is currently the largest genus of the family with about 200 species (Rothfels *et al.* 2012). Tryon & Tryon (1982) estimated 50 species in the Americas, but based on the new species described for the Neotropics (e.g., by Moran 1992, 1995b, Moran & Smith 2005, Rojas-Alvarado 2006, Kessler *et al.* 2007, Ramos Giacosa 2010, Dittrich *et al.* 2012), and considering the vast areas still unexplored or poorly explored (e.g., the Amazon basin and extra-Amazonian areas in Colombia, Ecuador, Peru, Bolivia, and Brazil), we estimate that the number of species in the Americas exceeds, by far, the number presented by Tryon & Tryon (1982), as we show below, reaching at least 106 species.

Blechnum was established by Linnaeus (1753) in his *magnum opus*, *Species Plantarum*. Since then, the genus has traditionally been divided on the basis of form of the sterile and fertile fronds: one group with monomorphic fronds, another having dimorphic fronds. Such a division, however, is artificial, and the genus as circumscribed today is clearly polyphyletic (Cranfill & Kato 2003, Schuettpelz & Pryer 2007, Shepherd *et al.* 2007, Rothfels *et al.* 2012, Gabriel y Galán *et al.* 2013, Perrie *et al.* 2014, Gasper *et al*. in press).

Recently, some proposals have been made to treat *Blechnum* in somewhat revised ways. Perrie *et al.* (2014) performed molecular phylogenetic analyses resulting in the naming of *Telmatoblechnum*, with two species, and subsuming *Pteridoblechnum* and *Steenisioblechnum* within *Blechnum*, thus reducing the number of accepted genera in the family to seven. For *Flora of China*, Wang *et al.* (2013) recognized eight genera, among them *Blechnidium*, *Struthiopteris*, and *Chieniopteris*, while acknowledging that some of these had no molecular support.

Based on molecular data (Gasper *et al.* in press), as well as morphological characters, spore ornamentation, and chromosome number, we here recognize 24 genera in the family (see below).

Methods

The identification key, notes, and synonyms are based on an analysis of type and non-type material from the following herbaria: B, BHCB, BM, CESJ, CRI, COL, ESA, FI, FURB, HB, HBR, HRCB, HUA, INPA, JOI, JPB, K, MBM, MEXU, MO, OUPR, P, PACA, PR, PMA, Q, QCA, QCNE, QPLS, R, RB, S, SI, SJRP, SP, SPF, UC, UEC, UPCB, WELT (on-line), as well as JSTOR Plants (http://plants.jstor.org/). Herbarium abbreviations follow Thiers (2015).

Names listed in this treatment are basionyms, combinations in genera generally accepted in recent literature (mostly in *Blechnum*), and our new combinations. The characterizations of the genera, as well the names (accepted species) we now recognize, were made through examination of floras, taxonomic revisions, checklists, and publications dealing with recently described species. The names collected in those works where checked in Tropicos.org and IPNI.org. **Neotropical** floras and revisions consulted were: Antilles (Killip 1917, Kramer 1962, Proctor 1977, 1985, 1989), Argentina (Sota 1973, 1975), Brazil (Brade 1966, Sehnem 1968, Dittrich 2005, Dittrich *et al.* 2007, 2012, 2015), Central America (Stolze 1981, Moran 1995a), Chile (Marticorena & Rodríguez 1995, Aguiar *et al.* 2007, Ríos *et al.* 2009, Ríos 2015), Colombia (Alston 1957, Lellinger & Sota 1972), Ecuador (Sodiro 1883, 1893, Moran 1995b), French Guiana (Mori *et al.* 1997), Hawaii (Palmer 1997, 2003), Mexico (Smith 1981, Mickel & Beitel 1988, Mickel & Smith 2004), Peru (Tryon & Stolze 1993), Uruguay (Legrand & Lombardo 1958), Venezuela (Vareschi 1969, Smith 1995, Moran & Smith 2005, Akirov 2013). In addition, there are lists of species for Central and South America (Rolleri & Prada 2006a), Suriname (Kramer 1978), Brazil (Dittrich & Salino 2014), South Cone—Chile, Argentina, Paraguay, Uruguay, and Southern Brazil (Zuloaga *et al.* 2008). South American species with monomorphic leaves were reviewed by Murillo (1968), and the species with dimorphic leaves from Central and North America, as well as the Antilles,

were studied by Broadhurst (1912a, b); the *Blechnum lherminieri* complex was revised by Rojas-Alvarado (2008); and a natural classification was proposed by Tryon & Tryon (1982). **Nearctic**: Norte America and North Mexico (Cranfill 1993). **Africa**: Africa (Schelpe 1952), Southern Africa (Burrows 1990, Roux 2001, Crouch *et al.* 2011), Swaziland (Roux 2003). **Asia**: China (Wang *et al.* 2013), Taiwan (Chiou *et al.* 1975), Thailand (Boonkerd & Pollawatn 2004), Himalayas (Li *et al.* 2014), and Malesian regions (Chambers & Farrant 2001, Nooteboom 2012). **Oceania**: Australia (Tindale 1960, Chambers & Farrant 1993, 1995, 1999, Brownsey & Smith-Dodsworth 2000, Chambers 2007, Parris 2010), Cook Islands (Sykes 2016), Fiji (Brownlie 1977), Mascarene Islands (Austrey *et al.* 2008), Tasmania (Hooker & Ross 1860), New Caledonia (Brownlie 1969), New Zealand (Chambers & Farrant 1996a, 1998, Breitwieser *et al.* 2010).

There is also a global classification of Blechnaceae, proposed by Kramer *et al.* (1990), and a thorough treatment of the circum-Antarctic species, *Blechnum penna-marina* (Poir.) Kuhn (Chambers & Farrant 1996b).

Results

Characters

We discuss here some of the more important characters of the blechnoid genera we recognize, especially those used in the key and descriptions presented below. Some characters show great variation among and sometimes within the genera. Genera recognized in this treatment are similar to many other fern genera in that a single character is often insufficient for characterization; rather a suite of characters may be necessary to identify a particular plant to genus. In general, both vegetative and reproductive characters are highly plesiomorphic in the family, and homoplasy is rampant (Sundue & Rothfels 2014). This is similar to variation in many large fern clades, e.g., the grammitids in the Polypodiaceae (Ranker *et al.* 2004).

Habit. Several growth habits are seen in Blechnaceae: most species are terrestrial, and the epiphytic habit appears in only a few species of some genera (*Lomariocycas, Stenochlaena,* and *Blechnum*), but there are also plants that climb by rhizomes (*Lomaridium*, *Icarus*, and *Stenochlaena*), plants that climb by twining indeterminate leaves (*Salpichlaena*), and plants with arborescent rhizomes (*Brainea, Lomaria, Lomariocycas, Neoblechnum,* and *Sadleria*), a habit that appears to have evolved multiple times (Sundue & Rothfels 2014). *Oceaniopteris francii* (Rosenst.) Gasper & Salino is the only truly aquatic member (Brownlie 1969, Veillon 1981) in the family, although species of *Telmatoblechnum* grow in swamps, their rhizomes and lower parts of fronds often under water.

Rhizomes. Rhizome habit shows great variation in the family, from long- or short-creeping, to ascending, suberect, or fully erect. These extremes can even be found in a single genus, e.g., *Diploblechnum*, in which *D. neglectum* (F.M.Bailey) Gasper & V.A.O.Dittrich has long-creeping, cord-like rhizomes and *D. fraseri* (A.Cunn.) De Vol has narrow, erect rhizomes to 1 m tall (Cranfill 2001). In *Lomariocycas*, several species form erect, trunk-like caudices to 1 m tall, resembling the habit of some cycads (hence the genus name), especially species occuring in paramos. In open habitats and when cultivated, *Neoblechnum brasiliense* (Desv.) Gasper & V.A.O.Dittrich and *Oceaniopteris gibba* (Labill.) Gasper & Salino may also have trunks to 1 m tall (Hoshizaki & Moran 2001). Several other species-rich genera also have predominantly ascending to erect rhizomes, with shorter, narrower trunks, e.g., *Parablechnum*¸ *Blechnum,* and *Austroblechnum*. However, even in these genera, certain species have long- to short-creeping rhizomes. In some of the more isolated lineages, particularly the woodwardioid lineage (*Anchistea*, *Lorinseria*, and some *Woodwardia* spp.), as well as the stenochlaenoid lineage (*Salpichlaena*, *Telmatoblechnum*), rhizomes are predominantly long-creeping, with sparse scales, or the rhizomes are climbing (*Stenochlaena*). Several other blechnoid lineages also have long-creeping rhizomes, e.g., *Blechnidium*, *Blechnopsis*, and some species of *Struthiopteris*. In hemiepiphytic species, the rhizomes maintain contact with the soil and produce fertile fronds only after climbing, apparently when light and plant mass requirements are fulfilled. In *Salpichlaena*, it is the leaf rachis that twines into the trees, not the rhizomes, and mature fronds can reach easily 15 m into the canopy (Moran 1995a).

Genera having predominantly or entirely long-creeping rhizomes generally are plants of temperate mesic forests or montane rain forests. In contrast, those genera having erect or suberect rhizomes, or stout, erect caudices, are generally plants of more open sites: *Neoblechnum* and *Brainea*, both monotypic, as well as *Sadleria*, *Oceaniopteris*, and *Lomariocycas* all exemplify this habit. Correspondingly, these five genera also generally have more coriaceous leaf blades than do species and genera that are predominantly forest-dwelling.

Stolons. Stolons are common only in *Blechnum* (Dittrich *et al.* 2015), where this condition seems to be a synapomorphy and hence useful in identification; stolon-like outgrowths occur in a few species of *Austroblechnum*,

e.g., *A. penna-marina*, especially in groups growing at middle to higher elevations or on rocks, and also in *Lomaria discolor*. *Cranfillia vulcanica* has been reported as having creeping to erect rhizomes, sometimes forming short caudices, or, under some conditions, producing slender, creeping, stoloniferous rhizomes borne from the growing rhizome apex (Chambers & Farrant 2001).

Rhizome scales. Rhizomes and stipe bases of members of Blechnaceae are always covered by triangular to acicular, mostly entire scales; however, in *Lomaridium*, the scales can be denticulate. Those genera having long, acicular (needle-like) scales, like *Lomariocycas* and *Sadleria*, are quite distinctive in also having these scales prominently thickened at their bases; when detached, such scales leave raised protuberances (stumps) on the stipe bases. Scales in some genera are prominently bicolorous, with a blackish mid-stripe, as in *Neoblechnum*, *Oceaniopteris,* and *Lomariocycas*. Scales in other species (genera) may be peltate and blackish at the point of attachment, as in some members of the New Zealand *Parablechnum procerum* complex (Chambers & Farrant 1998). In most other genera the scales are tan or brown, broadly lanceolate, and concentrated on rhizome apices and stipe bases.

Leaf dimorphism. Traditionally, species of Blechnaceae have been divided into two main groups, based on having either monomorphic or dimorphic leaves. Dimorphic leaves are common in most genera, and the monomorphic condition is mostly restricted to species of *Blechnum*, the woodwardioid genera (*Woodwardia* and *Anchistea*), *Telmatoblechnum*, *Blechnidium*, *Blechnopsis*, *Sadleria*, *Neoblechnum*, *Oceaniopteris*, and *Doodia*. However, in several ordinarily dimorphic genera, there are exceptions, like *Lomariocycas columbiensis* and *Parablechnum loxense* (Tryon & Stolze 1993), *P. monomorphum*, and *P. obtusum*. In both genera, some plants or species can be subdimorphic, with laminar types somewhat (but not decidedly) dimorphic, i.e., the sporangia do not cover the entire surface of the lamina (dimorphic condition), but fertile blades are slightly different from the sterile ones. Trimorphy exists in *Icarus filiformis*, a monotypic genus. When in contact with soil, this species has small sterile leaves, and when climbing, much larger sterile leaves; the third leaf type, of fertile fronds, has greatly contracted pinnae (Allan 1961).

Blade dissection. Most members of Blechnaceae have pinnate or pinnatifid blades; the apex of the blades is either conform and pinna-like or gradually reduced and pinnatifid. There are a few species with simple, entire blades (e.g., *Blechnum lanceola* and *Austroblechnum difforme*), or bipinnatifid blades, e.g., certain species of *Sadleria*, *Diploblechnum*, or *Woodwardia unigemmata*. *Salpichlaena* and *Stenochlaena* have pinnate-pinnatifid or bipinnate fertile blades, but the sterile blades are pinnate in *Stenochlaena* and bipinnate in *Salpichlaena*. According to Cranfill (2001), most species have persistent fertile fronds, but in *Cranfillia* and *Diploblechnum*, the fertile fronds senesce rapidly after spore release. Rapid senescence of fertile fronds of dimorphic species probably occurs in some species of *Austroblechnum*, e.g., *A. lehmannii*. Blades in various genera may be basally truncate (lacking reduced pinnae) as in most species of *Parablechnum*, *Sadleria*, and *Woodwardia*, or with proximal pinnae gradually to abruptly reduced to auricles, as in *Austroblechnum*, *Blechnidium*, *Blechnopsis*, *Doodia*, *Struthiopteris*, and other genera.

Articulate pinnae. There are four species in three genera reported with articulate pinnae: *Anchistea* (monotypic), *Telmatoblechnum* (two species), and *Parablechnum articulatum* (Perrie *et al*. 2014). This last species is sister to two subclades in *Parablechnum* (Gasper *et al*. in press), one represented by Neotropical + African species and the other one by Oceanian/Malesian species. Pinna articulation is not reported for other members of the family, and is likely independently derived in genera where it occurs, as an adaptation to seasonal climate fluctuation (Moran 1995a). When examining dried specimens, there is a discrete, slightly raised disarticulation ring at the bases of articulate pinnae (e.g., in *Telmatoblechnum serrulatum*).

Blade indument. Many kinds of hairs and scales are found in species of Blechnaceae, but most are essentially glabrous to glabrescent, e.g., the woodwardioid and stenochlaenoid lineages. Densely scaly species are found in *Parablechnum* and *Lomariocycas*, with large scales sometimes covering most of the laminar surfaces. In other genera, amorphous hyaline or tan scales are often present, but these may be deciduous, or lost in mature fronds. *Lomaridium* is glabrous, lacking hairs or scales, like most species of *Blechnum* s.s., but some species of the latter genus have conspicuous hyaline, multicellular hairs. When hairs are present in *Blechnum* and other genera, they are mostly on the stipes and rachises, rarely on laminar tissue. Species of *Cranfillia* have abundant hairs on the blades; the hairs may be blackish or hyaline, except in *C. sampaioana*, which has minute hairs in some plants.

Blade color and texture. Young leaves of Blechnaceae are often reddish, the color produced by an anthocyanin (Crowden & Jarman 1974). When the leaves become adult, the laminae are generally green to yellow green, shiny, and opaque. The majority of species of Blechnaceae are concolorous when dried, but some species of *Lomaria* have discolorous blades—green adaxially and brownish abaxially. Some species of *Austroblechnum* also have discolorous blades, but less markedly than in *Lomaria*. In *Lomaridium*, the blades are often dark green adaxially, silvery green abaxially.

Coriaceous blades are found in *Lomariocycas*, but this condition varies greatly in Blechnaceae, even among

species in the same genus, e.g., *Austroblechnum*, where the species like *A. penna-marina*, that grow in full sun, have coriaceous to subcoriaceous blades, and *A. divergens*, a forest species, has chartaceous or herbaceous blades.

Pinna margins. Pinnae are generally slightly revolute at the margins, at least when dried, and strongly revolute (involute) in *Lomariocycas* and *Cleistoblechnum*. In *Struthiopteris* the pinna margins are entire and flat (not revolute), similar to species of *Neoblechnum*, *Oceaniopteris*, *Icarus*, and *Doodia*, but in these last four genera the pinna margins are usually crenate to serrate. In *Blechnum*, the pinna margins are finely denticulate. In Stenochlaenoideae and Woodwardioideae, the laminae are flat, but the margins crenulate to serrulate.

Vivipary. Laminar buds are rare in Blechnaceae, occurring in few species in distantly related genera, e.g., *Woodwardia*, *Salpichlaena*, *Parablechnum*, and *Cranfillia*. *Woodwardia prolifera* is unique in bearing many small plants over the adaxial surface of the blades.

Aerophores. Small tubercular or conical aeration structures, called aerophores (or pneumatophores; Bower 1923, 1926), are borne at the bases of pinnae, abaxial side; these seem to occur primarily on some (but not all) neotropical species of *Parablechnum* and one species of *Parablechnum acanthopodum*, from Goodenough Island, northeast coast of Papua. In addition, all, or nearly all, members of Blechnaceae have two whitish, lateral ventilation bands along the lengths of the stipes and continuing along the rachises; these bear copious stomata that presumably aid in aeration of young developing tissues (Davies 1991). In several species of Blechnaceae, especially those with prominent aerophores, copious amounts of mucilage cover the young croziers and early-developing fronds (Hennipman 1968). The taxonomic significance of these characters–aerophores and mucilage production–is poorly known and needs more study, as well the development of these structures.

Sori and indusia. Sori in the family are usually continuous or nearly so and protected by elongate indusia that open toward the costae. Only two genera, *Brainea* and *Stenochlaena,* are exindusiate. When mature, the indusia often become lacerate and expose the sporangia: two exceptions are *Salpichlaena* and *Cleistoblechnum*, which have reflexed indusia that remain entire or erose and covering the sporaniga at maturity.

Anchistea, Lorinseria, Woodwardia, and *Doodia* (Kramer *et al*. 1990) have so-called chain-like sori, i.e., sori follow the areolar veins, and then are interrupted. At maturity, chain-like sori may appear to form a continuous row. Acrostichoid sporangia (covering the abaxial surfaces of pinnae) rarely occur in Blechnaceae, and are found only in *Stenochlaena*. The acrostichoid condition is common in other genera outside Blechnaceae, e.g., in *Elaphoglossum* Schott ex J.Sm. (Dryopteridaceae) and *Acrostichum* L. (Pteridaceae), where the sori are borne not only on veins but on laminar tissue between veins. This condition caused Holttum (1949, 1971) to relate *Stenochlaena* to other acrostichoid genera. Chambers (2013), in the review of the genus, stated that the pinna margins reflex at maturity and the sori appear acrostichoid, a condition common in most dimorphic species of Blechnaceae and easily seen in *Austroblechnum, Cranfillia*, *Parablechnum, Struthiopteris,* and other genera, but in these genera, the sporangia, as can be seen in young leaves and developing sori, appear to be borne only on commissural veins, not on laminar tissue. In most Blechnaceae with dimorphic fronds, the fertile pinna margins reflex to expose the sporangia when the sporangia mature. The development of sporangia in *Stenochlaena*, whether truly on laminar tissue, needs further investigation developmentally.

Chromosome numbers. Chromosome numbers in Blechnaceae range from $x = 28–40$, with most genera having base numbers between 31–35 (Manton 1959, Quinn 1961, Abraham *et al.* 1962, Roy & Holttum 1965, Walker 1966, 1973, 1985, Jarrett *et al.* 1968, Manton & Vida 1968, Ghatak 1977, Smith & Mickel 1977, Sota & Pazos 1983, Smith & Foster 1984, Kurita 1986, Nakato 1987, Raj & Manickam 1987, Singh & Roy 1988, Sankari Ammal & Bhavanandan 1989, Takamiya *et al.* 1992, Bidin 1995, Wagner 1995, Tindale & Roy 2002, Marcon *et al.* 2003, de Lange *et al.* 2004, Jara-Seguel *et al.* 2006, Murray & Lange 2013, Ebihara *et al.* 2014). Base chromosome numbers appear to be a good synapomorphy for some genera, including *Salpichalena* ($x = 40$), *Diploblechnum* ($x = 27–28$), *Lomaridium* ($x = 28$), *Anchistea* and *Lorinseria* ($x = 35$), and *Woodwardia* ($x =$ mostly 34). A few genera and even some species have been reported to show variation in chromosome number, e.g., *Parablechnum* ($x = 28, 31, 33$), or *Brainea insignis* ($x = 33, 35$); however, additional counts are needed to assess whether such variation is real or the result of miscounts. Chromosome base numbers help separate some otherwise similar genera like *Cleistoblechnum* ($x = 33$) from *Struthiopteris* ($x =$ 31 or 32). Diploids, triploids, tetraploids, and even higher ploidy levels (decaploids) are known in the family (see Nakato 1987, Tindale & Roy 2002). Hybridization also appears to be common in some genera, especially *Blechnum s.s*. (Walker 1985, Moran 1995a), and introgression was recorded by Sota & Pazos (1983); this may compound the problem of species delimitation.

Classification. Most taxonomic proposals made for Blechnaceae define *Blechnum* very broadly, and hence it has almost always been considered as a very large genus (Tryon & Tryon 1982, Kramer *et al.* 1990). Wang *et al.* (2013) placed some species of *Blechnum* in previously named genera (as early as 1754, e.g., *Struthiopteris*), but pointed out

that the classification they adopted had no molecular support. Perrie *et al*. (2014), with a broad sample of species from Oceania, emphasized that a larger sample (which we use as the basis of this paper) would be necessary to recognize the clades recovered in their analysis. Based on this, they chose to lump *Doodia* and other genera in *Blechnum*.

Taxonomic treatment

Blechnaceae Newman, Hist. Brit. Ferns (ed. 2) 8. 1844.

Plants perennial, terrestrials, epipetric, scandent or occasionally epiphytic, very rarely aquatic; *rhizomes* erect, decumbent, creeping, subarborescent to arborescent or scandent, slender to robust, sometimes stoloniferous, covered with non-clathrate scales, sometimes bearing mucilage; *fronds* monomorphic or dimorphic, rarely trimorphic, reddish when young; *stipes* not articulate, with two or more vascular bundles arranged in an arc, generally scaly proximally; *blades* entire to bipinnate; *rachises* grooved adaxially; *pinnae* articulate or not to the rachises, often reduced proximally, aerophores sometimes present at pinna bases, buds also sometimes present in pinna axils, rarely on adaxial laminar surfaces; *veins* free or anastomosing, lacking included veinlets, reaching the margins or ending a little before, tips sometimes enlarged, clavate (appearing as hydathodes) or rarely joined by a submarginal commissural vein (*Salpichlaena*); *sori* borne on a commissural vein parallel to the midvein or costa, or borne on the arches of the areolae, or acrostichoid; *sori* elongate, continuous or discontinuous, mostly not green; *indusia* usually present, introrse, absent in a few genera; *spores* monolete, reniform, variously ornamented; $x = 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 40$.

Distribution:—Sub-cosmopolitan with about 267 spp, with two main centers of diversity, Neotropics and Oceania/Australia.

Key to the Blechnaceae taxa

1. Plants truly aquatic (submerged in water) ..... *Oceaniopteris francii*
–. Plants terrestrial, epipetric, scandent or occasionally epiphytic, sometimes growing in swamps 2
2. Sori exindusiate or with pseudoindusia (recurved pinna margins) 3
–. Sori indusiate 4
3. Rhizomes erect, stout, trunk-like or forming stout caudices to about 1 m tall; fronds subdimorphic ..... *Brainea insignis*
–. Rhizomes long-creeping, climbing; fronds dimorphic ..... *Stenochlaena*
4. Sterile blades with at least partially anastomosing veins 5
–. Sterile blades with free veins 10
5. Pinnae articulate to rachises ..... *Anchistea virginica*
–. Pinnae not articulate to rachises 6
6. Blades pinnatisect, abruptly or subabruptly reduced proximally ..... *Blechnidium melanopus*
–. Blades simple, pinnate (at least proximally), or bipinnate 7
7. Pinna margins finely denticulate ..... *Blechnum*
–. Pinna margins entire, serrate, serrulate, crenate, or spinulose 8
8. Areoles arranged in a single order (row) on each side of costae, all areoles of similar size and shape ..... *Doodia*
–. Areoles clearly arranged in first and second order rows on each side of costae, the first order fertile, the second order sterile and of different shape and size 9
9. Fronds strongly dimorphic, the fertile ones with greatly contracted pinnae ..... *Lorinseria areolata*
–. Fronds monomorphic ..... *Woodwardia*
10 Blades climbing via twining rachises ..... *Salpichlaena*
–. Blades not climbing via twining rachises, if climbing via rhizomes 11
11. Rhizomes stoloniferous 12
–. Rhizomes not-stoloniferous 15
12. Fronds monomorphic to subdimorphic ..... *Blechnum*
–. Fronds dimorphic 13
13. Rhizome apices and stipe bases bearing linear-lanceolate scales; blades discolorous; rachises deeply grooved ..... *Lomaria*
–. Rhizomes bearing by lanceolate or ovate scales; blades concolorous; rachises shallowly grooved 14
14. Pinnae each with an obtuse apex; rachises mostly glabrous or with diminute hairs; fertile fronds taller than sterile ones ..... *Austroblechnum*
–. Pinnae each with an acute apex; rachises pilose, with persistent, fine, uniseriate hairs; fertile and sterile fronds similar in size ..... *Cranfillia vulcanica*
15. Rhizomes long-creeping, climbing 16
–. Rhizomes erect, short- or long-creeping, sometimes forming erect caudices, but not climbing 17
16. Rhizomes clothed with long-lanceolate, denticulate or entire scales; blades deeply pinnatisect or pinnate in the proximal half, with

vestigial or auricles pinnae proximally; sterile pinna margins entire ..... *Lomaridium*
–. Rhizomes clothed with linear-lanceolate, squarrose scales; blades pinnate, with sterile terrestrial blades smaller than epiphytic ones (di- to trimorphic), 2–6 pairs somewhat reduced proximally; sterile pinna margins serrulate ..... *Icarus filiformis*
17. Pinnae articulate to rachises 18
–. Pinnae not articulate to rachises 19
18. Pinna margins serrate; rhizomes long-creeping; fronds monomorphic to subdimorphic ..... *Telmatoblechnum*
–. Pinna margins entire to crenate; rhizomes erect; fronds dimorphic ..... *Parablechnum*
19. Blades pinnate-pinnatifid or bipinnatifid 20
–. Blades simple, pinnatifid, or 1-pinnate 21
20. Rhizomes erect, subarborescent, stout; fronds monomorphic ..... *Sadleria*
–. Rhizomes long-creeping to short-creeping, if caudices erect then slender; dimorphic or slightly dimorphic ..... *Diploblechnum*
21. Veins immersed in leaf tissue, almost invisible (except in *Lomariocycas aurata*) 22
–. Veins readily visible 23
22. Rhizomes erect, stout, trunk-like, densely clothed with bicolorous, acicular, curved, basally thickened scales ..... *Lomariocycas*
–. Rhizomes short, ascending or suberect, bearing at apices a tuft of orange-brown, glabrous, lanceolate scales ..... *Cleistoblechnum eburneum*
23. Proximal pinnae clearly stalked; blade apices conform to subconform 24
–. Proximal pinnae adnate, eventually subpetiolulate; blade apices pinnatifid 25
24. Blades truncate, without vestigial auriculate pinnae proximally; pinnae falcate, oblong-linear, lanceolate; indusia subentire to lacerate or erose ..... *Parablechnum*
–. Blades truncate with many vestigial auricles proximal to large pinnae; pinnae linear to narrowly elliptic, often with a basiscopic lobe; indusia entire at maturity ..... *Blechnopsis*
25. Fronds monomorphic ..... *Neoblechnum brasiliense*
–. Fronds dimorphic or subdimorphic 26
26. Rhizome scales linear-lanceolate or acicular, or scales sometimes pectinate and broadened only at the very base, otherwise acicular for nearly their entire length 27
–. Rhizome scales lanceolate, ovate, sometimes acuminate 29
27. Blades discolorous; rachises deeply grooved ..... *Lomaria*
–. Blades concolorous; rachises shallowly grooved 28
28. Rhizomes short-creeping to erect, sometimes trunk-like, bearing black, entire scales; blades slightly reduced proximally; pinna margins entire to serrate or dentate ..... *Oceaniopteris*
–. Rhizomes short-creeping or elongate, bearing brown to dark brown, entire or sparingly toothed scales; blades very gradually reduced proximally with proximal pinnae auriculate; pinnae margins entire ..... *Struthiopteris*
29. Stipes, rachises, costae, and veins pilose ..... *Cranfillia*
–. Stipes, rachises, costae, and veins glabrous 30
30. Rhizomes erect, forming narrow trunks 31
–. Rhizomes erect, but not forming narrow trunks 32
31. Veins each ending in a clavate hydathode ..... *Austroblechnum*
–. Veins not ending in hydathodes, all running to the pinna margins ..... *Lomaridium*
32. Pinnae petiolulate; blade apices radicant ..... *Cranfillia*
–. Pinnae sessile or adnate; blade apices not radicant 33
33. Blades truncate proximally, without auriculate pinnae below the longest pinnae ..... *Cranfillia*
–. Blades gradually or abruptly reduced to auricles proximally, or blades simple 34
34. Blades simple, pinnatifid, or pinnate, if pinnate, then pinnae oblong to suborbicular and margins crenate to serrate ..... *Austroblechnum*
–. Blades pinnate; pinnae oblong-linear to linear-falcate; margins entire ..... *Struthiopteris*

Blechnaceae subfamily Woodwardioideae Gasper, V.A.O.Dittrich & Salino, *subfam. nov*.—Type: *Woodwardia* Sm., Mém. Acad. Roy. Sci. Turin 5: 411. 1793.

Diagnosis: Plants with monomorphic or dimorphic fronds; blades pinnatifid, pinnate-pinnatifid or bipinnatifid, with margins serrulate to spinulose; veins anastomosing, forming a regular series of areoles along costae and costules, clearly visible in the first and second orders.

Plants terrestrial, rarely epipetric; *rhizomes* short- to long-creeping, erect or decumbent, slender to stout, densely clothed with brownish scales; *fronds* monomorphic or dimorphic; *stipes* scaly, at least proximally; *blades* pinnatifid, pinnate-pinnatifid, or bipinnatifid, rarely simple, truncate proximally, with margins serrulate; *buds* on blades present or not, if present then usually in axils of distal pinnae; *aerophores* absent; *rachises* and costae scaly to glabrescent; *veins* anastomosing and without included veinlets in both sterile or fertile fronds, forming a regular series of areoles along the costae and costules; *sori* arranged on each side of the costae and costules, in chain-like rows or sometimes confluent and long-linear, borne on the outer arc of costal areoles, usually immersed and covered by the paracostal indusia; $x = 31, 34, 35$.

Species number, comments, and distribution:—Three genera and 15 species, with a largely north-temperate,

amphioceanic distribution. Some authors segregate *Chieniopteris* Ching, from eastern Asia (Wang *et al.* 2013), but without molecular support (Li *et al*. 2014, Gasper *et al*. in press). The genera were reviewed by Cranfill (2001) and Cranfill and Kato (2003).

Anchistea C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 431. 1851.—Type: *Anchistea virginica* (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5 6: 431. 1851. Figs. 1A, 5A.

Plants terrestrial; *rhizomes* long-creeping, non-stoloniferous, slender, clothed with dark brown, shiny, ovate, entire scales; *fronds* monomorphic; *stipes* 3–4 mm diam., about as long as blades, castaneous to dark purple-black proximally, tan to stramineous distally, with few scales proximally and glabrous abaxially; *blades* concolorous, lanceolate, 1-pinnate-pinnatifid, not reduced proximally, apices pinnatifid; *rachises* sparsely scaly to glabrescent; *buds* absent; *aerophores* absent; *pinnae* sessile to subpetiolulate, articulate to rachises, narrowly lanceolate, with denticulate or serrulate margins; *veins* anastomosing, without included veinlets in both sterile or fertile fronds, forming single rows of areoles along costae and costules, ultimate (marginal) veins free; *sori* oblong to linear, often borne along both sides of costal and costular areoles, chain-like but often appearing confluent in mature sori, indusia membranaceus, often hidden by sporangia; $x = 35$.

Species number, comments, and distribution:—One species in North America (eastern U.S.A. and southeastern Canada). The genus is easily recognized by having long-creeping rhizomes, 1-pinnate-pinnatifid blades, pinnae articulate to the rachises, and areolate venation.

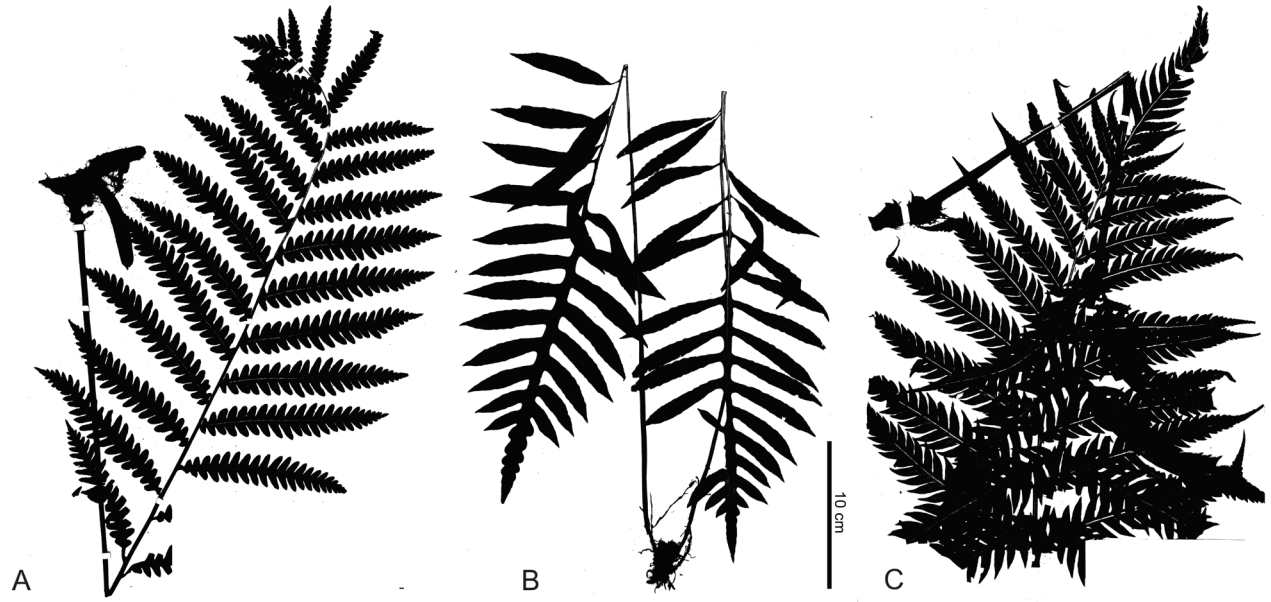

FIGURE 1. General appearance of the three genera of Blechnaceae subfamily Woodwardioideae. **A.** *Anchistea virginica* (P01513597); **B**. *Lorinseria areolata* (P01509531), **C.** *Woodwardia spinulosa* (P01557309). Vouchers are indicated by herbarium barcodes.

1. ***Anchistea virginica*** (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 431. 1851.—*Blechnum virginicum* L., Mant. Pl. 2: 307. 1771.—*Woodwardia virginic*a (L.) Sm., Mém. Acad. Roy. Sci. Turin 5: 412. 1793.

Lorinseria C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 432. 1851, non *Lorinsera* Opiz, 1839, a genus that seems not to be generally recognized, in Apiaceae; if the two are considered homonymous, then *Lorinseria* needs conservation.—Lectotype (chosen by J. Smith, Hist. Filic. 310. 1875): *Lorinseria areolata* (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 432. 1851. Figs. 1B, 5B.

Plants terrestrial; *rhizomes* long-creeping, non-stoloniferous, slender (ca. 5 mm diam.), densely clothed with brownish, ovate to broadly lanceolate, entire scales; *fronds* dimorphic, the fertile reddish brown; *stipes* slender, long, scaly at least proximally, sparsely scaly distally; *blades* concolorous, ovate to deltate, the sterile deeply pinnatifid, the fertile 1-pinnate, not reduced proximally, apices pinnatifid; *rachises* with scattered, ovate, light brown scales; *buds* absent; *aerophores* absent; *pinnae* not articulate to rachises, the sterile adnate, narrowly elliptic, margins serrulate, the fertile contracted, linear, attenuate at bases; *veins* anastomosing without included veinlets in areoles in both sterile and fertile fronds, forming a regular series of two or more rows of areoles between costae and pinna margins, veins free

toward margins; *sori* linear-oblong, deeply sunken into blades, confined to costal areoles on each side of the costae, indusia membranaceus, the outer edge tucked around sporangia; $x = 35$.

Species number, comments, and distribution:—One species in eastern North America (U.S.A. and Nova Scotia, Canada). It is easily recognized by the long-creeping rhizomes and the deeply pinnatifid sterile blades. The fertile blades are 1-pinnate and contracted.

1. ***Lorinseria areolata*** (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5 6: 432. 1851.—*Acrostichum areolatum* L., Sp. Pl. 2: 1069. 1753.—*Woodwardia areolata* (L.) T.Moore, Index Fil. xlv. 1857.

Woodwardia Sm., Mém. Acad. Roy. Sci. Turin 5: 411. 1793.—Lectotype (chosen by J. Smith, Hist. Fil. 310. 1875): *Woodwardia radicans* (L.) Sm. Figs, 1C, 5C.

Chieniopteris Ching, Acta Phytotax. Sinica 9: 1964.—Type: *Chieniopteris harlandii* (Hook.) Ching, based on *Woodwardia harlandii* Hook.

Plants terrestrial, rarely epipetric; *rhizomes* short- to long-creeping, erect or decumbent, slender to stout, non-stoloniferous, densely clothed with brownish, lanceolate to linear-lanceolate scales, with entire margins or few teeth; *fronds* monomorphic; *stipes* stout, long, dark brown proximally, stramineous distally, scaly at least proximally, then with sparse scales and/or hairs; *blades* concolorous, lanceolate, oblong-lanceolate, ovate-lanceolate, rarely simple, pinnatifid, pinnate-pinnatifid, or to bipinnatifid, not reduced proximally, apices pinnatifid; *rachises* scaly to glabrescent; *buds* present or not; *aerophores* absent; *pinnae* not articulate to rachises, oblong-lanceolate, margins entire to spinulose; *veins* anastomosing and without included free veinlets in both sterile or fertile fronds, forming a regular series of areoles along the costae and costules, ultimate veins free; *sori* long-linear, sunken, usually confined to costular areoles, arranged on each side of the costae and costules, indusia membranaceus, discrete; $x = 31, 34$.

Species number, comments, and distribution:—*Woodwardia* is a north-temperate, amphioceanic genus comprising approximately 13 species. The genus can be distinguished from the other genera in Woodwardioideae by the monomorphic leaves and the usually short-creeping to suberect rhizomes.

1. ***Woodwardia auriculata*** Blume, Enum. Pl. Javae 2: 196. 1828.
2. ***Woodwardia fimbriata*** Sm., in Ress, Cycl. 38. 1818.
3. ***Woodwardia harlandii*** Hook., Fil. Exot. 3: pl. 7. 1857.
4. ***Woodwardia japonica*** (L.f.) Sm., Mém. Acad. Roy. Sci. Turin 5: 411. 1793.—*Blechnum japonicum* L. f., Suppl. Pl. 445. 1781[1782].
5. ***Woodwardia kempii*** Copel, Philipp. J. Sci. 3: 280. 1908.
6. ***Woodwardia magnifica*** Ching & P.S.Chiu, Acta Phytotax. Sin. 12: 247–248. 1974.
7. ***Woodwardia martinezii*** Maxon ex Weath., Amer. Fern J. 39: 88. 1949.
8. ***Woodwardia orientalis*** Sw., J. Bot. (Schrader) 1800(2): 76. 1801.
9. ***Woodwardia prolifera*** Hook. & Arn., Bot. Beechey Voy. 275, pl. 56. 1841[1838].
10. ***Woodwardia radicans*** (L.) Sm., Mém. Acad. Roy. Sci. Turin 5: 412. 1793.—*Blechnum radicans* L., Mant. Pl. 2: 307–308. 1771.
11. ***Woodwardia semicordata*** Mickel & Beitel, Mem. New York Bot. Gard. 46: 403. 1988.
12. ***Woodwardia spinulosa*** M.Martens & Galeotti, Nouv. Mém. Acad. Roy. Sci. Bruxelles 15: 64. 1842.
13. ***Woodwardia unigemmata*** (Makino) Nakai, Bot. Mag. (Tokyo) 39(461): 103. 1925.—*Woodwardia radicans* var. *unigemmata* Makino, J. Jap. Bot. 2: 7. 1918.

Blechnaceae subfam. Stenochlaenoideae (Ching) J.P.Roux, Conspect. South. Afr. Pteridophyta, 156. 2001, emend. Gasper, V.A.O.Dittrich & Salino—Stenochlaenaceae Ching, Acta Phytotax. Sin. 16(4): 18. 1978.—Type: *Stenochlaena* J.Sm., J. Bot. 3: 401. 1841.

Plants epiphytic or terrestrial; *rhizomes* long-creeping, scandent or not; *fronds* monomorphic to dimorphic; *stipes* glabrous to hairy; *blades* pinnate to bipinnate, sometimes pilose; *buds* absent (present in *Salpichalena hookeriana*); *rachises* with determinate or indeterminate growth (*Salpichlaena*), glabrous; *pinnae* articulate to rachises or not (*Salpichlaena*), glabrous or with a pair of glands at their bases (*Stenochlaena*); *veins* free or with inconspicuous areoles near the costae, simple or furcate, with the ends connected by a marginal vein in *Salpichlaena*; *sori* (sporangia) acrostichoid, without indusia in *Stenochlaena*, indusia linear in other genera.

Species number, comments, and distribution:—About 12 species, with *Salpichlaena* in the Neotropics, *Stenochlaena* in Asia, Malesia, Australia, and Africa; *Telmatoblechnum* is pantropical.

Salpichlaena J.Sm., in Hooker, Gen. Fil.: pl. 93. 1842.—Type: *Salpichlaena volubilis* (Kaulf.) J.Sm., J. Bot. (Hooker) 4: 168. 1841. Figs. 2A, 5D.

Plants terrestrial, climbing by twining rachises; *rhizomes* long-creeping, non-stoloniferous, bearing dark brown, lanceolate, entire scales; *fronds* monomorphic to dimorphic, climbing, with indeterminate growth, reaching more than 15 m; *stipes* stout, long, stramineous, with few scales; *blades* linear, bipinnate, truncate proximally, apices conform, concolorous; *rachises* glabrous; *buds* present or absent; *aerophores* absent; *pinnae* not articulate to rachises, petiolulate, linear to linear-lanceolate, flat, margins entire to crenulate; *veins* simple or furcate, with the ends connected by a marginal vein; *sori* linear, parallel to commissural veins, protected by elongate indusia, these lacerate or strongly vaulted and virtually tubular, breaking up into narrow recurved strips as the mature spores are released; $x = 40$.

Species number, comments, and distribution:—*Salpichlaena* is a neotropical genus with three species (Moran 1990, Giudice *et al.* 2008), and is characterized by the rachises with indeterminate growth (reaching 15 m; Moran 1995a) and bipinnate blades.

1. ***Salpichlaena hookeriana*** (Kuntze) Alston, Bull. Misc. Inform. 1932: 312. 1932.—*Spicanta hookeriana* Kuntze, Revis. Gen. Pl. 2: 821. 1891.
2. ***Salpichlaena thalassica*** Grayum & R.C.Moran, Ann. Missouri Bot. Gard. 77: 591. 1990.
3. ***Salpichlaena volubilis*** (Kaulf.) J.Sm., J. Bot. (Hooker) 4: 168. 1841.—*Blechnum volubile* Kaulf., Enum. Filic. 159. 1824.

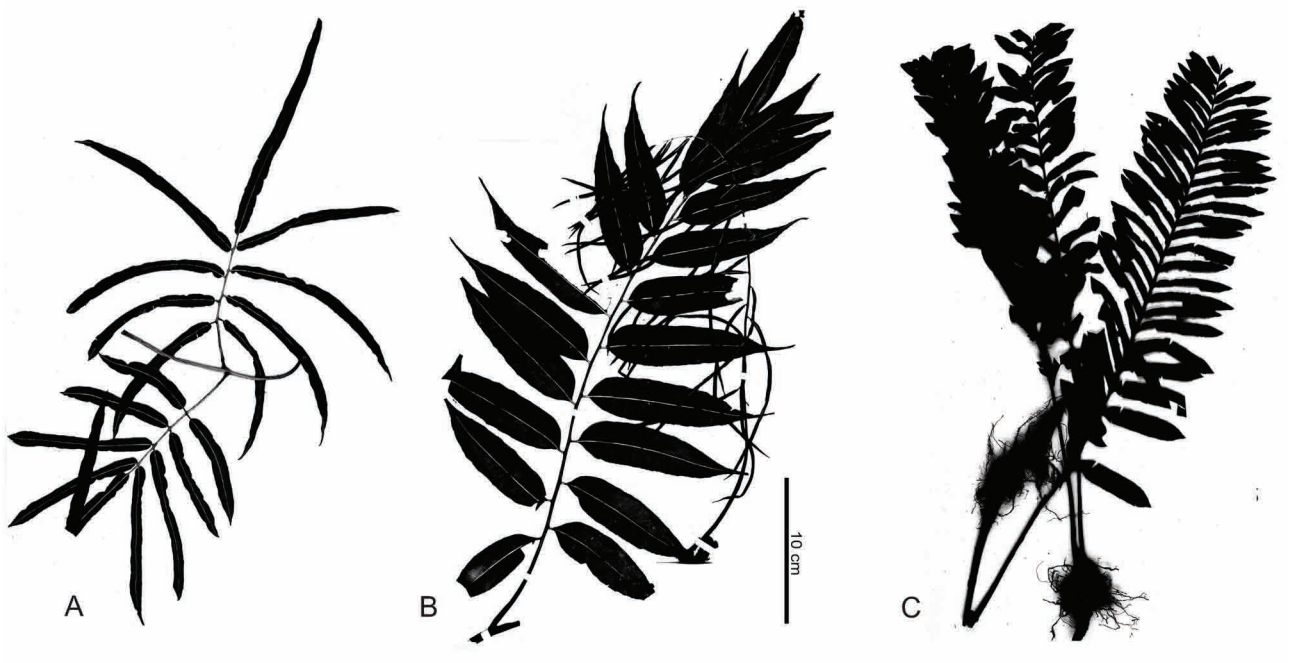

FIGURE 2. General appearance of the three genera of Blechnaceae subfamily Stenochlaenoideae. **A.** *Salpichlaena volubilis* (MO3588318); **B.** *Stenochlaena scandens* (P01420182); **C.** *Telmatoblechnum serrulatum* (MO2003917). Vouchers are indicated by herbarium barcodes.

Stenochlaena J.Sm., in Hooker, J. Bot. 3: 401. 1841.—Lectotype (designated by Pfeiffer, Nom. 2: 1274. 1874): *Stenochlaena scandens* J.Sm., nom. illeg. [= *Stenochlaena palustris* (Burm.f.) Bedd., 1876]. Figs. 2B, 5E.

Lomariobotrys Fée, Mém. Foug., 5. Gen. Filic. 45. 1852—Type: *Lomariobotrys tenuifolia* (Desv.) Fée, Mém. Fam. Foug. 5: 46. 1852 = [*Stenochlaena tenuifolia* (Desv.) T.Moore]

Plants terrestrial, rarely epiphytic; *rhizomes* long-creeping, climbing, non-stoloniferous, stout, clothed when young with brown peltate or linear-acuminate scales, these entire or subentire; *fronds* dimorphic, determinate; *stipes* stout, long, stramineous, red-brown, sometimes with a few persistent scales, glabrous distally or slightly hairy adaxially;

sterile blades ovate to oblong-lanceolate, pinnate, truncate proximally, apices conform, concolorous; *fertile blades* pinnate to bipinnate (in *S. tenuifolia*); *rachises* glabrous; *buds* absent; *aerophores* absent; *pinnae* not articulate to rachises, sessile to subsessile, oblong-ovate to lanceolate, serrate; *veins* with a unique series of inconspicuous areoles, the other ones simple to furcate; *sori* acrostichoid, exindusiate; $x = 37$.

Species number, comments, and distribution:—Seven species, distributed in Asia and Africa. The acrostichoid condition, as well as the exindusiate sori, both reported for this genus, need further investigation.

1. ***Stenochlaena areolaris*** (Harr.) Copel., Philipp. J. Sci., 2C: 406. 1908.—*Lomaria areolaris* Harr., J. Linn. Soc., Bot. 16: 28. 1877.
2. ***Stenochlaena cumingii*** Holttum, Amer. Fern J. 71: 122. 1971.
3. ***Stenochlaena mildbraedii*** Brause, Bot. Jahrb. Syst. 53: 384. 1915.
4. ***Stenochlaena milnei*** Underw., Bull. Torrey Bot. Club 33: 38. 1906.
5. ***Stenochlaena palustris*** (Burm.f.) Bedd., Suppl. Ferns S. Ind., 26, pl. 201. 1876.—*Polypodium palustre* Burm. f., Fl. Indica 234. 1768.
6. ***Stenochlaena riauensis*** Sofiyanti *et al*., Bangl. J. Pl. Taxon. 22: 137. 2015.
7. ***Stenochlaena tenuifolia*** (Desv.) T.Moore, Gard. Chron. 193. 1856.—*Lomaria tenuifolia* Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5: 326. 1811.

Telmatoblechnum Perrie, D.J.Ohlsen & Brownsey, Taxon 63: 755. 2014.—Type: *Telmatoblechnum serrulatum* (Rich.) Perrie, D.J.Ohlsen & Brownsey, Taxon 63: 755. 2014. Figs. 2C, 5F.

Blechnopsis sect. *Diafnia* C.Presl, Epimel. Bot. 119. 1851.

Plants terrestrial, rarely epipetric; *rhizomes* long-creeping, non-stoloniferous, stout, clothed with bicolorous (atrocostate), lanceolate, entire scales; *fronds* monomorphic or slightly dimorphic, determinate; *stipes* stout, long, smooth and glabrous, with dark bases, stramineous distally, with a few scales similar to those of rhizomes; *blades* concolorous, pinnate, oblong to lanceolate, truncate proximally, apices conform; *rachises* glabrous or with amorphous, hyaline scales; *buds* absent; *aerophores* absent; *pinnae* articulate to rachises, linear to linear-oblong, margins serrate; *veins* free, 1–3-furcate, ending at the pinna margins; *sori* linear, close to costae, with narrow indusia, margins erose or lacerate; $x = 36$.

Species number, comments, and distribution:—*Telmatoblechnum* comprises two species, one in the Neotropics and another in Australasia/Oceania. The genus is one of the few in the family with articulate pinnae. Plants grow in swamps, open wetlands, and wet savannas.

1. ***Telmatoblechnum indicum*** (Burm.f.) Perrie, D.J.Ohlsen & Brownsey, Taxon 63: 755. 2014.—*Blechnum indicum* Burm.f., Fl. Indica 231. 1768.
2. ***Telmatoblechnum serrulatum*** (Rich.) Perrie, D.J.Ohlsen & Brownsey, Taxon 63: 755. 2014.—*Blechnum serrulatum* Rich., Actes Soc. Hist. Nat. Paris 1: 114. 1792.

Blechnaceae subfam. Blechnoideae Gasper, V.A.O.Dittrich & Salino, *subfam. nov.*—Type: *Blechnum occidentale* L., Sp. Pl 2: 1077. 1753.

Diagnosis: Rhizomes various, sometimes forming caudices, stoloniferous or not; fronds monomorphic to usually dimorphic (rarely trimorphic); blades pinnatifid, pinnate, or bipinnate (rarely simple and undivided); buds and aerophores rare; veins free to areolate; sori linear, borne along commissural veins, indusiate or rarely exindusiate.

Plants terrestrial, epiphytic, climbing by rhizomes, or rarely aquatic; *rhizomes* short- to long-creeping, erect, sometimes trunk-like, occasionally climbing, stoloniferous or not, clothed with basifixed scales; *fronds* monomorphic, subdimorphic, or dimorphic, rarely trimorphic, determinate; *stipes* not articulate to rachises, stramineous to dark brown, pilose, scaly, or glabrescent; *blades* pinnatisect, pinnate-pinnatifid, or bipinnate (rarely simple and entire), glabrous or rarely pilose; *rachises* glabrous or scaly, rarely densely pilose, but commonly very scaly; *buds* and *aerophores* absent or present in some species; *pinna* margins entire to serrate, not articulate (except *P. articulatum*), adnate, sessile or petiolulate; *veins* free to areolate; *sori* linear, borne on commissural veins, indusiate or rarely exindusiate.

Species number, comments, and distribution:—About 239 species, most diverse in the southern hemisphere, but a few species in north-temperate regions. We recognize 18 genera in this subfamily, with strong molecular and morphological support as reported by Gasper *et al*. (in press).

Austroblechnum **Gasper & V.A.O.Dittrich, *gen. nov*.—Type**: *Austroblechnum penna-marina* (Poir.) Gasper & V.A.O.Dittrich. Figs. 3A, 5G.

Diagnosis: Rhizomes bearing concolorous or bicolorous scales; fronds dimorphic, blades with reduced pinnae proximally; pinnae partially or totally adnate, with veins ending in enlarged and readily visible hydathodes.

Plants terrestrial or epipetric; *rhizomes* erect, ascending, short- or long-creeping, stoloniferous or not, moderately stout, sometimes forming small caudices, apices with brown to reddish brown, concolorous, lanceolate or ovate, acuminate, entire scales (scales rarely bicolorous with pale margins); *fronds* dimorphic; *stipes* slender or stout, atropurpureus to dark or yellowish, usually longer in fertile fronds, proximally with scales similar to those on the rhizomes and sometimes with uniseriate hairs, mostly glabrous distally; *blades* concolorous, lanceolate-acuminate, narrowly elliptic or ovate, pinnatisect to pinnate, rarely entire, reduced proximally or blades truncate, sometimes with vestigial pinnae, apices pinnatifid or pinnatisect; *rachises* glabrous or bearing a few scales; *buds* rarely present; *aerophores* absent; *pinnae* partially or totally adnate to rachises, falcate, oblong or ensiform, entire or crenate to serrate, plane to slightly revolute at margins; *veins* free, rarely simple, 1–2 furcate, with clavate ends readily visible, forming hydathodes adaxially; *sori* linear, indusia entire to erose or fimbriate; $x = 33$.

Species number, comments, etymology, and distribution:—Ca. 39 species with tropical to south-temperate distributions. Most species from middle to high elevations are usually in forests, or in open rocky sites. Most characteristic are the veins ending in enlarged and readily visible hydathodes. The name, used by Raymond Cranfill in his unpublished notes, was adopted because of the austral distribution of the species. *Austroblechnum* is most closely related to *Blechnum* s.s., *Cranfillia*, and *Icarus* (Gasper *et al.* in press).

1. ***Austroblechnum aequatoriense*** **(A.Rojas) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum aequatoriense*** A. Rojas, Mét. Ecol. Sist. 3(Supl. 1): 9–10, f. 1a–c. 2008.
2. ***Austroblechnum andinum*** **(Baker) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria andina*** Baker, in Hooker & Baker, Syn. Fil., 2: 482. 1874.—*Blechnum andinum* (Baker) C.Chr., Index Filic. 150. 1905.
3. ***Austroblechnum ascendens*** **(A.Rojas) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum ascendens*** A.Rojas, Mét. Ecol. Sist. 3 (Supl. 1): 10, f. 2a, b. 2008.
4. ***Austroblechnum asperum*** **(Klotzsch) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria aspera*** Klotzsch, Linnaea 20: 344. 1847.—*Blechnum asperum* (Klotzsch) J.W.Sturm, Abh. Naturhist. Ges. Nürnberg 2: 172. 1858.
5. ***Austroblechnum bakeri*** **(C.Chr.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum bakeri*** C.Chr., Index Filic. 151. 1905.
6. ***Austroblechnum banksii*** **(Hook.f.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria banksii*** Hook.f., FI. Nov.-Zel. 2:31, t. LXXVI. 1845.—*Blechnum banksii* (Hook.f.) Mett. ex Diels, Nat. Pflanzenfam. 1(4): 249. 1899.
7. ***Austroblechnum colensoi*** **(Hook.f.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum colensoi*** Hook.f., Victorian Naturalist 72: 159. 1956.
8. ***Austroblechnum corralense*** **(Espinosa) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum corralense*** Espinosa, Revista Chilena Hist. Nat. 36: 92. 1932.
9. ***Austroblechnum difforme*** **(Copel.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Blechnum difforme* Copel., Bernice P. Bishop Mus. Bull. 59: 13, t. 3. 1929.
10. ***Austroblechnum divergens*** **(Kunze) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria divergens*** Kunze, Linnaea 9: 57. 1834.—*Blechnum divergens* (Kunze) Mett., Ann. Sci. Nat. Bot., sér. 5, 2: 225. 1864.
11. ***Austroblechnum doodioides*** **(Brack.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria doodioides*** Brack., U.S. Expl. Exped., Filic., 16: 124. 1854, non *Blechnum doodioides* Hook., Fl. Bor.-Amer. 2(12): 263. 1840.
12. ***Austroblechnum durum*** **(T.Moore) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria dura*** T.Moore, Gard. Chron. 1866. 290. 1866.—*Blechnum durum* (T. Moore) C.Chr., Index Filic. 153. 1905.
13. ***Austroblechnum fernandezianum*** **(Looser) Gasper & V.A.O.Dittrich, *comb. nov***.—*Blechnum blechnoides G.Kunkel* var. *fernandezianum* Looser, Revista Univ. (Santiago) 32(2): 61. 1947.—*Blechnum fernandezianum* (Looser), Prada & Rolleri, Acta Bot. Malac. 31: 35. 2006.
14. ***Austroblechnum integrifrons*** **(Bonap. ex Rakotondr.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum integrifrons*** Bonap. ex Rakotondr., Adansonia, sér. 3, 35: 171–173, f. 12, 13[map]. 2013.
15. ***Austroblechnum jamaicense*** **(Broadh.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Struthiopteris jamaicensis*** Broadh., Bull. Torrey Bot. Club 39: 266, t. 21. 1912.—*Blechnum jamaicense* (Broadh.) C.Chr., Index Filic., Suppl. 1, 16. 1913.
16. ***Austroblechnum keysseri*** **(Rosenst.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum keysseri*** Rosenst., Repert. Spec. Nov. Regni Veg. 12: 527. 1913.
17. ***Austroblechnum lanceolatum*** **(R.Br.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Stegania lanceolata* R.Br.,

Prodr. 152. 1810.—*Blechnum lanceolatum* (R.Br.) J.W.Sturm, Enum. Pl. Vasc. Crypt. Chil. 25. 1858, non Raddi (1819).—*Blechnum chambersii* Tindale, in Beadle *et al*., Fl. Sydney Region. ed. 2, 86. 1986.

18. ***Austroblechnum lechleri* (T.Moore) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria lechleri*** T.Moore, Gard. Chron. 1866: 634. 1866, non *Blechnum lechleri* Mett. (1859) = *Parablechnum lechleri* (Mett.) Gasper & Salino—*Blechnum mochaenum* Kunkel, Nova Hedwigia 13: 340. 1967.
19. ***Austroblechnum lehmannii* (Hieron.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Blechnum lehmannii* Hieron., Bot. Jahrb. Syst. 34: 473. 1904.
20. ***Austroblechnum lherminieri* (Bory) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria lherminieri*** Bory ex Kunze, Farrnkräuter 173. 1845.—*Blechnum lherminieri* (Bory) C.Chr., Index Filic. 156. 1905.
21. ***Austroblechnum leyboldtianum* (Phil.) Gasper & V.A.O. Dittrich, *comb. nov.***—*Lomaria leyboldtiana* Phil., Anales Univ. Chile 18: 68. 1861.—*Blechnum leyboldtianum* (Phil.) C.Chr., Index Filic. 156. 1905.
22. ***Austroblechnum melanocaulon* (Brack.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Lomaria melanocaulon* Brack., U.S. Expl. Exped., Filic. 16: 122. 1854.—*Blechnum melanocaulon* (Brack.) T.C.Chambers & P.A.Farrant, Blumea 46: 318. 2001.
23. ***Austroblechnum membranaceum* (Colenso ex Hook.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria membranacea*** Colenso ex Hook., Sp. Fil. 3. 1860.—*Blechnum membranaceum* (Colenso ex Hook.) Mett., Nat. Pflanzenfam. 1(4): 249. 1899.
24. ***Austroblechnum microphyllum* (Goldm.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria microphylla*** Goldm., Nov. Actorum Acad. Caes. Leop.-Carol. German. Nat. Cur. 16, Suppl. 1, 460. 1843.—*Blechnum microphyllum* (Goldm.) C.V.Morton, Amer. Fern J. 60: 103. 1970.
25. ***Austroblechnum norfolkianum* (Heward) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria norfolkiana*** Heward, London J. Bot. 1. 122 nota. 1842.—*Blechnum norfolkianum* (Heward) Maiden, Proc. Linn. Soc. New South Wales 28: 732. 1904.
26. ***Austroblechnum nukuhivense* (E.D.Br.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum nukuhivense*** E.D.Br., Bernice P. Bishop Mus. Bull. 89: 69, f. 13. 1931
27. ***Austroblechnum organense* (Brade) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum organense*** Brade, Arq. Inst. Biol. Veg. 2(1): 2–3, pl. 1, f. 3, pl. 3. 1935.
28. ***Austroblechnum patersonii* (R.Br.) Gasper & V.A.O.Dittrich subsp. *patersonii*, *comb. nov.*—***Stegania patersonii*** R.Br., Prodr. 152. 1810.—*Blechnum patersonii* (R.Br.) Mett. subsp. *patersonii,* Fil. Hort. Bot. Lips. 64, t. 4, f. 4–10. 1856.
29. ***Austroblechnum patersonii* (R.Br.) Gasper *&* V.A.O.Dittrich subsp. *queenslandicum* (T.C.Chambers & P.A.Farrant) Gasper & V.A.O.Dittrich, *comb. nov.*—***Stegania patersonii*** R.Br., Prodr. 152. 1810.—*Blechnum patersonii* (R.Br.) Mett. subsp. *queenslandicum* T.C.Chambers & P.A.Farrant, Telopea 6: 177. 1995.
30. ***Austroblechnum penna-marina* (Poir.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Polypodium penna-marina*** Poir., in Lam., Encycl. 5: 520. 1804.—*Blechnum penna-marina* (Poir.) Kuhn, Filic. Afr. 92. 1868.
31. ***Austroblechnum pinnatifidum* (A.Rojas) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum pinnatifidum*** A.Rojas, Mét. Ecol. Sist. 3(Supl. 1): 20–21, f. 5a–c. 2008.
32. ***Austroblechnum raiateense* (J.W.Moore) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum raiateense*** J.W.Moore, Bernice P. Bishop Mus. Bull. 102: 9. 1933.
33. ***Austroblechnum squamipes* (Hieron.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum lanceolatum*** var. *squamipes* Hieron., Bot. Jahrb. Syst. 22: 381. 1896.—*Blechnum squamipes* (Hieron.) M.Kessler & A.R.Sm., Amer. Fern J. 97: 80. 2007.
34. ***Austroblechnum stoloniferum* (Mett. ex E.Fourn.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria stolonifera*** Mett. ex E.Fourn., Mexic. Pl. 1: 113. 1872.—*Blechnum stoloniferum* (Mett. ex E.Fourn.) C.Chr., Index Filic. 154. 1905.
35. ***Austroblechnum vallegrandense* (M.Kessler & A.R.Sm.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum vallegrandense*** M.Kessler & A.R.Sm., Amer. Fern J. 97: 79. 2007.
36. ***Austroblechnum vieillardii* (Mett.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Blechnum vieillardii* Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 70. 1861.
37. ***Austroblechnum wardiae* (Mickel & Beitel) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum wardiae*** Mickel & Beitel, Mem. New York Bot. Gard. 46: 89, f. 122A,B, 125A. 1988.
38. ***Austroblechnum* ×*aggregatum* (Colenso) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria aggregata*** Colenso, Trans. & Proc. New Zealand Inst. 20. 223. 1888.—*Blechnum aggregatum* (Colenso) Tindale, Proc. Linn. Soc. New South Wales 85: 254. 1960. [*Blechnum chambersii* Tindale × *Blechnum membranaceum* (Colenso ex Hook.) Mett. ex Diels]
39. ***Austroblechnum* ×*rodriguezii* (Aguiar, Quintanilla & Amigo) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum* ×*rodriguezii*** Aguiar, Quintanilla & Amigo, Amer. Fern J. 97: 228, fig. 1. 2008. [*Blechnum corralense* Espinosa × *Blechnum mochaenum* G. Kunkel subsp. *mochaenum*]

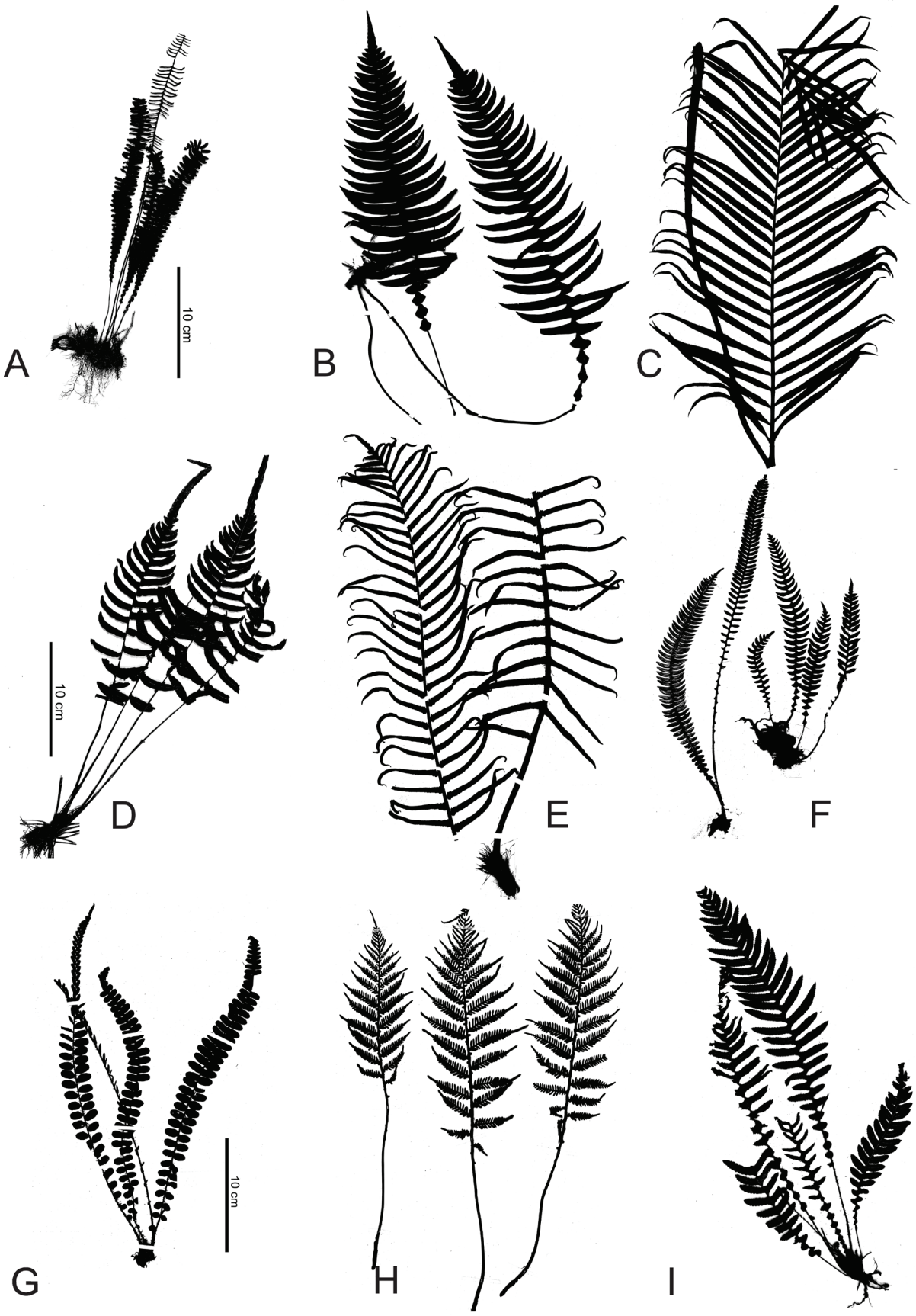

FIGURE 3. General appearance of the genera of Blechnaceae subfamily Blechnoideae (A-D). **A.** *Austroblechnum penna-marina* (FURB06706); **B.** *Blechnidium melanopus* (P02439094); **C.** *Blechnopsis orientalis* (P01406555); **D.** *Blechnum occidentale* (FURB06701); **E.** *Brainea insignis* (P01482127); **F.** *Cleistoblechnum eburneum* (P00627565); **G.** *Cranfillia fluviatilis* (P01606472); **H.** *Diploblechnum fraseri* (P01557366); **I.** *Doodia aspera* (P01618184). Vouchers are indicated by herbarium barcodes.

Blechnidium T.Moore, Index. Fil. CLV. 1860; Brit. Ferns Nat. Pr. [Moore], octavo ed., 2. 210. 1860.—Type: *Blechnidium melanopus* (Hook.) T.Moore, Brit. Ferns 210. 1860; Index Fil. CLV. 1860. Figs. 3B, 5H.

Plants terrestrial or epipetric; *rhizomes* long-creeping, slender (ca. 3–4 mm diam.), non-stoloniferous, bearing dense golden to dark-brown, lanceolate or ovate-lanceolate, entire scales; *fronds* monomorphic; *stipes* slender, long, dark brown to atropurpureous, with few scales proximally, glabrous toward apices; *blades* concolorous, lanceolate, pinnatisect, abruptly or subabruptly reduced proximally, apices pinnatifid; *rachises* glabrous; *buds* absent; *aerophores* absent; *pinnae* adnate, usually falcate, entire, slightly revolute at margins; *veins* partially anastomosing, with costal areoles, ultimate veinlets free, usually forking; *sori* linear, adjacent and closely parallel to costae, indusia entire, linear; $x = 31$.

Species number, comments, and distribution:—One species in China (including Taiwan) and India. The genus is characterized by the discrete areoles adjacent to the costae and resembles *Blechnum s.s.*, but the rhizomes are long-creeping and non-stoloniferous, and phylogenetic analyses do not show them to be closely related (Gasper *et al.* in press); rather, *Blechnidium* is closely related to *Brainea* and *Struthiopteris* (Gasper *et al.* in press).

1. ***Blechnidium melanopus*** (Hook.) T.Moore, Brit. Ferns 2: 210. 1860.—*Blechnum melanopus* Hook., Sp. Fil. 3: 64, pl. 161. 1859.

Blechnopsis C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 475. 1851.—Type: *Blechnopsis orientalis* (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 477. 1851. Figs. 3C, 5I.

Plants terrestrial; *rhizomes* erect to suberect, non-stoloniferous, stout, sometimes forming caudices, densely clothed with concolorous or weakly bicolorous brown, linear, entire scales; *fronds* monomorphic; *stipes* stout, dark reddish or purple-brown, bearing scales at bases similar to those of rhizomes, sometimes with very fine pale hairs distally; *blades* concolorous, ovate to deltate, pinnate, proximally abruptly reduced with many pairs (10+) of auriculate pinnae, apices subconform; *rachises* glabrous or with sparse irregular hairs and slender reddish brown scales; *buds* absent; *aerophores* absent; *pinnae* sessile or subpetiolulate, linear to narrowly elliptic, entire, sometimes revolute at margins, often with a basiscopic lobe; *veins* free, 1-furcate, each ending in a small hydathode adaxially; *sori* linear, indusiate, indusia entire at maturity, reflexed and not covering sporangia; $x = 32, 33, 34$.

Species number, comments, and distribution:—Two species, in Asia, Malesia, Japan, Australia, and Pacific islands. *Blechnopsis* is distinguished by the long stipes, with many auriculate pinnae (more than 10 pairs), and usually with basiscopic pinna lobes adnate. It is closely related to *Sadleria* and *Cleistoblechnum* (Gasper *et al.* in press).

1. ***Blechnopsis finlaysoniana*** (Wall. ex Hook. & Grev.) C.Presl, Epimel. Bot. 116. 1851.—*Blechnum finlaysonianum* Wall. ex Hook. & Grev., Pl. Voy. Russes Monde, t. 225. 1831.
2. ***Blechnopsis orientalis*** (L.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 477. 1851.—*Blechnum orientale* L., Sp. Pl. 2: 1077. 1753.

Blechnum L., Sp. Pl. 2: 1077. 1753.—Type: *Blechnum occidentale* L., Sp. Pl. 2: 1077. 1753. Figs. 3D, 6A.

Distaxia C.Presl, Epimel. Bot. 110. 1851.—Type: *Distaxia fraxinea* (Willd.) C.Presl, based on *Blechnum fraxineum* Willd.

Mesothema C.Presl, Epimel. Bot. 111. 1851.—*Blechnum* sect. *Mesothema* (C.Presl) J.Sm., Hist. Fil. 301. 1875.—Type: *Mesothema australe* (L.) C.Presl, based on *Blechnum australe* L.

Plants terrestrial, epipetric, or rarely epiphytic; *rhizomes* erect to ascending, decumbent or short-creeping, stoloniferous, slender to rather stout, bearing linear or linear-oblong, pale or dark brown, concolorous or bicolorous, entire scales (or scales with few minute teeth); *fronds* monomorphic or subdimorphic; *stipes* slender, short (sometimes absent) or long, stramineous to pale brown or atropurpureus, with scales similar to those of rhizomes proximally, and sometimes with multicellular, catenate, hyaline hairs toward apices; *blades* concolorous, lanceolate to deltate-lanceolate, entire (rare), pinnatisect or 1-pinnate, gradually reduced or truncate proximally, apices pinnatifid or conform; *rachises* glabrous or pilose, without scales; *buds* absent; *aerophores* absent; *pinnae* sessile, adnate or subpetiolulate, lanceolate, oblong-lanceolate, ensiform, margins entire, finely denticulate; *veins* rarely partially anastomosing, usually free and then 1–3 furcate, each ending near margins in an enlarged tip; *sori* linear, continuous or rarely interrupted along the costae, indusia slightly erose or ciliate; $x = 31$.

Species number, comments, and distribution:—Ca. 25 species, mostly neotropical, a few in southern Africa. With the segregation of the other genera, *Blechnum s.s*. is characterized by stoloniferous rhizomes, monomorphic to subdimorphic fronds, and finely denticulate pinna margins. *Blechnum* is closely related to *Austroblechnum, Cranfillia* and *Icarus* (Gasper *et al.* in press).

1. ***Blechnum anthracinum*** R.C.Moran, Novon 2: 132. 1992.
2. ***Blechnum appendiculatum*** Willd., Sp. Pl., ed. 4, 5(1): 410. 1810.
3. ***Blechnum arcuatum*** J.Rémy ex Gay, Fl. Chil. 6: 477. 1853.
4. ***Blechnum areolatum*** V.A.O.Dittrich & Salino, Syst. Bot. 37: 40, figs. 1–3. 2012.
5. ***Blechnum asplenioides*** Sw., Kongl. Vetensk. Acad. Handl. 1817(1): 72, t. 3, f. 3. 1817.
6. ***Blechnum auriculatum*** Cav., Descr. Pl. 262. 1802.
7. ***Blechnum australe*** L., Mant. Pl. 130. 1767.
8. ***Blechnum austrobrasilianum*** de la Sota, Bol. Soc. Argent. Bot. 16: 248. 1975.
9. ***Blechnum fraxineum*** Willd., Sp. Pl., ed. 4, 5(1): 413. 1810.
10. ***Blechnum gracile*** Kaulf., Enum. Filic. 158. 1824.
11. ***Blechnum gracilipes*** (Rosenst.) M.Kessler & A.R.Sm., Amer. Fern J. 97: 80. 2007.—*Blechnum blechnoides* var. *gracilipes* Rosenst., Repert. Spec. Nov. Regni Veg. 9: 343. 1911.
12. ***Blechnum guayanense*** A.Rojas, Mét. Ecol. Sist. 3(1): 36–37, f. 1, 3C, D. 2008.
13. ***Blechnum hastatum*** Kaulf., Enum. Filic. 161. 1824.
14. ***Blechnum heringeri*** Brade, Sellowia 18: 87. 1966.
15. ***Blechnum laevigatum*** Cav., Descr. Pl. 263. 1802.
16. ***Blechnum lanceola*** Sw., Kongl. Vetensk. Acad. Handl. 1817(1): 71, t. 3, f. 2. 1817.
17. ***Blechnum longipilosum*** V.A.O.Dittrich & Salino, Syst. Bot. 37: 40, figs. 1–3. 2012.
18. ***Blechnum ludificans*** Herter, Revista Sudamer. Bot. 8: 162. 1950.
19. ***Blechnum malacothrix*** Maxon & C.V.Morton, Bull. Torrey Bot. Club 66: 40. 1939.
20. ***Blechnum meridense*** Klotzsch, Linnaea 20: 349. 1847.
21. ***Blechnum occidentale*** L., Sp. Pl. 2: 1077. 1753.
22. ***Blechnum polypodioides*** Raddi, Opusc. Sci. 3: 294. 1819.
23. ***Blechnum punctulatum*** Sw., J. Bot. (Schrader) 1800(2): 74. 1801.
24. ***Blechnum punctulatum*** Sw. **var. *atherstonii*** R.Sim, Ferns S. Afr., ed. 2, 183, t. 79. 1915.
25. ***Blechnum punctulatum*** Sw. **var. *intermedium*** R.Sim, Ferns S. Afr, ed. 2, 185, t. 80. 1915.
26. ***Blechnum punctulatum*** Sw. **var. *krebsii*** R.Sim, Ferns S. Afr., ed. 2, 185, t. 81. 1915.
27. ***Blechnum* ×*antillanum*** Proctor, Brit. Fern Gaz. 9: 214. 1965. [*Blechnum appendiculatum* Willd. × *Blechnum meridense* Klotzsch]
28. ***Blechunm* ×*caudatum*** Cav., Descr. Pl. 262. 1802. [*Blechnum occidentale* L. × *Blechnum gracile* Kaulf.]
29. ***Blechnum* ×*confluens*** Schltdl. & Cham., Linnaea 5: 613. 1830. [*Blechnum occidentale* L. × *Blechnum polypodioides* Raddi]
30. ***Blechnum* ×*leopoldense*** (Dutra) V.A.O.Dittrich & Salino, Phytotaxa 231: 217. 2015. [*Blechnum auriculatum* Cav. × *Blechnum occidentale* L.]

Brainea J.Sm., Cat. Kew Ferns 5. 1856. Type: *Brainea insignis* (Hook.) J.Sm., Cat. Kew Ferns 5. 1856. Figs. 3E, 6B.

Bowringia Hook., Hooker's J. Bot. Kew Gard. Misc. 5: 237. 1853.—Type: *Bowringia insignis* Hook.

Plants terrestrial; *rhizomes* (caudices) erect, stout, trunk-like, to about 1 m tall, to 10 cm diam., non-stoloniferous, clothed with shiny dark brown, linear, entire scales, each with an attenuate or uniseriate tip; *fronds* subdimorphic; *stipes* stout, long, brownish, scales at bases similar to those of rhizomes, glabrous distally; *blades* bicolorous, elliptic- or deltate-lanceolate, pinnate, truncate or very slightly narrowed proximally, apices pinnatifid; *rachises* abaxially with small scales along costae and veins, or glabrescent; *buds* absent; *aerophores* absent; *pinnae* sessile or petiolulate, linear to narrowly oblong, crenate to serrulate, slightly revolute at margins; *veins* free or with a costal row of areoles in sterile and fertile pinna, then simple or 1- or 2-furcate; *sori* linear, borne along costal veins, exindusiate; $x = 33, 35$.

Species number, comments, and distribution:—Only one species, occurring in China, southeast Asia, and Malesia. This is a small arborescent fern, with subdimorphic fronds and exindusiate sori. *Brainea insignis* is one of the species in Blechnaceae with areolate venation, but the areoles are close to the costae and subtriangular, in contrast to the shapes of costal areoles in other genera in the family. This genus is closely related to *Blechnidium* and *Struthiopteris* (Gasper *et al.* in press).

1. ***Brainea insignis*** (Hook.) J.Sm., Cat. Kew Ferns 5. 1856.—*Bowringia insignis* Hook., Hooker's J. Bot. Kew Gard. Misc. 5: 237–238, pl. 2. 1853.

***Cleistoblechnum* Gasper & Salino, *gen. nov.*—Type:** *Cleistoblechnum eburneum* (Christ) Gasper & Salino, Bull. Acad. Int. Géogr. Bot. 1902: 233, fig. c. Figs. 3F, 6C.

Diagnosis: Rhizomes bearing at apices a tuft of orange-brown scales; fronds slightly dimorphic, blades proximally with pinnae reduced to small auricles; pinnae adnate, strongly revolute; sori linear, remaining enclosed by erose-margined indusia at maturity.

Plants terrestrial; *rhizomes* short, ascending or suberect, non-stoloniferous, slender, bearing at apices a tuft of orange-brown, glabrous, lanceolate, entire scales, some of these with a discrete, well-defined, darkened, atropurpureous mid-stripe; *fronds* slightly dimorphic, the fertile ones a bit longer, and with narrower, more widely spaced *pinnae* that are narrowed at their bases (vs. broader in sterile fronds); *stipes* short, ca. 5–10 cm long, slender, stramineous to tan, with scales confined to the very base, similar to those of rhizomes; *blades* thickened, concolorous, pinnatisect, linear-oblanceolate, the pinnae reduced in the proximal 1/4–1/3 to small auricles ca. 1–2 mm long, 3–5 mm broad, apices pinnatifid; *rachises* glabrous; *buds* absent; *aerophores* absent; *pinnae* adnate, oblong to narrowly deltate, margins entire but strongly revolute; *veins* inconspicuous or completely hidden in the subcoriaceous laminae, free, furcate, not reaching laminar margins; *sori* linear, remaining enclosed by erose-margined indusia at maturity; $x = 33$.

Species number, comments, etymology, and distribution:—One species with two varieties, endemic to Taiwan and mainland China. *Cleistoblechnum* resembles *Struthiopteris,* from which it is distinguished by slightly dimorphic fronds, the segment margins strongly inrolled, and the much more coriaceous blades. This is closely related to *Blechnopsis* and *Sadleria* (Gasper *et al.* in press). Chambers and Farrant (1996b) reported that the sori remain enclosed by erose indusia at maturity, a condition that suggests the generic name.

1. ***Cleistoblechnum eburneum* (Christ) Gasper & Salino var. *eburneum*, *comb. nov*.**—*Blechnum eburneum* Christ, Bull. Acad. Int. Géogr. Bot. 1902: 233, fig. c. *Spicantopsis eburnea* (Christ) Tagawa, Acta Phytotax. Geobot. 9: 88. 1940. 1940.
2. ***Cleistoblechnum eburneum* (Christ) Gasper & Salino var. *obtusum* (Tagawa) Gasper & Salino, *comb. nov*.**—*Spicantopsis eburnea* (Christ) Tagawa var. *obtusa* Tagawa in Acta Phytotax. Geobot. 9: 88. 1940.

***Cranfillia* Gasper & V.A.O.Dittrich, *gen. nov*.—Type**: *Cranfillia fluviatilis* (R.Br.) Gasper & V.A.O.Dittrich. Figs. 3G, 6D.

Diagnosis: Rhizomes suberect or erect, bearing oblong-attenuate or acuminate, brown to black scales; fronds dimorphic; rachises and costae pilose with multicellular hairs, these black or hyaline, to 2 mm long.

Plants terrestrial; *rhizomes* short-creeping to usually suberect or erect, stoloniferous or not, slender to stout, clothed with reddish brown to blackish, sometimes bicolorous, lanceolate or oblong-attenuate, entire scales with acuminate tips; *fronds* dimorphic; *stipes* slender or stout, short to long, stramineous to dark brown, scaly proximally, often abundantly hairy, or hairs sometimes sparse or absent; *blades* concolorous, linear-oblong to deltate, pinnate or deeply pinnatifid proximally, pinnatifid distally, proximally truncate or with gradually to subabruptly reduced pinnae; *rachises* scaly and often pilose, the hairs uniseriate, septate, sometimes sparse; *buds* absent or rarely present (in *C. sprucei*); *aerophores* absent; *pinnae* subpetiolulate proximally or often becoming fully adnate distally, oblong to lanceolate, sometimes falcate, entire to crenate or dentate along margins; *veins* free, 1- or 2-furcate, terminating adaxially in small submarginal hydathodes; *sori* linear, indusia more or less entire, sometimes with uniseriate hairs; $x = 33$.

Species number, comments, etymology, and distribution:—12 species, three in the Neotropics, the remainder in Oceania. This genus is characterized by usually pilose rachises and costae, with exception of *C. sampaioana*, where hairs are very tiny and scarce. The genus honors Raymond Cranfill, one of the first researchers to study Blechnaceae using molecular data; his notes advanced and inspired major portions of this work. *Cranfillia* is closely related to *Austroblechnum, Blechnum*, and *Icarus* (Gasper *et al.* in press).

1. ***Cranfillia fluviatilis* (R.Br.) Gasper & V.A.O.Dittrich, *comb. nov*.—**_Stegania fluviatilis_ R.Br., Prodr. 1: 152. 1810.—*Blechnum fluviatile* (R.Br.) Lowe ex Salomon, Nomencl. Gefässkrypt. 115. 1883.
2. ***Cranfillia fullagari* (F.Muell.) Gasper & V.A.O.Dittrich, *comb. nov*.—**_Lomaria fullagarii_ F.Muell., Fragm. 8: 157. 1874., as *Lomaria fullageri.—Blechnum fullagarii* (F.Muell.) C.Chr., Index Filic. 154. 1905.

3. ***Cranfillia geniculata*** **(T.C.Chambers & P.A.Farrant) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum geniculatum* T.C.Chambers & P.A.Farrant, Telopea 5: 329. 1993.
4. ***Cranfillia glabrescens*** **(T.C.Chambers & Sykes) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum glabrescens* T.C.Chambers & Sykes, Flora Cook Islands 68(–69). 2016.
5. ***Cranfillia hirsuta*** **(Rosenst.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum hirsutum* Rosenst., Repert. Spec. Nov. Regni Veg. 9: 74. 1910.
6. ***Cranfillia longicauda*** **(C.Chr.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum longicauda* C.Chr., Ark. Bot. 10(2): 10, pl. 1. 1910.
7. ***Cranfillia nigra*** **(Colenso) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Lomaria nigra* Colenso, Tasm. Journ. Nat. Sci. 1: 375. 1841.—*Blechnum nigrum* (Colenso) Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 69. 1861.
8. ***Cranfillia opaca*** **(Mett.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum opacum* Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 69. 1861.
9. ***Cranfillia pilosa*** **(Brack.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Lomaria pilosa* Brack., U.S. Expl. Exped., Filic. 16: 125, t. 15. 1854.—*Blechnum pilosum* (Brack.) Brownlie, Beih. Nova Hedwigia 55: 320. 1977.
10. ***Cranfillia sampaioana*** **(Brade) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum sampaioanum* Brade, Arq. Inst. Biol. Veg. 1: 225 1: 225. 1935.
11. ***Cranfillia sprucei*** **(C.Chr.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum sprucei* C.Chr., Index Filic. 160. 1905.
12. ***Cranfillia vulcanica*** **(Blume) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Lomaria vulcanica* Blume, Enum. Pl. Javae 202. 1828.—*Blechnum vulcanicum* (Blume) Kuhn, Ann. Mus. Bot. Lugduno-Batavi 4: 284. 1869.

Diploblechnum Hayata, Bot. Mag. (Tokyo) 41: 702. 1927.—Type: *Diploblechnum fraseri* (A.Cunn.) De Vol, Fl. Taiwan 1: 153. 1975. Figs. 3H, 6E.

Pteridoblechnum Hennipman, Blumea 13: 397. 1966.—Type: *Pteridoblechnum neglectum* (F.M.Bailey) Hennipman.
Steenisioblechnum Hennipman, Blumea 30: 17. 1984.—Type: *Steenisioblechnum acuminatum* (C.T.White & Goy) Hennipman.

Plants terrestrial; *rhizomes* slender, long- to short-creeping, or caudices erect, densely clothed at apices with bicolorous, linear-acuminate or lanceolate, entire or sparingly toothed scales; *fronds* dimorphic or slightly dimorphic; *stipes* slender, short, brown to reddish, densely scaly proximally, fewer persistent scales distally; *blades* concolorous, ovate to narrowly elliptic, pinnate to deeply pinnatifid, or bipinnatisect to bipinnate, usually becoming bipinnatifid distally, proximal pinnae gradually to abruptly reduced with one or two pairs of pinnae, or abruptly reduced to winged lobes extending down rachis, apical portions of the blades pinnatifid; *rachises* with sparse scales; *buds* sometimes present in axils of distal pinnae; *aerophores* absent; *pinnae* subpetiolulate to adnate, narrowly linear to narrowly elliptic, lanceolate, slightly revolute, margins subentire to crenate; *veins* free, 1-furcate, each ending in a clavate hydathode or (in *D. neglectum*) anastomosing and forming polygonal areoles, these in ca. 2 rows between costae and pinna margins; *sori* linear, indusiate, indusia subentire to erose, reflexed at maturity and not covering sporangia; $x = 27, 28$.

Species number, comments, and distribution:—Six species, in Malesia, Australia, and Oceania. The species usually have narrow, erect rhizomes (sometimes over 1 m tall) that may eventually collapse and thus appear to be long-creeping, as reported by Cranfill (2001). The blades are pinnate to deeply pinnatifid or bipinnatisect to bipinnate, usually becoming bipinnatifid distally, and the basal pinnae gradually to abruptly reduced or the stipes winged. *Diploblechnum* is closely related to the *Lomariocycas* clade, plus the *Neoblechnum-Oceaniopteris-Doodia* clade and the *Parablechnum* clade (Gasper *et al.* in press).

1. ***Diploblechnum acuminatum*** **(C.T.White & Goy) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Leptochilus acuminatus* C.T.White & Goy, Victorian Naturalist 54: 150. 1938.—*Pteridoblechnum acuminatum* (C.T.White & Goy) Hennipman, Proc. Roy. Soc. Queensland 87: 98. 1976.—*Blechnum reticulatum* R.K.Wilson & Bayly, Taxon 63: 755. 2014.
2. ***Diploblechnum diversifolium*** **(Mett.) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Blechnum diversifolium* Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 71. 1861.
3. ***Diploblechnum fraseri*** (A.Cunn.) De Vol, Fl. Taiwan 1: 153. 1975.—*Lomaria fraseri* A.Cunn., Companion Bot. Mag. 2: 364. 1836.—*Blechnum fraseri* (A.Cunn.) Luerss., Flora 1876: 292.
4. ***Diploblechnum lenormandii*** **(Baker) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Lomaria lenormandii* Baker, Syn. Fil. (Hooker & Baker) 181. 1867.—*Blechnum lenormandii* (Baker) Diels, Nat. Pflanzenfam. 1(4): 249. 1899.
5. ***Diploblechnum neglectum*** **(F.M.Bailey) Gasper & V.A.O.Dittrich,** ***comb. nov.—****Acrostichum neglectum*

F.M.Bailey, Proc. Linn. Soc. New South Wales 5: 32. 1880.—*Pteridoblechnum neglectum* (F.M.Bailey) Hennipman, Blumea 13: 397. 1966.—*Blechnum neglectum* (F.M.Bailey) R.K.Wilson & Bayly, Taxon 63: 755. 2014.

6. ***Diploblechnum rosenstockii* (Copel.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum rosenstockii*** Copel., Univ. Calif. Publ. Bot. 12. 394. 1931, non *Blechnum rosenstockii* de la Sota, Darwiniana 18: 254. 1973.

Doodia R.Br., Prodr. Fl. Nov. Holl.: 151. 1810.—Lectotype (designated by J. Smith, Hist. Fil. 309. 1875): *Doodia aspera* R.Br. Figs. 3I, 6F.

Plants terrestrial; *rhizomes* erect to ascending, sometimes stoloniferous, slender, clothed with black to brown, lanceolate to linear-lanceolate, entire scales; *fronds* monomorphic or dimorphic; *stipes* slender, mostly short, usually dark proximally and stramineous on rachises, scaly, with scales similar to those of rhizomes, usually glabrescent; *blades* concolorous, linear-lanceolate, lanceolate-acuminate, deeply pinnatifid to pinnate, truncate or with reduced, auriculate pinnae proximally, apices pinnatifid or sub-conform; *rachises* sometimes with scales; *buds* absent; *aerophores* absent; *pinnae* sessile or adnate, lanceolate, sometimes falcate, ovate to linear, margins serrate-dentate; *veins* with one or three series of areoles, the first series between veinlets of different forks, the second between veinlets of the same fork and sometimes also like the first series, the third, if present, the same as the first; *sori* in a single or several rows on both sides of the costae, borne on areolar veins, short and discrete or ±continuous, indusia linear, entire to repand; $x = 32$.

Species number, comments, and distribution:—About 19 species, in Australia, New Zealand, Pacific Islands to Hawaii. *Doodia* is characterized by having erect to ascending rhizomes and areolate venation, forming distinct series; fronds are monomorphic or dimorphic. It is closely related to *Neoblechnum* and *Oceanoptris* (Gasper *et al.* in press).

1. ***Doodia aspera*** R.Br., Prodr. 151. 1810.
2. ***Doodia australis*** Parris, Fl. Australia 48: 710. 1998.
3. ***Doodia brackenridgei*** Carruth. ex Seem., Fl. Vit. 352. 1873.
4. ***Doodia caudata*** (Cav.) R.Br., Prodr. 151. 1810.—*Woodwardia caudata* Cav., Descr. Pl. 264. 1802.
5. ***Doodia dissecta*** Parris, Fl. Australia 48: 711. 1998.
6. ***Doodia dives*** Kunze, Bot. Zeitung (Berlin) 6: 144. 1848.
7. ***Doodia gracilis*** Copel., Univ. Calif. Publ. Bot. 14: 362. 1929.
8. ***Doodia heterophylla*** (F.M.Bailey) Domin, Bibliotheca Bot. 85: 121. 1915.—*Doodia aspera* var. *heterophylla* F.M.Bailey, Fern World Australia 51. 1881.
9. ***Doodia hindii*** Tindale ex T.C.Chambers, Telopea 12: 257. 2008.
10. ***Doodia kunthiana*** Gaudich., Voy. Uranie, Bot. 401, t. 14. 1829.
11. ***Doodia linearis*** J.Sm., Ferns Brit. For. 199. 1866.
12. ***Doodia marquesensis*** E.D.Br., Bernice P. Bishop Mus. Bull. 89: 73, t. 16. 1931.
13. ***Doodia maxima*** J.Sm. ex C.Chr., Index Filic. 243. 1906.
14. ***Doodia media*** R.Br., Prodr. 151. 1810.
15. ***Doodia milnei*** Carruth., Fl. Vit. [Seemann] 352. 1873.
16. ***Doodia mollis*** Parris, New Zealand J. Bot. 18: 145. 1980.
17. ***Doodia paschalis*** C.Chr., Nat. Hist. Juan Fernandez 2: 48, f. 1a–c 1920[1921].
18. ***Doodia scaberula*** Parris, Blumea 24: 505, f. 1. 1978.
19. ***Doodia squarrosa*** Colenso, Trans. & Proc. New Zealand Inst. 13: 382. 1881.

***Icarus* Gasper & Salino, *gen. nov.*—Type**: *Icarus filiformis* (A.Cunn.) Gasper & Salino. Figs. 4A, 6G.

Diagnosis: Rhizomes long-creeping, climbing trees; fronds di- or trimorphic; larger pinnae short-stalked; veins free, furcate.

Plants terrestrial, climbing by rhizomes; *rhizomes* long-creeping, climbing, non-stoloniferous, slender (2–4 mm diam.), densely clothed with bicolorous, dark brown, linear-lanceolate, squarrose scales; *fronds* di- or trimorphic, with different sterile fronds when climbing; *stipes* slender, relatively short, but longer in ones borne on climbing rhizomes, stramineous to tan, with a few scales similar to those of rhizomes proximally, with scattered scales to glabrescent distally; *blades* concolorous, lanceolate to narrow-oblong, with sterile terrestrial blades smaller than epiphytic ones, 2–6 pinna pairs somewhat reduced proximally, apices pinnatifid; *rachises* bearing scattered brownish scales and moderately dense, hyaline, flexuous, septate hairs 0.2–0.5 mm long; *buds* absent; *aerophores* absent; *pinnae* narrowly triangular, truncate at bases, sessile or short-petiolate, dentate-serrulate or minutely crenulate along margins; *veins* free, simple or furcate, each ending in a submarginal hydathode; *sori* linear, indusia brown, continuous, erose at margins, reflexed at maturity; $x = 33$.

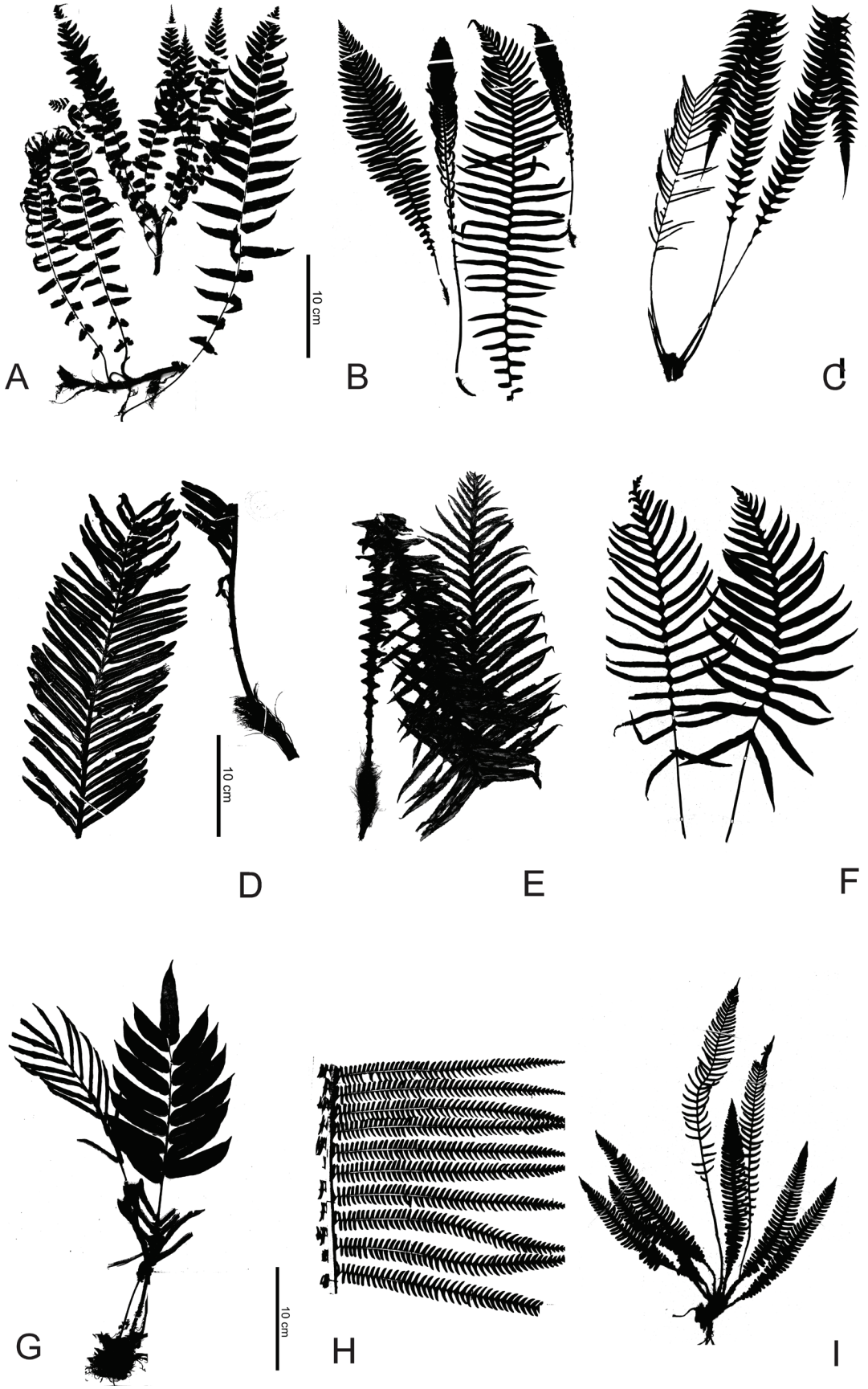

FIGURE 4. General appearance of the genera of Blechnaceae subfamily Blechnoideae (G-S). **A.** *Icarus filiformis* (WELT P009478); **B.** *Lomaria nuda* (P01557820)*;* **C.** *Lomaridium fragile* (MEXU 149093); **D.** *Lomariocycas aurata* (QCA7004842); **E.** *Neoblechnum brasiliense* (FURB06585); **F.** *Oceaniopteris cartilaginea* (P01630912). **G.** *Parablechnum cordatum* (FURB06639); **H.** *Sadleria pallida* (MEXU 956078); **I.** *Struthiopteris spicant* (P01658104). Vouchers are indicated by herbarium barcodes.

Species number, comments, etymology, and distribution:—One species, endemic to New Zealand. This is a unique genus in the Blechnaceae, having trimorphic leaves. When in contact with soil, this species has small sterile leaves, and when climbing, much larger sterile leaves; the third leaf type, of fertile fronds, has greatly contracted pinnae (Allan 1961). The dentate-serrulate or minutely crenulate pinna margins and the presence of adaxial hydathodes are other distinguishing characters. This is closely related to *Austroblechnum, Blechnum*, and *Cranfillia* (Gasper *et al.* in press). This name was coined by Raymond Cranfill in his unpublished notes, and we have decided to adopt it.

1. ***Icarus filiformis* (A.Cunn.) Gasper & Salino, *comb. nov.*—***Lomaria filiformis*** A. Cunn., Companion Bot. Mag. 2: 363. 1837.—*Blechnum filiforme* (A.Cunn.) Ettingsh., Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 24: 21, t. 6 f. 5. 1864.

Lomaria Willd., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 3: 160. 1809.—Lectotype (designated by J. Smith, Hist. Fil. 303. 1875): *Lomaria nuda* (Labill.) Willd., Sp. Pl. ed. 4, 5(1): 289. 1810. Figs. 4B, 6H.

Stegania R.Br., Prod. Nov. Holl. 152. 1810.—*Lomaria* sect. *Stegania* (R.Br.) J.Sm., Hist. Fil. 304. 1875.—Type: *Stegania nuda* (Labill.) R.Br., based on *Onoclea nuda* Labill. [= *Blechnum nudum* (Labill.) Luerss.]

Plants terrestrial; *rhizomes* erect, stout, sometimes forming small trunks, stoloniferous or not, clothed with bicolorous or concolorous, dark brown or blackish, linear-lanceolate to acicular, entire scales, these brown with a blackened mid-stripe; *fronds* dimorphic; *stipes* stout, long, brown to blackish, with scales like those of rhizomes, but smaller, scaly, pilose, or glabrous; *blades* lanceolate or oblong-elliptic, pinnate or pinnatisect, gradually reduced proximally, proximal pinnae auriculate, apices pinnatisect, discolorous (adaxial side dark green, abaxial side brownish in dried state); *rachises* with a few scales on abaxial surfaces, or glabrous; *buds* absent; *aerophores* absent; *pinnae* adnate to subpetiolulate, oblong, linear to lanceolate, plane to slightly revolute at the entire or minutely crenulate margins; *veins* free, 1- to 2-furcate, tips ending at pinna margins, sometimes ending in hydathodes adaxially, or slightly enlarged; *sori* linear, indusia continuous, lacerate or erose at maturity; $x = 28$.

Species number, comments, and distribution:—This widely dispersed genus comprises six species, and occurs in South America, South Africa, Australia, and New Caledonia. *Lomaria* has historically been a name applied to species with dimorphic leaves, differing from *Blechnum s.s.*, which has monomorphic leaves. The genus is characterized by having deeply grooved rachises and discolorous blades; two species with green spores have been reported (Lloyd & Klekowski, 1970, Sundue & Rothfels 2014). *Lomaria* is closely related to *Lomaridium* plus a clade formed by *Austroblechnum, Blechnum, Icarus*, and *Cranfillia* (Gasper *et al.* in press).

1. ***Lomaria brunea* (M.Kessler & A.R.Sm.) Gasper & V.A.O.Dittrich, *comb. nov.*—*Blechnum bruneum*** M.Kessler & A.R.Sm., Amer. Fern J. 97: 71. 2007.
2. ***Lomaria discolor*** (G.Forst.) Willd., Sp. Pl., ed. 4, 5(1): 410. 1810.**—***Blechnum discolor*** Keyserl., Polyp. Herb. Bunge 66. 1873.
3. ***Lomaria inflexa*** Kunze, Farrnkräuter 1: 150, t. 65. 1844.—*Blechnum inflexum* (Kunze) Kuhn, Filic. Afr. 92. 1868.
4. ***Lomaria nuda*** (Labill.) Willd., Sp. Pl., ed. 4, 5(1): 289. 1810.—*Onoclea nuda* Labill., Nov. Holl. Pl. 2: 96, pl. 246. 1806.—*Blechnum nudum* (Labill.) Mett., Flora 59: 292. 1876.
5. ***Lomaria oceanica* (Rosenst.) Gasper & V.A.O.Dittrich, *comb. nov.*—*Blechnum attenuatum*** var. *oceanicum* Rosenst., Repert. Spec. Nov. Regni Veg. 10: 159. 1911.—*Blechnum oceanicum* (Rosenst.) Brownlie, Fl. Nouv.-Calédonie & Dépend. 3: 245. 1969.
6. ***Lomaria spannagelii* (Rosenst.) Gasper & V.A.O.Dittrich, *comb. nov.*—*Blechnum spannagelii*** Rosenst., Hedwigia 46: 93–94. 1907.

Lomaridium C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 514. 1851.—Type: *Lomaridium plumieri* (Desv.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 514–515. 1851. Figs. 4C, 6I.

Plants terrestrial or climbing by rhizomes; *rhizomes* long-creeping, climbing trees or ascending to erect, non-stoloniferous, stout, clothed with mostly bicolorous, long-lanceolate, denticulate or entire (rare) scales; *fronds* dimorphic; *stipes* stout, long, stramineous, brown to dark brown, proximally with scales like those of rhizomes, glabrous or minutely but densely papillose; *blades* concolorous or bicolorous, the adaxial side dark green, abaxially silver-green, lanceolate or

ovate-deltate, deeply pinnatisect or pinnate in the proximal half, usually with many pairs of greatly reduced, auriculate or vestigial pinnae proximally, distally pinnatifid, sometimes with an entire, acuminate blade tip; *rachises* glabrous or with scattered minute hairs, often atropurpureus; *buds* absent; *aerophores* absent; *pinnae* adnate, oblong-acute to linear-attenuate or narrowly triangular, sometimes falcate, margins entire, slightly revolute; *veins* free, 1-furcate proximally, terminating near margins in enlarged vein tips adaxially; *sori* linear, indusia linear, entire to subentire; *x* = 29, 32.

Species number, comments, and distribution:—16 species in southern tropical regions, especially the Neotropics, eastern Africa, and Madagascar; a single species, *Lomaridium contiguum*, is known from Australasia. *Lomaridium* is easily distinguished from other Blechnaceae by the denticulate rhizome scales, glabrous leaves, and plants that climb by rhizomes.

1. ***Lomaridium acutum* (Desv.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Lomaria acuta* Desv., Mém. Soc. Linn. Paris 6: 290. 1827.—*Blechnum acutum* (Desv.) Mett., Ann. Sci. Nat. Bot., sér. 5, 2: 225. 1864.
2. ***Lomaridium attenuatum* (Sw.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Onoclea attenuata* Sw., J. Bot. (Schrader) 1800(2): 73. 1801.—*Blechnum attenuatum* (Sw.) Mett., Fil. Hort. Bot. Lips. 64, pl. 3, f. 1–6. 1856.
3. ***Lomaridium biforme* (Baker) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria biformis* Baker, J. Linn. Soc., Bot. 15: 415. 1876.—*Blechnum biforme* (Baker) Christ, Farnkr. Erde 180. 1897.
4. ***Lomaridium binervatum* (Poir.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Polypodium binervatum* Poir., in Lam., Encycl. 5: 521. 1804.—*Blechnum binervatum* (Poir.) C.V.Morton & Lellinger, Amer. Fern J. 57: 67. 1967.
5. ***Lomaridium bonapartei* (Rakotondr.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum bonapartei* Rakotondr., Adansonia, sér. 3, 35 167, f. 8, 9[map]. 2013.
6. ***Lomaridium contiguum* (Mett.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum contiguum* Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 70. 1861.
7. ***Lomaridium dendrophilum* (Sodiro) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria dendrophila* Sodiro, Anales Univ. Centr. Ecuador 8: 148. 1893.—*Blechnum dendrophilum* (Sodiro) C.Chr., Index Filic. 153. 1905.
8. ***Lomaridium ensiforme* (Liebm.) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria ensiformis* Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 234. 1849.—*Blechnum ensiforme* (Liebm.) C.Chr., Index Filic. 153. 1905.
9. ***Lomaridium fragile* (Liebm.) Gasper & V.A.O.Dittrich, *comb. nov.***—*Lomaria fragilis* Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 232. 1849.—*Blechnum fragile* (Liebm.) C.V.Morton & Lellinger, Amer. Fern J. 57: 68. 1967.
10. ***Lomaridium fuscosquamosum* (A.Rojas) Gasper & V.A.O.Dittrich, *comb. nov.***—*Blechnum fuscosquamosum* A.Rojas, Lankesteriana 5: 49, f. 1a, b. 2005.
11. ***Lomaridium nigrocostatum* (A.Rojas) Gasper & V.A.O.Dittrich, *comb. nov.*—***Blechnum nigrocostatum* A.Rojas, Mét. Ecol. Sist. 3: 38. 2008.
12. ***Lomaridium plumieri*** (Desv.) C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 515. 1851.—*Lomaria plumieri* Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5: 325. 1811.—*Blechnum plumieri* (Desv.) Mett., Fil. Hort. Bot. Lips. 61, t. 4, f. 19-20. 1856.
13. ***Lomaridium pteropus* (Kunze) Gasper & V.A.O.Dittrich, *comb. nov.***—*Lomaria pteropus* Kunze, Farrnkräuter 1(4): 97, t. 46. 1842. *Blechnum pteropus* (Kunze) Mett., Fil. Hort. Bot. Lips. 61. 1856.
14. ***Lomaridium schottii* (Colla) Gasper & V.A.O.Dittrich, *comb. nov.***—*Lomaria schottii* Colla, Herb. Pedem. 6: 220. 1836.—*Blechnum schottii* (Colla) C.Chr., Ark. Bot. 10(2): 7. 1910.
15. ***Lomaridium simillimum* (Baker) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria simillimum* Baker, J. Bot. 22: 141. 1884.—*Blechnum simillimum* (Baker) Diels, Nat. Pflanzenfam. 1(4): 248. 1899.
16. ***Lomaridium xiphophyllum* (Baker) Gasper & V.A.O.Dittrich, *comb. nov.*—***Lomaria xiphophylla* Baker, J. Bot. 22: 142. 1884.—*Blechnum xiphophyllum* (Baker) C.Chr., Index Filic. 161. 1905.

Lomariocycas* (J.Sm.) Gasper & A.R. Sm., *comb. nov.*—Lomaria* sect. *Lomariocycas* J.Sm., Hist. Fil. 305. 1875.—*Blechnum* sect. *Lomariocycas* (J.Sm.) C.V.Morton, Amer. Fern J. 49: 68. 1959.—**Type**: *Lomaria boryana* (Sw.) Willd., based on *Onoclea boryana* Sw. = [*Blechnum boryanaum* (Sw.) Schltdl.] = *Lomariocycas tabularis* (Thunb.) Gasper & A.R.Sm. Figs. 4D, 7A.

Plants terrestrial, rarely epiphytic; *rhizomes* erect, stout, trunk-like, non-stoloniferous, densely clothed at apices with bicolorous, acicular, curved, multilayered, entire scales; *fronds* dimorphic, rarely monomorphic; *stipes* stout, long, yellowish to dark brown, with scales similar to those of rhizomes at base, distally glabrous or scaly; *blades* concolorous,

oblanceolate to elliptic, pinnate, pinnatisect distally, pinnae gradually reduced proximally to small auricles, apices abruptly reduced to a large, entire segment; *rachises* with scales on both surfaces or only abaxially, these sometimes deciduous; *buds* absent; *aerophores* absent; *pinnae* sessile to subpetiolulate or partially adnate, linear to oblong, narrowly oblong-lanceolate, margins entire, strongly revolute; *veins* free, ending before the margins, immersed in blade tissue and practically invisible without clearing; *sori* linear, indusia linear, continuous, entire or erose; $x = 33$.

Species number, comments, and distribution:—About 19 species in the Neotropics, Africa, and Madagascar; the genus is absent in Australasia. *Lomariocycas* is reminiscent of species of *Cycas* (hence the name), a gymnosperm, because of the erect trunk-like rhizomes, and the rosetted arrangement of the pinnate leaves. The veins are immersed in the blade tissue and practically invisible, and the pinnae are beset with scales. This is closely related to *Diploblechnum* plus a clade formed by *Neoblechnum, Oceaniopteris, Doodia,* and *Parablechnum* (Gasper *et al.* in press).

1. ***Lomariocycas aurata* (Fée) Gasper & A.R.Sm., *comb. nov.***—*Lomaria aurata* Fée, Mém. Foug. 8: 71. 1857.—*Blechnum auratum* (Fée) R.M.Tryon & Stolze, Fieldiana, Bot., n.s., 32: 67. 1993.
2. ***Lomariocycas buchtienii* (Rosenst.) Gasper & A.R.Sm., *comb. nov.*—***Blechnum buchtienii* Rosenst., Repert. Spec. Nov. Regni Veg. 5: 231. 1908.
3. ***Lomariocycas columbiensis* (Hieron.) Gasper & A.R.Sm., *comb. nov.***—*Blechnum columbiense* Hieron., Hedwigia 47: 244. 1908.
4. ***Lomariocycas cycadifolia* (Colla) Gasper & A.R.Sm., *comb. nov.***—*Lomaria cycadifolia* Colla, Herb. Pedem. 6: 219. 1836.—*Blechnum cycadifolium* (Colla) J.W.Sturm, Abh. Naturhist. Ges. Nürnberg 2: 173. 1858.
5. ***Lomariocycas decrescens* (Rakotondr.) Gasper & A.R.Sm., *comb. nov.*—***Blechnum decrescens* Rakotondr., Adansonia 35: 169. 2013.
6. ***Lomariocycas insularis* (C.V.Morton & Lellinger) Gasper & A.R.Sm., *comb. nov.*—***Blechnum insularum* C.V.Morton & Lellinger, Amer. Fern J. 57: 70. 1967.
7. ***Lomariocycas longepetiolata* (Tardieu) Gasper & A.R.Sm., *comb. nov.*—***Blechnum longepetiolatum* Tardieu, Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 6: 230. 1955.
8. ***Lomariocycas longipinna* (Rakotondr.) Gasper & A.R.Sm., *comb. nov.*—***Blechnum longipinnum* Rakotondr., Adansonia, sér. 3, 35 174–176, f. 15, 16[map]. 2013.
9. ***Lomariocycas madagascariensis* (Tardieu) Gasper & A.R.Sm., *comb. nov.*—***Blechnum madagascariense* Tardieu, Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 6: 230, f. 3, 1–4. 1955.
10. ***Lomariocycas magellanica* (Desv.) Gasper & A.R.Sm., *comb. nov.*—***Blechnum magellanicum* (Desv.) Mett., Fil. Lechl. 1: 14. 1856.
11. ***Lomariocycas obtusifolia* (Ettingsh.) Gasper & A.R.Sm., *comb. nov.*—***Lomaria obtusifolia* C.Presl, Tent. Pterid. 143. 1836.—*Blechnum obtusifolium* Ettingsh., Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 23: 59, t. 8, f. 4. 1864.
12. ***Lomariocycas palmiformis* (Thouars) Gasper & A.R.Sm., *comb. nov.***—*Pteris palmiformis* Thouars, Fl. Tristan d'Acugna 30. 1804.—*Blechnum palmiforme* (Thouars) C.Chr., Results Norweg. Sci. Exped. Tristan da Cunha no. 6: 10. 1940.
13. ***Lomariocycas rufa* (Spreng.) Gasper & A.R.Sm., *comb. nov.*—***Lomaria rufa* Spreng., Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Natur. Cur. 10: 230. 1821.—*Blechnum rufum* (Spreng.) C.Chr., Index Filic., Suppl. 1, 17. 1913.
14. ***Lomariocycas shaferi* (Broadh.) Gasper & A.R.Sm., *comb nov.***—*Struthiopteris shaferi* Broadh.—Bull. Torrey Bot. Club 39: 374, t. 27. 1912.—*Blechnum shaferi* (Broadh.) C.Chr., Index Filic., Suppl. 1, 17. 1913.
15. ***Lomariocycas schomburgkii* (Klotzsch) Gasper & A.R.Sm., *comb. nov.*—***Lomaria schomburgkii* Klotzsch, Linnaea 20: 346. 1847.—*Blechnum schomburgkii* (Klotzsch) C.Chr., Index Filic. 159. 1905.
16. ***Lomariocycas tabularis* (Thunb.) Gasper & A.R.Sm., *comb. nov.***—*Pteris tabularis* Thunb., Prodr. Pl. Cap., 171. 1800.—*Blechnum tabulare* (Thunb.) Kuhn, Filic. Afr. 94. 1868.
17. ***Lomariocycas underwoodiana* (Broadh.) Gasper & A.R.Sm., *comb. nov.***—*Struthiopteris underwoodiana* Broadh., Bull. Torrey Bot. Club 39: 377, t. 28. 1912.—*Blechnum underwoodianum* (Broadh.) C.Chr., Index Filic., Suppl. 1, 17. 1913.
18. ***Lomariocycas werckleana* (Christ) Gasper & A.R.Sm., *comb. nov.***, *Lomaria werckleana* Christ, Bull. Herb. Boissier, sér. 2, 4(11): 1091. 1904.—*Blechnum werckleanum* (Christ) C.Chr., Index Filic. 161. 1905.
19. ***Lomariocycas yungensis* (J.P.Ramos) Gasper & A.R.Sm., *comb. nov.***—*Blechnum yungense* J.P.Ramos, Novon 20: 68. 2010.

Neoblechnum **Gasper & V.A.O.Dittrich,** ***gen. nov.*****—Type***: Neoblechnum brasiliense* (Desv.) Gasper & V.A.O.Dittrich. Figs. 4E, 7B.

Diagnosis: Rhizomes stout, erect, forming caudices, apices covered by long (2 cm) black, glossy, acicular, curved, entire scales; fronds monomorphic; pinnae adnate, strongly decurrent at bases, margins serrulate; proximal pinnae (many pairs) gradually reduced to small triangular, obtuse lobes ca. 1 cm long, broader than long.

Plants terrestrial; *rhizomes* erect, stout, trunk-like, non-stoloniferous, clothed with black, glossy, acicular, curved, entire scales; *fronds* monomorphic; *stipes* stout, short, brown to blackish, proximally with smaller scales similar to those of the rhizomes, glabrous or glabrescent distally; *blades* concolorous, oblong-lanceolate, pinnate to pinnatisect, gradually reduced at base, with small auricles at the blade bases, apices pinnatifid; *rachises* glabrous or with tiny capitate hairs; *buds* absent; *aerophores* absent; *pinnae* adnate to rachises, decurrent, linear to linear-lanceolate, margins serrulate; *veins* free, 1-furcate, each ending at pinna margins; *sori* linear, indusia entire to subentire; $x = 66$.

Species number, comments, and distribution:—One neotropical species. The plants are monomorphic, with trunk-like rhizomes when old; pinna margins are serrulate. The name was coined from the exclusively neotropical occurrence of the sole species *Neoblechnum brasiliense*. It is closely related to *Oceaniopteris* and *Doodia* (Gasper *et al.* in press).

1. ***Neoblechnum brasiliense*** **(Desv.) Gasper & V.A.O.Dittrich,** ***comb. nov.****—Blechnum brasiliense* Desv., Mag. Neuesten Entdeck. Gesammten Naturk. Ges. Naturf. Freunde Berlin 5: 330. 1811.

Oceaniopteris **Gasper & Salino,** ***gen. nov.*****—Type**: *Oceaniopteris gibba* (Labill.) Gasper & Salino. Figs. 4F, 6C.

Diagnosis: Rhizomes short-creeping to erect with black, acuminate, acicular scales, except when aquatic (*O. francii*); fronds dimorphic to subdimorphic; proximal pinnae only slightly shorter than others, or greatly reduced (e.g., *O. gibba*), veins free, furcate.

Plants terrestrial; *rhizomes* short-creeping to erect, non-stoloniferous, stout, sometimes trunk-like, clothed with black, acuminate, acicular, entire scales (except when aquatic, as *O. francii*), or scales sometimes pectinate and broadened only at the very base, otherwise acicular for nearly their entire length (as in *O. gibba*); *fronds* dimorphic to subdimorphic, or hemidimorphic (only distal pinnae fertile); *stipes* usually stout (but very narrow, 0.5 mm diam. in *O. francii*), long or short, stramineous, brown, or blackish, with scales similar to those of rhizomes, fewer scales distally, scales sometimes deciduous, rarely with small hairs; *blades* concolorous, deltate to ovate (narrowly lanceolate in *O. francii*), pinnate or pinnate-pinnatisect, slightly reduced proximally (greatly reduced in *O. francii*), with pinnatifid apices; *rachises* glabrous or with sparse scales and hairs; *buds* absent; *aerophores* absent; *pinnae* adnate or petiolulate, linear to narrowly elliptic, entire to serrate-dentate; *veins* free, furcate, each ending in a clavate hydathode adaxially; *sori* linear, on both sides of costae, indusia entire (over-arching and covering sporangia at maturity in *O. francii*); $x = 32$.

Species number, comments, etymology, and distribution:—About eight species, distributed in Malesia, Fiji, New Caledonia, and Australia. This genus has trunk-like rhizomes, sometimes more than 1 m tall, with the exception of *O. francii*, an aquatic plant. The rhizomes have black, acuminate, acicular scales, and the fronds are dimorphic to subdimorphic. *Oceaniopteris* is similar to *Neoblechnum brasiliense*, which occurs only in the Neotropics, and has glossy, acicular, curved, entire scales and monomorphic fronds. The name was coined for the exclusively Oceanian (in Oceania) distribution of all known species. It is closely related to *Neoblechnum* and *Doodia* (Gasper *et al.* in press).

1. ***Oceaniopteris cartilaginea*** **(Sw.) Gasper & Salino,** ***comb. nov.*****—***Blechnum cartilagineum* Sw., Syn. Fil. 114. 1867.
2. ***Oceaniopteris ciliata*** **(T.Moore) Gasper & Salino,** ***comb. nov.****—Lomaria ciliata* T.Moore, Gard. Chron. 1866: 290, non *Blechnum ciliatum* C.Presl, 1925).—*Blechnum moorei* C.Chr., Index Filic. 157. 1905.
3. ***Oceaniopteris egregia*** **(Copel.) Gasper & Salino** ***comb. nov.*****—***Blechnum egregium* Copel., Fragm. Fl. Philipp. 187. 1905.
4. ***Oceaniopteris francii*** **(Rosenst.) Gasper & Salino,** ***comb. nov.*****—***Blechnum francii* Rosenst., Repert. Spec. Nov. Regni Veg. 12: 191. 1913.
5. ***Oceaniopteris gibba*** **(Labill.) Gasper & Salino,** ***comb. nov.*****—***Lomaria gibba* Labill., Sert. Austro-Caledon. 3, t. 4. 5. 1824.—*Blechnum gibbum* (Labill.) Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 68. 1861.
6. ***Oceaniopteris obtusata*** **(Labill.) Gasper & Salino,** ***comb. nov.*****—***Lomaria obtusata* Labill., Sert. Austro-Cale-

don. 4, t. 6. 1824.—*Blechnum obtusatum* (Labill.) Mett., Ann. Sci. Nat. Bot., sér. 4, 15: 68. 1861.

7. ***Oceaniopteris vittata* (Brack.) Gasper & Salino, *comb. nov.*—***Blechnum vittatum*** Brack., U.S. Expl. Exped., Filic. 16: 131, t. 16. 1854.—*Blechnum cartilagineum* Sw. var. *vittatum* (Brack.) Luerss., Fil. Graeff. 132. 1871.
8. ***Oceaniopteris whelanii* (F.M.Bailey) Gasper & Salino, *comb. nov.*—***Blechnum whelanii*** F.M.Bailey, Rep. Bellenden-Ker Range 77. 1889.

Parablechnum C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 6: 469. 1851.—Type: *Parablechnum procerum* (G.Forst.) C.Presl, Epimel. Bot. 109. 1851. Figs. 4G, 7D.

Orthogramma C.Presl, Epimel. Bot. 121. 1851—Type: *Orthogramma gilliesii* (Hook. & Grev.) C.Presl, based on *Lomaria gilliesii* Hook. & Grev. [= *Blechnum chilense* (Kaulf.) Mett.]

Lomaria subg. *Paralomaria* Fée, Mém. Fam. Foug. 5: 69 (Gen. Fil.). 1852.—Type: *Lomaria procera* (G.Forst.) Spreng., based on *Osmunda procera* G.Forst. [= *Blechnum procerum* (G.Forst.) Sw.]

Plants terrestrial; *rhizomes* erect or suberect, sometimes subarborescent to decumbent, short-creeping, non-stoloniferous, stout, clothed with reddish to brown, bicolorous or concolorous, ovate or ovate-lanceolate, entire or denticulate scales one cell thick, sometimes covered by mucilage; *fronds* usually dimorphic, rarely monomorphic or subdimorphic; *stipes* stout, long, stramineous, light brown, or dark purplish, proximally with scales similar to those of rhizomes, scaly, rarely with twisted hairs; *blades* concolorous, oblong to lanceolate, 1-pinnate, bases truncate, apices conform; *rachises* glabrous or glabrescent to often densely scaly; *buds* absent or present in a few species; *aerophores* sometimes borne at the bases of pinnae abaxially; *pinnae* sessile or stalked, usually not articulate (articulate in *P. articulatum*), often falcate, oblong-linear, lanceolate, plane or revolute at margins, entire or finely denticulate; *veins* free, simple to 1-furcate, clavate at tips adaxially, near pinna margins; *sori* linear, indusia subentire to lacerate or erose; $x = 28, 31, 33$.

Species number, comments, and distribution:—About 65 species, pantropical. The species of *Parablechnum* are characterized by the truncate laminae, 1-pinnate blades, and conform or subconform apices. The genus is most closely related to *Lomariocyas* and a clade formed by *Neoblechnum, Oceaniopteris,* and *Doodia* (Gasper *et al.* in press).

1. ***Parablechnum acanthopodum* (T.C.Chambers & P.A.Farrant) Gasper & Salino, *comb. nov.*—*Blechnum acanthopodum*** T.C.Chambers & P.A.Farrant, Blumea 46: 290. 2001.
2. ***Parablechnum ambiguum*** C.Presl, Epimel. Bot. 109. 1851.—***Blechnum ambiguum*** (C.Presl) Kaulf. ex C.Chr., Dansk Bot. Ark., 9, 3: 21. 1937.
3. ***Parablechnum articulatum* (F.Muell.) Gasper & Salino, *comb. nov.*—*Lomaria articulata*** F.Muell., Fragm. 5: 187. 1866.—***Blechnum articulatum*** (F.Muell.) S.B.Andrews, Austrobaileya 1: 11. 1977.
4. ***Parablechnum atropurpureum* (A.R.Sm.) Gasper & Salino, *comb. nov.*—*Blechnum atropurpureum*** A.R.Sm., Acta Bot. Venez. 14(3): 5. 1984.
5. ***Parablechnum bicolor* (M.Kessler & A.R.Sm.) Gasper & Salino, *comb. nov.*—*Blechnum bicolor*** M.Kessler & A.R.Sm., Amer. Fern J. 97: 66. 2007.
6. ***Parablechnum bolivianum* (M.Kessler & A.R.Sm.) Gasper & Salino, *comb. nov.*—*Blechnum bolivianum*** M.Kessler & A.R.Sm., Amer. Fern J. 97: 69. 2007.
7. ***Parablechnum camfieldii* (Tindale) Gasper & Salino, *comb. nov.*—*Blechnum camfieldii*** Tindale, Proc. Linn. Soc. New South Wales 85: 251. 1960.
8. ***Parablechnum capense* (Burm.f.) Gasper & Salino, *comb. nov.*—*Blechnum capense*** Burm.f., Fl. Indica 28. 1768; see Roux (1982) for re-lectotypification.—***Blechnum sylvaticum*** Schelpe, J. S. African Bot. 45: 221. 1979.
9. ***Parablechnum chauliodontum* (Copel.) Gasper & Salino, *comb. nov.*—*Blechnum chauliodontum*** Copel., Univ. Calif. Publ. Bot. 14. 361. 1929.
10. ***Parablechnum chilense* (Kaulf.) Gasper & Salino, *comb. nov.*—*Lomaria chilensis*** Kaulf., Enum. Filic. 154. 1824.—***Blechnum chilense*** (Kaulf.) Mett., Fil. Lechl. 1: 14. 1856.
11. ***Parablechnum chiriquanum* (Broadh.) Gasper & Salino, *comb. nov.*—*Struthiopteris chiriquana*** Broadh., Bull. Torrey Bot. Club 39: 361. 1912.—***Blechnum chiriquanum*** (Broadh.) C.Chr., Index Filic., Suppl. 1, 16. 1913.
12. ***Parablechnum christii* (C.Chr.) Gasper & Salino, *comb. nov.*—*Blechnum christii*** C.Chr., Index Filic. 152. 1905.
13. ***Parablechnum cochabambense* (M.Kessler & A.R.Sm.) Gasper & Salino, *comb. nov.*—*Blechnum cochabambense*** M.Kessler & A.R.Sm., Amer. Fern J. 97: 72. 2007.

14. ***Parablechnum confusum*** **(E.Fourn.) Gasper & Salino, *comb. nov.*—***_Lomaria confusa_** E.Fourn., Ann. Sci. Nat. Bot., sér. 5, 18: 316. 1873.—*Blechnum confusum* (E.Fourn.) Brownlie, Fl. Nouv.-Calédonie & Dépend. 3: 249, t. 31, f. 5–6. 1969.
15. ***Parablechnum corbassonii*** **(Brownlie) Gasper & Salino, *comb. nov.*—***_Blechnum corbassonii_** Brownlie, Fl. Nouv.-Calédonie & Dépend. 3: 246, t. 31, f. 3, 4. 1969.
16. ***Parablechnum cordatum*** **(Desv.) Gasper & Salino, *comb. nov.*—***_Lomaria cordata_** Desv., Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 5: 330. 1811.—*Blechnum cordatum* (Desv.) Hieron., Hedwigia 47: 239. 1908.
17. ***Parablechnum decorum*** **(Brause) Gasper & Salino, *comb. nov.*—***_Blechnum decorum_** Brause, Bot. Jahrb. Syst. 56: 156. 1920.
18. ***Parablechnum dilatatum*** **(T.C.Chambers & P.A.Farrant) Gasper & Salino, *comb. nov.*—***_Blechnum dilatatum_** T.C.Chambers & P.A.Farrant, Blumea 46: 292. 2001.
19. ***Parablechnum falciforme*** **(Liebm.) Gasper & Salino, *comb. nov.*—***_Lomaria falciformis_** Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 234. 1849.—*Blechnum falciforme* (Liebm.) C.Chr., Index Filic. 154. 1905.
20. ***Parablechnum gemmascens*** **(Alston) Gasper & Salino, *comb. nov.*—***_Blechnum gemmascens_** Alston, Bull. Jard. Bot. État 27: 57, f. 4. 1957.
21. ***Parablechnum glaziovii*** **(Christ) Gasper & Salino, *comb. nov.***—*Blechnum glaziovii* Christ, Annuaire Conserv. Jard. Bot. Genève 3: 42. 1899.
22. ***Parablechnum gregsonii*** **(Tindale) Gasper & Salino, *comb. nov.*—***_Blechnum gregsonii_** Tindale, Proc. Linn. Soc. New South Wales 85: 253. 1960.
23. ***Parablechnum hieronymi*** **(Brause) Gasper & Salino, *comb. nov.***—*Blechnum hieronymi* Brause, Bot. Jahrb. Syst. 56: 155. 1920.
24. ***Parablechnum howeanum*** **(T.C.Chambers & P.A.Farrant) Gasper & Salino, *comb. nov.*—***_Blechnum howeanum_** T.C.Chambers & P.A.Farrant, Telopea 5: 331. 1993.
25. ***Parablechnum lechleri*** **(Mett.) Gasper & Salino, *comb. nov.*—***_Blechnum lechleri_** Mett., Fil. Lechl. 2: 17. 1859.
26. ***Parablechnum lima*** **(Rosenst.) Gasper & Salino, *comb. nov.*—***_Blechnum lima_** Rosenst., Repert. Spec. Nov. Regni Veg. 11: 53. 1912.
27. ***Parablechnum lineatum*** **(Sw.) Gasper & Salino, *comb. nov.*—***_Osmunda lineata_** Sw., Prodr. 127. 1788.—*Blechnum lineatum* (Sw.) C.Chr., Index Filic. 156. 1905.
28. ***Parablechnum loxense*** **(Kunth) Gasper & Salino, *comb. nov.*—***_Lomaria loxensis_** Kunth, Nov. Gen. Sp. (quarto ed.) 1: 18–19. 1815[1816].—*Blechnum loxense* (Kunth) Hook. ex Salomon, Nomencl. Gefässkrypt. 117. 1883.
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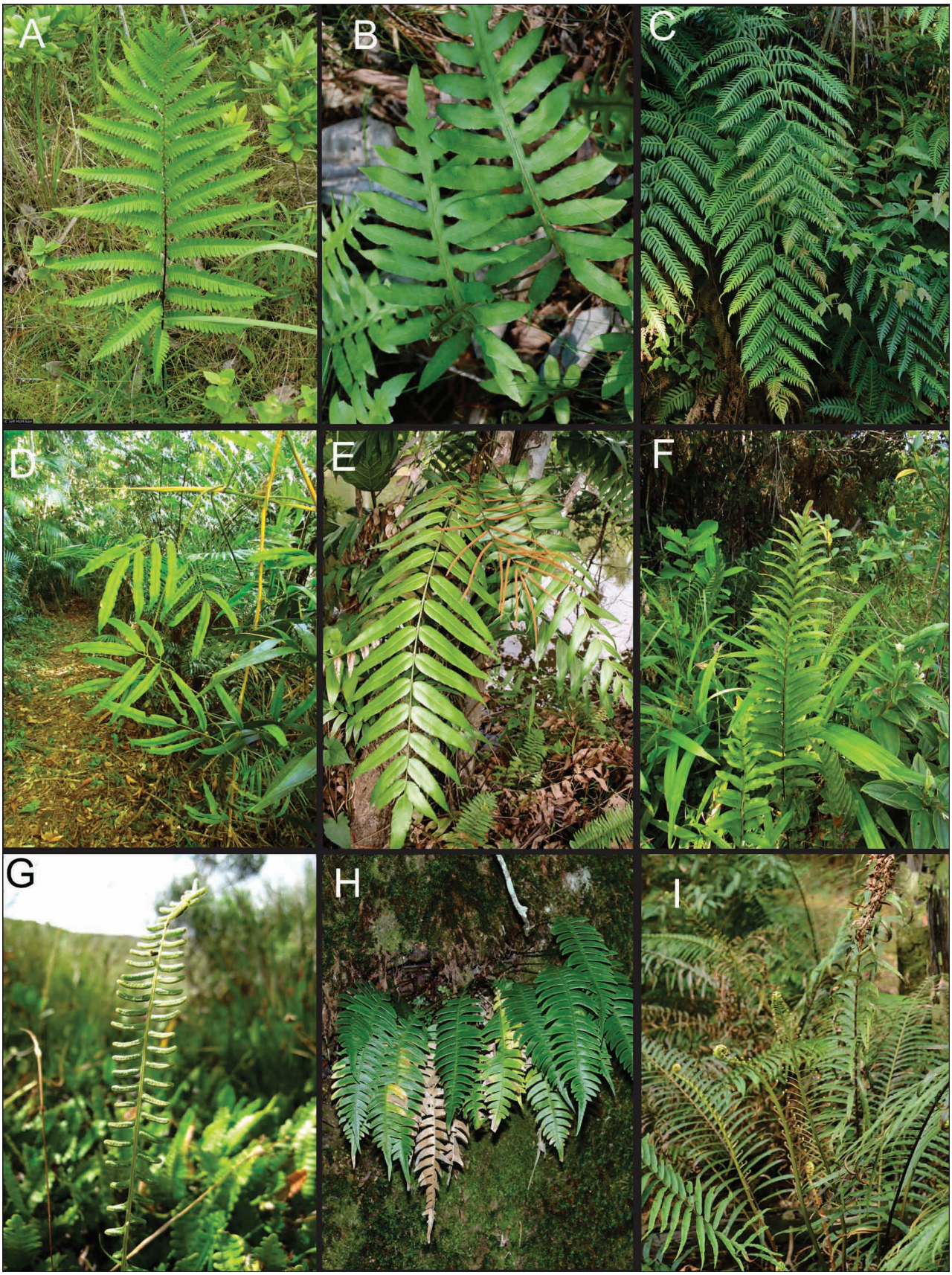

FIGURE 5. Habitat of Blechnaceae genera. **A.** *Anchistea virginica*; **B.** *Lorinseria areolata;* **C.** *Woodwardia unigemmata*; **D.** *Salpichalena volubilis;* **E.** *Stenochlaena milnei*; **F.** *Telmatoblechnum serrulatum*; **G.** *Austroblechnum penna-marina*; **H.** *Blechnidium melanopus*; **I.** *Blechnopsis orientalis*. Photos from: A. The PLANTS Database, USDA, NRCS. 2016; B. James Van Kley; C. Ralf Knapp; D. Luis Adriano Funez; E. Julie F. Barcelona; F. Luis Adriano Funez; G. Vinícius A.O. Dittrich; H. Ralf Knap; I. Ralf Knap. Reproduced with permission from the authors.

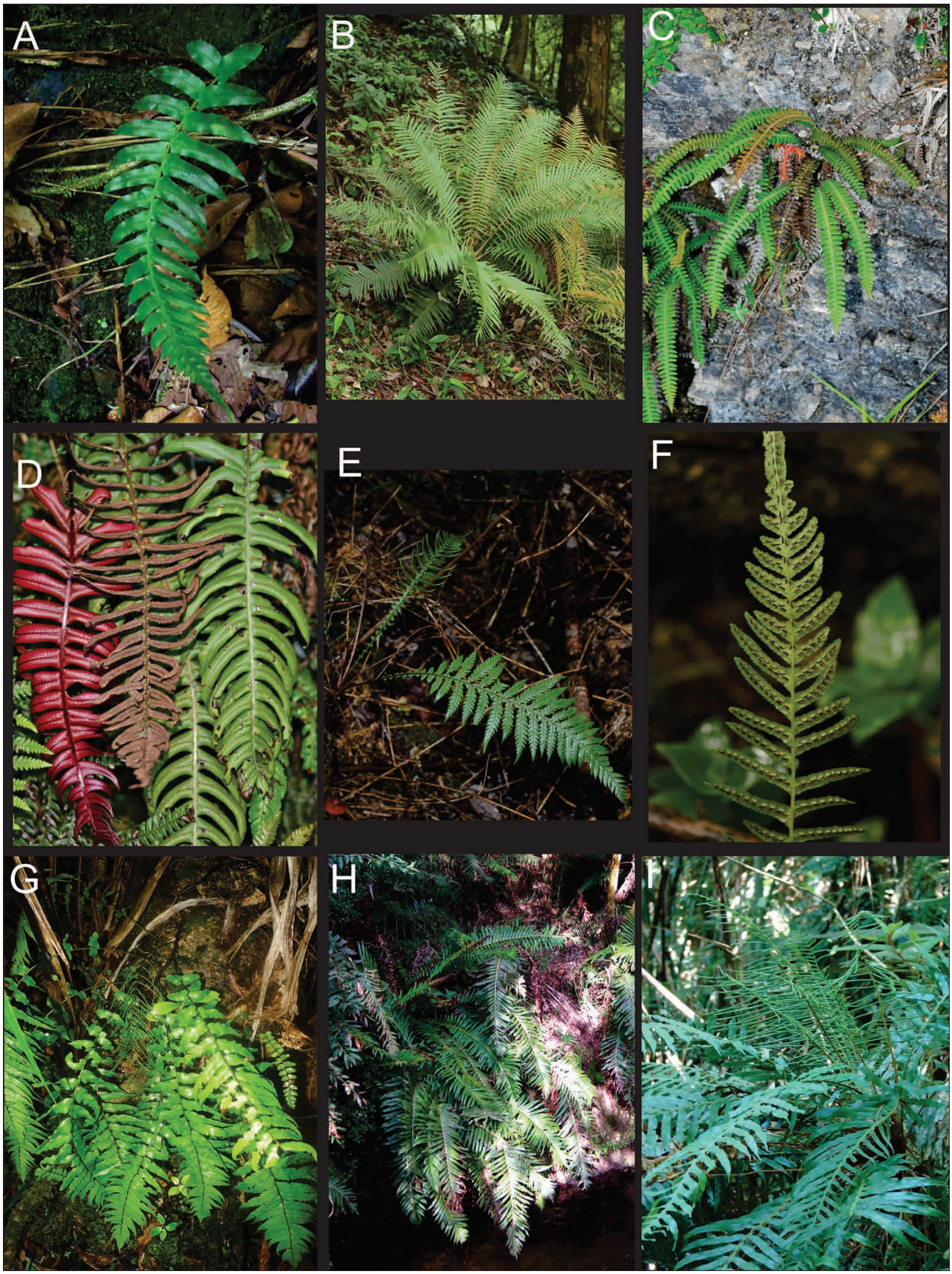

FIGURE 6. Habitat of Blechnaceae genera. **A.** *Blechnum occidentale*; **B.** *Brainea insignis;* **C.** *Cleistoblechnum eburneum*. **D.** *Cranfillia vulcanica*; **E.** *Diploblechnum fraserii;* **F.** *Doodia caudata*; **G.** *Icarus filiformis*; **H.** *Lomaria spannagelii*; **I.** *Lomaridium acutum*. Photos from: A. Luis Adriano Funez; B. Ralf Knapp; C. Ralf Knap; D. Julie F. Barcelona; E. Michael Sundue; F. Paulo Araújo; G. WELT herbarium; H. Vinícius A.O. Dittrich; I. Tiago João Cadorin. Reproduced with permission from the authors.

FIGURE 7. Habitat of Blechnaceae genera. **A.** *Lomariocycas schomburkii*. **B.** *Neoblechnum brasiliense;* **C.** *Oceaniopteris gibba*; **D.** *Parablechnum glaziovii*; **E.** *Sadleria cyatheoides;* **F.** *Struthiopteris spicant*; **F.** Photos from: A–B. Luis Adriano Funez; C. Vojtěch Zavadil; D. Vinícius A.O. Dittrich; E. Kit Herring; F. Ralf Knapp. Reproduced with permission from the authors.

Sadleria Kaulf., Enum. Filic. 161. 1824.—Type: *Sadleria cyatheoides* Kaulf., Enum. Filic. 161. 1824. Figs. 4H, 7E.

Plants terrestrial, epipetric in *Sadleria squarrosa*; *rhizomes* erect, subarborescent, non-stoloniferous, stout, bearing brown, linear-acuminate or lanceolate scales, these entire or minutely toothed or ciliolate at the margins; *fronds* monomorphic; *stipes* stout, long, stramineous or darkened, with filiform brown scales proximally, glabrous or glabrescent distally; *blades* concolorous, lanceolate to elliptic, pinnate-pinnatifid or bipinnate, apices pinnatifid; *rachises* scaly, sometimes with glandular hairs, glabrous or glabrescent; *buds* absent; *aerophores* absent; *pinnae* sessile or short-stipitate, with segments falcate to obtuse, subentire to crenate; *veins* furcate near the costa, uniting to form a pericostal arch, ending in hydathodes; *sori* linear, continuous over vein arches, indusia continuous or not, sometimes glandular; $x = 33$.

Species number, comments, and distribution:—About six species, endemic to Hawaii. The trunk-like rhizomes, pinnate-pinnatifid or bipinnate blades, and brown, linear-acuminate or lanceolate rhizome scales are typically present in species of this genus. It is closely related to *Cleistoblechnum* and *Blechnopsis* (Gasper *et al.* in press).

1. ***Sadleria cyatheoides*** Kaulf., Enum. Filic. 162. 1824.
2. ***Sadleria pallida*** Hook. & Arn., Bot. Beech. Voy. 75, 171. 1832.

3. ***Sadleria souleyetiana*** (Gaudich.) T.Moore, Index Fil. 26. 1857.—*Blechnum souleyetianum* Gaudich., Voy. Bonite Bot. 134, t. 2, fig. 7–8. 1846.
4. ***Sadleria squarrosa*** (Gaudich.) T.Moore, Index Fil. 26. 1857.—*Blechnum squarrosum* Gaudich., Voy. Bonite Bot. 42, t. 2, fig. 1–6. 1854.
5. ***Sadleria unisora*** (Baker) W.J.Rob., Bull. Torrey Bot. Club 40: 227. 1913.—*Polypodium unisorum* Baker, in Hooker & Baker, Synops. Fil. 307. 1867.
6. ***Sadleria wagneriana*** D.D.Palmer & Flynn, Pacific Sci. 51: 302. 1997.

Struthiopteris Scop., Meth. Pl. 25. 1754.—*Spicanta* C.Presl 114. 1851, nom. superfl.—Type: *Struthiopteris spicant* (L.) F.W.Weiss., Pl. Crypt. Fl. Gott. 287. 1770. Figs. 4I, 7F.

Homophyllum Merino, Ann. Soc. Hist. Nat. 1898: 108.—Type: *Homophyllum blechniforme* Merino [=*Blechnum spicant* (L.) Roth] = *Struthiopteris spicant* (L.) F.W. Weiss.

Spicantopsis Nakai, Bot. Mag. (Tokyo) 47: 180. 1933.—Type: *Spicantopsis niponica* (Kunze) Nakai, based on *Lomaria niponica* Kunze [= *Blechnum niponicum* (Kunze) Makino]

Plants terrestrial; *rhizomes* short-creeping or elongate, non-stoloniferous, stout, clothed with brown to dark brown, linear, lanceolate, or ovate-lanceolate, entire or sparingly toothed scales; *fronds* dimorphic or subdimorphic (*S. amabilis*); *stipes* slender, short, stramineous or dark purplish, scaly proximally, glabrous distally; *blades* concolorous, oblanceolate or lanceolate, pinnate to pinnatifid, very gradually reduced proximally to auricles, apices pinnatifid; *rachises* with a few filiform scales or glabrous; *buds* absent; *aerophores* absent; *pinnae* adnate, oblong-linear to linear-falcate, margins entire; *veins* free, inconspicuous, furcate, ending in submarginal hydathodes adaxially; *sori* linear, on both sides of costae, indusia linear, continuous or not, entire, usually enveloping sporangia at maturity; $x = 31, 34$.

Species number, comments, and distribution:—Five temperate species, mostly from China and Japan, with *Struthiopteris spicant* having a circumboreal distribution. Characterized by the subdimorphic to dimorphic fronds, adnate pinnae, free veins, and veins ending in submarginal hydathodes. *Struthiopteris* resembles *Austroblechnum*, but they can be distinguished by the distribution, north-temperate for *Struthiopteris* and predominantly austral for *Austroblechnum*. Pinna margins—entire in *Struthiopteris* and crenate to serrate in *Austroblechnum*—also differ. *Struthiopteris* is closely related to *Blechnidium* and *Brainea* (Gasper *et al.* in press).

1. ***Struthiopteris amabilis*** (Makino) Ching, Sunyatsenia 5: 243. 1940.—*Blechnum amabile* Makino, Bot. Mag. (Tokyo) 11: 83. 1897.
2. ***Struthiopteris castanea*** (Makino & Nemoto) Nakai, Bot. Mag. (Tokyo) 47. 186. 1933.—*Lomaria castanea* Makino, Bot. Mag. (Tokyo) 6(60): 45. 1892, nom. nud.—*Blechnum castaneum* Makino & Nemoto, Fl. Japan 1591. 1925.
3. ***Struthiopteris hancockii*** (Hance) Tagawa, Acta Phytotax. Geobot. 14: 192. 1952.—*Blechnum hancockii* Hance, J. Bot. 21: 267. 1883.
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