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The botanical legacy of Martinus Houttuyn (1720-1798) in Geneva

Dirk Onno Wijnands[†], Johannes Heniger, Jan Frederik Veldkamp, Nicolas Fumeaux & Martin W. Callmander

In memory of Dr. Dirk Onno Wijnands (1945-1993) (see also DE JONG, 1993)

Abstract

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The contribution made by Martinus Houttuyn (1720-1798) to systematic botany has been widely underestimated. Fourteen volumes of the second part of his *Natuurlijke Historie of Uitvoerige Beschrijving der Dieren, Planten en Mineraalen*, published between 1773 and 1783, dealt with botany. Houttuyn popularized the Linnaean system and published more than 150 species and several genera. The historical context of this early botanical work is described. The history of the acquisition of Houttuyn's herbarium is outlined and an English translation of his auction catalogue is provided. We discuss Houttuyn's exotic herbaria from the Cape of Good Hope (South Africa), Ceylon (Sri Lanka), Java (Indonesia), and Japan. Houttuyn did not go abroad to collect plants. His herbarium consisted of material from many collectors, with the vast majority of specimens collected by Thunberg, but collections were also made by Auge, Radermacher, Richter, and possibly von Wurmb, while material from unknown collectors is also present. The main set of Houttuyn herbarium, which proves to be present in the Geneva herbarium, was originally part of the Burman herbarium bought by Delessert in 1801 on the advice of Augustin-Pyramus de Candolle. It is now incorporated in the Pre-Linnaean herbarium (G-PREL). Much smaller sets from Java are present in Leiden (L) and Amsterdam (AMD, now in L). In many cases Houttuyn described new species on the basis of Thunberg specimens before Linnaeus f. or Thunberg did, whose identical but later names are based on the specimens in their own herbaria, and although some might consider these to be homonyms, we regard them as isonyms because their types are duplicates of the same gatherings. A selection of 111 names are discussed, most of which were published by Houttuyn in the *Natuurlijke Historie*. Others are linked to Burman, Thunberg, Linnaeus f. or A.-P. de Candolle. A total of 57 lectotypes and one epitype are designated.

Keywords

Houttuyn – Thunberg – Burman – Linnaeus f. – A.-P. de Candolle – Ceylon – Indonesia – Japan – Java – South Africa – Sri Lanka – Nomenclature – Botanical History

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Introduction

Martinus Willem Houttuyn (born March 26, 1720 in Hoorn - buried May 2, 1798, Amsterdam; often erroneously cited as “Maarten”, a given name he never used himself) was a Dutch naturalist who published the *Natuurlijke Historie of Uitvoerige Beschrijving der Dieren, Planten en Mineraalen* [*Natuurlijke Historie*] (HOULTUYN, 1761-1785), a work in 3 parts and 37 volumes containing over 21,500 pages of text in Dutch. The second part (HOULTUYN, 1773-1783a) deals with plants and is distantly related to ed. 12 and 13 of LINNAEUS's *Systema naturae* (1766-1768) and *Systema vegetabilium* (1774). A generic index to this part, *Systematische bladwijzer der planten* (HOULTUYN, 1785), was issued in the last volume of part 3: it follows MURRAY's ed. 14 of *Systema vegetabilium* (1784) and includes later described genera, “sometimes amended and improved”.

Martinus was the son of Willem Maartensz Houttuyn (1692-1756), medical doctor in Hoorn, and Aagje Zeylemaker (1719-?). Frans Houttuyn (?-1765), a publisher in Hoorn and later in Amsterdam, is often but erroneously mentioned as the father, perhaps because he published the *Uitgezogte Verhandeligen* (1757-1765) to which Martinus contributed a considerable part. In fact he was a cousin. Martinus studied medicine in Leiden, graduating in 1749. After a short period as a physician in Hoorn, he settled in Amsterdam, although it is not clear whether he actually had a medical practice there. His main occupation appears to have been natural history, and he owned a large cabinet of naturalia that was auctioned in 1787 and 1789 (see Appendix I). He seems to have been a likable and very modest person. Many of his contributions and the first volumes of the *Natuurlijke Historie* were published without an author, and no portrait of him is known.

Houttuyn's contribution to systematic botany, apart from his popularization of the Linnaean system, has been widely underestimated, even though for the Phanerogams alone he described eleven new genera and proposed at least 140 new species or combinations (see MERRILL, 1938). This neglect is no doubt due to the fact that his work was written in Dutch and also because it was extremely expensive for the time: the fourteen botanical volumes alone already cost fl. 77 (Dutch guilders) and 12 stuivers (shillings: 20 to a guilder) at publication. The cost of the complete set was fl. 188/15 (ARRENBURG, 1788: 372). For comparison, a physician at that time had an average income of around fl. 500 a year. A Dutch master painting could be had for about fl. 20! Jan Andries Auge (1711-1796), Gardener of the Company's Garden in the Cape from 1755 until 1778 (WIJNANDS, 1992: 490) was paid fl. 14 a month. In November 2016, complete sets were offered online for prices ranging between € 7,500 and 10,860.

A title issue of the *Natuurlijke Historie* printed on better paper and with exquisitely hand-coloured plates was published more or less simultaneously with the *Handleiding tot*

de plant- en kruidkunde (HOULTUYN, 1773-1783b). STAFLEU & COWAN (1979: 344) mentioned the presence of copies in BR and K, noting that the *Natuurlijke Historie* has coloured plates. This is incorrect: copies at herbaria such as A, BR, HH, L, NY, and U are uncoloured, although another copy in L is coloured. The books were already expensive enough: coloured copies would have cost even more! ARRENBURG (1788) did not mention these.

The *Systematische bladwijzer der planten* (HOULTUYN, 1785) is a critically updated listing of genera, with diagnoses, based on MURRAY's ed. 14 (1784) of *Systema vegetabilium*.

Houttuyn's work was probably best known from the German treatment (not a literal translation!) by CHRISTMANN & PANZER (1777-1788). This was cited by e.g. WILLDENOW (1797) and apparently used by the early compilers of *Index Kewensis*. The original set, which cost fl. 72, was offered online in November 2016 for a price ranging from € 1,700 to 2,000. There is an earlier German treatment of the zoological part by MÜLLER (1773-1776) that is not mentioned by BOESEMAN & DE LIGNY (2004: 122). The latter also noted on page 26 that Yokusai Iinuma (1783-1865) consulted it for his 20 volume iconography of Japanese plants (IINUMA, 1874). He presumably could read Dutch, as that was, up to the middle of the 19th century, the only Western language allowed in Japan.

As was usual for works like these, the first volume published paid for the next one, and so on. Apparently they came in loose quires and the buyer was then free to have them bound as he pleased (or could afford). As an aid to the binder, the bundles were provided with an unpaginated pamphlet, the *Aanwyzingen der plaaten* [*Aanwyz. Plaat.*] (Directives to the binder on where to insert the plates). Having served their purpose, these may have been discarded after binding and so may be absent in some copies, or, when present, may have been bound in various (unexpected) places and are thus easily overlooked. The logical placement seems to be between the table of contents and the main text. The *Aanwyz. Plaat.* are of importance as in some cases they contained new Latin names or combinations published by Houttuyn that are not found in the main text, e.g. *Celosia japonica* Houtt. (see below under n° 26) or *Truellum japonicum* Houtt. (see below under n° 109).

As an aside, to give honour where it is due and too often neglected: the copper plates used for *Natuurlijke Historie* were engraved first by Jan Caspar Philips (c. 1700-1775) and then from part 6 onwards by his pupil and nephew Caspar Philips (1732-1789).

MERRILL (1938, 1939) provided a study of Houttuyn's botanical publications, while BOESEMAN & DE LIGNY (2004) published an extensive analysis of the genealogy of his family, the history of the *Natuurlijke Historie* and other publications, and the origin and fate of the zoological naturalia in his possession.

Houttuyn's herbarium

The search for Houttuyn's herbarium

An obvious place to look for Houttuyn specimens was G, as LASÈGUE (1845: 66) reported that they were bought by Benjamin Delessert (1773-1847) as part of the Burman herbarium. Delessert bought the latter herbarium in 1801 (MORREN, 1843: 129) on the advice of Augustin-Pyramus de Candolle (1778-1841), who heard about it during a trip to Holland in 1799 (see CANDOLLE, 2004). CANDOLLE (1801), in a letter to his mother, explained how pleased he was with this purchase: “Delessert vient de faire l'acquisition d'un herbier magnifique qui a appartenu à un ancien botaniste.” [“Delessert just purchased a wonderful herbarium which belonged to an earlier botanist.”] Six hundred duplicates of this herbarium were given to de Candolle, who incorporated them in his herbarium the same year (CANDOLLE, 1830a), mentioning: “... plantes de l'herbier de Burman... doubles de plantes du Cap” [“... plants from the Burman herbarium... duplicates of plants from the Cape...”]. His son, Alphonse de Candolle (1806-1893), mentioned 602 species in *La Phytographie* (CANDOLLE, 1880: 401). More recently, BURDET (2008: X) explained that Houttuyn's specimens present in the de Candolle herbarium are much more numerous. They clearly did not originate only from the Cape. This would explain the absence of some specimens in the Burman herbarium (see *Cineraria incisa* Thunb. ex Houtt. below under n° 28). The first author's search for Houttuyn specimens, while searching for a specimen of *Athanasia* L. in G-DC (based on IDC microfiche 800), resulted, for example, in the discovery of four sheets from Asia: *Ochna nitida* sensu DC. [non *O. nitida* Sw.] from Ceylon [2 sheets]; *Oldenlandia brachypoda* DC. from Java; and *Piper officinarum* C. DC. from Java, thus confirming the presence of Houttuyn material from these areas.

A closer look at the material of *Athanasia* revealed a specimen of *A. tomentosa* Thunb., labelled as *A. pubescens* (L.) L. and annotated in Houttuyn's characteristic handwriting (see Fig. 1-11). The Linnaean binomial, the Linnaean classification, and a reference to COMMELIN (1701: 93, tab. 47) are given. The same information is present in HOUTTUYN (Nat. Hist. II(6): 39. 1776). However, as he did not cite a specimen, he must have received it afterwards. Another Houttuyn specimen in G was mentioned by HILLIARD & BURTT (1981: 239), who recognised it as the type of *Gnaphalium aureum* Thunb. ex Houtt. (see below under n° 50). DAHLGREN (1968: 70) identified the type specimen in G as the basis for Houttuyn's figure of *Aspalathus pedunculata* Houtt. (see below under n° 18).

It is remarkable that MERRILL (1938) failed to locate any of Houttuyn's specimens in G. Perhaps he did not recognise Houttuyn's very characteristic handwriting? (see *Agrostis javanica* Houtt. below under n° 3 for an example, which was seen by Merrill but not recognised for what it was).

CANDOLLE (1801) referred to the Burman herbarium as a single *unit*. The explanation offered by WIJNANDS (1992: 492) of the possible accidental merging of the Burman and Houttuyn herbaria when they arrived in Geneva, “[Houttuyn collections]... were erroneously stamped as *Herbier Burman*”, is very plausible. Starting in 1992, the Burman herbarium (Burman and Houttuyn herbaria) in G was extracted from the general herbarium (WIJNANDS, 1992; STAPLES & JACQUEMOUD, 2005) although several specimens remain in the general herbarium (G). Some Houttuyn specimens are also part of the de Candolle (G-DC) historical herbarium. The Burman herbarium has recently received a specific acronym (G-PREL) and will be referred to below as the Pre-Linnaean collection. In the process, many more Houttuyn specimens were discovered. However, it is not yet possible to provide a comprehensive account of them: much research remains to be done. Only a selection of specimens is discussed below, illustrating the kind of issues one may expect in consulting the herbarium and the publications based on it.

From our research, it is clear that the main set of specimens from Houttuyn's herbarium is now incorporated in the Pre-Linnaean collection (G-PREL). It is currently impossible to know exactly how many sheets are there; only time will tell. Other Houttuyn specimens have been found in L (with a total of 70 including seven originally in AMD) and P (mainly *Solanaceae*, unreturned loans?), and currently one in C (Vahl herbarium).

Characteristics of Houttuyn specimens

Sheets originating from various Houttuyn herbaria have been recognised on the basis of his handwriting (Fig. 1-11), as pictured by VAN STEENIS & VELDkamp (1973), and of a letter dated 1762 from Houttuyn to Linnaeus (HOUTTUYN, 1762). On several sheets, 18th century Dutch watermarks are present, which support the supposition that most of Houttuyn's exsiccata have not been remounted afterwards. The most frequent Dutch watermark is the French lily without a coat of arms or other additions, e.g. the specimens of *Amaryllis dubia* Houtt. [non *A. dubia* L.], *Galega villosa* L., *Mussaenda frondosa* L., and *Tragia involucrata* L. The same watermark, but on a coat of arms, is present on sheets of *Plumbago rosea* L., *Rajania quinata* Thunb. ex Houtt., and *R. quinquefolia* L. Various watermarks of the Dutch paper maker Jan Honig & Sons at Zaandijk figure on the sheets of *Achyranthes lanata* L., *Apocynum frutescens* L., *Nerium zeylanicum* L., and *Ocimum sanctum* L. This paper is known to have been produced from 1737 to 1787 (CHURCHILL, 1967: 15).

The watermark “D. & C. Blauw” is present on sheets of *Athanasia pubescens*, *Ixia campanulata* Houtt., and *I. uniflora* L. Dirk Blauw & Co. was a Dutch mill active from 1733 to 1827 (CHURCHILL, 1967: 13). The watermark of the Dutch United East India Company (VOC: Vereenigde Oost-Indische

Compagnie [United East Indian Company]), Chamber of Amsterdam, consisting of the intertwined letters A, V, O, and C, figures on the sheet of *Sida cordifolia* L. A countermark "IV" (Jean Villedary) is found on *Agrostis javanica* Houtt.

Occasionally specimens on Houttuyn's sheets are mounted in an ornamental printed pot, a curious custom of the mid-18th century in the Netherlands and Flanders, e.g. by Johannes Burman (1706-1779) and his son Nicolaas Laurens Burman (1734-1793), George Clifford (1685-1760), David de Gorter (1717-1783), and Adriaan van Royen (1704-1779) (WIJNANDS & HENIGER, 1991: 137, tab. 5; WIJNANDS, 1992: 491, tab. 1). The same urns were also used by Daniel de la Roche (1743-1813) (WIJNANDS, 1992: 492), the Belgian E.-J. D'Oignies (1735-1791; 4 vol., c. 1780, L), and the Bernese Albrecht von Haller (1708-1777) (depicted by BURDET, 1975: 383). Houttuyn was one of the last botanists to use these.

A simple pot printed in blue was found in L: a specimen of *Caesalpinia pulcherrima* (L.) Sw. (Fig. 1), but more elaborate designs were used, as in *Plumeria acuminata* Ait. (Fig. 2).

The Houttuyn sheets in G differ in their state of originality. The characteristics of an original, undamaged Houttuyn sheet are a top and a bottom line (Fig. 3). On the left side of the top line he noted the origin of the plant such as *Planta Capensis*, *Planta Ind. Orient. Javanica*, *Planta Japonica*, and *Planta Zeylanica*; also *Planta Ind. Orient.* occurs, which could refer to either Java or Ceylon, with an example from the Moluccas (see *Myristica fragrans* Houtt. below under n° 64). On the right side of the top line is the relevant Linnaean class. On the left of the bottom line, Houttuyn wrote the plant name in Linnaean binomial nomenclature, sometimes followed by a citation from the *Natuurlijke Historie* and more rarely by some diagnostic notes (Fig. 4). For binomials coined by himself, he frequently added "mihi", just as he did in the *Natuurlijke Historie* (Fig. 4). Some sheets have a number written near the statement of origin, which appear to be consecutive, e.g. in *Geranium* L. from the Cape 145, 146, 147, 148, 149. No number is higher than the total number of specimens quoted for the respective herbaria in the auction catalogue. From the sheets found in G it is clear that Houttuyn generally based his discussions in the *Natuurlijke Historie* on extensive herbarium material, and conversely, he referred newly received specimens to his published treatments. Unfortunately, several original sheets have been trimmed. Nevertheless, some of them are almost completely preserved, with Houttuyn's top and bottom lines. From others, however, his annotations have been cut off and pasted or pinned on the sheet (Fig. 4, 5, 8-11).

The provenance of Houttuyn's specimens

The history of Houttuyn's acquisitions is complex (see BOESEMAN & DE LIGNY, 2004). This is partly due to the absence of correspondence to him, and partly to the fact that he did not

always clearly state the origin of his specimens. Based on the auction catalogue (HOUTTUYN, 1789a, often filed sub J. POSTHUMUS & P. POSTHUMUS, 1789, see Appendix I) and on his remarks in the *Natuurlijke Historie*, the present notes deal only with his exotic herbaria from the Cape of Good Hope (South Africa), Ceylon (Sri Lanka), Japan, and Java (Indonesia).

Houttuyn never went abroad to collect plants. His herbarium thus consisted of material from many collectors. In the botanical section, "Deel" II, of the *Natuurlijke Historie*, Houttuyn frequently referred to exsiccata of exotic species in his possession and he occasionally established new genera and species based on them. Some other new species were based on living plants in the Botanical Gardens of Amsterdam [Burmans] and Leiden [A. van Royen and his nephew David van Royen (1727-1799)] along with material from his own collection.

Of importance here is Carl Peter Thunberg (1743-1828) who, as Supreme Chirurgijn [Opperchirurgijn] of the Dutch VOC (1772-1777), provided Houttuyn with many specimens from the Cape, Ceylon [Sri Lanka], Java (often with a mention of Batavia for Jakarta), and Japan, and will be mentioned numerous times below (WIJNANDS, 1987).

Many sheets in G and some in L were annotated by Thunberg. His calligraphic writing of generic names (Fig. 5, 11) is identical to that seen in his letters of 1771-1775 to Linnaeus (THUNBERG, 1771-1775), and to that in his herbarium (UPS-THUNB). According to SMITH (1793), Houttuyn was one of Thunberg's sponsors and thus directly or indirectly received specimens from his travels to the Cape, Ceylon, Java, and Japan. These specimens in his herbarium are therefore most likely duplicates of material in Thunberg's herbarium (UPS-THUNB, and also in at least H, M, or S). A few of Thunberg's Japanese specimens in G were not found in UPS-THUNB: e.g. *Polygala japonica* Houtt. (see below under n° 84), and *Rumex japonicus* Houtt. (see below under n° 98).

JUEL (1918) made no mention of Houttuyn with respect to Thunberg collections, and GUNN & CODD (1981) overlooked him as the owner of a Cape herbarium.

In L, three specimens were annotated by David van Royen: *Mussaenda fruticosa* L. (L-908.204-226) "Op Java rondom Samarang", e.g. a Thunberg collection; *Myristica fragrans* (L-908.133-1797) "Pro Myristica vera dedit Cl. Houttn. 1784" and "Myristica officinalis s. vera. Linn. Suppl. 265. Cl. Houttuin dedit Jun. 1784"; and *Piper longum* L. (L-908.165-114) "Piper longum L. Cl. Houttuin dedit Jun 1784".

The Cape of Good Hope herbarium

Houttuyn described his Cape herbarium in the auction catalogue sub D (see Appendix I), but he did not mention a collector. The first reference to a Cape specimen (see *Protea linearis* Houtt. below under n° 91) is discussed in HOUTTUYN's *Natuurlijke Historie* II (1773-1783), vol. 4: 116 published in 1775 [cited below as Nat. Hist. II(4): 116. 1775]. In a note



Fig. 1. – *Nerium oleander* L. Example of a decorative pot in in Houttuyn's herbarium in L.
[© Nationaal Herbarium Nederland, Naturalis, L]

on p. 381, he wrote: "From time to time I have bought this collection being transferred from the Cape." Under *Mesembryanthemum pugioniforme* L. (Nat. Hist. II(9): 34-35, tab. 53. 1778), he noted "delivered to me by an East Indian skipper from the Cape". Throughout the *Natuurlijke Historie*, Houttuyn, discussing many of his Cape specimens, did not mention a collector's name. Quite likely he obtained this collection through one of those "private enterprises" that were so strictly forbidden by the VOC and so the origin had to be kept secret. Thunberg, who stayed at the Cape from 1772 until 1775, was not mentioned as the collector of this Cape herbarium. On the contrary, Thunberg was unaware of its existence until he visited Houttuyn in October 1778, when he inspected it and saw species in it that he had collected, e.g. *Atractylis angustifolia* Thunb. ex Houtt. and *Cineraria incisa*.

The Governor of the Cape at that time, Rijk Tulbagh (1699-1771), known for his good offices in the shipment of specimens to Linnaeus (GUNN & CODD, 1981: 352), is not a likely source. In the discussion on *Tulbaghia* L. (Nat. Hist. II(12): 127-128. 1780), Houttuyn mentioned that this genus was named after the late Mr. Tulbagh, former Governor of the Cape of Good Hope, "by whom a great number of Cape seeds, bulbs and dried plants have been delivered to Messrs. Burmannus here, for the use of the Hortus Medicus", but he did not refer to Tulbagh as the collector or intermediary of his Cape herbarium. For the present we must suppose that Houttuyn paid a private collector at the Cape, who sent him specimens. This might have been Jan Andries Auge (1711-1805), who accompanied visiting naturalists such as Thunberg, while D. van Royen called him "our ocellus botanicus [= "botanical eye", "Auge" in German] at the Cape" (WIJNANDS, 1992: 490). He may well have been more than that; Auge was probably the main collector of Houttuyn's Cape herbarium (WIJNANDS, 1990a).

The Ceylon herbarium

Houttuyn's herbarium of Ceylonese plants consisted of two parts, one collected by Thunberg (see Appendix I), the other (again ?) from an anonymous smuggler. On his way back from Japan and Java, Thunberg stayed in Ceylon from 20 August 1777 until 6 February 1778 (THUNBERG, 1796, vol. 4: 205, 315), making trips to Matara and Negombo (THUNBERG, 1796, vol. 4: 248-282). Houttuyn apparently received his first specimens in 1783 (Nat. Hist. II(14): 43-44, tab. 94, fig. 1; see *Ophioglossum zeilanicum* Houtt. below under n° 73). The sheets of *Ochna nitida* sensu DC. [non *O. nitida* Sw.], recognised by Houttuyn as belonging to the Linnaean class XIII *Polyandria*, were not discussed in his treatments of *Polyandria* in Nat. Hist. II(5) published in 1775 or II(9) published on 29 August 1778. Perhaps Thunberg donated Ceylon specimens during his visit in October 1778, so Houttuyn had no previous opportunity to include them.

The anonymous part of Houttuyn's Ceylon herbarium consisted of "35 Ceylonese dried plants", as mentioned in his auction catalogue sub H. They were not necessarily gathered by a European collector. In the course of the 18th century, the Dutch government of Ceylon sent each year a selection of seeds collected by the current Surgeon of the Company to the botanical gardens in Leiden and in Amsterdam. Sometimes dried specimens were sent as well (HENIGER, 1986: 77). For instance, D. van Royen, Professor in Leiden, received a Ceylonese herbarium in or shortly before 1770, which Thunberg studied on 17 October 1770 before he left for the East (THUNBERG, 1796, vol. 1: 18). In 1774 (Nat. Hist. II(2): 336), Houttuyn recorded that Burman recently had received "a collection of excellently beautiful, large dried plants of Ceylon". Apparently it arrived in Amsterdam in June 1773, together with another box with Ceylonese plant material addressed to van Royen (ARA, VOC 281, meeting of the Chamber of Amsterdam on 17 June 1773).

The Japan herbarium

According to the auction catalogue of 1789 (HOUTTUYN, 1789a), Houttuyn's herbarium from Japan consisted entirely of Thunberg collections. Houttuyn mentioned this herbarium first in 1779 (Nat. Hist. II(10): 368); in a note under *Sonchus canadensis* L., he wrote: "In the hot parts of the East and West Indies one hardly finds plants of this kind; but in Japan several ones are found, as it appears to me from the beautiful collection recently made there by the learned Mr. Thunberg and communicated to me by Mr. Radermacher, Extraordinary Councillor of India". This remark suggests that Houttuyn did not receive this herbarium directly from Thunberg on the occasion of his visit in October 1778 (Nat. Hist. II(10): 518-519). Evidently it was Jacobus Cornelis Matheus Radermacher (1741-1783) at Batavia who received Thunberg's collections from Japan and forwarded them to Houttuyn. In a letter dated 25 January 1777 from Batavia to the Burmans, Thunberg wrote that he made herbarium collections in Japan for Radermacher as well. The question remains when Houttuyn received these specimens. From 1777, in part II(7) onwards, he described and illustrated Japanese plants from his herbarium, but without reference to Thunberg. However, in the captions to the plates of part II(8), p. (vi) in 1777, he mentioned in passing that the Japanese plants shown in plates 47, fig. 3 and 48, fig. 1, *Rumex umbellatus* Houtt., and *Truellum japonicum* Houtt., were considered by Thunberg to belong to *Polygonum chinense* L., respectively *P. perfoliatum* Burm. f. This strongly suggests that Houttuyn had Thunberg's Japan herbarium at his disposal a year before the latter's return to Europe. This is not in conflict with the data of his journey to Japan.

Thunberg stayed in the Dutch trading post on the artificial island of Dejima (出島, Tsukishima), in the Bay of Nagasaki, from 13 August 1775 until 3 December 1776 (THUNBERG,



Fig. 2. – *Poinciana pulcherrima* L. Example of a decorative pot in Houttuyn's Java herbarium in L.
[© Nationaal Herbarium Nederland, Naturalis, L]

1796, vol. 2: 414; vol. 4: 156). Initially he was confined to the island and could only study the plants in the small Company garden there. He also purchased plants from visiting Japanese interpreters. The VOC ships left for Batavia in mid-October 1775 and he sent some mounted (!) herbarium specimens with them to Burman f. in Amsterdam, as well as some seeds for the Hortus Medicus and his “patrons”, i.e. Egbert de Vrij Temmink (1706-1785), Jan Deutz (1743-1784), David ten Hoven (1724-1787), and Jan van de Poll Pietersz (1726-1781) (HALL, 1830: 259-262, letter of 15.X.1775).

On 30 January 1776 Thunberg obtained permission from the Japanese governor to botanize in the vicinity of Nagasaki. A second opportunity to collect there occurred in late July 1776, when he obtained a permit for three days (ARA: Archives Dutch Factory Japan, inv. no. 186a, Journal 28.X.1775-22.XI.1776: 24 & 96). Thunberg had to pay excessively for these permits; “By special favour of the Japanese Governor I was permitted to make several excursions around Nagasaki, when I say that for a single day, to collect plants with a big crowd of Japanese, I had to pay 16 or 18 imperiales [“rijksdaalders”, rix-dollars, fl. 2.50], you certainly do not believe me, and when I say that during my stay of 15 months in Japan, I had to pay 1000 imperiales, you will even less believe me” (HALL, 1830: 263).

The main occasion for Thunberg to collect plants was the journey of the Dutch delegation to the court at Edo (Tokyo), 4.III-29.VI.1776 (ARA: Archives Dutch Factory Japan, inv. no. 186a, Journal 28.X.1775-22.XI.1776: 35-51; see STEARN, 1947: 108 for the route). In the spring of 1776, when Thunberg was off to Edo, a few Chinese junks left Nagasaki for Batavia. Usually the Chinese skippers would carry letters and parcels addressed to the Dutch government at Batavia. Probably Radermacher received his consignment of Japanese plants this way and through him, Houttuyn. Thunberg used the next occasion to return with the Dutch fleet to Batavia, where he arrived on 4 January 1777 (THUNBERG, 1796, vol. 4: 158). If a Chinese junk would have taken Houttuyn's Japan collections to Batavia, it could have been shipped with the return fleet of October-November 1776 that arrived in the Netherlands in May-June 1777 (BRUIJN et al., 1979, vol. 3: 500-503). Another possibility is that Thunberg brought the herbarium with him to Batavia and was just in time to send it with the last ships of the fleet that departed on 27 January 1777 and arrived in the Netherlands in September-October 1777. With these ships, Thunberg sent his Japanese material to the Burmans in Amsterdam. He announced the shipment in a letter dated 25 January 1777, two days before the ships sailed. The consignment consisted of one box with mounted herbarium specimens for the Burmans, four small boxes with seeds for the Hortus and his patrons, and one box with living trees, shrubs, and perennials for the same.

The conclusion based on the various possibilities for shipment mentioned above is that Houttuyn received his Japanese collections before June 1777, as the first mention of a Japanese specimen from his own herbarium is in Nat. Hist. II(7): 702, tab. 43, fig. 1, published 11 June 1777 (see *Celosia japonica* Houtt. below under n° 26). The publisher's notice for part 8 is the first that mentions Japanese plants (FUCHS, 1962: 44). A comparison of Houttuyn's discussions on Japanese plants with THUNBERG's *Flora japonica* (1784) shows that Houttuyn's material originated almost exclusively from the vicinity of Nagasaki. Only *Viola hirta* sensu Houtt. (Nat. Hist. II(11): 132-133. 1779) [non *V. hirta* L.] was collected “circum Iedo [Edo]” (THUNBERG, 1784: 326), indicating that this species may have been collected during his visit to the court there. A comprehensive analysis of the plants described on the basis of Thunberg's collections in Japan has been published by WIJNANDS (1990b).

The specimens in Thunberg's Japanese herbarium in UPS-THUNB are available online (EBIHARA et al., 2016).

The Java herbarium

In the auction catalogue, HOUTTUYN (1789a: 12) wrote that his Java herbarium was “mainly collected by Mr. Thunberg in the Island of Java, in the surroundings of Batavia [Jakarta] and Semarang [C. Java] as well as in the Mountains southwards”. It appears from the *Natuurlijke Historie* that Richter and Radermacher also contributed to it.

The identity of Richter is still obscure. According to Houttuyn (Nat. Hist. II(2): 52-53. 1774), he was Second Surgeon in the service of the Dutch East India Company at Batavia, where he was active for many years in the pharmacy as well as the hospital. Possibly he is the same person as Benjamin Richter, Surgeon-major of the Lifeguards of the Dutch Governor General, who had his will drawn up on 27 January 1747 (ARA, VOC 6851, n° 1581). One of the nominated executors of this will was Christiaan Kleynhoff, at the time First Dressing-master of that hospital, who later on became a well-known collector of the Asian plants donated to Johannes Burman and Carl Linnaeus Sr. (FLORIJN, 1986). According to Houttuyn (Nat. Hist. II(2): 52-53. 1774), Richter returned to the Netherlands in 1773 with a collection of plant specimens. He donated part of this to Andreas Bonn (1738-1817?), who was Professor of Anatomy and Surgery since 1771 at the Athenaeum Illustre in Amsterdam and at the Hortus Botanicus. Bonn gave his share of Richter's specimens on extended loan to Houttuyn, who dedicated his volumes on botany to both the Burmans and Bonn. But Houttuyn also received specimens as a gift from Richter. In the *Natuurlijke Historie* he discussed, for example, *Jambolifera pedunculata* sensu Houtt. [non *J. pedunculata* L.] (Houttuyn placed it in *Rutaceae* but is actually a *Myrtaceae*, *Syzygium cuminii* (L.) Skeels), *Limonia diphylla* Houtt., *Psidium cujavillus* Burm. f.,

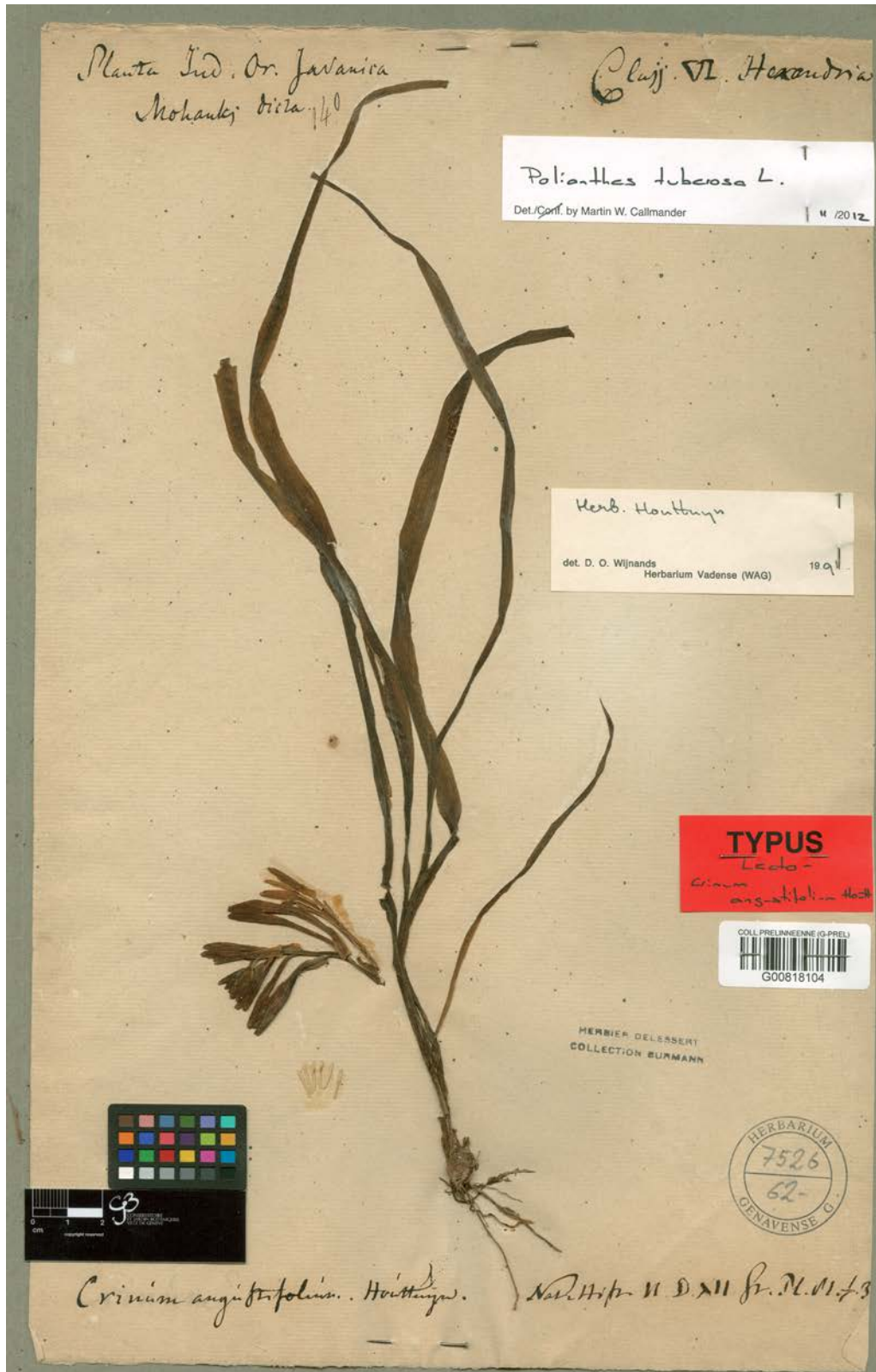


Fig. 3. – Lectotype of *Crinum angustifolium* Houtt. in Houttuyn's Java herbarium in G-PREL.

Melaleuca leucadendra (L.) L., and *Rondeletia asiatica* L. A specimen of *Vitex trifolia* L. is present in L (L-908.267-566: "Ex Java per Richterum allata. 1773") (see also HALLIER f., 1918, as cited by VAN STEENIS-KRUSEMAN, 1950: 435, under *V. bicolor* Willd.). H.J. Lam labelled this specimen as *V. negundo* var. *bicolor* H.J. Lam, but this taxon is now considered to be a synonym of *Vitex trifolia*.

Another part of Houttuyn's Java herbarium originated from Radermacher, one of the last vigorous high officials of the VOC. He arrived at Batavia in 1776, where he initially served as Bailiff of that town, and in 1776? he was promoted to Extraordinary Council of the Indies. Radermacher was a keen amateur botanist who contributed substantially to the foundation of the first Botanical Garden of the Batavian Society of Arts and Sciences at Buitenzorg (Bogor). He shipped at least two collections of specimens from Java to Houttuyn. In 1775 (Nat. Hist. II(5): 337-338, tab. 26, fig. 2), discussing *Volkameria serrata* L., Houttuyn mentioned a fruiting branch under the vernacular name "Pegougoet, with many other rare plants sent from East India by the most respected Mr. Radermacher, bailiff at Batavia". Founding the genus *Assa* Houtt. (Nat. Hist. II(5): 274. 1775; = *Tetracera* L.), he stated that he was describing "a plant of which I receive a small branch from East India at present". VAN STEENIS & VELDKAMP (1973: 151) assumed that Houttuyn's type specimen of *Assa indica* Houtt., found by Hoogland in L, was collected by Thunberg, but this cannot be correct. Thunberg's first visit to Java was from 18 May to 21 June 1775 (THUNBERG, 1796, 2: 226, 401). The next fleet bound for Holland left Batavia in October-November 1775 and arrived in late spring 1776 in Holland (BRUIJN et al., 1979, vol. 3: 504-507), some months after Houttuyn's publication of *Assa*. Thus, more likely, it was Radermacher who collected the specimens shortly before 1775.

The second collection that Radermacher sent to Houttuyn was mentioned in 1777 (Nat. Hist. II(7): 539-540, tab. 42, fig. 1; *Convolvulus obscurus* L.), "in the beautiful collection of East Indian plants, kindly delivered to me by J.C.M. Radermacher Esq., Extraordinary Councillor of Dutch India, this year, I find a species of Bindweed". Houttuyn's type specimen of *Ipomoea pilosa* Houtt. (Nat. Hist. II(7): 573-574, tab. 42, fig. 2. 1777), "from my said East India collection", probably formed part of this Radermacher shipment as well, although there is a possibility that Thunberg made this collection. On his way back from Japan, Thunberg arrived on 4 January 1777 at Batavia and was frequently invited for dinner by Radermacher (THUNBERG, 1796, vol. 4: 162-163). The last ships that could have reached Holland in 1777 left from Batavia on 27 January (BRUIJN et al., 1979, vol. 3: 504-505).

The third part of Houttuyn's Java herbarium consists of Thunberg's collections from the surroundings of Batavia and Semarang. Radermacher and Friedrich Baron von Wurmb

(1742-1781) (not mentioned by VAN STEENIS-KRUSEMAN, 1950) joined him and their collections may make part of this herbarium. When and how Houttuyn received these specimens cannot be ascertained from the available evidence.

Thunberg's trip to Semarang lasted from 23 March to 1 June 1777 (THUNBERG, 1796, vol. 4: 164-188). The first opportunity to ship plants from there to Holland was the fleet of October-November 1777, mentioned above. However, HOUTTUYN (1778) discussed in part II(9 and later ones) many of his specimens from Java, but he did not mention Thunberg as the collector. Only in 1783, in parts 13 and 14 on grasses, ferns, mosses, and lichens, did he cite many specimens as being collected by Thunberg in Java. Our provisional conclusion must therefore be that Radermacher presented these to Houttuyn directly or more likely indirectly between 1778 and 1783. Quite a few Thunberg collections from Java are present in L, e.g. *Boerhavia diffusa* L. (VAN STEENIS & VELDKAMP, 1973: 151) from the vicinity of Semarang.

Houttuyn's systematic botany legacy

Nomenclature of Houttuyn's names

The botanical part of *Natuurlijke Historie* was published between 1773 and 1783. In many cases Houttuyn described new species on the basis of Thunberg's specimens before LINNAEUS f. (1782), MURRAY (1784), or THUNBERG (between 1784 and 1825) did; see MERRILL (1938, 1939) for a discussion of this. Sometimes Houttuyn coined the names himself, in other cases he adopted Thunberg's binomials written on the sheets or from oral suggestions made when Thunberg visited him in October 1778. In these cases the correct author citation is "Houtt." Only in those instances where Houttuyn quoted Thunberg as the origin of a name may the citation "Thunb. ex Houtt." be used (MCNEILL et al., 2012: Art. 46.5) (see *Acrostichum bastatum* Thunb. ex Houtt. below under n° 2 for an example). Houttuyn based his names primarily on the material in his possession but also from other Dutch herbaria, e.g. those of the Burmans, father and son, Johan Frederik Gronovius (1686-1762), and the van Royens. We have not found a connection with Clifford. This association with the Burmans might explain the presence of Houttuyn material in AMD (now at L), although no sheets bear any indication of ever having been part of their herbarium (WIJNANDS, 1987).

The identical but later names published by Linnaeus f. and Thunberg are based on the specimens in their own herbaria, and although some might consider them to be homonyms, we regard them as isonyms because their types are duplicates of the same gatherings (see Art. 6.3, note 2). This may cause troublesome complications, because many later authors referred to Linnaeus f. and Thunberg since Houttuyn's publications were generally unknown, a situation that has persisted until now. Examples include, for instance *Acrostichum bastatum* and



Fig. 4. – Lectotype of *Anthyllis ensifolia* Houtt. in Houttuyn's Cape herbarium in G-PREL.

Bromus japonicus Houtt. (1782), while more than 50 infra-specific taxa have been described under the later isonym *B. japonicus* Thunb. (1784). These names are legitimate according to Art. 55.2: the authorship of the specific name may be corrected, the later one being an isonym without nomenclatural status (Art. 6.3, note 2).

Typification of the names listed below follows the International Code of Nomenclature (McNEILL et al., 2012) and the very useful user's guide by TURLAND (2013). As indicated above, the main set of the Houttuyn herbarium has been located and is now part of the Pre-Linnaean collection in Geneva (G-PREL). Nevertheless, because of the complex history of the specimens that Houttuyn may have used for his discussions in the *Natuurlijke Historie* and the fact that several original sheets have been trimmed and possibly split, we have chosen to designate lectotypes even though the vast majority of the names published by Houttuyn are associated to a single gathering of original material in G-PREL, generally with Houttuyn's handwriting, although the *Natuurlijke Historie* plates can also be considered as part of the original material. Designating original specimens from Houttuyn's herbarium as lectotypes will avoid any future doubts about the typification of his binomials. Any duplicates deposited elsewhere (e.g. in UPS-THUNB) are thus iso(lecto)types. For names validated by Thunberg, original material now at UPS-THUNB is considered to represent material used by him (Art. 9.1). Therefore, if a single gathering is present at UPS-THUNB, it is considered as the holotype and any duplicates in G-PREL as isotypes.

Citations of the *Natuurlijke Historie* presented in the section below follow the abbreviations used above in this paper. Nat. Hist. II(5) refers to *Natuurlijke Historie* II, vol. 5, etc. (HOUTTUYN, 1773-1783a) and *Aanwyz. Plaat.* refers to the unpaginated pamphlet (pages indicated below between square brackets) that contained instructions to the binder, which may be absent in some copies or bound in an unspecified place in others. Specimens from L are cited by their sheet numbers (within brackets) because they were quoted as such in the original manuscript left by the first author. Today they have L barcodes, which unfortunately have not been linked to the sheet numbers. Specimens from G are cited with their respective barcodes (within square brackets). UPS-THUNB specimens are cited by their assigned numbers in the Thunberg herbarium.

Cape, Ceylon, Japan, and Java herbaria refer to the different parts of Houttuyn's herbarium (see above). Appendix II presents an index of all 111 names cited below with their current usage (accepted names and heterotypic synonyms) sorted by families.

Lectotypifications and miscellaneous notes associated with Houttuyn's herbarium and names

1. *Abrus precatorius* L., Syst. Nat. ed. 12, 2: 472. 1767 [cited in Nat. Hist. II(5): *Aanwyz. Plaat.* [2], 436, tab. 37, fig. 3. 1775].

Notes. – Houttuyn's plate was based on a specimen from China (collected by Osbeck?) (see VAN STEENIS-KRUSEMAN, 1950: 395), but there is a specimen in G-PREL [G00818009] from his Ceylon herbarium. Two additional specimens from Ceylon are present in the Thunberg herbarium (UPS-THUNB n° 16299 and n° 16300).

2. *Acrostichum hastatum* Thunb. ex Houtt., Nat. Hist. II(14): *Aanwyz. Plaat.* [1], 68, tab. 95, fig. 2. 1783.

= *Pyrrosia hastata* (Thunb. ex Houtt.) Ching in Bull. Chin. Bot. Soc. 1: 48. 1935.

Lectotypus (first step designated by VELDKAMP, 2004: 191; second step designated here by Wijnands, Veldkamp, Callmänder & Fumeaux): JAPAN: *Thunberg s.n.* (G-PREL [G00818012]!); isolecto-: UPS-THUNB n° 24584 image seen) (Fig. 5).

Notes. – The type material is present in the Japan herbarium in G-PREL with Thunberg's handwriting, and was found by the first author (Fig. 5). THUNBERG (1784: tab. 34) published an illustration of his later isonym that appeared in MURRAY (1784: 928), and original material was located in UPS-THUNB. HOVENKAMP (1986: 186) designated Houttuyn's plate as the lectotype. However, since the original specimen from which the illustration clearly was made has been located, the lectotypification was superfluous (see Art. 9.19).

In reality, the situation is more complicated, as fully discussed by VELDKAMP (2004), who erroneously assumed that *Acrostichum hastatum* Thunb. ex Houtt. and *A. hastatum* Thunb., both based on Thunberg collections, "might quite possibly be parts of the same gathering" (Art. 8.2). But he went on to write that "because these combinations were based on different specimens deposited in different places" they would be "heterotypic, synonymous homonyms", as has previously been pointed out by TAGAWA (1957: 354).

This is not in agreement with Art. 9.3. Accordingly, here and elsewhere, the specimens collected by Thunberg and used by Houttuyn and by Thunberg are regarded as duplicates of the same gathering. Houttuyn's names are generally the older ones (see *Osmunda japonica* Houtt. below under n° 76 for an exception). In the present case, the name published by Thunberg is an isonym with no nomenclatural status (Art. 6.3 Note 2). The author citation should therefore be adjusted (but see above), making the correct name *Pyrrosia hastata*, by which name this ornamental species is universally known.

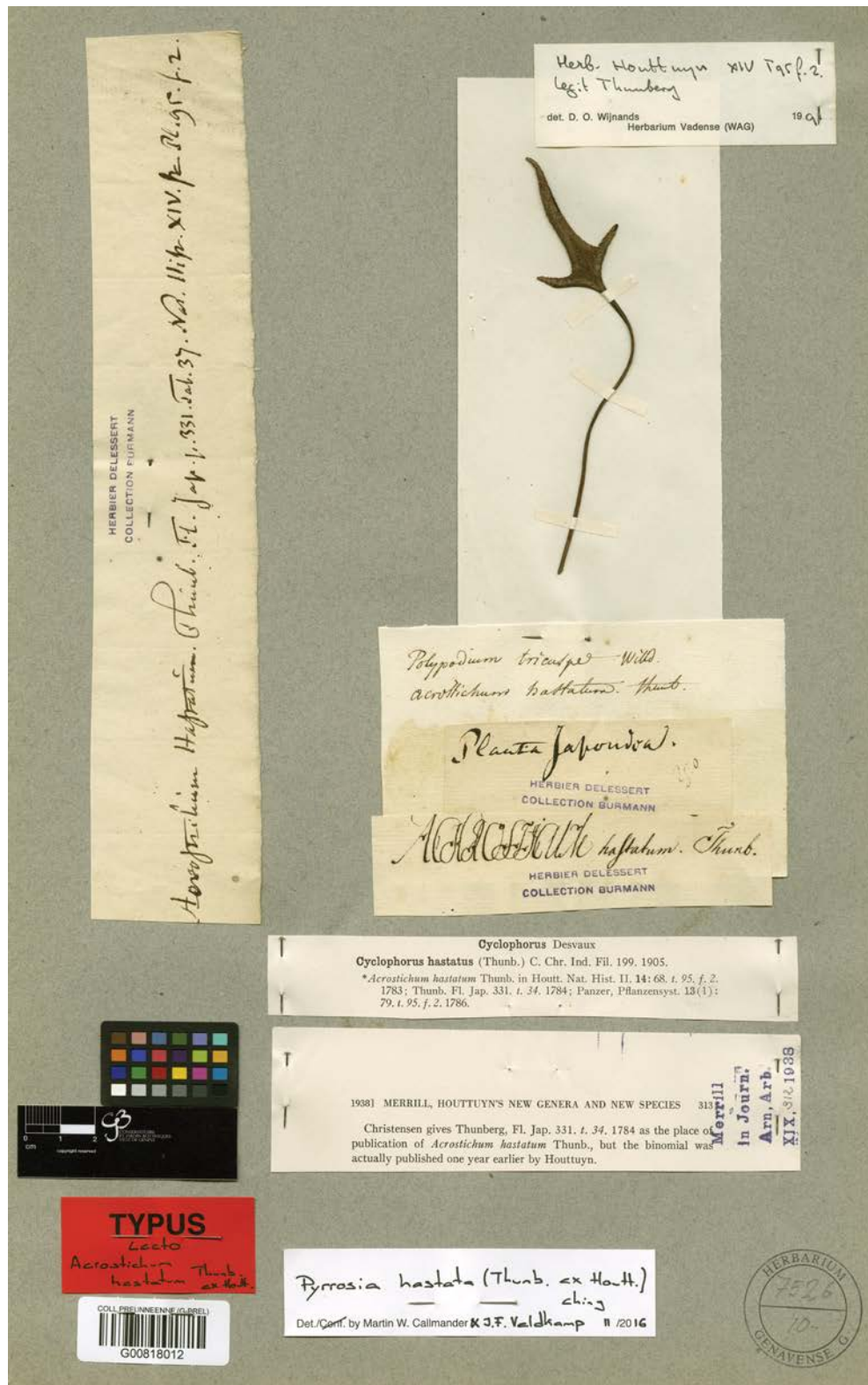


Fig. 5. – Lectotype of *Acrostichum hastatum* Thunb. ex Houtt. in Houttuyn's Japan herbarium in G-PREL.

3. *Agrostis javanica* Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [2], 225, tab. 90, fig. 5. 1782.

Lectotypus (designated here by Veldkamp & Callmander): **INDONESIA. Java:** *Thunberg s.n.* [?] (G-PREL [G00818013]!).

= *Ischaemum muticum* L., Sp. Pl.: 1049. 1753.

Notes. – MERRILL (1938: 319) discussed the G-PREL specimen but did not recognise it as Houttuyn's. A Houttuyn specimen of *Agrostis javanica* in L (L-908.77-91) represents *Zoysia matrella* (L.) Merr. (Goudswaard, 1980: 170) with watermark "IV" (Jean Villedary). The single gathering present in the Houttuyn herbarium in G-PREL is designated here as the lectotype.

4. *Aira arundinacea* sensu Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [2], 229, tab. 91, fig. 1. 1782 [non *A. arundinacea* L.].

= *Panicum bisulcatum* Thunb. in Nova Acta Regiae Soc. Sci. Upsal. 7: 141. 1815. **Lectotypus** (designated here by Veldkamp & Callmander): **JAPAN:** *Thunberg s.n.* (UPS-THUNB n° 1817 image seen; isolecto-: G-PREL [G00818157]!, UPS-THUNB n° 1818 image seen).

Notes. – Houttuyn's text here is rather complicated and one may have trouble interpreting what exactly he was trying to convey. We have concluded that in *Aanwyz. Plaat.* he did not propose *Aira arundinacea* as a name for the "Japansch Rietgras", but that plate 91 with an illustration of the latter had to be placed opposite ("tegenover", *Aanwyz. Plaat.* [2]) or next to ("nevens", Nat. Hist. II(13): 229. 1782) the citation of *A. arundinacea* ("aangehaald", *Aanwyz. Plaat.* [1]).

Houttuyn discussed on pp. 229-230 three species under the heading *Aira arundinacea*. The first is the Linnaean one from the Near East, the "Levantsch", now *Eragrostis collina* Trin. Linnaeus, cited by Houttuyn, gave the phrase name "AIRA panicula oblonga secunda mutica imbricata, foliis planis", suggesting that he had seen more than just Tournefort's phrase name "Gramen orientale paniculatum, portulacea semine", where these characters are not mentioned. However, there is no specimen present in the Linnaean herbarium and he could never have seen that of Tournefort. In the absence of further data, there was little that Houttuyn could have added.

The second "Rietgras", "Indisch", is mentioned in a sentence that is grammatically incorrect. It would seem that it should have begun with something like "Voor" [in place of]. The species clearly is *Aira indica* L., with a somewhat complicated nomenclatural history, which is beyond the present discussion. Houttuyn said he had transferred it to the "Trosachtig of Gekropte Panikgras", i.e. *Panicum conglomeratum* L., "Trosachtig [panikgras]" found in Nat. Hist.

II(13): 178. 1782. This is now known as *Sacciolepis indica* (L.) Chase. Instead, Houttuyn replaced the latter by a very beautiful "Japansch Rietgras", which he said had much similarity in growth with the "Levantsch", according to the diagnosis ("bepaling"). A description of his own Thunberg specimen in the Japan herbarium in G-PREL [G00818157] follows. No combination is proposed for it here.

In the Thunberg herbarium, there are two duplicates (UPS-THUNB n° 1817 and 1818) on which Thunberg based his *Panicum bisulcatum* and from which the lectotype has been selected.

5. *Amaranthus mangostanus* sensu Houtt., Nat. Hist. II(11): Aanwyz. Plaat. [2], 254, tab. 72, fig. 1. 1779 [non *A. mangostanus* L.].

= *Amaranthus interruptus* R. Br., Prodr.: 414. 1810.

Notes. – There is a collection in the Japan herbarium collected by Thunberg (G-PREL [G00818105]). It is a good match for the plate.

6. *Amaryllis dubia* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 181, tab. 82, fig. 1. 1780 [non *A. dubia* L.].

Lectotypus (designated here by Wijnands): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818014]!).

= *Nerine sarniensis* (L.) Herb. in Bot. Mag.: sub tab. 2124. 1820.

Notes. – A single element of original material is present in the Cape herbarium. This collection is designated here as the lectotype.

7. *Anacardium occidentale* L. Sp. Pl.: 383. 1753 [cited in Nat. Hist. II(2): Aanwyz. Plaat. [2], 409, tab. 9, fig. 1. 1774].

Notes. – Houttuyn's plate represents a fruit and its cross section. There is an unannotated specimen from his Ceylon herbarium in G-PREL [G00818015]. Another specimen from Ceylon is in the Thunberg herbarium (UPS-THUNB n° 24033).

8. *Anemone japonica* Houtt., Nat. Hist. II(9): Aanwyz. Plaat. [2], 191, tab. 55, fig. 1. 1778.

= *Clematis florida* Thunb. in Murr., Syst. Veg. ed. 14: 512. V-VI.1784.

Lectotypus (designated here by Veldkamp): **JAPAN:** *Thunberg s.n.* (G-PREL [G00818016]!; isolecto-: UPS-THUNB n° 13017!).

Notes. – The type specimen of *Anemone japonica* from Japan was collected by Thunberg. WIJNANDS (1988: 3, 5) equated this with *Clematis florida* Thunb., a name that is also cited in THUNBERG (VIII.1784: 240). *Clematis florida* is the accepted name as Houttuyn's epithet in *Clematis* L. is preceded by *C. japonica* Thunb. published in MURRAY (1784: 512). Its type specimen is in the Thunberg herbarium (UPS-THUNB n° 13023). Following to our remarks under *Acrostichum hastatum* above, these specimens are duplicates of each other and the combinations are homotypic.

9. *Anthericum bulbine* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 353, tab. 80, fig. 3. 1780.

Lectotypus (designated here by Veldkamp & Callmander): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818006]!; probable isolecto-: G-PREL [G00818007, G00818008]!).

= *Pontederia stricta* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 9. 1768. = *Onixotis stricta* (Burm. f.) Wijnands in Bothalia 21: 157. 1991. = *Wurmbea stricta* (Burm. f.) J.C. Manning & Vinn. in Taxon 56: 177. 2007.

Lectotypus (first step designated by WIJNANDS, 1991: 157; second step designated here by Wijnands & Callmander): **SOUTH AFRICA**: Cape, *Auge s.n.* (G-PREL [G00818007]!; probable isolecto-: G-PREL [G00818006, G00818008]!).

Notes. – The lectotype of *Anthericum bulbine* is in the Cape herbarium, probably collected by Auge (WIJNANDS, 1991: 157; 1992: 499). We may never be certain whether Houttuyn's name is a later heterotypic synonym, as it is probably also based on an Auge specimen. It is not a *nom. provisorium*, because although he indicated that “Possibly [!] the Cape plant will belong to one of the species mentioned”, he did accept it (McNEILL et al., 2012: Art. 36.1). A second step lectotypification of *Pontederia stricta* is made here as two collections are present in the Burman herbarium in G-PREL [G00818007, G00818008].

10. *Antholyza aletroides* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 1. 1768.

= *Watsonia aletroides* (Burm. f.) Ker Gawl. in Bot. Mag.: tab. 533. 1801.

Lectotypus (first step designated by GOLDBLATT, 1989: 50; second step designated here by Veldkamp & Callmander): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818018]!; isolecto-: G-PREL [G00818017, G00818019, G00818020]!).

Notes. – GOLDBLATT (1989: 50) cited a *Burman herbarium s.n.* collection as the lectotype. This implicit lectotypification requires a second step because four collections are present in G-PREL from two different origins: 3 from the Burman herbarium and one from the Houttuyn herbarium [G00818017]. The lectotype designated here is the most complete collection from the Burman herbarium. The Cape herbarium collection is very likely a duplicate as all four collections were very likely collected by Auge (see *Anthericum bulbine* above under n° 9).

11. *Antholyza caryophyllacea* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 1. 1768.

= *Gladiolus caryophyllaceus* (Burm. f.) Poir. in Lam., Encycl. Suppl. 2: 795. 1812.

Lectotypus (designated by LEWIS & OBERMEYER, 1971: 114): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818021]!; isolecto-: G-PREL [G00818022]!).

Notes. – LEWIS & OBERMEYER (1971: 114) designated a specimen in Houttuyn's Cape herbarium preserved in G-PREL as the lectotype. The designation of a clear single specimen makes this lectotypification perfectly valid but unfortunate. Indeed, another specimen in the Burman herbarium with the handwriting of Burm. f. is present in G-PREL [G00818022], which should have been considered for the lectotype. As both specimens are very likely duplicates collected by Auge, the latter must be considered to be an isolectotype.

12. *Anthyllis ensifolia* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [2], 120, tab. 62, fig. 3. 1779.

= *Psoralea ensifolia* (Houtt.) Merr. in J. Arnold Arbor. 19: 348. 1938.

Lectotypus (designated here by Callmander): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818131]!) (Fig. 4).

Notes. – A single collection of original material is in the Houttuyn Cape herbarium in G-PREL. It is a good match for the plate and is designated here as the lectotype (Fig. 4).

13. *Apocynum frutescens* L., Sp. Pl.: 213. 1753 [cited in Nat. Hist. II(7): 746. 1777].

= *Ichnocarpus frutescens* (L.) W.T. Aiton, Hort. Kew ed. 2, 2: 69. 1811.

Notes. – A specimen in the Ceylon herbarium is in G-PREL [G00818025]. Two Thunberg specimens from Ceylon have been located in the Thunberg herbarium (UPS-THUNB n° 6198 and n° 6199).

14. *Arctotis aspera* L., Sp. Pl.: 922. 1753 [cited in Nat. Hist. II(11): 90. 1779].

Notes. – A specimen is present in the Cape herbarium in G-PREL [G00818026]. Two Thunberg collections are also present in the Thunberg herbarium (UPS-THUNB n° 20748 and n° 20749).

15. *Argostemma borragineum* Blume ex DC., Prodr. 4: 417. 1830.

Notes. – A specimen from the Java herbarium is in L (L-908.352-509). It was collected in the mountains south of Batavia and bears the watermark “IV” (Villedary).

16. *Aspalathus fascicularis* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 21. 1768.

Lectotypus (designated here by Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818024]!).

Notes. – *Aspalathus fascicularis* was cited by DAHLGREN (1963: 252) as a *nom. dubium* and not treated in his twelve papers published in *Botaniska Notiser* and *Opera Botanica* [see VAN WYK (1987) for a complete list of Dahlgren's publications]. The Houttuyn specimen from the Cape in G-PREL was determined in 1959 by Dahlgren as *A. vermiculata* Lam. and is designated here as the lectotype. *Aspalathus fascicularis* should be regarded as the correct name for the taxon often referred to by the later name *A. vermiculata* Lam.

17. *Aspalathus multiflora* Thunb., Prodr. Fl. Cap. 2: 128. 1800.

Lectotypus (designated by DAHLGREN, 1968: 60): **SOUTH AFRICA:** “Cap. b. spei a”, *Thunberg s.n.* (UPS-THUNB n° 16487 image seen; isolecto-: LD-1241837 image seen).
= *Aspalathus vermiculata* Lam., Encycl. 1: 288. 1783.

Notes. – Two collections are present in UPS-THUNB. One is identified as *Aspalathus vermiculata* Lam. by W.H. Harvey and was designated as the lectotype by DAHLGREN (1968: 60). The second collection was identified as *A. thymifolia* var. *albiflora* (Eckl. & Zeyh.) Harv. by W.H. Harvey (see HARVEY, 1862). The collection in LD is stamped “Museum Acharianum” and is therefore regarded here as an isolectotype, given that “Acharius and Thunberg were close friends and exchanged material”, according to NORDENSTAM & BUYS (2011: 1191).

18. *Aspalathus pedunculata* Houtt., Nat. Hist. II(5): Aanwyz. Plaat. [3], 475, tab. 28, fig. 2. 1775.

Lectotypus (designated by DAHLGREN, 1968: 70): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818023]!).

Notes. – The lectotype is in the Cape herbarium and represents a clear match for the plate. MERRILL's (1938: 345) interpretation of this plate as *Aspalathus divaricata* Thunb. is incorrect. The type specimen of *A. squamosa* Thunb. in the Thunberg herbarium (UPS-THUNB n° 16508) was identified as *A. pedunculata* by W.H. Harvey, but DAHLGREN (1960: 313) equated it with *A. bracteata* Thunb.

19. *Assa indica* Houtt. ex Christm. & Panz., Vollst. Pflanzensyst. 4: 40, tab. 26, fig. 1. 1779.

= *Tetracera indica* (Houtt. ex Christm. & Panz.) Merr., Interpr. Herb. Amboin.: 367. 1917.

Lectotypus (designated by HOOGLAND, 1953: 207): **INDONESIA, Java:** *Radermacher s.n.* [?] (L-902.111-291!).

Notes. – The genus *Assa* Houtt. was validly published by Houttuyn in *Natuurlijke Historie* (Nat. Hist. II(5): 275. 1775) with no designation of a type species. It is now accepted under the Linnaean name *Tetracera* L.

Assa indica was published four years later by CHRISTMANN & PANZER (1777-1788). A Thunberg specimen (the type of *Wahlbomia indica* Thunb.) is in the Thunberg herbarium (UPS-THUNB n° 12837), which is not a duplicate as it was collected by Thunberg after 1775.

20. *Athanasia pubescens* sensu Houtt., Nat. Hist. II(6): 39. 1776 [non *A. pubescens* (L.) L.].

= *Athanasia tomentosa* Thunb., Prodr. Pl. Cap.: 144. 1800.
Typus: **SOUTH AFRICA:** Cape, *Thunberg s.n.* (holo-: UPS-THUNB n° 18960 image seen).

Notes. – A specimen in the Cape herbarium is in G-PREL [G00818027]. It belongs to *Athanasia tomentosa* but is probably not a duplicate of the Thunberg collection at UPS-THUNB.

21. *Atractylis angustifolia* Thunb. ex Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 518, tab. 67, fig. 1. 1779.

= *Berkhaya angustifolia* (Thunb. ex Houtt.) Merr. in J. Arnold Arbor. 19: 369. 1938.

Lectotypus (designated here by Veldkamp & Callmander): **SOUTH AFRICA:** Cape, *Thunberg s.n.* (G-PREL [G00818028]!).

Notes. – Original material is present in the Cape herbarium, and the single collection is designated here as the lectotype. There appears to be no corresponding specimen in UPS-THUNB. Only two sheets of *Atractylis humilis* L. have been located (UPS-THUNB n° 18590, Spain; UPS-THUNB n° 18591, *sine loco*).

22. *Averrhoa carambola* L., Sp. Pl.: 428. 1753 [cited in Nat. Hist. II(2): 477. 1774].

Notes. – A specimen in the Java herbarium, annotated by Houttuyn “omstreeks Batavia” [around Batavia], is in G-PREL [G00818029]. Two specimens are also present in the Thunberg herbarium: UPS-THUNB n° 10989 in the Java herbarium and UPS-THUNB n° 10999 from Ceylon.

23. *Boerhavia diffusa* L., Sp. Pl.: 3. 1753 [cited in Nat. Hist. II(7): 43. 1777].

Notes. – A specimen in the Java herbarium, annotated as such by Thunberg, is in L (L-908.157-428) (see VAN STEENIS & VELDKAMP, 1973: 151). A specimen without provenance is present in the Thunberg herbarium (UPS-THUNB n° 65). Three collections are in the Houttuyn herbarium in G-PREL, respectively determined in Houttuyn handwriting as *B. diffusa* [G00818030], *B. hirsuta* L. [G00818032], and *B. erecta* L. [G00818031].

24. *Bromus japonicus* Thunb. ex Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [2], 315, tab. 91, fig. 4. 1782.

Lectotypus (designated here by Veldkamp): JAPAN: *Thunberg s.n.* (G-PREL [G00380028]!); isolecto-: UPS-THUNB n° 2503 image seen).

Notes. – The priority of the Houttuyn name has been overlooked by almost everyone, even MERRILL (1938), with the exception of a casual mention by NAKAI (1952: 136). Thunberg in MURRAY (1784: 119) described the isonym *Bromus japonicus* Thunb. (also cited in THUNBERG, 1784: 52, tab. 11). The type material of Houttuyn's earlier name is in the Japan herbarium in G-PREL. PÉNZES (1936: 18) cited the type of Thunberg's isonym at UPS-THUNB. This collection is here considered as an isolectotype.

25. *Caucalis japonica* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [1], 42, tab. 45, fig. 1. 1777.

= *Torilis japonica* (Houtt.) DC., Prodr. 4: 219. 1830.

Lectotypus (designated here by Veldkamp): JAPAN: *Thunberg s.n.* (G-PREL [G00096184]!); isolecto-: G-PREL [G00818003] specimen A!).

Notes. – The lectotype is in the Japan herbarium in G-PREL. According to a label on the sheet, there should be another specimen under *T. scabra*. This is G-PREL [G00818003], labelled as *Chaerophyllum hirsutum* L. by Thunberg; it is a mixture of “A”: *Torilis japonica* and “B”: *Torilis scabra* (Thunb.) DC. in A.-P. de Candolle's handwriting.

In the Thunberg herbarium there are two sheets of *Chaerophyllum hirsutum* without provenance (UPS-THUNB n° 7164 and n° 7165), which might be duplicates of the G-PREL collection.

26. *Celosia japonica* Houtt., Nat. Hist. II(7): Aanwyz. Plaat. [2], 702, tab. 43, fig. 1. 1777.

Lectotypus (designated here by Callmänder & Fumeaux): JAPAN: *Thunberg s.n.* (G-PREL [G00818101]!).

= *Celosia pyramidalis* Burm. f., Fl. Indica: 65, tab. 25, fig. 1. 1768 [cited in Nat. Hist. II(7): 705]. 1777.

Lectotypus (designated here by Callmänder & Fumeaux): [INDONESIA. Java]: (Burman f., Fl. Indica: tab. 25, fig. 1. 1768).

= *Celosia argentea* L., Sp. Pl.: 205. 1753.

Notes. – Original material of *Celosia japonica* accepted under the Linnaean name *C. argentea* is present in G-PREL. The sole collection in the Japan herbarium collected by Thunberg is designated here as the lectotype of *C. japonica*. A Thunberg collection annotated by himself and Houttuyn as “*Celosia pyramidalis* Burm.” is in the Java herbarium in G-PREL [G00818112]. This collection cannot be considered as original material as the name is based on a cultivated plant originating from seeds collected in Java and grown at the Botanical Garden in Amsterdam (original description and Nat. Hist. II(7): 705. 1777). Figure 1 of plate 25 in *Flora Indica* by Burman f. is therefore designated as the lectotype in the absence of any original material.

A Pryon collection is present in the Burman herbarium (G-PREL [G00818142]), annotated by Pryon as “*Amarantus foliis angustis, pyramidalis flagellis, luteo purpureis*”.

There is a specimen in UPS-THUNB with no indication of its provenance (UPS-THUNB n° 5929). Another specimen was made from material grown much later in the Uppsala Botanical Garden (UPS-THUNB n° 5940); it has a fair resemblance to Houttuyn's plate.

Celosia japonica is the first report by Houttuyn of a specimen from Japan in his own herbarium (see introduction p. 162).

27. *Chaerophyllum scabrum* Thunb. in Murr., Syst. Veg. ed. 14: 289. V-VI.1784.

= *Torilis scabra* (Thunb.) DC., Prodr. 4: 219-220. 1830.

Lectotypus (designated here by Veldkamp & Callmander): JAPAN: *Thunberg s.n.* (UPS-THUNB n° 7166!).

Notes. – *Chaerophyllum scabrum* was also cited in the *Flora japonica* (THUNBERG 1784: 119). Two collections are present in the Thunberg herbarium, one collection from Japan and the other from a cultivated plant grown in Uppsala (UPS-THUNB n° 7167). We designate the former, from Japan, as lectotype. It is uncertain whether another specimen in G-PREL [G00818003 specimen B] is original material as its provenance is not given, but most likely it is an isolectotype.

28. *Cineraria incisa* Thunb. ex Houtt., Nat. Hist. II(10): 693. 1779.

Lectotypus (designated here by Wijnands): SOUTH AFRICA: Cape, *Thunberg s.n.* (G-DC [G00204742]!); isolecto-: UPS-THUNB n° 19830 image seen).

= *Senecio erosus* L. f., Suppl. Pl.: 370. 1782.

Notes. – Houttuyn wrote in Nat. Hist. II(10): 693. 1779 that “Mr. Thunberg recently has found yet a new one ... in my collections and had named it *Cineraria incisa*”, followed by a brief diagnosis. Buried in the text, it is no wonder that even MERRILL (1938) overlooked this name in his survey of Houttuyn's novelties. It is not mentioned in the survey by ARNOLD & DE WET either (1993: 759).

Although *Cineraria incisa* was named by Thunberg when he visited Amsterdam in 1778, he did not publish it. Instead, he described the species as *Doria incisa* Thunb. based on *Thunberg s.n.* (UPS-THUNB n° 19830) (THUNBERG, 1800a: 156) and presumably again a little later (THUNBERG, 1800b: 167). WILLDENOW (1803: 2074), citing these two references, made the “new” combination *Cineraria incisa* (Thunb.) Willd., which is a later homonym, or perhaps even an isonym.

CANDOLLE (1838: 438) based *Brachyrhynchos trachycarpus* DC. on a Houttuyn sheet in the Delessert herbarium, presumably the type material of *Cineraria incisa* Houtt., but did not mention that name. With a question mark he added *Doria incisa* and without any remark *Cineraria incisa* Willd. The only sheet in G-DC [G00204742] annotated as such (“*Senecio trachycarpus* / Cap / M. Delessert 1833”) is a fragment bearing none of the characteristics of a Houttuyn sheet, but de Candolle cited it as “*Cineraria incisa* Houtt.! in h. Deless.”, so we must assume that this remounted fragment is part of a specimen from Houttuyn's herbarium that remains untraceable to date (no further specimen has been located). For this reason, the fragment is therefore designated here as

the lectotype. Regardless of whether this argument is accepted or not, *Brachyrhynchos trachycarpus* is in any case a superfluous name for either *Cineraria incisa* Houtt. or *Doria incisa* Thunb.

Brachyrhynchos trachycarpus was not mentioned by ARNOLD & DE WET (1993: 769), but they did mention *Doria incisa* as a synonym of the earlier name *Senecio erosus* L. f. (LINNAEUS f., 1782: 370). The name *S. erosus* is not threatened by *Cineraria incisa* because of *Senecio incisus* Thunb. (THUNBERG, 1800a: 158).

29. *Clerodendrum infortunatum* L., Sp. Pl.: 637. 1753.

Notes. – Two specimens in the Java herbarium are present in G-PREL [G00818035, G00818137] with no assigned collectors. Two other specimens collected by Thunberg are in the Ceylon herbarium [G00818138, G00818139], and two specimens are in the Thunberg herbarium (UPS-THUNB n° 14591 and n° 14592) labelled “India orientalis”, which suggests that these are not original Thunberg collections, as he usually labelled them as “Cap. b. spei”, “Ceylon”, “Japan”, “Java”. In Java, this name has been misapplied to *C. viscosum* Vent. (BACKER & BAKHUIZEN VAN DEN BRINK f., 1965: 611; see CALLMANDER et al., 2017).

30. *Clerodendrum paniculatum* L., Mant. Pl. 1: 90. 1767 [cited in Nat. Hist. II(5): 342. 1775].

Notes. – A specimen of this widespread Asian species (“*Planta Ind. Orient. Loliamenta dicta*”) is in L (L-908.352-522); Houttuyn did not discuss it. The vernacular name does not seem to be Malayan / Javanese, so it may have come from Ceylon. A Thunberg collection from Java (UPS-THUNB n° 14593) bears what is presumably another vernacular name, “*Noka nanta*” (or a huge misreading?), and is therefore probably not a duplicate.

31. *Clitoria ternatea* L., Sp. Pl.: 753. 1753 [cited in Nat. Hist. II(10): 170. 1779].

Notes. – There is a specimen in the Ceylon herbarium in G-PREL [G00818033] and another one from Java in G-PREL [G00818034], annotated by Houttuyn as “*Bonga Bi(r)ou*”. Two specimens from Java are present in the Thunberg herbarium (UPS-THUNB n° 10843 and n° 10844).

32. *Convolvulus batatas* L., Sp. Pl.: 154. 1753 [cited in Nat. Hist. II(7): 541. 1777].
 = *Ipomoea batatas* (L.) Lam., Tabl. Encycl. 1: 465. 1793.
Notes. – A specimen from the Japan herbarium is in G-PREL [G00818039]. It belongs to *Stephania japonica* (Thunb.) Miers. Two specimens are present in the Thunberg herbarium; one of them, collected by Thunberg from the Cape (UPS-THUNB n° 4422), is annotated as *Convolvulus batatas*.
33. *Convolvulus capensis* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 5. 1768.
Lectotypus (designated by MEEUSE & WELMAN, 2000: 40): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818038]!; isolecto-: G-PREL [G00818140]!).
Notes. – MEEUSE & WELMAN (2000: 40) implicitly designated a collection in the Houttuyn Cape herbarium as the lectotype. Another collection is present in the Burman herbarium and very likely represents a duplicate collected by Auge. The latter collection is here considered to be an isolectotype and would have been a better choice for the lectotypification. WOOD et al. (2015) also cite the Cape herbarium specimen as the type in their monograph of the genus *Convolvulus* L.
34. *Convolvulus obscurus* L., Sp. Pl. ed. 2: 220. 1762 [cited in Nat. Hist. II(7): Aanwyz. Plaat. [2], 539, tab. 42, fig. 1. 1777].
 = *Ipomoea obscura* (L.) Ker Gawl. in Bot. Reg.: tab. 239. 1817.
Notes. – A specimen sent by Radermacher is mentioned by Houttuyn and is in G-PREL [G00818039]. There seems to be no corresponding specimen in UPS-THUNB.
35. *Corchorus japonicus* Thunb. ex Houtt., Nat. Hist. II(9): Aanwyz. Plaat. [1], 146, tab. 44, fig. 2. 1778.
Lectotypus (designated here by Veldkamp & Callmänder): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818040]!; isolecto-: UPS-THUNB n° 12736!).
 = *Kerria japonica* (L.) DC. in Trans. Linn. Soc. London 12: 157. 1818.
Notes. – A single collection of original material has been located in the Japan herbarium in G-PREL. It is designated here as the lectotype of *Corchorus japonicus*.
36. *Crinita capensis* Houtt., Nat. Hist. II(7): Aanwyz. Plaat. [1], 362, tab. 40, fig. 1. 1777.
 = *Pavetta capensis* (Houtt.) Bremek. in Repert. Spec. Nov. Regni Veg. 37: 166. 1934.
Lectotypus (designated here by Veldkamp): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818041]!).
Notes. – A single element of original material is in the Cape herbarium in G-PREL. This specimen is designated here as the lectotype.
37. *Crinum angustifolium* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 165, tab. 81, fig. 3. 1780.
Lectotypus (designated here by Callmänder): **INDONESIA**. **Java**: *Anon. s.n.* (G-PREL [G00818104]!) (Fig. 3).
 = *Polianthes tuberosa* L., Sp. Pl.: 316. 1753.
Notes. – A single element of original material is in the Java herbarium in G-PREL. This collection is a good match for the plate and is designated here as the lectotype (Fig. 3).
38. *Cyperus javanicus* Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [1], 67, tab. 88, fig. 1. 1782.
Lectotypus (designated here by Veldkamp): **INDONESIA**. **Java**: *Anon. s.n.* (G-PREL [G00360105]!).
Notes. – A single element of original material is in the Java herbarium in G-PREL. This collection is a good match for the plate and is designated here as the lectotype.
39. *Dillenia indica* L., Sp. Pl.: 535. 1753 [cited in Nat. Hist. II(3): 60. 1774].
Notes. – A specimen is present in L (L-902.111-125) from the Ceylon herbarium, which was not available to Houttuyn before 1778. There is another sheet in L of this from the Burman herbarium from “Zeylan” (L-902.111-121), annotated “Boo kerre”, presumably a Sinhalese vernacular name.
40. *Diosma pulchella* sensu Houtt., Nat. Hist. II(4): Aanwyz. Plaat. [3], 326, tab. 21, fig. 2, 1775 [non *D. pulchella* L.].
 = *Diosma ovata* Thunb., Prodr. Pl. Cap. 1: 43. 1794.
 = *Agathosma ovata* (Thunb.) Pillans in J. S. African Bot. 16: 69. 1950. **Lectotypus** (designated by STRID, 1972: 42): **SOUTH AFRICA**: Cape, *Thunberg s.n.* (UPS-THUNB n° 5700 image seen; isolecto-: G-PREL [G00818115]!).

Notes. – A specimen present in the Cape herbarium in G-PREL [G00818106] is a good match for the plate. A Thunberg collection in the Burman herbarium represents an isolectotype of *Diosma ovata* (G-PREL [G00818115]).

41. *Echium capitatum* L., Mant. Pl. 1: 42. 1767.

= *Lobostemon capitatus* (L.) H. Buek in Linnaea 11: 143. 1837.

Notes. – A specimen from the Cape herbarium is in G-PREL [G00818042]. See NORDENSTAM & BUYS (2011) for more information on the accepted name.

42. *Erica pulchella* Houtt., Nat. Hist. II(4): Aanwyz. Plaat. [4], 504, tab. 23, fig. 1. 1775.

Lectotypus (designated here by Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818128]!).

Notes. – Original material is in the Cape herbarium in G-PREL. The only collection there is a good match for the plate and is therefore designated here as the lectotype.

43. *Erica splendida* Houtt., Nat. Hist. II(4): Aanwyz. Plaat. [4], 519, tab. 23, fig. 3. 1775.

Lectotypus (designated here by Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818127]!) (Fig. 6).

Notes. – Original material is in the Cape herbarium in G-PREL. The only collection there is a good match for the plate and is therefore designated here as the lectotype (Fig. 6).

44. *Erigeron capensis* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [4], 629, tab. 69, fig. 2. 1779.

= *Hilliardiella capensis* (Houtt.) H. Rob. et al. in PhytoKeys 60: 87. 2016.

Lectotypus (designated here by Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818097]!).

Notes. – Original material is in the Cape herbarium in G-PREL. The only collection there is a good match for the plate and is designated here as the lectotype.

45. *Ethulia paniculata* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 551, tab. 67, fig. 2. 1779.

Lectotypus (designated here by Callmander): **INDONESIA, Java:** *Anon. s.n.* (G-PREL [G00818113]!).

= *Dichrocephala integrifolia* (L. f.) Kuntze, Revis. Gen. Pl. 1: 333. 1891.

Notes. – Original material is present in the Java herbarium in G-PREL. The single collection with Houttuyn's handwriting is designated here as the lectotype. It is a good match for the plate. *Dichrocephala paniculata* Miq. prevents the transfer of the earlier Houttuyn binomial to *Dichrocephala* L'Hér. ex DC. Another collection in the Houttuyn herbarium (G-PREL [G00818116]), cited under the name *Spilanthes atriplicifolius* (L.) L. in the *Natuurlijke Historie* (Nat. Hist. II(10): 536. 1779), also represents *D. integrifolia*.

46. *Geranium chelidonium* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [1], 8, tab. 61. 1779.

= *Pelargonium chelidonium* (Houtt.) DC., Prodr. 1: 650. 1824.

Lectotypus (designated here by Veldkamp & Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818043]!); isolecto-: G-DC [G00213107]!).

Notes. – The single collection in the Cape herbarium in G-PREL is designated here as the lectotype. A fragment of this collection is in the G-DC herbarium. No matching specimen is present in UPS-THUNB. *Pelargonium ficaria* Willd. (WILLDENOW, 1800: 643) is a superfluous name. No specimen has been found in the Willdenow herbarium (B-W).

47. *Geranium ovale* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 19. 1768.

= *Pelargonium ovale* (Burm. f.) L'Hér. in Aiton, Hort. Kew. 2: 429. 1789.

Lectotypus (designated by VAN DER WALT & VAN ZUYL, 1988: 150): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818133]!).

Notes. – There is a specimen in Houttuyn's Cape herbarium [G00818133]. VAN DER WALT & VAN ZUYL (1988: 150) designated a "specimen with Burman handwriting" as the lectotype but clearly failed to recognise Houttuyn's handwriting. This specimen, probably collected by Auge, should be considered in the lectotypification of Burman's name as it may have been available to Burman f. and collected by Auge.



Fig. 6. – Lectotype of *Erica splendida* Houtt. in Houttuyn's Cape herbarium in G-PREL.

48. *Geranium tetragonum* L. f., Suppl. Pl.: 305. 1782.

= *Pelargonium tetragonum* (L. f.) L'Hér. in Aiton, Hort. Kew. 2: 427. 1789.

– *Geranium quadrangulare* Thunb. [nom. nud.].

Lectotypus (designated by ALBERS et al., 1995: 344): **SOUTH AFRICA:** *Thunberg s.n.* (UPS-THUNB n° 15663!; isolecto-: G-PREL [G00818045, G00818046, G00818047, G00818048]!, UPS-THUNB n° 15662 image seen).

Notes. – *Geranium tetragonum* was based on a Thunberg specimen from the Cape. ALBERS et al. (1995: 344) designated a specimen in UPS-THUNB as the lectotype. Four duplicates of this collection are also present in G-PREL: three in the Burman herbarium [G00818045, G00818046, G00818047] and one in the Houttuyn herbarium [G00818048]. The latter bears the name *G. quadrangulare* Thunb. in Houttuyn's handwriting. The four G-PREL collections are duplicates of the original material and are here considered as isolectotypes.

49. *Gladiolus liliaceus* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [1], 55, tab. 79, fig. 2. 1780.

Lectotypus (designated here by Callmänder): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818054]!).

Notes. – A single element of original material is in the Cape herbarium in G-PREL. This collection is designated here as the lectotype.

50. *Gnaphalium aureum* Thunb. ex Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 590, tab. 67, fig. 3. 1779.

= *Helichrysum aureum* (Thunb. ex Houtt.) Merr. in J. Arnold Arbor. 19: 372. 1938.

Lectotypus (designated by HILLIARD & BURTT, 1981: 239): **SOUTH AFRICA:** Cape, *Thunberg s.n.* (G-PREL [G00818049]!; probable isolecto-: G-PREL [G00818141]!) (Fig. 7).

Notes. – A specimen in the Cape herbarium in G-PREL (Fig. 7) was designated as the implicit lectotype by HILLIARD & BURTT (1981: 239) as “herb. Houttuyn now in herb. Burman, G!”. A further specimen collected by Thunberg is in the Burman herbarium (G-PREL [G00818141]) and probably is an isolectotype. No duplicate has been located at UPS-THUNB.

51. *Guilandina moringa* L., Sp. Pl.: 381. 1753. [cited in Nat. Hist. II(2): 388. 1774].

= *Moringa oleifera* Lam., Encycl. 1: 398. 1785.

Notes. – A specimen in the Houttuyn herbarium from either Java or Ceylon is in G-PREL [G00818132].

A specimen from Java of this widespread SE Asian species is also present in L (L-908.133-1291). No corresponding specimen was found in UPS-THUNB. Another specimen from the Burman herbarium represents possible original material of *Guilandina moringa*, namely *Burman 18* (G-PREL [G00818136]), which represents original material of the pre-Linnaean “*Moringa zeylanica* Burm.” published in *Thes. Zeyl.*: 162, tab. 75. 1736. The Burman publication was cited by Linnaeus in 1753 and *Burman 18* was designated as the lectotype by VIDAL (1962: 5), but rejected by the LINNAEAN PLANT NAME TYPIIFICATION PROJECT (2016), indicating “... this would not have been studied by Linnaeus and is not original material”. The correct lectotype, which Linnaeus definitely saw, was designated by KERAUDREN & GILLET (1963: 317): *Hermann 2: 24, n° 155* [BM000594587].

52. *Hedysarum motorium* Houtt., Nat. Hist. II(10): 246. 1779.

= *Codariocalyx motorius* (Houtt.) Ohashi in J. Jap. Bot. 40: 367. 1965.

Typus: [INDONESIA, Java]: [cultivated in Leiden], *D. van Royen s.n.* (holo-: L-908.115-344!).

Notes. – OHASHI (2004: 109) mentioned a *D. van Royen s.n.* specimen in L (L-908.115-344) as the type of *Hedysarum motorium*. Houttuyn cited “a very small plant in the Hortus here”, i.e. in the Botanical Garden of Amsterdam.

53. *Hedysarum vaginale* L., Sp. Pl.: 746. 1753 [cited in Nat. Hist. II(10): 233. 1779].

= *Alysicarpus vaginalis* (L.) DC., Prodr. 2: 353. 1825.

Notes. – A specimen from the Ceylon herbarium is in G-PREL [G00818050] and there is another one in the Java herbarium (G-PREL [G00818051]).

54. *Illecebrum lanatum* (L.) L., Syst. Veg. ed. 13: 206. 1774 [cited in Nat. Hist. II(7): Aanwyz. Plaat. [2], 708, tab. 43, fig. 2. 1777].

= *Aerva lanata* (L.) Juss. ex Schult. in Roem. & Schult., Syst. Veg. ed. 15 bis, 5: 564. 1819.



Fig. 7. – Lectotype of *Gnaphalium aureum* Thunb. ex Houtt. in Houttuyn's Cape herbarium in G-PREL.

Notes. – LINNAEUS (1771: 344) based *Illecebrum lanatum* on *Achyranthes lanata* L. (LINNAEUS, 1753: 204). IAMONICO (2014: 407) erroneously lectotypified it with “*Amaranthus spicatus zeylanicus, foliis obtusis*” (BURMAN, 1737, vol. 1: tab. 26, fig. 1), which in fact depicts material of *A. sicula* (L.) All.

Two specimens in the Ceylon Herbarium were annotated by Houttuyn and Thunberg as *Achyranthes lanata* (G-PREL [G00818010, G00818011]). Another specimen is in L (L-902.283-2). Specimens from Ceylon and Java are in the Thunberg herbarium (UPS-THUNB n° 5986 and n° 5987).

55. *Ipomoea pilosa* Houtt., Nat. Hist. II(7): Aanwyz. Plaat. [2], 573, tab. 42, fig. 2. 1777.

Lectotypus (designated here by Veldkamp): **INDONESIA.**

Java: *Radermacher s.n.* [?] (G-PREL [G00818052]!).

= *Merremia umbellata* (L.) Hallier. f. in Bot. Jahrb. Syst. 16: 552. 1893.

Notes. – The single specimen of original material in the Java herbarium in G-PREL is designated here as the lectotype. It was sent to Houttuyn by either Radermacher or Thunberg. No specimen is present in UPS-THUNB, where Hallier f. identified the material of *Convolvulaceae*.

56. *Ixia campanulata* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [1], 42, tab. 78, fig. 4. 1780.

Lectotypus (designated by BROWN, 1929: 1933): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818053]!).

= *Ixia aristata* Thunb., Diss. Ixia: 14. 1783. = *Ixia leucantha* var. *aristata* (Thunb.) Baker, Hand. Irid.: 162. 1892. **Lectotypus** (designated here by Callmander & Veldkamp): **SOUTH AFRICA:** Cape, *Thunberg s.n.* (UPS-THUNB n° 918 image seen).

Notes. – The type specimen of *Ixia campanulata* is in the Cape herbarium in G-PREL. MERRILL (1938: 327) did not recognise it as Houttuyn's. BROWN (1929: 133) and LEWIS (1962: 126) recognised this collection as the holotype, whereas GOLDBLATT & MANNING (2016: 185) correctly accepted Brown's mention as an implicit lectotypification. Four collections of possibly different gatherings are present in UPS-THUNB for *Ixia aristata* (UPS-THUNB n° 917, n° 918, n° 919 and n° 920). The better-preserved specimen is designated here as the lectotype.

Several other collections of *Ixia* L. are in Houttuyn's Cape herbarium: *I. maculata* L. (G-PREL [G008181221]), *I. monadelphica* D. Delaroche (G-PREL [G008181217, G008181218]), *I. polystachya* L. (G-PREL [G008181219]), and *I. scillaris* L. (G-PREL [G00818120]). Two further specimens identified by

Houttuyn as *I. grandiflora* D. Delaroche are now recognised in *Sparaxis* Ker Gawl. as *S. grandiflora* (D. Delaroche) Ker Gawl. (G-PREL [G00818122, G00818123]).

57. *Lilium japonicum* Thunb. ex Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 245, tab. 82, fig. 2. 1780.

Lectotypus (designated here by Callmander & Wijnands):

JAPAN: *Thunberg s.n.* (G-PREL [G00818143]!); isolecto-: UPS-THUNB n° 8137 image seen).

Notes. – Original material is in the Japan herbarium in G-PREL. The single collection there is designated here as the lectotype. A duplicate is present in UPS-THUNB.

58. *Lotus capensis* Houtt., Nat. Hist. II(10): 311, tab. 65, fig. 3. 1779.

Lectotypus (designated here by Callmander): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818107]!).

= *Lotononis umbellata* (L.) Benth. in London J. Bot. 2: 602. 1843.

Notes. – *Lotus capensis* was considered to be a synonym of *Lotononis umbellata* by MERRILL (1938: 347). The former was not cited by VAN WYK (1991) in his revision of *Lotononis* (DC.) Eckl. & Zeyh. A note by R. Dahlgren (Lund, 15.I.1959) on the Cape herbarium collection confirms that Houttuyn's species belongs to *Lotononis*. *Lotus suffruticosus* Burm. f. (BURMAN f., 1768: 22) undoubtedly represents the same taxon. Houttuyn cited Burman's binomial in Nat. Hist. II(10): Aanwyz. Plaat. [2]. 1779. No type specimen of the latter has been located in G-PREL but a fragment is present in G-DC [G00477415].

59. *Massonia depressa* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [3], 424, tab. 85, fig. 1. 1780.

Lectotypus (designated by JESSOP, 1976: 411): (Houttuyn, Nat. Hist. II(12): tab. 85, fig. 1. 1780).

Epitypus (designated here by Callmander & Veldkamp): **SOUTH AFRICA:** Cape, *Thunberg s.n.* (UPS-THUNB n° 7991 image seen).

Notes. – The genus *Massonia* Thunb. ex Houtt. was described by Houttuyn in *Natuurlijke Historie* (Nat. Hist. II(12): 424. 1780), with *M. depressa* listed as the only species. The description was based on “A Cape plant recently from the Hortus medicus of this place [Amsterdam] thus named by Mr. Thunberg”. The illustration shows two flowers, which were given to him by its Curator Johannes Storm in 1779. Thunberg was paid by the Hortus for sending seeds and bulbs. No specimen

of *Massonia* has been found in the Houttuyn herbarium in G-PREL. The illustration by Houttuyn must therefore be considered to be the type.

Massonia Thunb. ex L. f. (LINNAEUS f., IV.1782: 27, 193) and *Massonia* Thunb. (THUNBERG, 10.VII.1782: 39) are later homonyms.

Massonia latifolia L. f. (and Thunb.) is based on a Masson collection that has never been located (LINNAEUS f., 1782: 193; THUNBERG, 1782: 40; see JESSOP, 1976: 410–412). This species is now widely considered to be a synonym of the earlier *M. depressa*. JESSOP (1976: 411) only found fruiting material at UPS-THUNB and implicitly designated Houttuyn's plate of flowers as the lectotype. A Thunberg flowering collection in UPS-THUNB, located by M. Hjertson (UPS), is designated here as the epitype.

60. *Memecylon capitellatum* L., Sp. Pl.: 349. 1753 [cited in Nat. Hist. II(2): 300. 1774].

Notes. – A specimen is present in Houttuyn's Ceylon herbarium in G-PREL [G00818093]. There is no obvious corresponding collection in UPS-THUNB.

61. *Memecylon floribundum* Blume in Mus. Bot. 1: 361. 1851.
= *Memecylon caeruleum* Jack in Malayan Misc. 1(5): 26. 1820.

Notes. – A specimen in the Java herbarium is in L (L-908.352–540), annotated “Tamba bisa” (see BAKHUIZEN VAN DEN BRINK, 1943: 359), Malay, perhaps meaning “possibly a *Syzygium*”. There appears to be no Java specimen in UPS-THUNB.

62. *Menispermum glabrum* sensu Houtt., Nat. Hist. II(11): Aanwyz. Plaat. [3], 377, tab. 75, fig. 2. 1779 [non *M. glabrum* Burm. f.].

= *Stephania japonica* var. *discolor* (Blume) Forman in Kew Bull. 11: 56. 1956.

Notes. – A specimen in the Java herbarium is in G-PREL [G00818094]. Diels identified it as *Stephania bernandifolia* (Willd.) Walp. FORMAN (1956: 51) cited this collection as *S. japonica* var. *discolor*. It is rather fragmentary and based on spirit material, and hardly matches the plate, in particular by the total absence of fruits. A specimen in the Thunberg herbarium (UPS-THUNB n° 23658) is probably a duplicate.

The holotype of *Menispermum glabrum* Burm. f. is *Pryon s.n.* (G-PREL [G00818095]) and represents material of *Tinospora glabra* (Burm. f.) Merr. A specimen without provenance is identified under that name in the Thunberg herbarium (UPS-THUNB n° 23657).

63. *Mussaenda frondosa* L., Sp. Pl.: 177. 1753 [cited in Nat. Hist. II(4): 226. 1775].

Notes. – A specimen in the Ceylon herbarium is in G-PREL [G00818055]; another is in the Thunberg herbarium (UPS-THUNB n° 5000).

64. *Myristica fragrans* Houtt., Nat. Hist. II(3): 333. 1774.

Lectotypus (designated here by Callmänder & Veldkamp): INDONESIA. **Moluccas**: *Anon. s.n.* (G-PREL [G00818072]!) (Fig. 8).

Notes. – WARBURG (1897: 472) cited a Houttuyn collection in the Vahl herbarium (C [C10015464]) in a list of specimens seen: “Houttuyn, Kopenhag, ster. Wein”. MERRILL (1938: 342) mentioned the same specimen annotated as “*Myristica aromatica* ded. Dr. Houttuyn”, whereas SINCLAIR (1968: 231) mentioned two Houttuyn collections at L and one in G as “Ex Herb. Burman”. None of these publications designated a type for *Myristica fragrans*, the source of nutmeg.

One of the L sheets (L-908.133–1765) is annotated by Houttuyn with a reference to his publication (HOUTTUYN, 1789b). The other was given to D. van Royen in 1784 (L-908.133–1797). Two collections have been located in Houttuyn's herbarium in G-PREL and are annotated by Houttuyn. The only collection with a reference to Houttuyn's *Natuurlijke Historie* is designated here as the lectotype. The remaining collections may be considered as part of original material.

DE WILDE (2000: 470) designated a lectotype as: “J. W. Weinmann [Taalrijk Register 7 (1748) tab. 760–a]”. However, the presence of original material in Houttuyn's herbarium in G-PREL (Fig. 8) renders this lectotypification superfluous. The origin of the lectotype is quoted as *Planta Ind. Orient.* in Houttuyn's herbarium, referring to the Moluccas rather than Ceylon or Java, as is predominantly the case.

65. *Nepeta incana* Thunb. ex Houtt., Nat. Hist. II(9): Aanwyz. Plaat. [2], 306, tab. 56, fig. 2. 1778.

= *Caryopteris incana* (Thunb. ex Houtt.) Miq. in Ann. Mus. Bot. Lugduno-Batavi 2: 97. 1866.

Lectotypus (designated here by Wijnants): JAPAN: *Thunberg s.n.* (G-PREL [G00818056]!); isolecto-: UPS-THUNB n° 13349 image seen).



Fig. 8. – Lectotype of *Myristica fragrans* Houtt. in Houttuyn's herbarium in G-PREL.

Notes. – Original material collected by Thunberg and present in the Japan herbarium is designated here as the lectotype. The same name [an isonym] was described by Thunberg using the UPS-THUNB material in MURRAY (1784: 529) and THUNBERG (1784: 244).

66. *Nerium oleander* L., Sp. Pl.: 209. 1753 [cited in Nat. Hist. II(4): 389. 1775].

Notes. – A specimen in the Java herbarium is in L (L-898.111-57). It represents material of *Plumeria rubra* L. (see Nat. Hist. II(2): 178. 1774) (Fig. 2). Two leaves and an inflorescence are mounted with a mid-18th century pot, so far only known from this sheet (G. Thijssse, pers. comm. to the first author). Another specimen without provenance is present in the Thunberg herbarium (UPS-THUNB n° 6128).

67. *Nerium zeylanicum* L., Cent. Pl. 2: 12. 1756 [cited in Nat. Hist. II(4): 390. 1775].

= *Wrightia antidysenterica* (L.) R. Br. in Mem. Wern. Nat. Hist. Soc. 1: 73. 1811.

Notes. – A specimen in the Ceylon herbarium annotated by Thunberg as *Nerium zeylanicum* is in G-PREL [G00818057]. A Thunberg specimen from Ceylon is in the Thunberg herbarium (UPS-THUNB n° 6125).

68. *Ochna nitida* sensu DC. in Ann. Mus. Natl. Hist. Nat. 17: 412. 1811 [non *O. nitida* Sw.].

= *Ochna jabotapita* L., Sp. Pl.: 513. 1753.

Notes. – CANDOLLE (1811, 1824) identified and depicted a Thunberg collection from Ceylon in the Houttuyn herbarium (“v.s. in h. Deless.”) as “*Ochna nitida* Thunb.” He noted that the species came from “India orient.”, but created confusion by citing “Thunb. prod. 67”. The cited page of this work (THUNBERG, 1794a) lists taxa of *Hexandria*, whereas *Ochna* L. belongs to the *Polyandria monogynia*, which are dealt with in the second volume (THUNBERG, 1800: 92), although no *Ochna* are listed there. “*Ochna nitida* Thunb.” is cited twice by THUNBERG (1794b: 132; 1825: 7) as a *nom. nud.* (JUEL, 1918: 251).

It is clear that de CANDOLLE (1811, 1824) mistakenly cited THUNBERG's *Prodromus* (1794a) when he actually intended to cite that of SWARTZ (1788). This is even more obvious from the description of the name, where de CANDOLLE (1811: 412) wrote “calyci aequalia juxta Thunbergium”, referring to SWARTZ (1788: 67): “calycibus corolla aequalibus”.

Ochna nitida Sw. refers to a Roger Shakespear material from Jamaica, whereas de Candolle's misapplication of that name refers to a plant from Ceylon currently known as *O. jabotapita* L.

KANIS (1987: 248) designated a specimen in G-DC as the type of “*Ochna nitida* Thunb. ex DC.” but this misapplied name has no nomenclatural status.

Material of *Ochna jabotapita* L. (= *O. nitida* sensu DC.) is present in the Thunberg herbarium (UPS-THUNB n° 12528, n° 12539 and n° 12540) and in G-DC [G00310780, G00310781]. The latter two sheets are from Houttuyn's herbarium but were originally in the Delessert herbarium, and were probably incorporated by de Candolle in his own herbarium, as no specimen has been located in G-PREL.

69. *Ocimum sanctum* L., Mant. Pl. 1: 85. 1767 [cited in Nat. Hist. II(9): 422. 1778].

= *Ocimum tenuiflorum* L., Sp. Pl.: 597. 1753.

Notes. – A specimen in the Ceylon herbarium is in G-PREL [G00818058]. No Thunberg specimens from Java have been located in UPS-THUNB.

70. *Oenanthe capensis* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [1], 140, tab. 45, fig. 2. 1777.

Lectotypus (designated here by Veldkamp): **SOUTH AFRICA:** *Auge s.n.* [?] (G-PREL [G00818059]!).

= *Bubon proliferum* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 7. 1768. = *Glia prolifera* (Burm. f.) B.L. Burtt in Edinburgh J. Bot. 48: 208. 1991. **Lectotypus** (designated here by Callmänder): **SOUTH AFRICA:** Cape, *Garcin 100* (G-PREL [G00818060]!).

Notes. – Original material of *Oenanthe capensis* probably collected by Auge is in the Cape herbarium in G-PREL. It is designated here as the lectotype.

Bubon proliferum was based on a Garcin collection in the Burman herbarium, which is designated here as the lectotype. Laurent Garcin (1683-1752), a VOC ship's surgeon originating from Nyon, a town not far from Geneva, provided collections to Burman, which were then used by his son for his *Flora Indica* and *Prodromus Florae Capensis* (BURMAN f., 1768) (see WIJNANDS, 1992; COOK, 2016).

71. *Oldenlandia linearifolia* Thunb., Fl. Jav.: 9. 1825.

Typus: **INDONESIA. Java:** *Thunberg s.n.* (holo-: UPS-THUNB n° 3655 image seen; iso-: G-DC [G00208560]!, G-PREL [G00818061]!).

Notes. – Not discussed by Houttuyn, but a specimen is present in his Java herbarium in G-PREL [G00818061] from around Batavia (“Omstreeks Batavia”). This collection was annotated by Thunberg as *O. linearifolia* and should be considered as a duplicate of the holotype in the Thunberg herbarium (UPS-THUNB n° 3655).

Another specimen from Houttuyn's Java herbarium is in G-DC [G00208560] filed under *O. brachypoda* DC. (CANDOLLE, 1830b: 424).

72. *Ophioglossum acuminatum* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [1], 49, tab. 94, fig. 3. 1783.

Lectotypus (designated here by Veldkamp & Callmander): **INDONESIA. Java:** *Thunberg s.n.* (G-PREL [G00818062]!). = *Nephrolepis davallioides* (Sw.) Kunze in Bot. Zeitung (Berlin) 4: 460. 1846.

Notes. – HOVENKAMP & MIYAMOTO (2005: 298) indicated that the type was the plate in *Natuurlijke Historie*, as follows: “Type: Plate in Houttuyn”. A specimen of original material collected by Thunberg is in the Java herbarium with a label “van 't gebergte bezuiden Batavia” [“from the mountains south of Batavia”]. Houttuyn mentioned the same origin in Nat. Hist. II(14): 49. 1783. The plate could well have been drawn from this specimen, now remounted, which is designated here as the lectotype.

73. *Ophioglossum zeilanicum* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [1], 43, tab. 94, fig. 1. 1783.

= *Tectaria zeilanica* (Houtt.) Sledge in Kew Bull. 27: 422. 1972.

Lectotypus (designated here by Callmander & Fumeaux): **CEYLON [SRI LANKA]:** *Thunberg s.n.* (G-PREL [G00818063]!); isolecto-: UPS-THUNB n° 24418 image seen) (Fig. 9).

Notes. – HOLTUM (1991: 75) designated a type specimen at UPS: “Type: Thunberg s.n., Sri Lanka (UPS, not seen)”. The finding of a specimen annotated by Houttuyn in his own herbarium in G-PREL (Fig. 9) supersedes this implicit lectotypification. Houttuyn's plate was clearly drawn from the specimen in G-PREL.

On the latter sheet and in *Aanwyz. Plaat.*, the epithet is spelled as the more usual “zeylanicum”, but on p. 43 as “zeilanicum”, which is the spelling that most people saw and copied and that should be retained. It was identified as *Acrostichum quercifolium* Retz. by H. Christ, a synonym according to HOLTUM (1991: 75).

Ophioglossum zeilanicum is the first report by Houttuyn of a specimen from Ceylon in his own herbarium (see introduction p. 160).

74. *Ornithogalum dubium* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 309, tab. 82, fig. 3. 1780.

Lectotypus (designated here by Wijnands): **SOUTH AFRICA:** *Auge s.n.* [?] (G-PREL [G00818064]!).

Notes. – Original material is present in the Cape herbarium. It is designated here as the lectotype. There is no obvious corresponding collection in UPS-THUNB.

75. *Osmunda japonica* Thunb. in Nova Acta Regiae Soc. Sci. Upsal. 3: 209. 1780 [cited in Nat. Hist. II(14): Aanwyz. Plaat. [1], 57, tab. 95, fig. 1. 1783].

Lectotypus (designated by Nakaike in KATSUYAMA et al., 2013: 44): **JAPAN:** *Thunberg s.n.* (UPS-THUNB n° 25200 image seen; isolecto-: G-PREL [G00818130]!, UPS-THUNB n° 25199 image seen).

Notes. – Original material is present in the Japan herbarium in G-PREL. The single fertile collection at UPS-THUNB is designated here as the lectotype. Nakaike already annotated it as such in 1978 but the lectotypification was validated in 2013 in KATSUYAMA et al. (2013).

76. *Osmunda japonica* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [1], 57, tab. 95, fig. 1. 1783 [non *O. japonica* Thunb.].

= *Osmunda lancea* Thunb. in Murr., Syst. Veg. ed. 14: 928. 1784; Fl. Jap.: 330. 1784. **Lectotypus** (designated by Nakaike in KATSUYAMA et al., 2013: 44): **JAPAN:** *Thunberg s.n.* (UPS-THUNB n° 25201 image seen; iso-: G-PREL [G00818129]!).

Notes. – *Osmunda japonica* Houtt. is a later homonym of *O. japonica* Thunb. As Houttuyn cited *O. lancea* the name is also superfluous.

77. *Oxalis sensitiva* L., Sp. Pl.: 434. 1753 [cited in Nat. Hist. II(8): 659. 1777].

= *Biophytum sensitivum* (L.) DC., Prodr. 1: 690. 1824.

Notes. – A specimen in the Java herbarium is in G-PREL [G00818065]. Another one is in the Thunberg herbarium (UPS-THUNB n° 11121).

78. *Paspalum dissectum* (L.) L., Sp. Pl. ed. 2: 81. 1762 [cited in Nat. Hist. II(13): Aanwyz. Plaat. [1], 164, tab. 89, fig. 2. 1782].

= *Panicum dissectum* L., Sp. Pl.: 57. 1753.



Fig. 9. – Lectotype of *Ophioglossum zeilanicum* Houtt. in Houttuyn's herbarium in G-PREL.

Notes. – A collection probably from the Java herbarium is in L (L-904.26-22) (see VAN STEENIS & VELDKAMP, 1973: 151). The specimen on the left-hand of L-904.26-22 is the one depicted in *Natuurlijke Historie*. Another specimen from Java is in G-PREL [G00818066].

79. *Phalangium spicatum* Houtt., Nat. Hist. II(12): Aanwyz. Plaat. [2], 115, tab. 80, fig. 2. 1780.

Lectotypus (designated here by Callmander & Fumeaux): **SOUTH AFRICA:** *Auge s.n.* [?] (G-PREL [G00818067]!).

= *Micranthus plantagineus* Eckl., Topogr. Verz. Pflanzen-samml. Ecklon: 43. 1827.

Notes. – The single element of original material in the Cape herbarium is designated here as the lectotype. It is a good match for the plate. *Micranthus spicatus* (L.) Heyn. prevents the transfer of Houttuyn's epithet to the genus *Micranthus* (Pers.) Eckl. See GOLDBLATT et al. (2013: 140-142) for an interesting discussion on *M. plantagineus*. The latter authors considered the plate in Nat. Hist. II(12): tab. 80, fig. 2. 1780 to be the type of Houttuyn's name (i.e., they implicitly designated it as the lectotype), but the existence of original material supersedes their lectotypification.

80. *Phleum indicum* Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [1], 198, tab. 90, fig. 2. 1782.

= *Polytrias indica* (Houtt.) Veldk. in Blumea 36: 180. 1991.

Lectotypus (designated here by Veldkamp): **INDONESIA.** **Java:** *Anon. s.n.* (G-PREL [G00096222]!).

Notes. – The original material designated here as the lectotype is in the Java herbarium in G-PREL. See VELDKAMP (1991) for a discussion on this species.

81. *Piper officinarum* (Miq.) C. DC., Prodr. 16(1): 356. 1869.

= *Piper retrofractum* Vahl, Enum. Pl. 1: 314. 1804.

Notes. – Two specimens from Houttuyn's Java herbarium are respectively in G-PREL [G00818068] and G-DC [G00206609]. Both specimens are annotated as “Piper longum L.” by Houttuyn. A possible duplicate in L (L-908.165-114) is also marked “Piper longum L. Cl. Houttuin dedit Jun 1784” (msc. D. van Royen).

82. *Plumbago rosea* L., Sp. Pl. ed. 2: 215. 1762 [cited in Nat. Hist. II(7): 522. 1777].

= *Plumbago indica* L., Amboin.: 24. 1754.

Notes. – A specimen in the Ceylon herbarium is in G-PREL [G00818069]. A corresponding specimen is in the Thunberg herbarium (UPS-THUNB n° 4373).

83. *Poinciana pulcherrima* L., Sp. Pl. ed. 2: 215. 1762 [cited in Nat. Hist. II(5): 42. 1775].

= *Caesalpinia pulcherrima* (L.) Sw., Observ. Bot.: 166. 1791.

Notes. – A specimen from the Java herbarium is in L (L-913.64.595) mounted with a curious blue undecorated piece of paper, cut out in the shape of a small pot (Fig. 1).

84. *Polygala japonica* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [1], 89, tab. 62, fig. 1. 1779.

Lectotypus (designated here by Veldkamp & Callmander): **JAPAN:** *Thunberg s.n.* (G-PREL [G00818070]!); isolecto-: G-PREL [G00818071]! (Fig. 10).

Notes. – A specimen of original material collected by Thunberg has been located in the Japan herbarium in G-PREL. Thunberg annotated it as “Polygala vulgaris ? Lin.” and Houttuyn as “Polygala vulgaris Linn. vel potius Japonica, mihi. Nat. Hist. X. Stuk p. 89, Pl. 62. Fig. 1” with a later addendum “Thunb. Jap. p. 277”. The specimen is a very good match for the plate and is designated here as the lectotype. A corresponding specimen seems to be absent from UPS-THUNB. Another Thunberg specimen is in the Burman herbarium in G-PREL [G00818071] and should be considered as a duplicate. There are Chinese and Japanese vernacular names at the bottom of the latter sheet which were not mentioned by Houttuyn and do not seem to be in his writing.

85. *Polypodium japonicum* Thunb. ex Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [2], 167, tab. 98, fig. 3. 1783.

Lectotypus (designated here by Wijnands): **JAPAN:** *Thunberg s.n.* (G-PREL [G00818090]!); isolecto-: UPS-THUNB n° 24493 and n° 24494 images seen).

= *Polypodium falcatum* Thunb. ex L. f., Suppl. Pl.: 446. 1782. = *Cyrtomium falcatum* (Thunb. ex L. f.) C. Presl, Tent. Pterid.: 86. 1836. **Lectotypus** (designated here by Callmander): **JAPAN:** *Thunberg s.n.* (UPS-THUNB n° 24493 image seen; isolecto-: G-PREL [G00818090]!, UPS-THUNB n° 24494 image seen).

Notes. – A single element representing original material is in the Japan herbarium in G-PREL. It is a very good match for the plate and is designated here as the lectotype

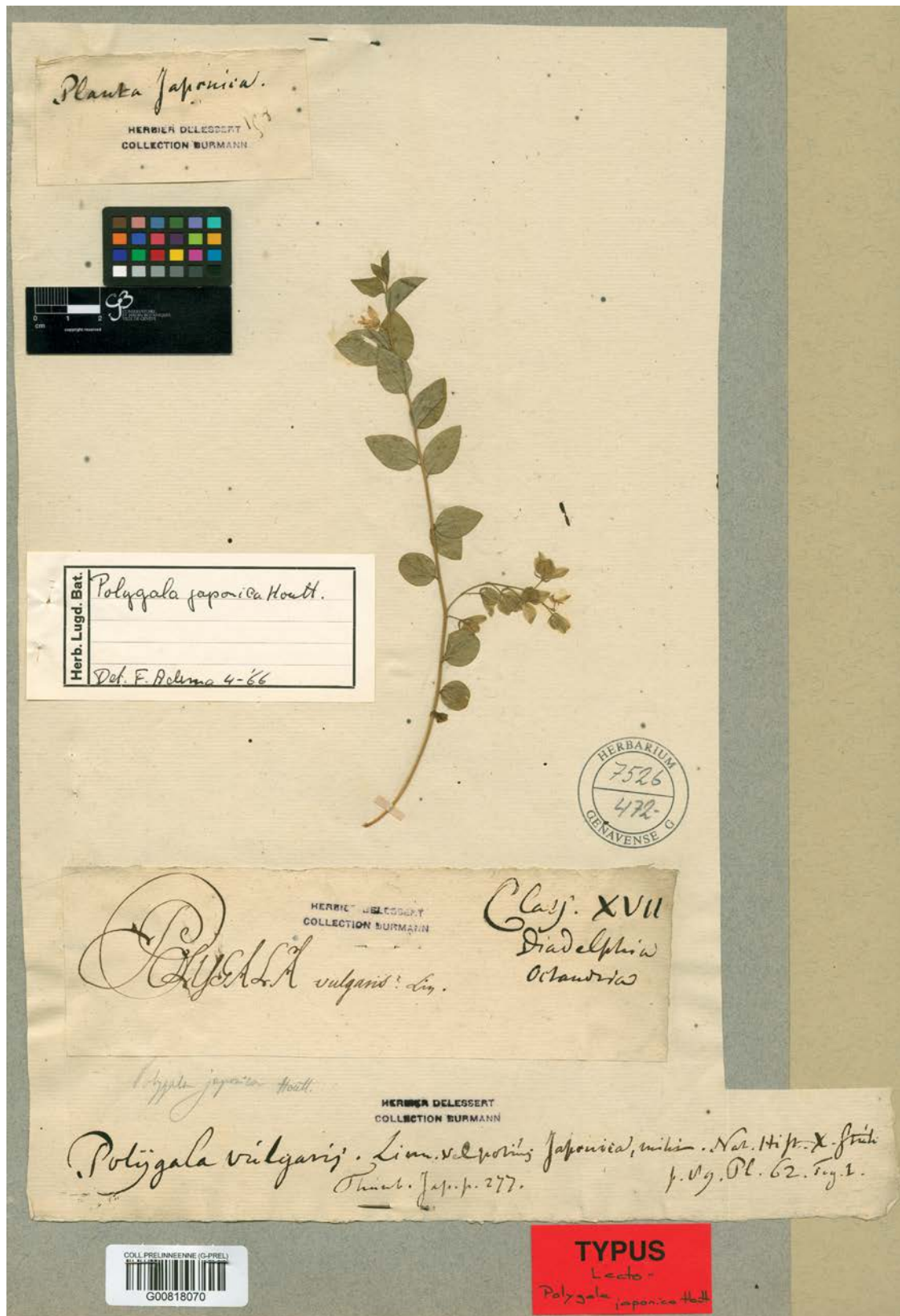


Fig. 10. – Lectotype of *Polygala japonica* Houtt. in Houttuyn's Japan herbarium in G-PREL.

of *Polypodium japonicum*. Houttuyn annotated the specimen as “*Polypodium japonicum* Thunb. vel *falcatum* Fl. Japon. p. 336, tab. 36”, so he apparently compared his plant with a manuscript of Thunberg's work that was published in 1784, after the publication in the *Natuurlijke Historie* had been completed. He did not cite LINNAEUS f. (1782) where *P. falcatum* Thunb. ex L. f. was published, based on the same duplicates in the Thunberg herbarium. Two collections of original material are present in UPS-THUNB. The lectotype of *P. falcatum* designated here is the most complete sheet (UPS-THUNB n° 24493).

86. *Polypodium pedatum* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [2], 148, tab. 98, fig. 1. 1783.

Lectotypus (designated here by Callmänder): JAPAN: *Thunberg s.n.* (G-PREL [G00349561]!; isolecto-: UPS-THUNB n° 25244, n° 25245 and n° 25247 images seen).

= *Polypodium lineare* Burm. f., Fl. Indica: 235, tab. 67, fig. 2. 1768. = *Dicranopteris linearis* (Burm. f.) Underw. in Bull. Torrey Bot. Club 34: 250. 1907. **Lectotypus** (designated by SCHELPE & ANTHONY 1986: 49): INDONESIA. **Java**: *van Santen s.n.* (G-PREL [G00360111]!).

= *Polypodium dichotomum* Thunb. in Murr., Syst. Veg. ed. 14: 512. V-VI. 1784. **Lectotypus** (designated here by Callmänder): JAPAN: *Thunberg s.n.* (UPS-THUNB n° 25247 image seen; isolecto-: G-PREL [G00349561]!, UPS-THUNB n° 25244 and n° 25245 images seen).

Notes. – The original material of *Polypodium pedatum* is in the Japan herbarium in G-PREL. This collection is a very good match for the plate and is designated here as the lectotype. Thunberg in MURRAY (1784: 512) described *P. dichotomum* based on the same Thunberg collection in his herbarium. This name is also cited in THUNBERG (1784: 338, tab. 37).

87. *Polypodium trilobum* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [2], 148, tab. 98, fig. 1. 1783.

= *Selliguea triloba* (Houtt.) M.G. Price in Blumea 43: 57. 1998.

Lectotypus (designated here by Callmänder & Fumeaux): INDONESIA. **Java**: *Thunberg s.n.* (G-PREL [G00818150]!).

Notes. – A single collection of original material is in the Java herbarium in G-PREL. This collection is a very good match for the plate and is designated here as the lectotype.

88. *Prenanthes denticulata* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 385, tab. 66, fig. 4. 1779.

= *Crepidiastrum denticulatum* (Houtt.) Pak & Kawano in Mem. Fac. Sci. Kyoto Univ., Ser. Biol. 15: 56. 1992.

Lectotypus (designated here by Callmänder): JAPAN: *Thunberg s.n.* (G-PREL [G00818096]!; isolecto-: UPS-THUNB n° 18119 image seen).

Notes. – The specimen collected by Thunberg in the Japan herbarium in G-PREL is designated here as the lectotype. It is a good match for the plate.

89. *Prenanthes laciniata* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 381, tab. 66, fig. 1. 1779.

Lectotypus (designated here by Callmänder): JAPAN: *Thunberg s.n.* (G-PREL [G00818100]!; isolecto-: UPS-THUNB n° 18135 image seen).

= *Lactuca indica* L., Mant. Pl. 2: 278. 1771.

Notes. – The only element of original material in the Japan herbarium in G-PREL collected by Thunberg is designated here as the lectotype. It is a good match for the plate. A duplicate is present in UPS-THUNB.

90. *Prenanthes lanceolata* Houtt., Nat. Hist. II(10): Aanwyz. Plaat. [3], 383, tab. 66, fig. 2. 1779.

= *Crepidiastrum lanceolatum* (Houtt.) Nakai in Bot. Mag. (Tokyo) 34: 150. 1920.

Lectotypus (designated here by Callmänder): JAPAN: *Thunberg s.n.* (G-PREL [G00818099]!; isolecto-: UPS-THUNB n° 18121 image seen).

Notes. – Original material collected by Thunberg is in the Japan herbarium in G-PREL. It is a good match for the plate and is designated here as the lectotype.

91. *Protea linearis* Houtt., Nat. Hist. II(4): Aanwyz. Plaat. [1], 116, tab. 19, fig. 2. 1775.

Lectotypus (designated here by Veldkamp & Callmänder): SOUTH AFRICA: Cape, *Auge s.n.* [?] (G-PREL [G00818074]!).

= *Leucadendron brunioides* Meisn. in A. DC., Prodr. 14: 215. 1856.

Notes. – A single original specimen is in the Cape herbarium in G-PREL probably collected by Auge. This collection was used for the illustration and is designated here as the lectotype.

Protea linearis is the first report by Houttuyn of a specimen from South Africa in his own herbarium (see introduction p. 158).

92. *Pteris orbiculata* Houtt., Nat. Hist. II(14): Aanwyz. Plaat. [1], 108, tab. 96, fig. 3. 1783.

Lectotypus (designated here by Callmander): **SOUTH AFRICA**: Cape, *Auge s.n.* [?] (G-PREL [G00818088]!).

Notes. – The single specimen representing original material is in the Cape herbarium in G-PREL. It is designated here as the lectotypus.

93. *Radermachia integra* Thunb., Kongl. Vetensk. Acad. Handl. 37: 254. 1776.

= *Artocarpus integra* (Thunb.) Merr., Interpr. Herb. Amboin.: 190. 1917.

Lectotypus (designated by CORNER, 1939: 70): **INDONESIA. Java**: *Thunberg s.n.* (UPS-THUNB 21664 [parts a and b] image seen; isolecto-: G-PREL [G00818144]!, L-908.185-852!, L-908.185-883!).

Notes. – The genus *Radermachia* Thunb. published by THUNBERG (1776: 251) is now accepted under the name *Artocarpus* J.R. Forst. & G. Forst. *Radermachia* was published with no type species designated and the lectotype is designated here by Veldkamp: *Radermachia incisa* Thunb. (= *Artocarpus altilis* (Parkinson) Fosberg). Original material of *Radermachia incisa* is in Houttuyn's Java herbarium in G-PREL [G00818146].

Two duplicates of *R. integra* are present in L in the Java herbarium (L-908.185-852 and L-908.185-883). The first one is annotated by Thunberg as “*Radermachia integra* Thunb.” Both are labelled as isotypes by Jarrett (I.1956) and identified as *Artocarpus integra*. A duplicate is also present in Houttuyn's Java herbarium in G-PREL.

94. *Rajania quinata* Thunb. ex Houtt., Nat. Hist. II(11): Aanwyz. Plaat. [3], 366, tab. 75, fig. 1. 1779.

= *Akebia quinata* (Thunb. ex Houtt.) Decne. in Ann. Sci. Nat., Bot. sér. 2, 12: 107. 1839.

Lectotypus (designated here by Callmander & Veldkamp): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818075]!; isolecto-: G-PREL [G00818076, G00818077]!, UPS-THUNB n° 23530 and n° 23531 images seen).

Notes. – DECAISNE (1839: 107) based his new combination on “Thunb. Fl. Jap. p. 148”, which should be corrected to Thunberg in MURRAY (1784: 888), but this is still a later homonym of Houttuyn's name.

The original collection designated here as the lectotype is in

the Japan herbarium, collected and annotated by Thunberg. It is not a very good match for the plate. On the same page Houttuyn mentioned *Rajania quinquefolia*, this name is written on the sheet as well. This is a West Indian species. Isolectotypes are present in the Houttuyn herbarium (G-PREL [G00818076]), the Burman herbarium (G-PREL [G00818077]), and the Thunberg herbarium (UPS-THUNB n° 23530 and n° 23531).

95. *Renalmia capensis* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [2], 335, tab. 47, fig. 1. 1777.

= *Villarsia capensis* (Houtt.) Merr. in J. Arnold Arbor. 19: 360. 1938.

Lectotypus (designated here by Veldkamp & Callmander): **SOUTH AFRICA**: Cape, *Thunberg s.n.* (G-PREL [G00074336]!; isolecto-: G-PREL [G00818091, G00818092]!, UPS-THUNB n° 4228 image seen).

= *Menyanthes capensis* Thunb., Prodr. Pl. Cap.: 34. 1794.
Typus: **SOUTH AFRICA**: Cape, *Thunberg s.n.* (holo-: UPS-THUNB n° 4228 image seen; iso-: G-PREL [G00074336, G00818091, G00818092]!).

Notes. – Original material of *Renalmia capensis* in Houttuyn's Cape herbarium is designated here as the lectotype. It was very likely collected by Thunberg and also represents a duplicate of the type of the later name *Menyanthes capensis* Thunb. Two further specimens in the Burman herbarium in G-PREL were annotated by Thunberg as *Menyanthes capensis* and represent original material of both Houttuyn's and Thunberg's names. *Menyanthes ovata* L. f. (LINNAEUS f., 1782: 133) is also based on the same Thunberg collection at UPS-THUNB, but this name is superfluous, as well as the combination by VENTENAT (1803-1808: sub tab. 9): *Villarsia ovata* (L. f.) Vent. (CALLMANDER et al., 2017).

The generic *Renalmia* Houtt. was published by Houttuyn in 1777 (Nat. Hist. II(8): 335). Houttuyn noted “A new genus ... which I ... baptise with the name now available”. Up to the beginning of the 19th century botanists often regarded that a name placed in synonymy was then available for another use, a practice that is no longer allowed. The generic name *Renalmia* had previously been validated by LINNAEUS (1753: 286). Both are *nom. rej.* [against the *nom. cons.* of LINNAEUS f. (1782: 7)].

96. *Reynoutria japonica* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [3], 640, tab. 51, fig. 1. 1777.

= *Fallopia japonica* (Houtt.) Ronse Decr. in Bot. J. Linn. Soc. 98: 369. 1988.

Lectotypus (designated here by Callmander): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818124]!) (Fig. 11).

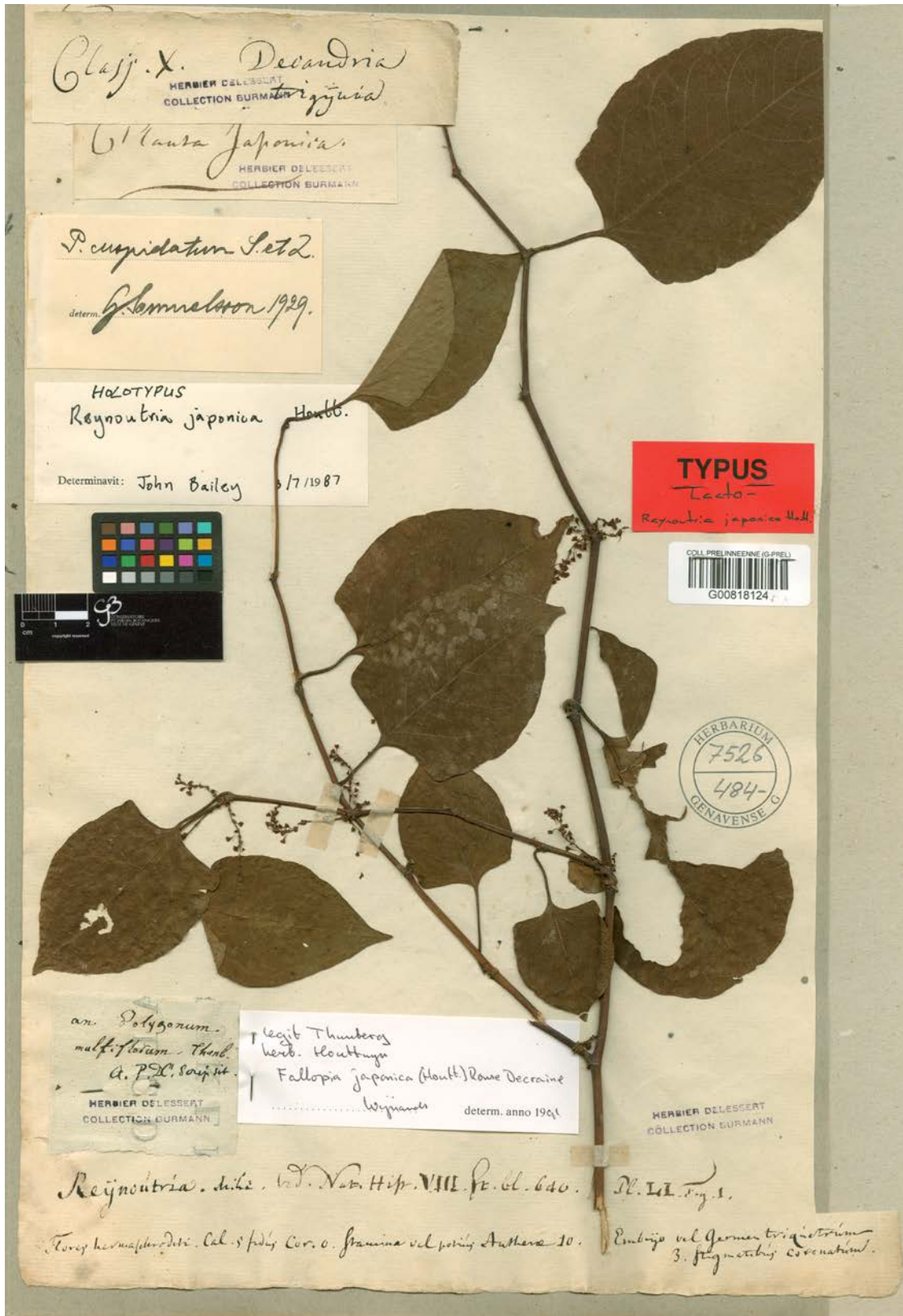


Fig. 11. – Lectotype of *Reynoutria japonica* Houtt. in Houttuyn's Japan herbarium in G-PREL.

Notes. – The only specimen representing original material collected by Thunberg is in the Japan herbarium in G-PREL. It is designated here as the lectotype (Fig. 11). It is a good match for the plate.

97. *Ruellia ringens* sensu Houtt., Nat. Hist. II(9): Aanwyz. Plaat. [4], 577, tab. 59, fig. 2. 1778 [non *R. ringens* L.].

- = *Ruellia erecta* Burm. f., Fl. Indica: 135, tab. 41, fig. 3. 1768. = *Hygrophila erecta* (Burm. f.) Hochr. in Candollea 5: 230. 1934. **Lectotypus** (designated here by Callmander & Fumeaux): **INDIA**: *Anon. s.n.* (G-PREL [G00818109]!).
- = *Ruellia repens* Burm. f., Fl. Indica: 235, tab. 67, fig. 2 [err. typ. fig. 1]. 1768 [non *R. repens* L.]. **Lectotypus** (designated here by Fumeaux & Callmander): **INDONESIA. Java**: *Kleynhoff s.n.* (G-PREL [G00818155]!).

Notes. – HOCHREUTINER (1934: 230) transferred *Ruellia erecta* to *Hygrophila* R. Br. and explained that *Ruellia repens* Burm. f. [non *R. repens* L.] should be considered as a synonym of *H. erecta*. Two specimens with the handwriting of Burman f. are present in G-PREL, each of which is designated here as lectotypes: a Kleynhoff collection from Java [G00818155] and a second sheet from an anonymous collector [G00818109], determined by Burman f. as *R. erecta*. Three collections exist in the Java herbarium annotated by Houttuyn, respectively, as “*Ruellia erecta*” [G00818108], “*Ruellia repens* Burm.” [G00818111], and “*Ruellia ringens* L.” [G00818110]. Thunberg collected the latter two, referring both to *Hygrophila erecta*.

98. *Rumex japonicus* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [2], 394, tab. 47, fig. 2. 1777.

- Lectotypus** (designated here by Wijnands): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818079]!).

Notes. – The only specimen representing original material in the Japan herbarium is designated here as lectotype. It is annotated by Houttuyn as “*Rumex dentatus* L. ?” Houttuyn noted on the sheet that the fruit was drawn for Nat. Hist. II(8): tab. 47, fig. 2. No duplicate has been found in UPS-THUNB.

99. *Rumex umbellatus* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [2], 414, tab. 47, fig. 3. 1777.

- Lectotypus** (designated here by Veldkamp): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818078]!).

- = *Persicaria chinensis* (L.) H. Gross in Bot. Jahrb. Syst. 49: 269. 1913.

Notes. – Original material is in the Japan herbarium in G-PREL. The only collection there is a good match for the plate and is therefore designated here as the lectotype. No duplicate has been found in UPS-THUNB.

100. *Saccharum japonicum* Houtt., Nat. Hist. II(13): Aanwyz. Plaat. [1], 146, tab. 89, fig. 1. 1782.

- = *Miscanthus japonicus* (Houtt.) Andersson in Öfvers. Kongl. Vetensk.-Akad. Förh. 12: 166. 1855.

Lectotypus (designated here by Veldkamp): **JAPAN**: *Thunberg s.n.* (G-PREL [G00818080]!; isolecto-: UPS-THUNB n° 1739 image seen; LE [Herb. Trinius 24.1] image seen).

Notes. – A specimen of original material is in the Japan herbarium in G-PREL annotated as “*Saccharum aristatum vel biflorum*”. A duplicate in the Thunberg herbarium (UPS-THUNB n° 1739) is annotated as *S. japonicum*. This was originally identified by THUNBERG (1794c: 329) as *S. polydactylon* L. The duplicate in LE was used by TRINIUS (1820: 169) for his combination *Ripidium japonicum* (Houtt.) Trin.

MERRILL (1938: 320) corrected the basionym author of *Miscanthus japonicus* from Thunberg to Houttuyn as Thunberg's name is a later isonym.

101. *Selago rapunculoides* L., Cent. Pl. II: 22. 1756 [cited in Nat. Hist. II(5): 324. 1775].

- = *Selago spuria* L., Sp. Pl.: 629. 1753.

Note. – A specimen in the Cape herbarium is in G-PREL [G00818081].

102. *Sida cordifolia* L., Sp. Pl.: 684. 1753 [cited in Nat. Hist. II(10): 39. 1779].

Notes. – A specimen in the Java herbarium is in G-PREL [G00818082]. A specimen annotated as “*S. rotundifolia*” is in the Thunberg herbarium (UPS-THUNB n° 15869), and another one is in L [L.0079191], annotated “*Sida cordifolia*. Linn.” and with a brief description by Houttuyn. The collection UPS-THUNB n° 15821 represents *S. cordifolia*, which was cultivated in the Uppsala Botanical Garden without provenance.

103. *Smilax zeylanica* L., Sp. Pl.: 1029. 1753 [cited in Nat. Hist. II(6): 356. 1776].

Note. – A specimen in the Ceylon herbarium is in G-PREL [G00818084].

104. *Stipa littorea* Burm. f., Fl. Indica: 29. 1768 [cited under *Stipa spinifex* L. in Nat. Hist. II(13): Aanwyz. Plaat. [2], 335; also cited under *Spinifex squarrosus* L., in Nat. Hist. II(13): 561, tab. 92, fig. 2. 1782].

= *Spinifex littoreus* (Burm. f.) Merr. in Philipp. J. Sci. 7: 229. 1912.

Lectotypus (designated here by Wijnands, Veldkamp & Callmänder): **INDONESIA. Java:** *Anon. s.n.* (G-PREL [G00360104]!).

Notes. – The only specimen of original material in the Burman herbarium is designated here as the lectotype. This collection is annotated as “rompot laut javanis” [“sea grass by the Javanese”] and represents a staminate plant. Houttuyn was clearly confused about this species, which he discussed twice, obviously unaware that it is dioecious. The single collection in his Ceylon herbarium [G00818158] also is a staminate plant of *Spinifex littoreus*.

105. *Teucrium japonicum* Houtt., Nat. Hist. II(9): 282, tab. 56, fig. 1. 1778.

Lectotypus (designated here by Callmänder & Fumeaux): **JAPAN:** *Thunberg s.n.* (G-PREL [G00818103]!; isolecto-: UPS-THUNB n° 13283, UPS-THUNB n° 13284 images seen).

Notes. – A Thunberg specimen of original material is in the Japan herbarium in G-PREL. It is a good match for the plate and is designated here as the lectotype.

106. *Tomex japonica* Thunb., Nov. Gen. Pl. 3: 65. 1783.

= *Litsea japonica* (Thunb.) Juss. in Bull. Soc. Philom. Paris 3: 73. 1801.

Typus: **JAPAN:** *Thunberg s.n.* (UPS-THUNB n° 11258 image seen; G-PREL [G00818147, G00818148, G00818149]!).

Notes. – Three original specimens collected by Thunberg are in G-PREL. Two are in Houttuyn's Japan herbarium [G00818147, G00818148] and one in Burman's [G00818149].

107. *Tragia involucrata* L., Sp. Pl.: 980. 1753 [cited in Nat. Hist. II(6): 221. 1776].

Notes. – A specimen without Houttuyn's annotation in the Ceylon herbarium is in G-PREL [G00818085]. It is annotated by Müller Argoviensis as “*Tragia involucrata* δ genuina”, an invalid name.

108. *Trichomanes aethiopicum* Burm. f., Fl. Ind. (Prodr. Fl. Cap.): 32. 1768.

= *Asplenium aethiopicum* (Burm. f.) Bech. in Candollea 6: 22. 1935.

Lectotypus (designated here by Callmänder & Fumeaux): **SOUTH AFRICA:** Cape, *Auge s.n.* [?] (G-PREL [G00818004]!).

Notes. – Two specimens are present in Houttuyn's Cape herbarium (G-PREL [G00818004, G00818005]) and one in Burman's (G-PREL [G00818089]). The only collection that bears the name *Trichomanes aethiopicum* is designated here as the lectotype.

109. *Truellum japonicum* Houtt., Nat. Hist. II(8): Aanwyz. Plaat. [2], 427, fig. 48, tab. 1. 1777.

Lectotypus (designated here by Wijnands): **JAPAN:** *Thunberg s.n.* (G-PREL [G00818086]!; isolecto-: UPS-THUNB n° 9714 image seen).

= *Polygonum senticosum* (Meisn.) Franch. & Sav., Enum. Pl. Jap. 1: 401. 1875.

Notes. – The genus *Truellum* Houtt. is currently considered a synonym of *Polygonum* L. Original material of *Truellum japonicum* is present in the Japan herbarium in G-PREL. This collection is a good match for the plate and is designated here as the lectotype. A duplicate is present in UPS-THUNB.

110. *Verbena officinalis* L., Sp. Pl.: 20. 1753.

Notes. – A specimen collected by Thunberg is in the Japan herbarium in G-PREL [G00818087]. Houttuyn annotated it with a reference to Thunberg's “*Flora japonica* p. 22”.

111. *Xanthium strumarium* L., Sp. Pl.: 987. 1753 [cited in Nat. Hist. II(9): 241. 1774].

Notes. – A specimen collected by Thunberg is in the Japan herbarium in G-PREL [G00818098]. The collection was determined by Thunberg as *Xanthium orientale* L.

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Appendix I. – The auction catalogue of Houttuyn's herbarium [translated by D.O. Wijnands and J. Heniger].

HOUTTUYN (1789a, often filed sub POSTHUMUS & POSTHUMUS, 1789). *Catalogus van eene uitmuntende Verzameling van Plantgewassen ...*, p. 11-14. [Catalogue of an excellent collection of plants...]. There is an annotated copy in the *Koninklijke Bibliotheek* [Royal Library] in The Hague with the names of the buyers of the zoological objects and the prices obtained, the botanical items unfortunately only have prices, so the travels of these specimens cannot be traced from there.

- A.** A living Japanese herbarium, collected by the very famous Professor of Upsala Thunberg and like the other one arranged according to the Linnaean Natural System, annotated with the specific names of the plants, with some annotations from the observations of the Medical Dr. M. Houttuyn. NB. This contains about 300 plants, to which are added 70 of which the fructifications need yet to be examined.
- B.** A living Javanese herbarium, partly collected by the most renowned Prof. Thunberg and likewise very beautifully arranged, annotated with the specific names of the plants and with notes by Dr. M. Houttuyn, as above. NB. The number of the plants in this splendid collection is about 400 to which are added another 125, which need examination.
- C.** A living Ceylonese herbarium, collected by the same most renowned Prof. Thunberg, and arranged in the same way, annotated with names and notes as above. NB. This contains the number of plants of 165, to which come 50 less known or to be examined.
- D.** A living Cape herbarium or collection of Plants gathered from the Cape of Good Hope, carefully examined by Dr. M. Houttuyn with the microscope and arranged according to the Linnaean Natural System, as above, everywhere with annotations and themselves used as the objects of the drawings in the Dutch commentary of the Syst. Nat. NB. The number of the plants of this herbarium is about 250, which all are distinguished as much as possible with specific names.
- E.** A living European herbarium, containing plants collected in Spain, Switzerland, and elsewhere, some also indigenous.
- F.** A medical herbarium, containing for the most plants belonging to Medicine.
- G.** A Tournefortian herbarium, containing more than two thousand plants beautifully arranged according to the Tournefortian system.
- H.** A painted Bengal herbarium which is used in medicine, and also noted by the Ceylonese (from the Dutch text: 99 plants from Bengal, to which are added 35 Ceylonese dried plants).
- I.** Several herbaria.
- K.** A Book with Cape sea-plants.

Appendix II. – Index of names treated in the lectotypification and miscellaneous note section, with their current state of use, organised by family.

FERNS

Aspleniaceae

108. *Trichomanes aethiopicum* Burm. f. = *Asplenium aethiopicum* (Burm. f.) Bech.

Davalliaceae

72. *Ophioglossum acuminatum* Houtt. = *Nephrolepis davallioides* (Sw.) Kunze

Dryopteridaceae

85. *Polypodium japonicum* Thunb. ex Houtt. = *Cyrtomium falcatum* (Thunb. ex L. f.) C. Presl

Gleicheniaceae

86. *Polypodium pedatum* Houtt. = *Polypodium dichotomum* Thunb. = *Dicranopteris linearis* (Burm. f.) Underw.

Osmundaceae

75. *Osmunda japonica* Thunb.
76. *Osmunda japonica* Houtt. [non *O. japonica* Thunb.] = *Osmunda lancea* Thunb.

Polypodiaceae

2. *Acrostichum hastatum* Thunb. ex Houtt. = *Pyrrosia hastata* (Thunb. ex Houtt.) Ching
87. *Polypodium trilobum* Houtt. = *Selliguea triloba* (Houtt.) M.G. Price

Pteridaceae

92. *Pteris orbiculata* Houtt.

Tectariaceae

73. *Ophioglossum zeilanicum* Houtt. = *Tectaria zeilanica* (Houtt.) Sledge

ANGIOSPERMS

Acanthaceae

97. *Ruellia ringens* sensu Houtt. [non *R. ringens* L.] = *Ruellia repens* Burm. f. = *Hygrophila erecta* (Burm. f.) Hochr.

Amaranthaceae

5. *Amaranthus mangostanus* sensu Houtt. [non *A. mangostanus* L.] = *Amaranthus interruptus* R. Br.
26. *Celosia japonica* Houtt. = *Celosia pyramidalis* Burm. f. = *Celosia argentea* L.
54. *Illecebrum lanatum* (L.) L. = *Aerva lanata* (L.) Juss. ex Schult.

Amaryllidaceae

6. *Amaryllis dubia* sensu Houtt. [non *A. dubia* L.] = *Nerine sarniensis* (L.) Herb.

Anacardiaceae

7. *Anacardium occidentale* L.

Apiaceae

25. *Caucalis japonica* Houtt. = *Torilis japonica* (Houtt.) DC.
27. *Chaerophyllum scabrum* Thunb. = *Torilis scabra* (Thunb.) DC.
70. *Oenanthe capensis* Houtt. = *Glia prolifera* (Burm. f.) B.L. Burtt

Apocynaceae

13. *Apocynum frutescens* L. = *Ichnocarpus frutescens* (L.) W.T. Aiton
66. *Nerium oleander* L.
67. *Nerium zeylanicum* L. = *Wrightia antidysenterica* (L.) R. Br.

Asparagaceae

37. *Crinum angustifolium* Houtt. = *Polianthes tuberosa* L.
59. *Massonia depressa* Houtt.
74. *Ornithogalum dubium* Houtt.

Asteraceae

14. *Arctotis aspera* L.
20. *Athanasia pubescens* sensu Houtt. [non *A. pubescens* (L.) L.] = *Athanasia tomentosa* Thunb.
21. *Atractylis angustifolia* Thunb. ex Houtt. = *Berkbeya angustifolia* (Thunb. ex Houtt.) Merr.
28. *Cineraria incisa* Thunb. ex Houtt. = *Senecio erosus* L. f.
44. *Erigeron capensis* Houtt. = *Hilliardiella capensis* (Houtt.) H. Rob. et al.
45. *Ethulia paniculata* Houtt. = *Dichrocephala integrifolia* (L. f.) Kuntze
50. *Gnaphalium aureum* Thunb. ex Houtt. = *Helichrysum aureum* (Thunb. ex Houtt.) Merr.
88. *Prenanthes denticulata* Houtt. = *Crepidiastrum denticulatum* (Houtt.) Pak & Kawano
89. *Prenanthes laciniata* Houtt. = *Lactuca indica* L.

90. *Prenanthes lanceolata* Houtt. = *Crepidiastrum lanceolatum* (Houtt.) Nakai
 111. *Xanthium strumarium* L.
- Boraginaceae**
41. *Echium capitatum* L. = *Lobostemon capitatus* (L.) H. Buek
- Colchicaceae**
9. *Anthericum bulbine* Houtt. = *Wurmbea stricta* (Burm. f.) J.C. Manning & Vinn.
- Convolvulaceae**
32. *Convolvulus batatas* L. = *Ipomoea batatas* (L.) Lam.
 33. *Convolvulus capensis* Burm. f.
 34. *Convolvulus obscurus* L. = *Ipomoea obscura* (L.) Ker Gawl.
 55. *Ipomoea pilosa* Houtt. = *Merremia umbellata* (L.) Hallier. f.
- Cyperaceae**
38. *Cyperus javanicus* Houtt.
- Dilleniaceae**
19. *Assa indica* Houtt. ex Christm. & Panz. = *Tetracera indica* (Houtt. ex Christm. & Panz.) Merr.
 39. *Dillenia indica* L.
- Ericaceae**
42. *Erica pulchella* Houtt.
 43. *Erica splendida* Houtt.
- Euphorbiaceae**
107. *Tragia involucrata* L.
- Fabaceae**
1. *Abrus precatorius* L.
 12. *Anthyllis ensifolia* Houtt. = *Psoralea ensifolia* (Houtt.) Merr.
 16. *Aspalathus fascicularis* Burm. f.
 17. *Aspalathus multiflora* Thunb. = *Aspalathus vermiculata* Lam.
 18. *Aspalathus pedunculata* Houtt.
 31. *Clitoria ternatea* L.
 52. *Hedysarum motorium* Houtt. = *Codariocalyx motorius* (Houtt.) Ohashi
 53. *Hedysarum vaginale* L. = *Alysicarpus vaginalis* (L.) DC.
 58. *Lotus capensis* Houtt. = *Lotononis umbellata* (L.) Benth.
 83. *Poinciana pulcherrima* L. = *Caesalpinia pulcherrima* (L.) Sw.
- Geraniaceae**
46. *Geranium chelidonium* Houtt. = *Pelargonium chelidonium* (Houtt.) DC.
 47. *Geranium ovale* Burm. f. = *Pelargonium ovale* (Burm. f.) L'Hér.
 48. *Geranium tetragonum* L. f. = *Pelargonium tetragonum* (L. f.) L'Hér.
- Iridaceae**
10. *Antholyza aletroides* Burm. f. = *Watsonia aletroides* (Burm. f.) Ker Gawl.
 11. *Antholyza caryophyllacea* Burm. f. = *Gladiolus caryophyllaceus* (Burm. f.) Poir.
 49. *Gladiolus liliaceus* Houtt.
 56. *Ixia campanulata* Houtt. = *Ixia aristata* Thunb.
 79. *Phalangium spicatum* Houtt. = *Micranthus plantagineus* Eckl.
- Lamiaceae**
29. *Clerodendrum infortunatum* L.
 30. *Clerodendrum paniculatum* L.
 65. *Nepeta incana* Thunb. ex Houtt. = *Caryopteris incana* (Thunb. ex Houtt.) Miq.
 69. *Ocimum sanctum* L. = *Ocimum tenuiflorum* L.
 105. *Teucrium japonicum* Houtt.
- Lardizabalaceae**
94. *Rajania quinata* Thunb. = *Akebia quinata* (Thunb. ex Houtt.) Decne.
- Lauraceae**
106. *Tomex japonica* Thunb. = *Litsea japonica* (Thunb.) Juss.
- Liliaceae**
57. *Lilium japonicum* Thunb. ex Houtt.
- Malvaceae**
102. *Sida cordifolia* L.
- Melastomataceae**
60. *Memecylon capitellatum* L.,
 61. *Memecylon floribundum* Blume = *Memecylon caeruleum* Jack
- Menispermaceae**
62. *Menispermum glabrum* sensu Houtt. [non *M. glabrum* Burm. f.] = *Stephania japonica* var. *discolor* (Blume) Forman

Menyanthaceae

95. *Renealmia capensis* Houtt. = *Villarsia capensis* (Houtt.) Merr.

Moraceae

93. *Radermachia integra* Thunb. = *Artocarpus integra* (Thunb.) Merr.

Moringaceae

51. *Guilandina moringa* L. = *Moringa oleifera* Lam.

Myristicaceae

64. *Myristica fragrans* Houtt.

Nyctaginaceae

23. *Boerhavia diffusa* L.

Ochnaceae

68. *Ochna nitida* sensu DC. [non *O. nitida* Sw.] = *Ochna jabotapita* L.

Oxalidaceae

22. *Averrhoa carambola* L.
77. *Oxalis sensitiva* L. = *Biophytum sensitivum* (L.) DC.

Piperaceae

81. *Piper officinarum* (Miq.) C. DC. = *Piper retrofractum* Vahl

Plumbaginaceae

82. *Plumbago rosea* L. = *Plumbago indica* L.

Poaceae

3. *Agrostis javanica* Houtt. = *Ischaemum muticum* L.
4. *Aira arundinacea* sensu Houtt. [non *A. arundinacea* L.] = *Panicum bisulcatum* Thunb.
24. *Bromus japonicus* Thunb. ex Houtt.
78. *Paspalum dissectum* (L.) L. = *Panicum dissectum* L.
80. *Phleum indicum* Houtt. = *Polytrias indica* (Houtt.) Veldk.
100. *Saccharum japonicum* Houtt. = *Miscanthus japonicus* (Houtt.) Andersson
104. *Stipa littorea* Burm. f. = *Spinifex littoreus* (Burm. f.) Merr.

Polygalaceae

84. *Polygala japonica* Houtt.

Polygonaceae

96. *Reynoutria japonica* Houtt. = *Fallopia japonica* (Houtt.) Ronse Decr.
98. *Rumex japonicus* Houtt.
99. *Rumex umbellatus* Houtt. = *Persicaria chinensis* (L.) H. Gross
109. *Truellum japonicum* Houtt. = *Polygonum senticosum* (Meisn.) Franch. & Sav.

Proteaceae

91. *Protea linearis* Houtt. = *Leucadendron brunioides* Meisn.

Ranunculaceae

8. *Anemone japonica* Houtt. = *Clematis florida* Thunb.

Rosaceae

35. *Corchorus japonicus* Thunb. ex Houtt. = *Kerria japonica* (L.) DC.

Rubiaceae

15. *Argostemma borragineum* Blume ex DC.
36. *Crinita capensis* Houtt. = *Pavetta capensis* (Houtt.) Bremek.
63. *Mussaenda frondosa* L.
71. *Oldenlandia linearifolia* Thunb.

Rutaceae

40. *Diosma pulchella* sensu Houtt. [non *D. pulchella* L.] = *Agathosma ovata* (Thunb.) Pillans

Scrophulariaceae

101. *Selago rapunculooides* L. = *Selago spuria* L.

Smilacaceae

103. *Smilax zeylanica* L.

Verbenaceae

110. *Verbena officinalis* L.