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Typification and nomenclature of the ferns described in N.L. Burman's *Flora Indica*

Jaideep Mazumdar, Martin W. Callmander & Nicolas Fumeaux

Abstract

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Nicolaas Laurens Burman (1734–1793) treated in his *Flora Indica* 69 pteridophyte names. Most of those names were described earlier by Carl Linnaeus (1707–1778) who was a friend of his father Johannes Burman (1706–1779). The *Flora Indica* (1768) is one of those early works that followed Linnaeus' binomial nomenclature formalized in 1753. N.L. Burman described 25 new ferns in this work. His herbarium is now stored as a separate historical collection at Geneva with the acronym G-PREL. We located all original material in G-PREL, with the goal to review the taxonomic identity and nomenclature of those 25 names. We also studied the Paul Hermann herbarium from Ceylon, bound in a folio volume now kept in the library of the Institut de France in Paris with the acronym BIF-CEYL, which was the main base of Johannes Burman's *Thesaurus Zeylanicus* (1737). Lectotypes are designated for twelve names lacking proper typification: *Adiantum chinense* Burm. f., *Adiantum truncatum* Burm. f., *Ophioglossum pedatum* Burm. f., *Polypodium acutum* Burm. f., *Polypodium adianthoides* Burm. f., *Polypodium palustre* Burm. f., *Polypodium radicans* Burm. f., *Polypodium rostratum* Burm. f., *Polypodium simplex* Burm. f., *Polypodium trapezoides* Burm. f., *Pteris ensiformis* Burm. f., and *Trichomanes tenuifolium* Burm. f.

Keywords

PTERIDOPHYTA – *Flora Indica* – Burman – Pryon – Typification

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Introduction

Nicolaas Laurens Burman (1734–1793), son of Johannes Burman (1706–1779), described in his *Flora Indica* (BURMAN, 1768) about 1305 species excluding the appended *Prodromus florum capensis*, not treated here, of which about 241 were proposed as new (MERRILL, 1921: 330).

N.L. Burman based his *Flora Indica* on the herbarium he shared with his father, now stored as a separate historical collection at Geneva with the acronym G-PREL. G-PREL also includes the herbarium of Martinus Houttuyn (1720–1798). Both herbaria were bought at the same time by Benjamin Delessert (1773–1847) in 1801 (LASÈGUE, 1845; STAPLES & JACQUEMOUD, 2005; WIJNANDS et al., 2017).

BURMAN (1768: 227–238) treated 69 pteridophyte names (incl. 7 names of *Lycopodium* L. treated as “*Musci*”) in his *Flora Indica*. Twenty-five were described as new.

Original material of N.L. Burman referred to his own herbarium (G-PREL) and to illustrations published in various pre-Linnaean works, notably in Leonard Plukenet (1642–1706)'s *Phytographia* (PLUKENET, 1691–1694) and subsequent work (see GUÉDÈS, 1981 for a review of his publications), his father Johannes Burman (1707–1780)'s *Thesaurus Zeylanicus* (BURMAN, 1737), and Georg Eberhard Rumphius (1628–1702)' *Herbarium Amboinese* (RUMPHIUS, 1741–1750). BURMAN (1737)'s father work was mainly based on a Paul Hermann herbarium from Ceylon. This herbarium bound in a folio volume is now kept in the library of the Institut de France in Paris with Benjamin Delessert's personal library (see LOURTEIG, 1966) with the acronym BIF-CEYL.

We have examined all the original material in G-PREL and BIF-CEYL in order to review both the nomenclature and taxonomy of the new ferns described by N.L. Burman in the genera *Acrostichum* L. (1 sp.), *Adiantum* L. (4 spp.), *Asplenium* L. (1 sp.), *Blechnum* L. (1 sp.), *Ophioglossum* L. (2 spp.), *Polypodium* L. (13 spp.), *Pteris* L. (1 sp.), and *Trichomanes* L. (2 spp.). Due to the absence of reproductive structures, BURMAN (1768) mistakenly described four ferns that do represent angiosperms.

Elmer Drew Merrill (1876–1956) was a pioneer in reviewing the names published in the *Flora Indica* (MERRILL, 1921). Even if his interpretations were based only on descriptions (see MERRILL, 1921: 331–332; STEENIS, 1934: 288), he nevertheless reviewed the nomenclature and typification of 20 Burman fern names. We accept four implicit lectotypifications by Merrill. Subsequent pteridophyte treatments by various authors for regions included in the *Flora Indica* (i.e., India, Southeast Asia and the West Indies) were thorough examined. This results in twelve names lacking proper typification for which lectotypes are designated.

Taxonomy and nomenclature

Acrostichum longifolium Burm. f., Fl. Ind.: 228. 1768.

≡ *Pyrrosia longifolia* (Burm. f.) C.V. Morton in J. Wash. Acad. Sci. 36: 168. 1946.

Lectotypus (designated by HOVENKAMP, 1986: 209): **INDONESIA. Java:** s.d., *Pryon* s.n. (G-PREL [G00801094]!).

Notes. – In the protologue, BURMAN (1768: 228) cited a *Pryon* specimen and two illustrations (PETIVER, 1702–1709: tab. 61, fig. 2, 4).

HOVENKAMP (1986: 209) was the first to mention a *Pryon* specimen at G as holotype. This should be considered as an implicit lectotypification, as a single *Pryon* specimen representing original material is present in G-PREL.

An uncited specimen [G00801093] from unknown origin is also extant in G-PREL: it bears a reference to one of Petiver's illustrations (tab. 61, fig. 4. Tab. 61, fig. 2 is mentioned on the *Pryon* specimen), as well as the name of the new species, both in N.L. Burman's handwriting, and thus should be regarded as original material.

Adiantum chinense Burm. f., Fl. Ind.: 236. 1768.

Lectotypus (designated here): **CHINA:** *sine loco*, s.d., *Anon. s.n.* (ex Herb. Petiver) (G-PREL [G00801087]!).

≡ *Odontosoria chinensis* (L.) J. Sm. in Seem., Bot. Voy. Herald 10: 430. 1857. ≡ *Trichomanes chinense* L., Sp. Pl.: 1099. 1753.

Notes. – The protologue of *Adiantum chinense* included references to a plate in PLUKENET (1691: tab. 4, fig. 1) and to a specimen in James Petiver's herbarium, also cited by RAY (1688: 1854).

A single specimen from Petiver's herbarium representing original material is extant in G-PREL and is therefore designated as lectotype.

Adiantum denticulatum Burm. f., Fl. Ind.: 236. 1768.

≡ *Davallia denticulata* (Burm. f.) Mett. ex Kuhn, Filic. Afr.: 27. 1868.

Lectotypus (designated by MAZUMDAR & CALLMANDER, 2018: 218): **INDONESIA. Java:** s.d., *Pryon* s.n. (G-PREL [G00800170]!). **Syntypus:** **INDONESIA. Java:** s.d., *Pryon* s.n. (G [G00800169]!).

Notes. – MERRILL (1921: 333) was the first to mention “a Javan specimen collected by *Pryon*” as “actual type”. But as two *Pryon* gatherings are present in G-PREL, representing syntypes,



Fig. 1. – Plate 66 of *Flora Indica* (Burman, 1768) representing *Ophioglossum pedatum* Burm. f. (fig. 1), *Polypodium trapezoides* Burm. f. (fig. 2), *P. radicans* Burm. f. (fig. 3) and *Adiantum truncatum* Burm. f. (fig. 4).
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this cannot be accepted as implicit lectotypification or even as first-step lectotypification (TURLAND et al., 2018: Art. 9.17).

MAZUMDAR & CALLMANDER (2018) attempted a second-step lectotypification, taking MERRILL (1921)'s type citation as first-step lectotypification. This nomenclatural act is correctable as actual lectotypification and acceptable.

Adiantum lunulatum Burm. f., Fl. Ind.: 235. 1768.

Lectotypus (designated by MERRILL, 1921: 334): INDONESIA. Java [?]: s.d., *Anon. s.n.* (G-PREL [G00800009]).

= *Adiantum philippense* L., Sp. Pl.: 1094. 1753.

Notes. – The protologue of *Adiantum lunulatum* included references to plates from PETIVER (1702–1709)'s *Gazophylacii Naturae* and RHEEDE (1678–1693)'s *Hortus Indicus Malabaricus*, as well to a specimen (or possibly more) received from Malabar or Java (“*Habitat in Malabara & Java, unde missa*”).

MERRILL (1921: 334) stated that: “the actual type was apparently a Javan specimen, the Malabar reference being apparently added either from Avenka Rheede *Hort. Malabar.* 12: 72, tab. 40, or from Petiver *Gaz.* tab. 54, f. 10, both cited as representing the species”. As a single specimen of original material (from unknown origin but bearing references to both plates) is present in G-PREL [G00800009], Merrill's implicit lectotypification is accepted here.

This was overlooked by MORTON (1974: 370), who selected the same specimen as lectotype.

Adiantum truncatum Burm. f., Fl. Ind.: 235, tab. 66, fig. 4. 1768.

= *Acacia truncata* (Burm. f.) Hoffmanns., Verz. Pfl.-Kult.: 34. 1824. (*Leguminosae*)

Lectotypus (designated here): [AUSTRALIA]: Burm. f., Fl. Ind.: tab. 66, fig. 4. 1768 (Fig. 1).

Notes. – *Adiantum truncatum* was described based on a sterile *Christiaan Kleynhoff* collection. This name is currently accepted under *Acacia truncata* (*Leguminosae*). The *Kleynhoff* collection was cited as originating from Java but this is certainly an error as this plant does not grow in Java (MERRILL, 1921: 353) but is rather endemic to southwestern Australia (MASLIN, 1978, 2001).

Despite another thorough search in the Geneva herbarium, no original material was located, as already mentioned by MASLIN (1978: 318). We therefore formally designate the plate in *Flora Indica* as lectotype.

Asplenium arifolium Burm. f., Fl. Ind.: 231. 1768.

= *Parabemionitis arifolia* (Burm. f.) Panigrahi in Indian Fern J. 9: 244. 1993.

Lectotypus (designated by MAZUMDAR, 2015: 91): [INDIA]: Rheede, Hort. Malab. 12: 21, tab. 10. 1693. **Epitypus** (designated by MAZUMDAR, 2015: 91): INDIA. West Bengal: Burdwan, Kanchannagar, near bridge above canal, 30 m, 21.XI.2007, *Mazumdar 59* (CAL!).

Notes. – The only original material preserved in G-PREL [G00360112], an uncited specimen from unknown origin, represents a juvenile of *Acrostichum aureum* L., as determined by A.H.G. Alston (label). Aware of this, MORTON (1974: 316) was not sure whether this gathering should be considered as the type (“If this really is the type”) and therefore did not designate a lectotype (TURLAND et al. 2018: Art. 7.11). MAZUMDAR (2015) selected one of the illustrations cited in the protologue (RHEEDE, 1693: 21, tab. 10) as lectotype and designated an epitype to fix the taxonomy of this name.

Blechnum indicum Burm. f., Fl. Ind.: 231. 1768 [nom. cons. prop., in prep.].

= *Telmatoblechnum indicum* (Burm. f.) Perrie, D.J. Ohlsen & Brownsey in *Taxon* 63: 755. 2014.

Typus: AUSTRALIA. New South Wales: Evans Head behind surf shed, 18.XI.1972, *Coveny 4712* (NSW [NSW267420] image seen; iso-: A, AD, BM [BM001048200] image seen, BRI [BRI-AQ0020702] image seen, G, K [K001092743, K001092744] images seen, L, LE, TNS, UC [UC1431736] image seen) [typ. cons. prop., in prep.].

Notes. – BURMAN (1768: 231)'s description was based on a *Pryon* collection from Java. A single *Pryon* collection is preserved in G-PREL [G00800023] (Fig. 2). It bears in *Pryon's* handwriting the polynomial cited in the protologue (“*Filix lonchitidis facie alis denticulatis dupliciter auriculatis*”) and undoubtedly corresponds to the description.

CHAMBERS & FARRANT (1998a: 710; 2001: 315) erroneously stated that the type was lost and replaced by the extant *Pryon* specimen mentioned above, which would not match the description of the species and thus the plants currently known as *Blechnum indicum*, but the widespread *Asplenium longissimum* Blume published in 1828 (BLUME, 1828), as correctly determined by F. Ballard (on Sept. 10, 1951). They designated therefore a neotype.

As the *Pryon* specimen clearly represents the type of Burman's name, making it the oldest available name for *A. longissimum*, Chambers & Farrant's neotypification cannot be accepted. In order to enable the further use of both names and to preserve nomenclatural stability (TURLAND et al., 2018: Art. 14.2), a proposal to conserve Burman's name with a conserved type is needed (MAZUMDAR et al., in prep.). The gathering selected by Chambers & Ferrant as neotype will be retained as conserved type.

Ophioglossum circinnatum Burm. f., Fl. Ind.: 228. 1768.

= *Lygodium circinnatum* (Burm. f.) Sw., Syn. Fil.: 153. 1806.

Lectotypus (designated by HOLTUM, 1959a: 59):
INDONESIA. Java: s.d., *Pryon* s.n. (G-PREL [G00818001]!).

Notes. – In the protologue, BURMAN (1768: 228) cited a *Pryon* specimen and two illustrations (RUMPHIUS, 1750: 75 (*sphalm.* “76”), tab. 33; PETIVER, 1702–1709: tab. 64, fig. 10).

HOLTUM (1959a: 59) mentioned as type “Java, herb. Burman (G, not seen)”. As the only original material in G-PREL is a *Pryon* collection from Java [G00818001], Holtum's statement is accepted as implicit lectotypification.

Ophioglossum pedatum Burm. f., Fl. Ind.: 227, tab. 66, fig. 1. 1768.

= *Lygodium pedatum* (Burm. f.) Sw., Syn. Fil.: 154. 1806 [nom. illeg.] [non *L. pedatum* Sw. in J. Bot. (Schrader) 1800(2): 106. 1801].

Lectotypus (designated here): INDONESIA. Java: s.d., *Pryon* s.n. (G-PREL [G00800094]!).

= *Lygodium circinnatum* (Burm. f.) Sw., Syn. Fil.: 153. 1806.

Notes. – The original material of this species includes a plate (BURMAN, 1768: tab. 66, fig. 1) (Fig. 1) and a single specimen in G-PREL [G00800094] collected by *Pryon* from Java. A lectotype is therefore designated on the *Pryon* specimen in G-PREL.

MERRILL (1921: 336) erroneously recognized the illegitimate name *Lygodium pedatum* over *L. circinnatum* following page priority. The name *L. circinnatum* is currently generally accepted for this species (ALSTON & HOLTUM, 1959; HOLTUM, 1959a).

Polypodium acutum Burm. f., Fl. Ind.: 232. 1768.

Lectotypus (designated here): SRI LANKA: *sine loco*, s.d., *Hermann* s.n. (BIF-CEYL p. 152, upper specimen) (Fig. 3).

= *Osmunda regalis* L., Sp. Pl.: 1065. 1753.

Notes. – No original material of *Polypodium acutum* has been located in G-PREL. BURMAN (1768) referred only to three pre-Linnaean polynomial names and an illustration (PLUKENET, 1694: tab. 285, fig. 1). One of these polynomial names referred to Burman's father work: “*Burm. Zeyl. 98*”. Johannes Burman's *Thesaurus zeylanicus*, published in 1737, was based mainly on a Paul Hermann herbarium from Ceylon. This herbarium is bound in a folio volume now kept in BIF-CEYL with Benjamin Delessert's personal library (see LOURTEIG, 1966). Page 152 of this bound herbarium features a collection

of *Polypodium acutum*, bearing a reference to the protologue as well as the name of the new species, both from N.L. Burman's hand. This collection, representing original material, is here designated as lectotype (Fig. 3).

The lectotype matches with sterile pinnae of the fern *Osmunda regalis*, showing similar shape of pinnules and free venation. This species is widely cultivated and popularly known as ‘royal fern’. It does not occur naturally in Sri Lanka (SLEDGE, 1981) and *Hermann* probably collected a cultivated plant.

Polypodium adiantoides Burm. f., Fl. Ind.: 234. 1768.

Lectotypus (designated here): INDONESIA: *sine loco*, s.d., *Pryon* s.n. (G-PREL [G00800154]!) (Fig. 4).

Notes. – In the protologue, BURMAN (1768) cited an illustration (PETIVER, 1712: 67 (*sphalm.* “69”), tab. 2, fig. 9) and a *Pryon* collection. The single specimen representing original material is a *Pryon* specimen with no clear origin. MERRILL (1921: 337) mentioned a probable origin from Java. *Pryon* left on the 7th December 1756 as head surgeon for the Dutch East India Company (VOC: Vereenigde Oostindische Compagnie) on board the *Vrouw Petronella Maria* vessel to Batavia [Jakarta] (FLORIJN, 1987). The vessel arrived in Batavia on the 21st July 1757 (BRUIJN et al., 1979). Before his definitive settlement in Java in 1760, *Pryon* served on two vessels in the region between 1757 and 1760 (FLORIJN, 1987). It is clear that *Pryon* also collected outside Java. He must have collected in other VOC settlements, elsewhere in Indonesia and possibly in India. Correspondence between *Pryon* and N.L. Burman kept in the archives of the University of Amsterdam (see STEENIS-KRUSEMAN, 1958) dated 1764 give no further information on *Pryon*'s itinerary (A. Stork, pers. comm.).

The *Pryon* specimen in G-PREL (Fig. 4) clearly represents a species of the genus *Rumohra* Raddi. It corresponds to *Rumohra adiantiformis* (G. Forst.) Ching, showing similar frond morphology, leathery lamina, and free veins. BURMAN (1768)'s *Polypodium adiantoides* predates FORSTER (1786)'s *P. adiantiforme* G. Forst. In order to allow the further use of a well-known and widely used fern name (A. Smith, pers. comm.) and to avoid disadvantageous nomenclatural changes entailed by the strict application of the ICN rules (TURLAND et al., 2018: Art. 14.1), a proposal to conserve Forster's name over Burman's is in preparation.

Rumohra adiantiformis is widely distributed in the neotropics (South and Central America and the West Indies), the paleotropics (Southern Africa, Madagascar, the Mascarenes, New Guinea), Australia and New Zealand. It is also widely cultivated and known as the “leatherleaf fern”. The type locality is unknown but it has been most probably collected from a cultivated specimen somewhere in Asia or Southeast Asia, and not in its natural range in the Cape region.



Fig. 3. – Page 152 of Paul Hermann's herbarium from Ceylon in BIF-CEYL with the lectotype of *Polypodium acutum* Burm. f. (upper specimen) and original material of *Polypodium palustre* Burm. f. (lower specimen).
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A recent molecular phylogeny showed that the species represents a polyphyletic taxon and includes six lineages in distinct geographical regions (BAURET et al., 2017). *Rumohra adiantiformis* may therefore represent several cryptic species.

Polypodium glabrum Burm. f., Fl. Ind.: 235. 1768.

Lectotypus (designated by MERRILL, 1921: 337): **INDONESIA. Java:** s.d., *Pryon* s.n. (G-PREL [G00800126]!) (Fig. 5).

Notes. – A single specimen of original material, collected by *Pryon* in Java, is present in G-PREL [G00800126] (Fig. 5). A further Javanese specimen mentioned by Burman as (unnamed) variety could not be traced.

The *Pryon* specimen was cited by MERRILL (1921: 337) as type. This is regarded as a valid implicit lectotypification.

The *Pryon* specimen in G-PREL (Fig. 5) clearly represents a species of the genus *Nephrolepis* Schott. It corresponds to *Nephrolepis biserrata* (Sw.) Schott, showing glabrous lamina, pinnate fronds, entire margin, pinnae articulate to rachis, hydathodes at vein endings. BURMAN (1768)'s *Polypodium glabrum* predates SWARTZ (1801)'s *Aspidium biserratum* Sw. In order to allow the further use of a well-known and widely used fern name (A. Smith, pers. comm.) and to avoid disadvantageous nomenclatural changes entailed by the strict application of the ICN rules (TURLAND et al., 2018: Art. 14.1), a proposal to conserve Swartz's name over Burman's is in preparation.

Polypodium laciniatum Burm. f., Fl. Ind.: 231. 1768.

Lectotypus (designated by D.H. Nicolson in SMITH, 1978: 346): **INDONESIA. Java:** s.d., *Anon.* s.n. (G-PREL [G00348760]!).

= *Epipremnum pinnatum* (L.) Engl., Pflanzenr. 37: 60. 1908. = *Pothos pinnatus* L., Sp. Pl. ed. 2: 1374. 1763. (*Araceae*)

Notes. – In the protologue, BURMAN (1768: 231) referred to two plates (RHEEDE, 1693: 41, tab. 20, 21) and did not mention any collector, but “*Habitat in Java & Malabara*” as locality and the Javanese vernacular names “*Kakajar*” and “*Tally kaffa*”. The latter should be regarded as specimen citation, since these names are not mentioned in the cited publication. The existence of a Javan gathering is confirmed by Burman's concluding remark (“*In Javanica foliorum foramina non observantur*”). See MERRILL, 1921: 342).

A single gathering in G-PREL [G00348760], consisting of a giant leaf, matches this specimen citation; it bears both Javanese names “*Kakajar*” and “*Tally kassa*”, and the species name from N.L. Burman's hand.

Nicolson in SMITH (1978: 346) was the first to discuss the typification of Burman's name: “In Burman's herbarium (G),

there is a leaf specimen, [...] to be regarded as the type of *Polypodium laciniatum* Burm. f.”. This is regarded as a valid implicit lectotypification.

The type specimen represents a leaf of *Epipremnum pinnatum* (*Araceae*), “a common and weedy species of Java” (Nicolson in SMITH, 1978: 346).

Polypodium lineare Burm. f., Fl. Ind.: 235, tab. 67, fig. 2. 1768.

= *Dicranopteris linearis* (Burm. f.) Underw. in Bull. Torrey Bot. Club 34: 250. 1907.

Lectotypus (designated by MERRILL, 1921: 336): **INDONESIA. Java:** s.d., *H. van Santen* s.n. (G-PREL [G00360111]!).

Notes. – In the protologue, BURMAN (1768: 235) referred to two pre-Linnaean publications and a plate. He did not mention any collector, but “*Habitat in Java*” as locality and the Javanese vernacular name “*Pakoe-hantam*”. The latter should be regarded as specimen citation (the only one in the protologue!), since this name is not mentioned in any of the cited publications.

A single gathering in G-PREL [G00360111] matches this specimen citation: it bears the Javanese name “*Pakoe-hantam*”, the mention “*ex Java hanc accepi ab H. v Santen 1758*” from J. Burman's hand, and the species name in N.L. Burman's handwriting. The collector, Henricus van Santen (1714–1765), arrived in Batavia [Jakarta] in 1747 and stayed as Head of the Surgery for the VOC until his death in 1765 (FLORIJS, 1987).

MERRILL (1921: 336) stated that “Burman's actual type is a Javan specimen”. As a single specimen from Java is extant in G-PREL, this citation should be considered a valid implicit lectotypification. This was overlooked by WIJNANDS et al. (2017: 186).

Subsequent authors such as HOLTUM (1959b) and KNAPP (2014) cited original material from Ceylon or Sri Lanka in Herb. Delessert (G). Two collections in G-PREL originated from Ceylon [Sri Lanka] [G00349562, G00349563]. Both are collections from the Ceylon's VOC, dated 1773, and cannot be considered as original material.

Polypodium ovatum Burm. f., Fl. Ind.: 233. 1768.

Lectotypus (designated by STEENIS, 1934: 288): **INDONESIA. Java:** s.d., *Anon.* s.n. (G-PREL [G00348837]!).

= *Plectranthus scutellarioides* (L.) R. Br., Prodr.: 506. 1810. = *Ocimum scutellarioides* L., Sp. Pl. ed. 2: 834. 1763. (*Lamiaceae*)

Notes. – In the protologue, BURMAN (1768: 233) simply referred to an illustration (PETIVER, 1712: 38, tab. 14, fig. 2) as (unnamed) variety β . He did not mention any collector, merely “*Habitat in Java*” as locality. But his comment about the variety β (“[...] *cum javanica sit ovata* [...]”), a comparison between

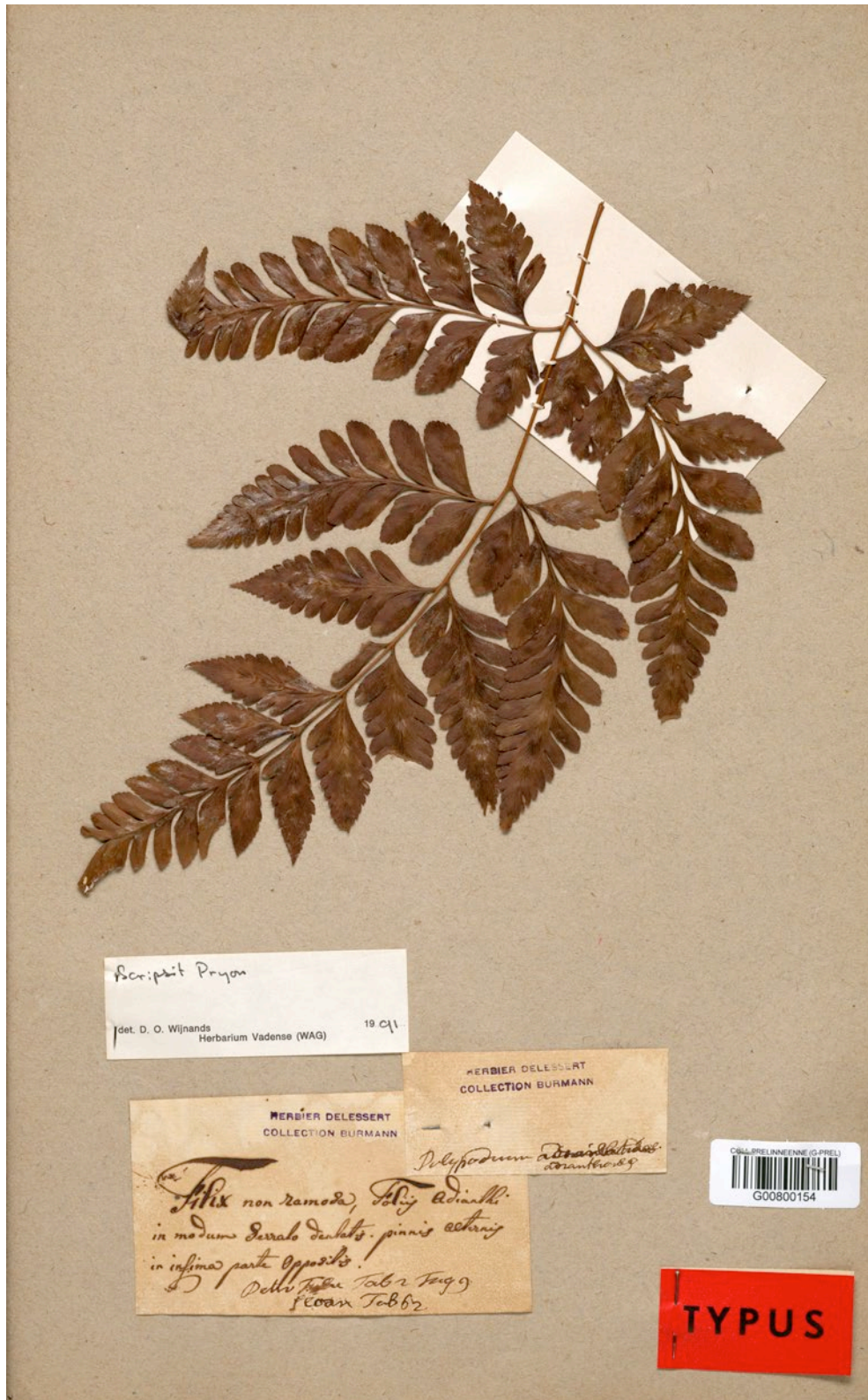


Fig. 4. – Lectotype of *Polypodium adiantoides* Burm. f. in G-PREL.

Petiver's plate and an actual Javan specimen, may be regarded as implicit specimen citation.

A single specimen of original material is extant in G-PREL [G00348837]: it bears a reference to Petiver's illustration and the name of the new species, both from N.L. Burman's hand, as well as a few notes by John Briquet (1870–1931), former curator of the Delessert Herbarium (“*Java / non filix / non Petiver*” in front of the reference to Petiver's illustration).

MERRILL (1921: 337) treated *Polypodium ovatum* as of doubtful status. This name refers indeed to a commonly cultivated form of *Plectranthus scutellarioides* (*Lamiaceae*), as correctly identified by STEENIS (1934: 288), who also designated the above specimen (seen as photograph!) as “actual type”. This implicit lectotypification is accepted here.

Polypodium palustre Burm. f., Fl. Ind.: 234. 1768.

= *Stenochlaena palustris* (Burm. f.) Bedd., Suppl. Ferns. S. Ind.: 26. 1876.

Lectotypus (designated here): INDONESIA. Java: s.d., Anon. s.n. (G-PREL [G00818199]!).

Notes. – BURMAN (1768) referred in the protologue to various pre-Linnaean publications and plates. He did not mention any collector, but “*Habitat in Indiis*” as locality and the Javanese vernacular name “*Daun-Peekou*”, which should be regarded as specimen citation (the only one in the protologue!), since this name is not mentioned in any of the cited publications, as stated by MERRILL (1921: 334).

A single specimen in G-PREL [G00818199] matches this citation; it bears the Javanese name “*Daun Pakoe*”, followed by two polynomials from the protologue and the name of the new species, all from Burman's hand. Another specimen in G-PREL [G00801097], possibly part of the original material, only bears the same two polynomials from an unknown hand. Three *Paul Hermann* specimens from Ceylon extant in BIF-CEYL (p. 152 (Fig. 3, lower specimen), p. 21 and p. 156) may also be regarded as original material; they were used by Burman's father for his *Thesaurus Zeylanicus* (1737), a work cited in the protologue (see above Notes under *Polypodium acutum*).

UNDERWOOD (1906: 38) cited the type specimen as “Type from Ceylon”, and FRASER-JENKINS et al. (2018: 187) as “Type from Sri Lanka, “*In Indiis*”, Herb. Burman, ?G”. None of these citations may be considered as valid implicit lectotypification, or even as first-step lectotypification, as BURMAN (1768) did not cite any specimen from Sri Lanka, and as there are three different gatherings from Sri Lanka conserved in Paris. Therefore, we designate here the only specimen cited (G-PREL [G00818199]) as lectotype (TURLAND et al., 2018: Art. 9.12).

Polypodium radicans Burm. f., Fl. Ind.: 233, tab. 66, fig. 3. 1768.

= *Nephrolepis radicans* (Burm. f.) Kuhn in Ann. Mus. Bot. Lugduno-Batavi 4: 285. 1869.

Lectotypus (designated here): INDONESIA. Java: s.d., *Pryon* s.n. (G-PREL [G00800108]!).

Notes. – BURMAN (1768: 233) cited in the protologue a *Pryon* collection, a reference to his father's *Thesaurus Zeylanicus* (1737: 98) and a plate (tab. 66, fig. 3) (Fig. 1).

A single specimen of *Pryon* is present in G-PREL (G00800108). HOVENKAMP & MIYAMOTO (2005: 308) and HOVENKAMP (2013a: 65) cited this specimen as type but failed to indicate the institution of deposit in 2005 and the term “lectotype” both in 2005 and 2013. Thus, none of these citations can be accepted as valid lectotypification (TURLAND et al., 2018: Art. 9.22, 9.23). The lectotypification is based here on the single specimen of original material present in G-PREL [G00800108].

Polypodium rostratum Burm. f., Fl. Ind.: 235. 1768.

Lectotypus (designated here): INDONESIA. Java [?]: s.d., *Pryon* s.n. (G-PREL [G00801123]!).

= *Pteridium aquilinum* subsp. *wightianum* (Wall. ex J. Agardh) W.C. Shieh in Quart. J. Chin. Forest. 6: 98. 1973. = *Pteris recurvata* var. *wightiana* Wall. ex J. Agardh, Recens. Spec. Pter.: 50. 1839.

Notes. – In the protologue, BURMAN (1768: 235) cited an illustration (PLUKENET, 1705: tab. 399, fig. 4) and a *Pryon* collection.

The only original material in G-PREL is a *Pryon* specimen [G00801123]), probably from Java. It is formally designated here as lectotype.

The taxonomy of *Pteridium aquilinum* has been controversial. Recent morphometric and molecular genetic studies tend to recognize a single species containing several subspecies (THOMSON, 2000, 2004, 2008; ZHOU et al., 2014), while previous treatments recognized distinct species (e.g. BROWNSEY, 1998). A single subspecies is recognized in South East Asia (THOMSON, 2008; ZHOU et al., 2014).

Polypodium scolopendria Burm. f., Fl. Ind.: 232. 1768.

= *Phymatosorus scolopendria* (Burm. f.) Pic. Serm. in Webbia 28: 460. 1973.

Lectotypus (designated by MERRILL, 1921: 335): INDONESIA. Java [?]: s.d., *Pryon* s.n. (G-PREL [G00360110]!). **Syntypus**: INDONESIA: s.d., *Pryon* s.n. (G-PREL [G00360042]!).



Fig. 5. – Lectotype of *Polypodium glabrum* Burm. f. in G-PREL.

Notes. – BURMAN (1768: 232) cited in the protologue several plates and two *Pryon* collections from Indonesia (“*malaice fimbar-minganang*” and (semicolon!) “*javanice daun sambang*”). The two syntypes are extant in G-PREL. One bear the Malay name “*fimbar-minganang*” from Pryon’s hand [G00360042] and represents a fertile specimen with a mature fern leaf. The second collection bears the Javanese name “*daun sambang*” from the same hand [G00360110] and represents a sterile specimen, probably collected in Java. An uncited *Paul Hermann* specimen from Ceylon extant in the library of the Institut de France in Paris (BIF-CEYL p. 41) (Fig. 6) may also be regarded as original material; it was used by BURMAN (1737)’s father for his *Thesaurus Zeylanicus*, a work cited in the protologue (see above Notes under *Polypodium acutum* and *P. palustre*). MERRILL (1921: 335) made a clear reference to “*Pryon’s* Javan specimen for which the local name *daun sambang* is cited” as “actual type”. This should be considered as an implicit lectotypification, despite the fact that the selected specimen is unfortunately the sterile one (G-PREL [G00360110]).

HOVENKAMP (2013b: 159) cited “*Herb. Hermann s.n., Sri Lanka [Ceylon] (n.v.)*” as type, but first selected an uncited specimen, and second failed to mention the institution of deposit and the term lectotype to effect the lectotypification (TURLAND et al., 2018: Art. 9.12, 9.22, 9.23). VERDCOURT (2001: 24) cited as lectotype: “India, Indonesia, Java, *Pryon s.n.* (G, lecto)”. In a footnote, he accepted Schelpe (SCHELPE & ANTHONY, 1986: 165)’s citation of a specimen he had seen (“Type: India, Herb. Burmann (G, holo!)”), but Schelpe did not designate a single specimen as type.

KNAPP (2014: 122) cited a *Pryon* specimen at G as lectotype (“India, Java, *Pryon s.n.* (LT: G) // Indonesia”) but again without referring to a single specimen.

Phymatosorus scolopendria is a common fern in the tropics of the Old World. Its native range is mainly restricted to the Malesian region, and maybe a few adjacent areas (A. Smith, pers. comm.).

Polypodium simplex Burm. f., Fl. Ind.: 235. 1768.

Lectotypus (designated here): **INDONESIA. Java:** s.d., *Pryon s.n.* (G-PREL [G00818253]!) (Fig. 7).

Notes. – In the protologue, BURMAN (1768: 235) referred to a plate in RUMPHIUS’s *Herbarium Amboinense* (1750: 70, tab. 30, fig. 1) and a *Kleynhoff* collection in his herbarium. Thus a lectotypification is necessary. The only original material in G-PREL is a *Pryon* collection from Java that Burman erroneously attributed to *Kleynhoff*: the polynomial “*Filix non ramosa foliis integris alternis*” cited in the protologue appears in Pryon’s typical handwriting on the sheet. This collections is here designated as lectotype (Fig. 7).

The *Pryon* specimen in G-PREL clearly represents a species of the genus *Drynaria* (Bory) J. Sm. It corresponds to

Drynaria rigidula (Sw.) Bedd., showing a sterile frond with anastomosing veins and narrow pinnae articulate to rachis. BURMAN (1768)’s *Polypodium simplex* predates SWARTZ (1801)’s *P. rigidulum*. In order to allow the further use of a well-known and widely used fern name (A. Smith, pers. comm.) and to avoid disadvantageous nomenclatural changes entailed by the strict application of the ICN rules (TURLAND et al., 2018: Art. 14.1), a proposal to conserve Swartz’s name over Burman’s is in preparation.

Polypodium spinulosum Burm. f., Fl. Ind.: 233, tab. 67, fig. 1. 1768.

= *Synaphea spinulosa* (Burm. f.) Merr. in Proc. Linn. Soc. New South Wales 44: 354. 1919. (*Proteaceae*)

Lectotypus (designated by GEORGE, 1995: 277): [AUSTRALIA]: *sine loco*, s.d., *Anon. s.n.* (G-PREL [G00818240]!).

Notes. – *Polypodium spinulosum* was based on a sterile specimen that was erroneously supposed to originate from Java and an illustration. This name does in fact represent an endemic *Proteaceae* from Western Australia: *Synaphea spinulosa* (MERRILL, 1919: 354; 1920: 347).

GEORGE (1995: 277) cited the single specimen of original material extant in G-PREL as holotype. This implicit lectotypification is accepted here.

GEORGE (1971: 177; 1981: 53) suggested that the type specimens of *Acacia truncata* (see above *Adiantum truncatum*) and *Synaphea spinulosa* may have been collected in 1697 during the VOC expedition conducted by Wilhelm Vlaming. Thus one of the oldest collections made by Europeans in Australia. Vlaming’s ship was the first Dutch ship to stop in Australia on the way to Java. During the course of the 18th century, the VOC ships took a more direct sea road from the Cape to Java often sailing the coast of Western Australia before reaching Java (BRUIJN, 1980). Those Australian specimens could also have been collected later in the mid 18th century when Kleynhoff, Pryon or van Santen travelled to Java.

Polypodium trapezoides Burm. f., Fl. Ind.: 233, tab. 66, fig. 2. 1768.

Lectotypus (designated here): **INDONESIA. Java:** s.d., *Anon. s.n.* (G-PREL [G00801112]!).

= *Pteris vittata* L., Sp. Pl.: 1074. 1753.

Notes. – The original material of this species includes two plates (BURMAN, 1768: tab. 66, fig. 2; SLOANE, 1707: tab. 35, fig. 2) and a single collection in G-PREL [G00801112]. A lectotype is therefore designated on the G-PREL collection.

The lectotype represents an immature specimen of *Pteris vittata*.

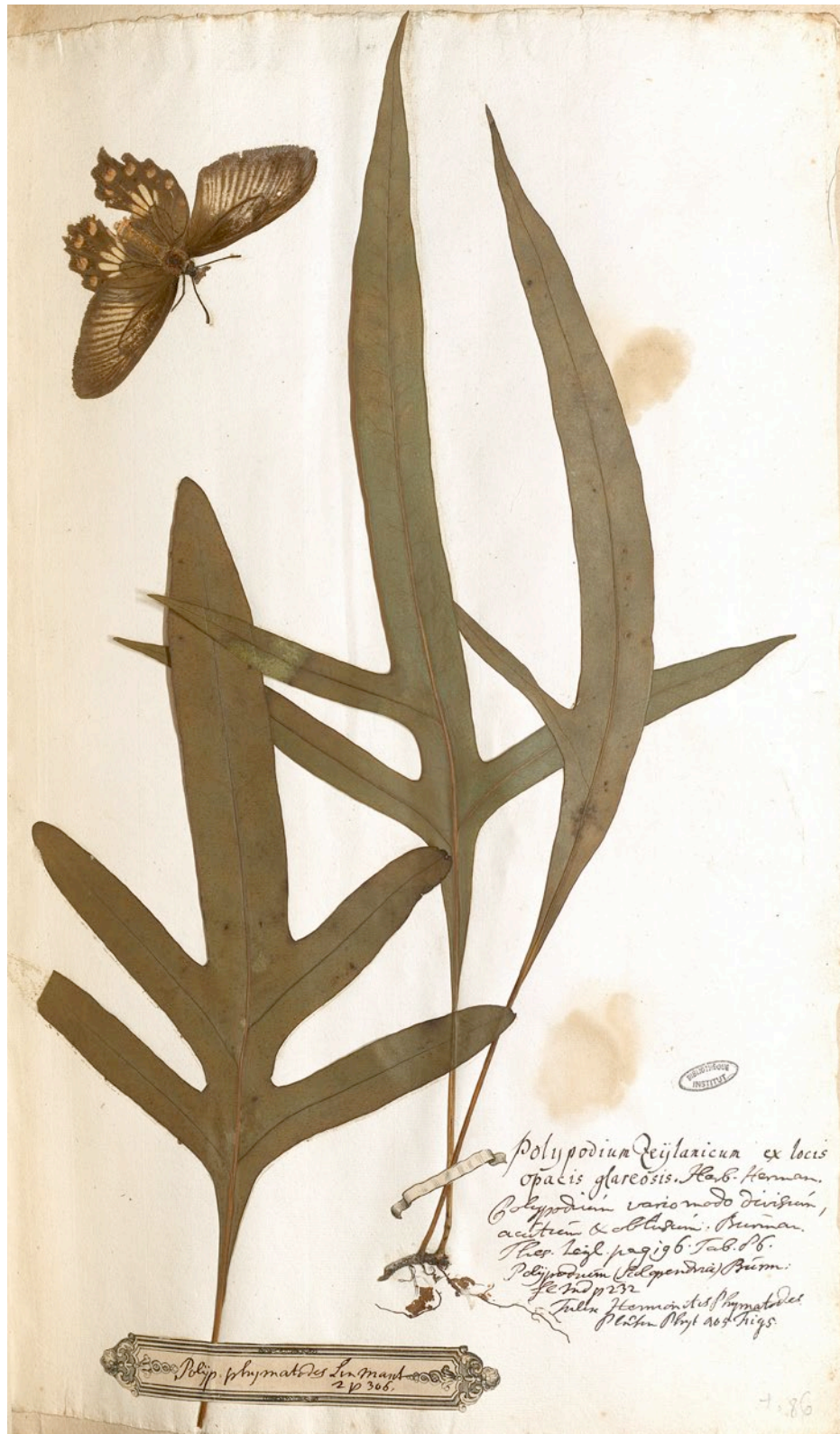


Fig. 6. – Page 41 of Paul Hermann's herbarium from Ceylon in BIF-CEYL with original material of *Polypodium scolopendria* Burm. f. [© Bibliothèque de l'Institut de France, Paris]

Pteris ensiformis Burm. f., Fl. Ind.: 230. 1768.

Lectotypus (designated here): **INDONESIA. Java:** s.d., *Pryon* s.n. (G-PREL [G00360108]!).

Notes. – In the protologue, BURMAN (1768: 230) cited two illustrations (BURMAN, 1737: tab. 87; PLUKENET, 1705: tab. 407, fig. 2) and a *Pryon* collection from Java. The latter, extant in G-PREL, is designated here as the lectotype.

FRASER-JENKINS et al. (2017: 286) designated as lectotype a *Pieter Hertog* collection from Ceylon (G-PREL [G00360109]), annotated by C.V. Morton as holotype. It was cited by Burman's father (BURMAN, 1737) in the *Thesaurus Zeylanicus* and is the basis for plate 87 in the same work, precisely the plate mentioned by Burman in the *Flora Indica*. Unfortunately, as *Hertog's* specimen was not cited by BURMAN (1768: 230), unlike *Pryon's* (see above), this lectotypification cannot be accepted (TURLAND et al., 2018: Art. 9.12). DAS et al. (2018: 286) provided a superfluous second-step lectotypification based on the same specimen, apparently overlooking that FRASER-JENKINS et al. (2017: 286) already unambiguously designated a single specimen (“[...] *Polypodium zeylanicum* etc. Herbarium Delessert collection Burman, Holotypus, det. C.V. Morton [...]”).

Trichomanes nivea Burm. f., Fl. Ind.: 237. 1768.

Lectotypus (designated by TRYON & WEATHERBY, 1956: 51): **SINE PATRIA:** “Habitat in utraque India”, s.d., *Anon. s.n.* (G-PREL [G00818252]!).

= *Notholaena trichomanoides* (L.) R. Br., Prodr.: 145. 1810.
= *Pteris trichomanoides* L., Sp. Pl.: 1074. 1753.

Notes. – A single specimen of original material probably collected in the West Indies is extant in G-PREL [G00818252]. This specimen has been cited by TRYON & WEATHERBY (1956: 51) in their revision of the American species of *Notholaena* R. Br. as: “Type: in Hb. Delessert, G!”. This implicit lectotypification is accepted here as a single element of original material is present in G-PREL.

Trichomanes tenuifolium Burm. f., Fl. Ind.: 237. 1768.

= *Cheilanthes tenuifolia* (Burm. f.) Sw., Syn. Fil.: 129. 1806.

Lectotypus (designated here): **SINE PATRIA:** *sine loco*, s.d., *Anon. s.n.* (G-PREL [G00349568]!).

Notes. – In the protologue, BURMAN (1768: 237) cited a *Pryon* specimen, as well as an illustration (RUMPHIUS, 1750: 77, tab. 34, fig. 2) under the (unnamed) variety β .

MERRILL (1921: 335) referred to the type as “an actual specimen from *Pryon*, probably of Javan origin”, but unfortunately, no *Pryon* specimen could be found in G-PREL.

An uncited specimen [G00349568] from unknown origin is however extant in G-PREL and should be regarded as original material; it bears a reference to Rumphius' illustration in J. Burman's handwriting with a slip of the pen (tab. 39 instead of tab. 34, the former representing a species of *Selaginella* P. Beauv.).

CHAMBERS & FARRANT (1991: 535; 1998b: 278) cited as holotype two collections at G (“T: *Planta Zeylanica* collection (Sri Lanka). *N.L. Burman* (holo: G 1416 [= G loan number!], 2 sheets”), originated from two different herbaria and both sheets were annotated by T.C. Chambers: 1) the uncited specimen mentioned above (G-PREL [G00349568]); and 2) a Ceylon collection from Houuttuyn's herbarium (see above Introduction), probably collected by Thunberg in the years 1777–1778 (G-PREL [G00349567]). Therefore, this typification cannot be accepted.

The lectotypification is based here on the single specimen of original material present in G-PREL [G00349568].

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Fig. 7. – Lectotype of *Polypodium simplex* Burm. f. in G-PREL.

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