

---

## TAXONOMIC AND NOMENCLATURAL NOTES ON PHILIPPINE FERNS II: THREE NEW NAMES IN *ASPLENIUM*

E. SALGADO

The new names *Asplenium luzonicum* and *A. perplexum* are published to replace the homonyms *A. cristatum* Brack. and *A. riparium* Brack.; their nomenclatural history is reviewed and data are provided to support their retention as separate species. The legitimate name *A. baileyana* should be used instead of the homonym *A. gracile* Fée.

*Keywords.* *Asplenium baileyana*, *A. cristatum*, *A. gracile*, *A. luzonicum*, *A. perplexum*, *A. riparium*, Malesia.

### INTRODUCTION

The genus *Asplenium* is represented in the Philippines by at least 43 species (Salgado, 1990). While revising the genus in this area it became obvious that some species are in fact aggregates or complexes, others have invalid names, and a few have been erroneously reduced to synonymy. *Asplenium laserpitiiifolium*, *A. affine* and *A. spathulinum* are names traditionally used in the Philippines and other parts of Asia to designate these complexes (Tardieu-Blot & Ching, 1936; Holttum, 1955; Copeland, 1960; Sledge, 1962; Iwatsuki, 1975), and they are difficult to understand due to variability, which may be caused by hybridization and polyploidy (Sledge, 1962). Tardieu-Blot & Ching (1936) in Indochina and Sledge (1962, 1965) in Ceylon (Sri Lanka) have attempted to solve the intricate taxonomy of *A. laserpitiiifolium* and *A. affine*. This paper clarifies the nomenclature and establishes the true identity of *Asplenium cristatum* Brack., *A. riparium* Brack., and *A. gracile* Fée, that, in my opinion, were misinterpreted by J. Smith (1841), Christensen (1905), and Copeland (1960), respectively. It is not the purpose of this study to understand these species complexes completely, but rather to clarify the status of two Philippine species that have erroneously been lumped under those names. I will refer here to these complexes in a broad sense, merely to point out their differences from the species in question.

#### ***Asplenium luzonicum* Salgado, nom. nov.**

*Asplenium cristatum* Brack., U.S. Expl. Exp. 16: 163, pl. 21 (1854), *nom. illeg.*, non Lamarck (1786), *nec* Mettenius (1883). Type: Philippines, Luzon, mountains near Los Baños (Mt. Makiling), 1842, *Wilkes Exped.* 38 (holo. US!).

*Specimens examined.* LUZON. **Bataan Province.** Mt. Mariveles, 19–27 v 1904, *L. Topping* 371 and 382 (US); Mt. Mariveles, Lamao River, v 1904, *H.N. Whitford* 176 (US). **Batangas Province.** Without locality, vii–viii 1914, *M. Ramos* BS 22362 (US). **Laguna Province.** Mt. Makiling, Los Baños, vi–vii 1917, *A.D.E. Elmer* 17991 (US); Banks of the Molawin River, 300ft, 14 ix 1963, *W.L. Stern* 2070 (L, US); Jamelo Cove, vii 1908, *P. Bartsch* 537 (US).

*Distribution.* Philippines: central Luzon, provinces of Bataan, Batangas and Laguna. Endemic.

Scientists of the U.S. South Pacific Exploring Expedition under the command of Captain Charles Wilkes collected the type of *Asplenium cristatum* on or near Mount Makiling, Province of Laguna, Luzon, between 1838 and 1842 (Brackenridge, 1854). Lamarck (1786) had already used the epithet ‘*cristatum*’ for a species found in tropical America. *Asplenium luzonicum* is chosen here as the new name for the later homonym *Asplenium cristatum* Brack. *Asplenium luzonicum* is an endemic Philippine plant found on Mt. Makiling and Mt. Mariveles in central Luzon. The new name, *A. luzonicum*, is mostly used in the following paragraphs in place of the invalid name *A. cristatum*.

Mettenius (1859) listed *A. cristatum* Brack. as a synonym of *A. laserpitiifolium* Lam., though Christensen (1905) later reduced it to a synonym of *A. cuneatum* Lam. Copeland (1960), probably following Christensen, did not recognize it in his *Fern Flora of the Philippines*, but stated ‘*A. cristatum* Brack., . . . from Luzon: Makiling has been reduced to *A. cuneatum*. The name is invalid’. M.G. Price (1973) expressed doubts that the name *A. cuneatum* should be applied to this species. *Asplenium cuneatum* can be readily distinguished from *A. luzonicum* (*A. cristatum* Brack.) by the details of rhizome scales and sori. The former has black, clathrate scales and four or five pinnately arranged sori on each side of the costa; the latter has brown scales which are not clathrate and two sori proximal to the base of the pinna or pinnule. The types of *A. luzonicum* and *A. cuneatum* clearly show the difference in the position of the sori. *Asplenium cuneatum* is a New World species originally described by Lamarck in 1786. The holotype is at the Herbarium Jussieu in Paris. The collector and locality of the type are unknown (Proctor, 1985) but it is presumed to be from Jamaica (Copeland, 1960). Philippine plants named *A. cuneatum* are superficially similar, but are actually different from true *A. cuneatum*, which is not found in the Philippines.

The provenance of *Asplenium laserpitiifolium* is not completely clear. The type was collected by Philibert Commerson, a French naturalist and collector who travelled with L.A. de Bougainville on part of his trip around the world (1766–69). Commerson’s itinerary included La Plata (Argentina), Tahiti, Melanesia, the Moluccas, Java, and Mauritius, where he stayed behind in 1768 (Staffeu & Cowan, 1976). Lamarck (1786) stated that *A. laserpitiifolium* came from Port Praslin in New Britain, but there is no such location on that island as far as I can ascertain. Kaulfuss (1824), in his commentary on the plants collected by Chamisso, mentions the origin of Lamarck’s *A. laserpitiifolium* to be ‘in Nova Britannia’. There is a handwritten note by C.V. Morton on a picture of Lamarck’s type, deposited at US,

saying that the type locality is New Ireland, an island adjacent to New Britain in the Bismarck Archipelago north of New Guinea. To complicate matters further, there is a note added to one of the type sheets saying 'du Bresil' (from Brazil). This is an error because Commerson did not collect in Brazil and this fern does not occur in the New World. Tardieu-Blot & Ching (1936), possibly following Hooker (1860), concluded that the type must have come from the Seychelles, where there is an island called Praslin. From Mauritius, Commerson made trips to Reunion and Madagascar, but to my knowledge there is no record of his visiting the Seychelles. He might have done so, however, because these islands were a French possession until 1794, when they became a British territory. The difficulty with Praslin in the Seychelles being the type locality arises from the lack of other reports of *A. laserpitiifolium* from these islands (Baker, 1875, 1877; Cordemoy, 1895; Christensen, 1912). I believe that Lamarck and Morton are correct in saying that the type of *A. laserpitiifolium* was collected in the Bismarck Archipelago, north of New Guinea.

From the time of Blume (1828) *A. laserpitiifolium* has presented difficulties to taxonomists (Tardieu-Blot & Ching, 1936). The name has been used in a broad sense (Copeland, 1960; Sledge, 1965) to include a number of closely related South Asian, Indochinese, and Malesian ferns. The species in this group are very variable and difficult to define. Tardieu-Blot & Ching (1936) attempted to distinguish the Indochinese members of this group after studying the plants identified as *A. laserpitiifolium* deposited in Paris, but none of these plants agreed with the type. They are of the opinion that true *A. laserpitiifolium* is not found in India, China, or Indochina, and that none of the Malesian species agree with the type either. Holttum (1955) did not find true *A. laserpitiifolium* in Malaysia. In the Philippines, the name *A. laserpitiifolium* has been used to lump together plants that are difficult to distinguish by stable characters. Botanists have usually identified herbarium specimens of *A. luzonicum* as *A. laserpitiifolium*. Exhaustive examination of specimens from different parts of Asia identified as *A. laserpitiifolium* and deposited in BM, K, L, NY, P, PRC, and US has not yielded any representatives of *A. luzonicum* outside central Luzon. I have seen the type of *A. laserpitiifolium* in Paris and it is very different from the type of *A. luzonicum*. *Asplenium luzonicum* can be distinguished from *A. laserpitiifolium* by details of the pinnae and pinnules and by soral position (Fig. 1A,B).

*Key to Asplenium cuneatum, A. laserpitiifolium, and A. luzonicum*

- 1a. Rhizome scales black, clathrate \_\_\_\_\_ **A. cuneatum**  
 1b. Rhizome scales reddish brown, not clathrate \_\_\_\_\_ 2
- 2a. Lamina 2- or 3-pinnate; pinnae contracting rather abruptly to a serrate apex; pinnulets evenly cuneate with straight sides, broadly obtriangular, truncate, their apical margin deeply dentate with narrow teeth 0.5–2mm long; larger pinnules with 1 or 2 deep incisions; sori usually 1–6 per pinnule, 2–5mm long, 1 or 2 being proximal or wedged near pinnule base on each side of costa (Fig. 1A,B) \_\_\_\_\_ **A. luzonicum**

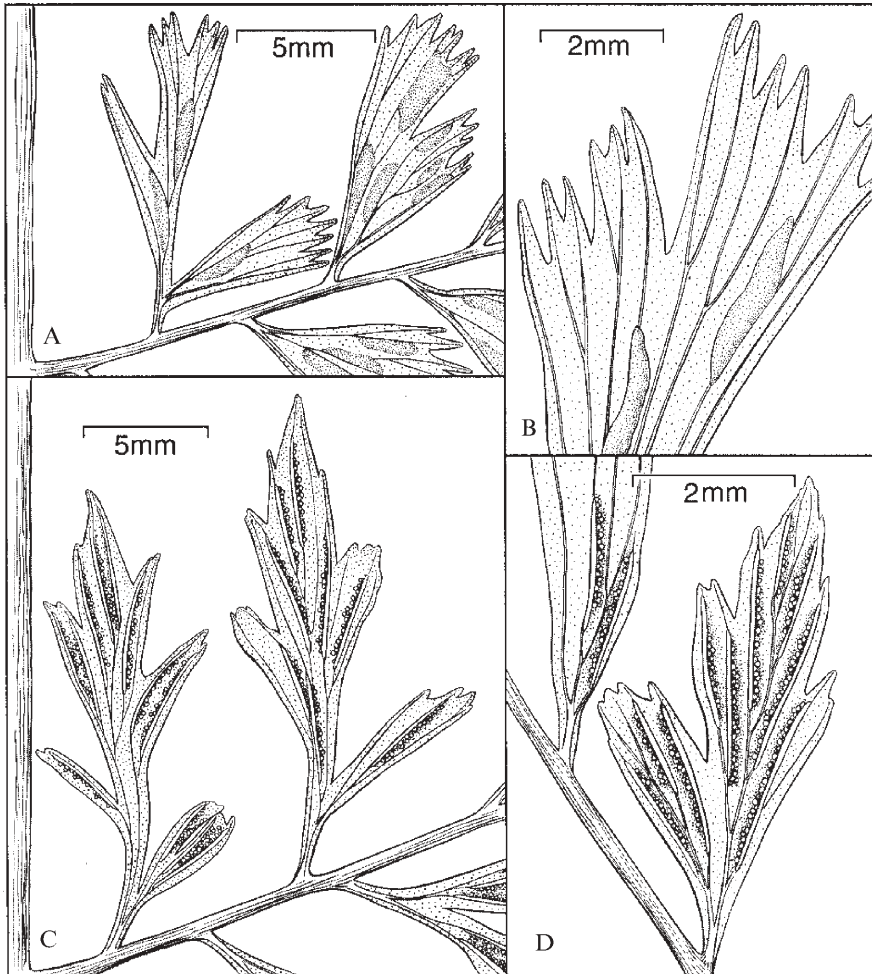


FIG. 1. A & B, *Asplenium luzonicum*: abaxial side of pinnules (holotype, *Wilkes Exp.* 38); C & D, *Asplenium perplexum*: abaxial side of pinnules (holotype, *Wilkes Exp.* 37).

- 2b. Lamina 3-pinnate; pinnae contracting gradually towards the apex; pinnulets unevenly cuneate with one or both sides curving, usually oblong with the pinnule apex rounded; apical margin crenate or serrate; larger pinnules with 1 or 2 incisions; sori 3–5 per pinnule, 2–6mm long, distal, alternating on each side of costa \_\_\_\_\_ **A. laserpitiifolium**

***Asplenium perplexum* Salgado, nom. nov.**

*Asplenium riparium* Brack., U.S. Expl. Exped. 16: 162 (1854), *nom. illeg.*, *non* Liebmann (1849). Type: Philippines, Luzon, Laguna Province, mountain near Los Baños (Mt. Makiling), 1842, *Wilkes Exped.* 37 (holo. US!).

*Distribution.* Philippines: Luzon. Known only from the type collection.

Brackenridge (1854) was unaware that a Mexican fern published by F. Liebmann (1849) already occupied the epithet '*riparium*'. Christensen (1905) considered Liebmann's plant to be part of *A. obtusifolium* L., but Murakami & Moran (1993) consider them to be distinct. Because the name given by Brackenridge (1854) is invalid, *Asplenium perplexum* is chosen here as the new name for this species. In subsequent paragraphs I will mostly use the new name *A. perplexum* in place of the invalid *A. riparium* Brack.

Mettenius (1859) reduced *A. riparium* Brack. to a synonym of the South African *A. furcatum* Thunb., which in turn was reduced to *A. praemorsum* Swartz by Christensen (1905). *Asplenium furcatum* and *A. praemorsum* have been considered to be the same as *A. aethiopicum* (Burm.f.) Bech. (Tardieu-Blot, 1953; Schelpe & Anthony, 1986; Burrows, 1990). I consider *A. riparium* Brack. to be an entirely different plant, not related to *A. furcatum*. On the other hand, Hooker (1860), Christensen (1905), and Copeland (1960) listed *A. riparium* Brack. as a synonym of *A. laserpitiifolium*. *Asplenium perplexum* (*A. riparium* Brack.) differs from *A. laserpitiifolium* and *A. luzonicum* in the texture of the pinnules and indusium, the rachis and costa scales, and the shape of the pinnule apex. *Asplenium perplexum* has short, black, triangular scales on the rachis and costa, with one or two marginal hairs near the base; the costa scales are the same shape as those on the rachis but are smaller, and the pinnules are coriaceous with a dentate margin (Fig. 1C,D); the indusium is coriaceous. The lamina texture of *A. laserpitiifolium* and *A. luzonicum* is papyraceous. They have reduced, biseriate scales on the rachis and costae that look like long, thick, curving hairs, and the scale cells are very elongated and narrow. The pinnule apex of *A. luzonicum* is truncate, the margin is deeply dentate with long narrow teeth 0.5–2mm long (Fig. 1B). *Asplenium laserpitiifolium* has the pinnule apex rounded or pointed and shallowly dentate; its indusia are papyraceous.

Price (1973), using Brackenridge's description, interpreted *A. perplexum* (*A. riparium* Brack.) to be a form of *A. affine* Swartz, an extremely variable species capable of dramatic changes in frond morphology in response to age and environmental changes, according to Sledge (1962), who refers to 8-ploid and 12-ploid forms found in Sri Lanka without mentioning the source of this information. This variability led Hooker (1860) to describe *A. spathulinum* as distinct from *A. affine* based on the shape of the pinnules. Herbarium specimens show that forms intermediate between *A. affine* and *A. spathulinum* exist in different parts of Asia. Sledge (1962) concluded that *A. affine* is an aggregate and not just a single species. He considered the large form called *A. spathulinum* to be in *A. affine* and named it *A. affine* f. *major* Sledge. The pinnule shape of *A. perplexum* (Fig. 1C,D) is close to that of *A. affine* f. *major*. The thick texture of the lamina and indusium of *A. perplexum*, the pinnule shape and marginal teeth, and the shape of the scales are different from the Philippine *A. affine* but close to some specimens of *A. affine* f. *major*. The pinnules of *A. affine* f. *major* are wider, less deeply cut, with oblique teeth

along the margin; *A. perplexum* has narrower pinnules, with more deeply incised teeth at the apex of the lobes; the margin is otherwise entire (Fig. 1C). The fact that *A. perplexum* is known only from a single collection from Mt. Makiling, a mountain that has been very well studied by M.G. Price and other collectors in the 20th century, is surprising for an established species. Although *Wilkes Exped. 37* could represent a genetic oddity in the variable *A. affine*, I conclude that the two are different and that the characters presented in the following key can distinguish them.

*Key to Asplenium affine, A. affine f. major, A. laserpitiifolium, and A. perplexum*

- 1a. Rachis scales reduced to long, curving hairs \_\_\_\_\_ **A. laserpitiifolium**  
 1b. Rachis scales wide, not reduced to long, curving hairs \_\_\_\_\_ 2
- 2a. Fronds papyraceous; pinnules closely spaced along costae, occasionally imbricate, shallowly lobed, basal acroscopic lobe sometimes broadly adnate, margins shallowly serrate or crenate, pinnule apex rounded, toothed \_\_\_\_\_ **A. affine**  
 2b. Fronds coriaceous or papyraceous; pinnules widely spaced along costae, with 1–4 deep incisions, basal acroscopic lobe adnate, margin entire, lobe apices with a few acute teeth, pinnule apex acute \_\_\_\_\_ 3
- 3a. Rachis and pinna scales small, black, with 2 marginal hairs near base; terminal segment 1mm wide; pinnules of median pinnae 0.5cm wide, unevenly cuneate, with 3 or 4 incisions, margins entire except near apex, where irregularly acute-dentate \_\_\_\_\_ **A. perplexum**  
 3b. Rachis and pinna scales long, reddish brown, with 2–4 hairs along margin; terminal segment 3–4mm wide; pinnules of median pinnae 0.7–1.4cm wide, evenly cuneate, with 1 or 2 incisions, margins shallowly oblique-dentate \_\_\_\_\_ **A. affine f. major**

**Asplenium baileyianum** (Domin) Watts, Proc. Linn. Soc. New South Wales 39: 783 (1915). Type: Mt. Bellenden-Ker, Queensland, vi–viii 1889, *F.M. Bailey* s.n. (BRI n.v., NSW).

*Asplenium gracile* Fée, Gen. Fil. Mém. Foug. 5: 198 (1852), *nom. illeg.*; *non* D. Don (1825), *nec* Pappe & Rawson (1858), *nec* Fournier (1872); Copeland, Fern Fl. Phil. III: 439 (1960). Type: Philippines, Luzon, 1841, *Cuming* 54 (iso. BM!, K!, P!, PRC!, US!).

*Specimens examined.* AUSTRALIA. **Queensland.** Massed on sunny rocks edging a waterfall in rainforest, Mt. Bellenden-Ker, east slopes, 250m, 3 iv 1948, *L.J. Brass* 18271 (K); On rocky stream bank in rain forest, local, Mossman Gorge, North Queensland, 30 xii 1971, *J.P. Croxall & B.S. Parris* 3656 (K); Growing on rocks, in heavy shade along creek, State Forest Reserve 557, Davies L. A., 740m, 28 ii 1980, *B. Gray* 1656 (L); Fern growing on large granite boulders in very moist gully, rainforest, State Forest Reserve 756, Kaaru L. A., 480m, 27 ix 1981, *B. Gray* 2118 (L); Queensland, *Bailey* s.n. (K).

PAPUA NEW GUINEA. **Bougainville District.** Stone, forest floor, Pavairi, Bougainville district, 2000ft, 18 i 1967, *C. Ridsdale & P. Lavarack* NGF 30636 (L).

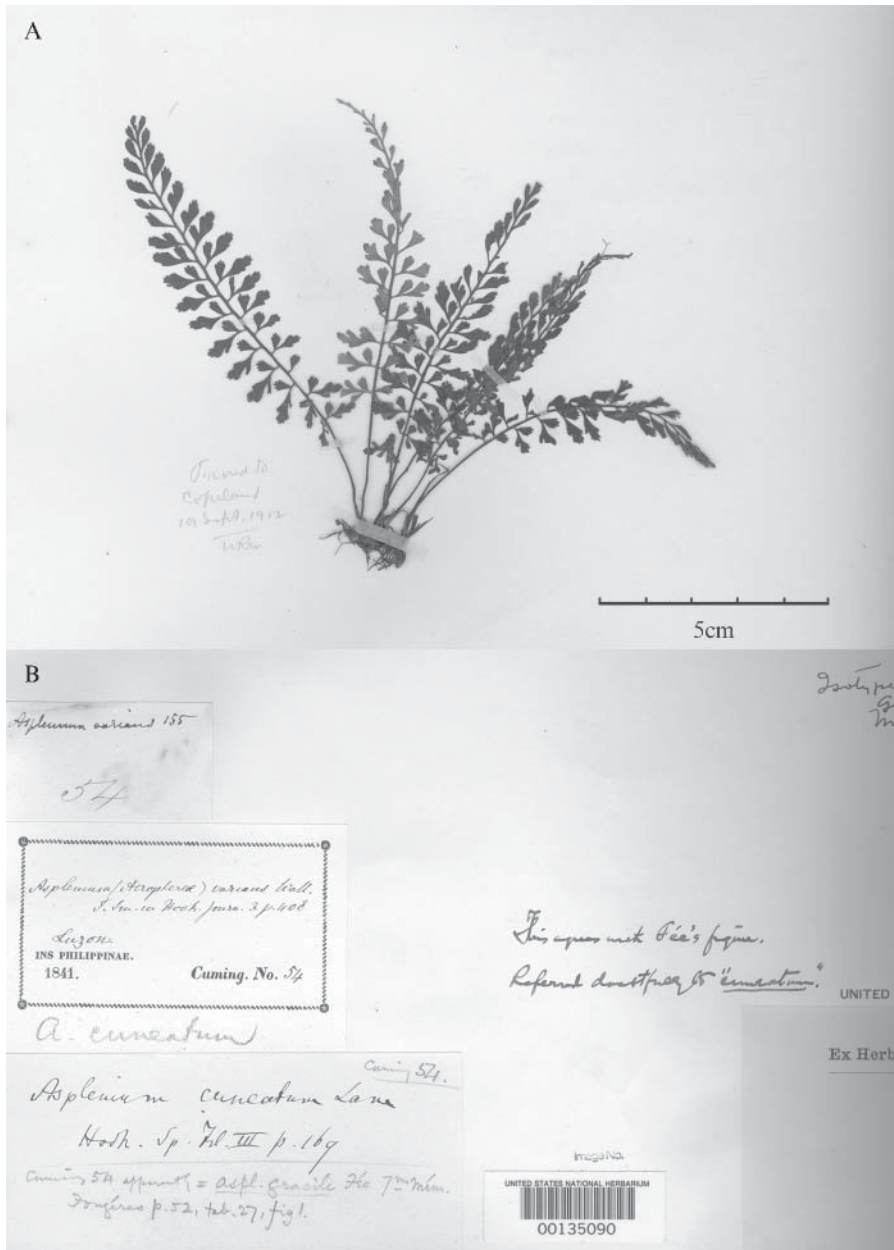


FIG. 2. *Asplenium gracile* Fée (isotype, Cuming 54): A, specimen; B, label with annotations.

THAILAND. **Pak Thong Chai District.** Dry evergreen forest, on moist stones in stream, along Huai Krae stream, Pak Thong Chai, Sakaerat Forest Reserve, 400m, 30 x 1969, C.F. van Beusekiom & C. Charoenpol 1910 (K).

*Distribution.* Thailand, Philippines, Papua New Guinea, Australia.

*Asplenium gracile* Fée was based on several small plants collected by Cuming during his visit to the Philippines in the years 1836 to 1840 (Fig. 2). The name is invalid because D. Don (1825) had already used the epithet for a species from Nepal. The epithet 'gracile' was used again for an African fern (Pappe & Rawson, 1858) and for a Mexican fern (Fournier, 1872). Several years after publishing the original description, Fée (1857) maintained *A. gracile* as a separate species, although he expressed doubts about its distinctness by suggesting that it might be a small plant of some more common, larger form.

In my opinion *A. gracile* Fée is the same as the Australian *A. baileyana* (Domin) Watts, being similar in details of rhizome, frond, pinnae, scales, prolific rachis, and sorus. The name *Asplenium baileyana* should be used for the Philippine and Australian plants.

*Cuming 54* has received several different names since Smith (1841) wrongly called it *A. varians* Wall. ex Hook. & Grev., when he published the list of ferns collected by Cuming in the Philippines and Peninsular Malaysia. *Asplenium varians* is a small fern from Nepal described and illustrated by Hooker & Greville (1831, pl. 172), with a wide distribution ranging from South Africa, Nepal, India, Sri Lanka, China, and Japan to Hawaii, but absent from the Philippines. It has non-proliferous rachises with uniseriate hairs and long filiform scales, pinnae with a few deep incisions (their margins bearing long, acute teeth, some becoming awl-shaped when dry), and short, wide sori occupying most of the lamina surface. *Asplenium baileyana* lacks uniseriate hairs on the proliferous rachises, the scales are triangular and somewhat elongate, the pinnae are not deeply incised but have short acute teeth, and the sori are narrowly linear and do not cover the abaxial surface.

Mettenius (1859) considered *A. gracile* Fée a young plant near *A. cuneatum* Lam. and included it among its synonyms. Christensen (1905) listed *A. gracile* as a doubtful synonym of *A. cuneatum*. However, the characters in the key below distinguish the two species. *Asplenium cuneatum* is an American fern not found in Asia.

Copeland (1960) listed *A. gracile* as a synonym of *A. planicaule* Wall. ex Mett., a later homonym of *A. planicaule* E.J.Lowe (1858, t. 10). Wallich (1828–29) applied the number 189 to several collections of *A. planicaule* from the Himalayan region: from Nepal (Wallich) and from Srinagar, India (C. Moorecroft). Mettenius (1859) published Wallich's species, based on *Wallich 189*, from Nepal. Several sheets are present in Berlin labelled 'Typus'. Morton (1973) designated one of these specimens as the lectotype of *A. planicaule* Wall. ex Mett. All other *Wallich 189* specimens from Nepal are *A. planicaule* and become isolectotypes by inference because they all have the same number and origin. Sledge (1965) renamed Mettenius' species *A. indicum* Sledge and mentioned that the Japanese plants were a variety of this species. Sledge, however, was unaware that Makino (1900, pl. 64) had already named the species *A. yoshinagae* based on the Japanese plants and that the name had been reduced by Tagawa (1951) to *A. planicaule* var. *yoshinagae*. Tagawa (1951) also described *A. planicaule* var. *planicaule* based on *Wallich 189* and applied this name to the



non-proliferous Himalayan plants. Christensen (1934) united *A. yoshinagae* with *A. planicaule* and subsequently Morton (1973) selected *Wallich* 189 (B) as the lectotype of the variety *A. yoshinagae* var. *planicaule* Morton, for complex nomenclatural reasons. This is the name accepted here. The isolectotypes of *A. yoshinagae* var. *planicaule* (*Wallich* 189, NY!, US!) and the isotypes of *A. gracile* (*Cuming* 54, BM!, K!, P!, PRC!, US!) clearly represent different species that can be distinguished by the characters presented in the following key.

*Key to Asplenium baileyanaum, A. cuneatum, A. varians, and A. yoshinagae* var. *planicaule*

- 1a. Fronds pinnate; costa and secondary veins fringed adaxially with prominent ridges \_\_\_\_\_ **A. yoshinagae** var. **planicaule**
- 1b. Fronds 2- or 3-pinnate; costa and secondary veins without ridges \_\_\_\_\_ 2
- 2a. Stipe and rachis with brown, uniseriate hairs \_\_\_\_\_ **A. varians**
- 2b. Stipe and rachis glabrescent or scaly, without uniseriate hairs \_\_\_\_\_ 3
- 3a. Rachis scales hairlike, long, twisted, brown; lamina sometimes with small reduced scales; subapical rachis bud absent \_\_\_\_\_ **A. cuneatum**
- 3b. Rachis scales broad, short, straight, black, with flagellate apex; lamina surface naked; rachis usually proliferous \_\_\_\_\_ **A. baileyanaum**

#### REFERENCES

- BAKER, J. G. (1875). On the Seychelles Fern Flora. *Trans. Roy. Irish Acad.* 25: 509–518.
- BAKER, J. G. (1877). *Flora of Mauritius and the Seychelles*. London: L. Reeve & Co.
- BLUME, C. L. (1828). *Enumeratio Plantarum Javae et insularum adjacentium*. Leiden: J. W. Van Leeuwen.
- BRACKENRIDGE, W. D. (1854). *United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N. Botany. Cryptogamia. Filices, including Lycopodiaceae and Hydropterides VII, 1–357, Atlas t. 1–46*. Philadelphia: C. Sherman.
- BURROWS, J. E. (1990). *Southern African Ferns and Fern Allies*. Frandsen Publishers: Fourways, Natal, South Africa.
- CHRISTENSEN, C. (1905–06). *Index Filicum*. Hafniae (Kobenhavn): H. Hagerup.
- CHRISTENSEN, C. (1912). On the ferns of the Seychelles and Aldabra group. *Trans. Linn. Soc. London* 15: 407–422.
- CHRISTENSEN, C. (1934). *Index Filicum. Supplementum Tertium pro Annis 1917–1933*. Hafniae (Kobenhavn): H. Hagerup.
- COPELAND, E. B. (1960). *Fern Flora of the Philippines*, vol. III. Manila: Nat. Inst. Sci. Tech., Bureau of Printing.
- CORDEMOY, E. J. DE (1895). *Flore de l'Ile de la Réunion*. Paris: Paul Klincksieck.
- DON, D. (1825). *Prodromus Florae Nepalensis*. London: J. Gale.
- FÉE, A. L. A. (1857). *Iconographie des Espèces Nouvelles. Mémoires sur la Famille des Fougères. Septième Mémoire*. Paris & Strasbourg: Berger-Levrault et Fils.

- FOURNIER, E. (1872). *Mexicanas Plantas nuper a collectoribus expeditionis scientificae allatas aut longis ab annis in herbario Musei Parisienis depositas preside J. Descaines, enumerandas curavit E. Fournier. Pars Prima: Cryptogamia*. Parisiis: Typographeo Republicae.
- HOLTUM, R. E. (1955). *Flora of Malaya*, vol. II. *Ferns of Malaya*. Singapore: Government Printing Office.
- HOOKER, W. J. (1860). *Species Filicum*, vol. 3. London: W. Pamplin.
- HOOKER, W. J. & GREVILLE, R. K. (1831). *Icones Filicum*, vol. II, pls. 121–240. London: Treutel & Wurtz, Treutel fils & Richter.
- IWATSUKI, K. (1975). Taxonomic studies of Pteridophyta. X. *Acta Phytotax. Geobot.* 27: 39–54.
- KAULFUSS, G. F. (1824). *Enumeratio Filicum*. Lipsiae: C. Cnobloch.
- LAMARCK, J. B. DE (1786). *Encyclopédie Méthodique. Botanique*, vol. 2. Paris: Panckoucke.
- LIEBMANN, F. M. (1849). Mexico's Bregner, en systematisk, kritisk, plantengeografisk undersogelse af F. Liebmann. *Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Afd.* 1: 153–322; 353–362.
- LOWE, E. J. (1858). *Ferns British and exotic*, vol. 2. London: Groombridge & Sons.
- MAKINO, T. (1900). *Phanerogamae et Pteridophyta Japoniae iconibus illustratae, or, figures with brief descriptions and remarks of the flowering plants and ferns of Japan*, vol. 2. Tokyo: Keigyosha & Co.
- METTENIUS, G. H. (1859). Ueber einige Farngattungen, vol. 3. *Abh. Senckenberg. Naturf. Gesellsch.* 3: 100–254.
- METTENIUS, G. H. (1883). In: SALOMON, C., *Nomenclator der Gefasskryptogamen*. Leipzig: Hugo Voigt.
- MORTON, C. V. (1973). Studies of fern types II. *Contr. U.S. Natl. Herb.* 38: 215–281.
- MURAKAMI, N. & MORAN, R. C. (1993). Monograph of the neotropical species of *Asplenium* sect. *Hymenoasplenium*. *Ann. Missouri Bot. Gard.* 80: 1–38.
- PAPPE, L. & RAWSON, R. W. (1858). *Synopsis Filicum Africae Australis or An enumeration of the South African ferns hitherto known*. Cape Town: W. Brittain.
- PRICE, M. G. (1973). The pteridophytes described from Mount Makiling. *Philipp. Agriculturalist* 57: 37–48.
- PROCTOR, G. R. (1985). *Ferns of Jamaica*. London: British Museum of Natural History.
- SALGADO, A. E. (1990). A checklist of Philippine ferns. *Philipp. J. Sci.* 119: 107–148.
- SHELPE, E. A. C. L. E. & ANTHONY, N. C. (1986). *Flora of Southern Africa* (ed. O. A. LEISTNER). Botanical Research Institute, Department of Agriculture. Pretoria: Government Printer.
- SLEDGE, W. A. (1962). *Asplenium affine* Swartz and *A. spathulinum* J. Sm. ex Hook. *Kew Bull.* 15: 401–410.
- SLEDGE, W. A. (1965). The Ceylon species of *Asplenium*. *Bull. Brit. Mus. Nat. Hist. Bot.* 3: 235–277.
- SMITH, J. (1841). *Enumeratio Filicum Philippinarum; or a Systematic Arrangement of the Ferns collected by H. Cuming, Esq., F.L.S., in the Philippine Islands and the Peninsula of Malacca, between the years 1836 and 1840*. *J. Bot. (Hooker)* 3: 392–422.
- STAFLEU, F. A. & COWAN, R. S. (1976). *Taxonomic Literature*, vol. I, A–G, 2nd edition. The Hague: W. Junk.
- TAGAWA, M. (1951). Occasional notes on Asiatic pteridophytes 2. *Acta Phytotax. Geobot.* 14: 91–95.
- TARDIEU-BLOT, M. L. (1953). *Les Ptéridophytes de l'Afrique Intertropicale Française*. Mémoires de l'Institut Français d'Afrique Noire, No. 28. Ifan-Dakar.

TARDIEU-BLOT, M. L. & CHING, R. C. (1936). Révision des espèces confondues avec l'«*Asplenium laserpitiifolium*» Lam., avec description d'espèces nouvelles asiatiques de ce groupe. *Not. Syst.* 5: 134–154.

WALLICH, N. (1828–29). *A numerical list of dried specimens of plants in the East India Company's Museum, collected under the superintendence of Dr. Wallich of the Company's Botanic Garden at Calcutta.* (1828) No. 1–2160; (1829) No. 2161–2829. Manuscript, pp. 1–306.

*Received 5 January 2003; accepted after minor to moderate revision 10 February 2005*