



# Possible Rumphius specimens detected in Paul Hermann's Ceylon herbarium (1672–1679) in Leiden, The Netherlands

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Our respected colleague and Rumphius-lover Jan-Frits Veldkamp passed away shortly after he checked the final version of this manuscript.

## Key words

Ambon  
*Biophytum sensitivum*  
*Colocasia esculenta*  
*Gomphrena globosa*  
*Helminthostachys zeylanica*  
Herbarium Amboinense  
Hermann  
Rumphius  
Sri Lanka

**Abstract** Georg Eberhard Rumphius (1627–1702), author of the monumental work *Herbarium Amboinense* (1741–1755) is seen as the undisputed patriarch of Malesian Natural Sciences. Until recently, it was thought that if Rumphius had collected any specimens, they all had been lost. The recent digitisation and revision of two book herbaria in Leiden collected by Paul Hermann (1646–1695) on Ceylon revealed four specimens with reference to either Rumphius or Ambon in Hermann's handwriting: *Colocasia esculenta*, *Gomphrena globosa*, *Helminthostachys zeylanica* and *Biophytum sensitivum*, of which the latter does not occur in Sri Lanka. Here we discuss the description of these species in both published and unpublished historic works and consider the possibility that they may represent the only extant herbarium material attributable to Rumphius.

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## INTRODUCTION

Georg Eberhard Rumpf (1627–1702), better known as Rumphius, was a German naturalist employed by the Dutch East India Company (Vereenigde Oostindische Compagnie, hereafter VOC) in the Moluccas in today's Indonesia. For 49 years he was resident of the island of Ambon, where he spent, on top of his official military and trading duties, considerable time in studying the local flora and fauna (Veldkamp 2002, Buijze 2006, Beekman 2011). He was plagued by a series of natural catastrophes (an earthquake, a tsunami, a fire) and personal misfortunes (deaths in his family, theft of his manuscripts and blindness). Rumphius' strong dedication, however, enabled him to finish his monumental manuscript *Herbarium Amboinense*, the first, and also extensive, account of Malesian plants, with elaborate, illustrated descriptions of almost 1 300 plant species and their uses (Baas & Veldkamp 2013). Rumphius's original manuscripts were sent to the Netherlands, but the Dutch squadron with the ship *De Waterlandt* was intercepted by a French fleet and sunk with company and contents lost near La Coruña in the Bay of Biscay, Spain, in 1692. As ships often foundered during such hazardous voyages, it was customary for copies of important papers to be made in Batavia (today's Jakarta). A handwritten copy of Rumphius' manuscripts and illustrations that was left in Batavia was copied again and sent to Amsterdam in 1697 (Buijze 2006). The older copy reached the Netherlands a few years later (Menger & Van Duijn 2014). The two handwritten copies of the *Herbarium Amboinense* are kept at the Leiden University Library.

Johannes Burman (1706–1779), the director of the Amsterdam Botanic Garden, edited the Dutch manuscript and translated it into Latin, publishing it as twelve books in six large volumes with an addendum (Rumphius 1741–1755), long after Rumphius'

death (Baas & Veldkamp 2013). Today, the *Herbarium Amboinense* still serves as the basic source of (ethno-)botanical knowledge of the Moluccas while Rumphius is considered as the undisputed patriarch of Malesian botany, zoology and geology (Veldkamp 2002). A biography of Rumphius and an English translation of his work have been published by Beekman (2011).

It is generally assumed that no plant collections of Rumphius have survived (Veldkamp 2002, Baas & Veldkamp 2013), although Martelli (1903) argued that some plant specimens reached the herbarium in Florence (FI), where the original labels were destroyed and the specimens became so mixed up with others that they can no longer be recognised. In this paper, we discuss four plant specimens in a book herbarium containing Sri Lankan plants compiled by the German physician and botanist Paul Hermann (1646–1695), specimens that might have been collected by Rumphius.

Hermann was stationed as a Chief Medical Officer for the VOC in Ceylon (today's Sri Lanka) from 1672 to 1680 (Heniger 1986, Buijze 2004). During his stay on the island, he collected a large number of plant specimens, from which he compiled several bound book herbaria and made at least 346 botanical drawings (Trimen 1887). The specimens were added to the herbaria as they came in, so not in any systematic order, sometimes the same species being added several times and thus in different places. In 1679, Hermann took up the chair of Botany at the University of Leiden, where he spent the rest of his life, dedicating himself to the development of the Leiden Botanic Garden and making botanical illustrations (Veendorp & Baas Becking 1938). Hermann's field notes on his Sri Lankan collections, which contained lists of local names, plant descriptions and uses, were edited and published after his death by his student William Sherard as *Museum Zeylanicum* (Sherard 1717). Four of Hermann's book herbaria with c. 550 specimens and one volume of 346 illustrations are held in the Natural History Museum (BM) in London. These were extensively studied by Carl Linnaeus (1707–1778), who used them for his taxonomic descriptions in his *Flora Zeylanica* (Linnaeus 1747). This formed the basis for most of the Sri Lankan plants he published in his *Species Plantarum* (Linnaeus 1753, Trimen 1887, Jarvis 2007).

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There are three other Sri Lankan herbaria compiled by Herman that Linnaeus did not see. One is in the Institut de France, Paris, and served as the basis for Burman's *Thesaurus Zeylanicus* (1736) and is described by Lourteig (1966). A second is in the Forschungsbibliothek Gotha, University of Erfurt, Germany, and has never been thoroughly studied beyond a survey made by Rauschert (1970). No digital images are available of these collections. Thirdly, in Leiden, The Netherlands, there are two bound volumes, entitled *Herbarius Vivus Ceylonensis* Vol. I and II, which are currently in the Naturalis Biodiversity Center (L). These have been studied by Van Ooststroom (1937), and briefly by F.R. Barrie and C.E. Jarvis for their Linnaean Plant Name Typification Project (<http://www.nhm.ac.uk/our-science/data/linnaean-typification/>). Contrary to Van Ooststroom's assertions, not a single specimen can be shown to have been seen by Linnaeus.

## MATERIALS AND METHODS

A recent digitisation project has enabled botanical assessment of these historic specimens (Barth 2015). High-resolution images of the 183 specimens on the 157 pages were made, facilitating their identification without having to handle them frequently. Use was made of the comments by Van Ooststroom (1937), the original notes by Hermann written next to the specimens, historic literature on the Hermann collections (Sherard 1717, Linnaeus 1747, 1753, Trimen 1887) and recent botanical studies on Sri Lankan botany (Jayaweera 1980, Dassanayake & Fosberg 1980–2006). All specimens were compared with more recent herbarium collections from the area in the L herbarium, the descriptions of the Hermann collections in France (Lourteig 1966) and Germany (Rauschert 1970) and the digital images made of Hermann collections in London (<http://www.nhm.ac.uk/research-curation/scientific-resources/collections/botanical-collections/hermann-herbarium/>). The latest plant identifications of the Leiden Hermann Herbaria were published by Barth (2015) and the digitised images of all specimens will be published elsewhere (Van An del & Barth forthcoming).

In this paper, we focus on the four specimens in the Leiden Hermann collections with references to either Rumphius or Amboin. For Rumphius' description of these four species and their uses, we used the published version of *Herbarium Amboinense* (Rumphius 1741–1755, Vol. 1–12), digitally available through Google Books and the Biodiversity Heritage Library (BHL) and the two handwritten copies of Rumphius' original Dutch manuscript now in the Special Collections of the Leiden University Library: BPL 311 (c. 1690–1703) and BPL 314 (c. 1692). For a description of these manuscripts, see Menger & Van Duijn (2014).

## RESULTS

### Added specimens

During our examination of the second volume of the Hermann Ceylon herbarium in L our attention was drawn by the remarks of Van Ooststroom (1937) to one specimen (folio 88) with a reference to the Moluccas and three specimens (folios 90, 92 and 94) that mention pre-Linnaean names with the abbreviation 'Rumph.'. All annotations are in Hermann's handwriting and similar to those written on his London and Erfurt collections (Rauschert 1970: 303), and to the notes in a book herbarium owned by Hermann with 51 specimens from Suriname (Van An del et al. 2012). Van Ooststroom (1937: 203) suggested that the specimens on these four folios have been added afterwards ('unnumbered leaves are missing here') and that Hermann must have received the 'data for these references in some way from Rumphius himself', for the first volume of Rumphius' *Herbarium Amboinense* did not appear until 1741, while Hermann died

in 1695. We confirm Van Ooststroom's observation that after every specimen there is an empty, unnumbered sheet and a cut-off page, a strip of paper that provides some protection for the specimens, except in the case of folios 88, 90, 92 and 94, where specimens are glued on the (previously) empty page. The folio numbers appear to have been added after binding. Apparently, the paper sheets were not added afterwards, as the watermark (a letter P and smaller letters V and L, referring to the Dutch papermaker Pieter van der Ley. This type of paper was made between 1665 and 1765) is similar throughout Volume II (Appendix 1). Folio 165 has a more elaborate watermark of a rooster above the letters HD (Appendix 2), but we have not been able to trace the origin of this watermark as it is not listed in the Bernstein database Memory of Paper (<http://www.memoryofpaper.eu/>).

### *Colocasia esculenta*

Folio 88 bears a specimen of a single leaf that we identify as *Colocasia esculenta* (L.) Schott (*Araceae*). It is accompanied by the text: 'Keladi. Ambon. Lotus Aegyptia Alpini.' (Fig. 1), indicating it came from the Moluccas. This aroid species with edible corms, currently widely cultivated in the tropics, is not included in Hermann's collections in London, Erfurt or Paris (Lourteig 1966, Rauschert 1970), and is not mentioned in the *Museum Zeylanicum* (Sherard 1717, Gunawardena 1975). Rumphius, however, described 10 forms of 'Kelady' or 'Egyptian

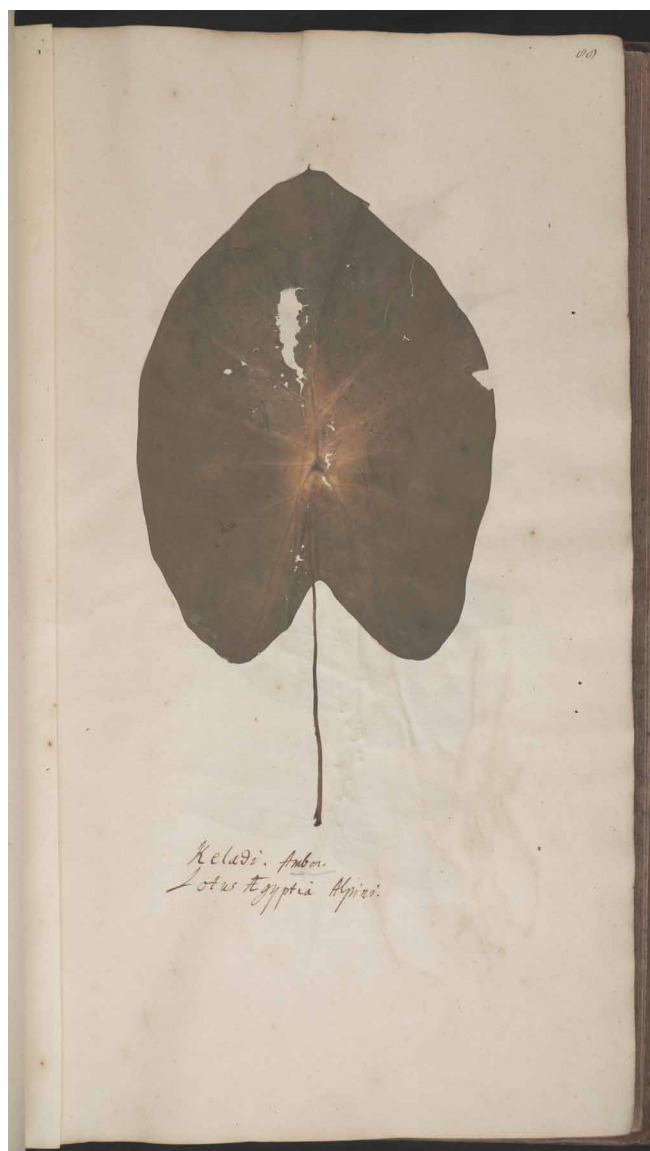


Fig. 1 Folio 88, Vol. II of the Hermann herbarium in Leiden. *Colocasia esculenta*. — Photograph: Naturalis Biodiversity Center.



**Fig. 2** Original drawing of *Colocasia esculenta* on plate 195a in Rumphius' manuscript BPL 314 (1692) at the Leiden University Library. The names 'keladi', 'Arum Aegyptium' and 'Caladium sativum' are visible in the upper left corner. — Photograph: Tinde van Andel.

Arum' in his *Herbarium Amboinense* (1747: 313), among which is the sterile, domesticated tuber crop *Caladium sativum* (now *Colocasia esculenta*). The original illustration of *C. esculenta* in Rumphius' manuscript BPL 314 is shown in Fig. 2.

### *Gomphrena globosa*

Folio 90 bears a flowering specimen that we identify as the common garden ornamental *Gomphrena globosa* L. (*Amaranthaceae*). Hermann's annotation mentions: 'Amarantho adfinis Breyni. Cent. 1. Flos globularius Rumph.' (Fig. 3). Hermann did not report any local name of this plant either with the specimens or in his notes (Sherard 1717). Four specimens of *G. globosa* are preserved in BM, and one in the Paris collection (Lourteig 1966: 32), but none of them bears a reference to Rumphius. The species is not represented in the Erfurt collections (Rauschert 1970). Rumphius (1747: 289) described it as 'flos globosus' and 'flos globularius', with the local Malay-Dutch name 'Bonga knop', a garden ornamental introduced from Java, of which the flowers are strung into garlands during weddings and other festivities and the leaves are consumed as a vegetable. Rumphius also mentioned Breyné's description of the species, as did Hermann. The small illustration of the plant in the published version of *Herbarium Amboinense* (1747: 289; Fig. 4) is a fragment of the much larger illustration that is stuck between p. 320 and p. 321 in the handwritten manuscript (BPL 314, 1692) in the Leiden University Library (Fig. 5).

### *Helminthostachys zeylanica*

Folio 92 bears a specimen of the fern *Helminthostachys zeylanica* (L.) Hook. (*Ophioglossaceae*) annotated by Hermann as 'Ophioglossum laciniatum Rumph.' (Fig. 6). This fern occurs in South-East Asia and Australia (Bharali et al. 2017). Linnaeus' description in the *Flora Zeylanica* (Linnaeus 1747: 178) is



**Fig. 3** Folio 90, Vol. II of the Hermann herbarium in Leiden. *Gomphrena globosa*. — Photograph: Naturalis Biodiversity Center.

partly based on Hermann's notes in the *Museum Zeylanicum* (Sherard 1717: 6), which only mention the Sinhalese names 'Paba' and 'Paniba' and the use of this fern to make fences, but do not cite Rumphius. No specimens of this fern are present in the Hermann collections in London or Erfurt. In the catalogue of the Paris collections, two specimens of 'Ophioglossum' are present (on page 136 and 148), identified by Lourteig (1966: 31) as *O. circinnatum* Burm.f. (now *Lygodium circinnatum* (Burm.f.) Sw.) and *O. flexuosum* L. (now *Lygodium flexuosum* (L.) Sw.). Both specimens bear a reference to Rumphius' published work, probably noted by Burman. Gunawardena (1975) interpreted Hermann's species as *Lygodium* sp. (*Schizaeaceae*), possibly based on Burman's *Thesaurus Zeylanicus* (1737). Rumphius (1750: 153) described the plant as the 'incised snake tongue' and mentioned that the young shoots are cooked and eaten as asparagus. An illustration of this species was published in the *Herbarium Amboinense* (Fig. 7).

### *Biophytum sensitivum*

Folio 94 bears a specimen of *Biophytum sensitivum* (L.) DC. (*Oxalidaceae*), annotated by Hermann as 'Herba sentiens Rumph. Nintikumba Zeylan.' (Fig. 8). This is a widespread species in Southeast Asia, but not known from Sri Lanka (Veldkamp 1989). At BM, there are five specimens identified by Trimen (1887) as *B. sensitivum* (three specimens in Vol. 1, folio 28 and



Fig. 4 Illustration of *Gomphrena globosa* in the printed version of the *Herbarium Amboinense* (Rumphius 1747: 289).

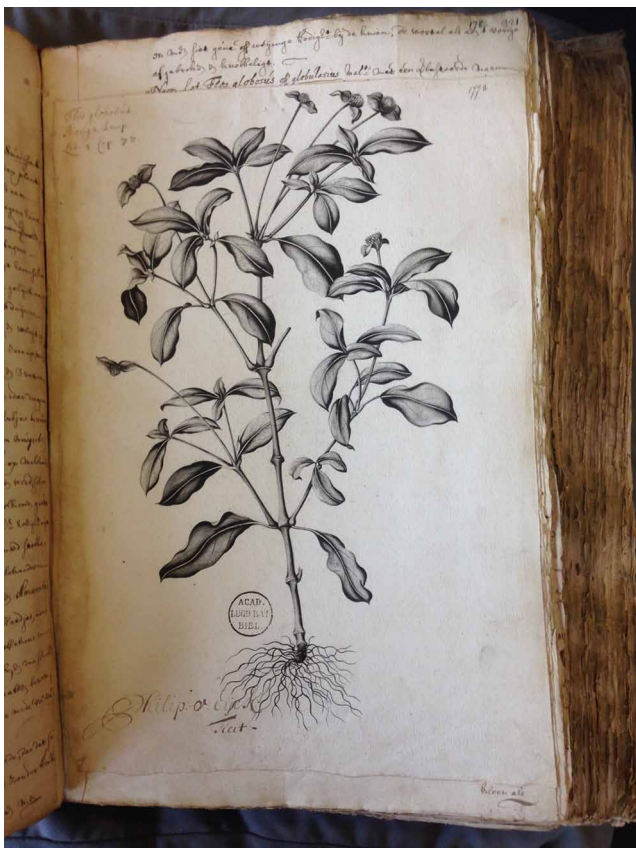


Fig. 5 Original drawing of *Gomphrena globosa* inserted between p. 320 and p. 321 in Rumphius' manuscript (BPL 314, 1692) in the Leiden University Library. — Photograph: Tinde van Andel.

two specimens in Vol. 3, folio 54). These have, however, much longer peduncles and clearly pedicellate flowers (Fig. 9), while the L specimen has relatively shorter peduncles and sessile flowers (Fig. 8). The illustrations in both the manuscript (Fig. 10) and the printed version of *Herbarium Amboinense* (Fig. 11) depict the same taxon as the Leiden specimen, *B. sensitivum*.

All BM specimens represent the Sri Lankan endemic *B. hermanni* Veldk., with the specimen depicted in Fig. 9 being the type (Veldkamp 1989), though Dassanayake in the *Revised Flora of Ceylon* (1999: 181), considered it to be *B. reinwardtii* (Zucc.) Klotzsch. Rumphius provided an extensive description of 'Herba sentiens' in 1685 and dedicated three pages on it in *Herbarium Amboinense* (1747: 301). He considered this plant a masterpiece of nature, as it leaves close at the slightest touch. Because of its characteristic behaviour, the plant was used in the Moluccas as a love charm, but in his long list of vernacular names, Rumphius did not mention the Sinhalese 'Nintikumba' or anything similar. Annotations on the BM collections refer to *Herba viva* (Acosta 1578) and *Herba sentiens* (Bontius 1658: 120), but not to Rumphius or a Sinhalese name. Apparently, when Hermann made these collections, he had not yet received the 'Rumphius' specimen of *Biophytum sensitivum* or read Rumphius' publication on the plant (1685). The Erfurt collection has one specimen identified by Rauschert (1970) as *B. sensitivum*, with the annotation 'Nintikumbu'. We requested a digital image and identified this specimen as *B. hermanni*. The Paris collection has a specimen (page 63) identified by Lourteig



Fig. 6 Folio 92, Vol. II of the Hermann herbarium in Leiden. *Helminthostachys zeylanica*. — Photograph: Naturalis Biodiversity Center.



Fig. 7 Illustration of *Helminthostachys zeylanica* from the printed version of the *Herbarium Amboinense* (Rumphius 1750: 152).



Fig. 8 Folio 94, Vol. II of the Hermann herbarium in Leiden. *Biophytum sensitivum*. — Photograph: Naturalis Biodiversity Center.



Fig. 9 Specimens of *Biophytum hermanni* in the Hermann collection in London, Vol. 3, page 54 (BM000628004). — Photograph: Natural History Museum, London.

(1966: 28) as *B. sensitivum*, without a reference to Rumphius or a Sinhalese name, which was considered by Veldkamp (1989) as an isotype of *B. hermanni*. *Museum Zeylanicum* (Sherard 1717: 35, 37) lists the Sinhalese names Nidikudda or Ni(n) dikumba, explaining that it is derived from 'nidi' (sleeping) and 'cumba' (sleep), and indicates the pages in the British Hermann collections (on folios 28 and 54), but not the Leiden one. The name Gasnidikumba is mentioned under *B. reinwardtii* (now considered to be *B. hermanni*) in Sri Lanka (Dassanayake 1999: 192).

With a different spelling, the vernacular name 'Nidikoempaij' is mentioned for a drawing made by an unknown artist in Sri Lanka around 1700 (Fig. 12a, b), found in an unpublished codex of 262 watercolour drawings of medicinal plants from there (*Icones Plantarum Malabaricarum, adscriptis nominibus et viribus*. Vol. I. & II (BPL\_126 D), in the Special Collections of the Leiden University Library (Beumer 2013). This plant, with obvious long pedicels, was recently identified following the *Flora of Ceylon* as *B. reinwardtii* (Scholman 2017), but should be renamed *B. hermanni*.

## DISCUSSION

Hermann died in 1695, 46 years before the publication of Rumphius' *Herbarium Amboinense*, and two years before the first copied version of Rumphius' manuscript safely reached

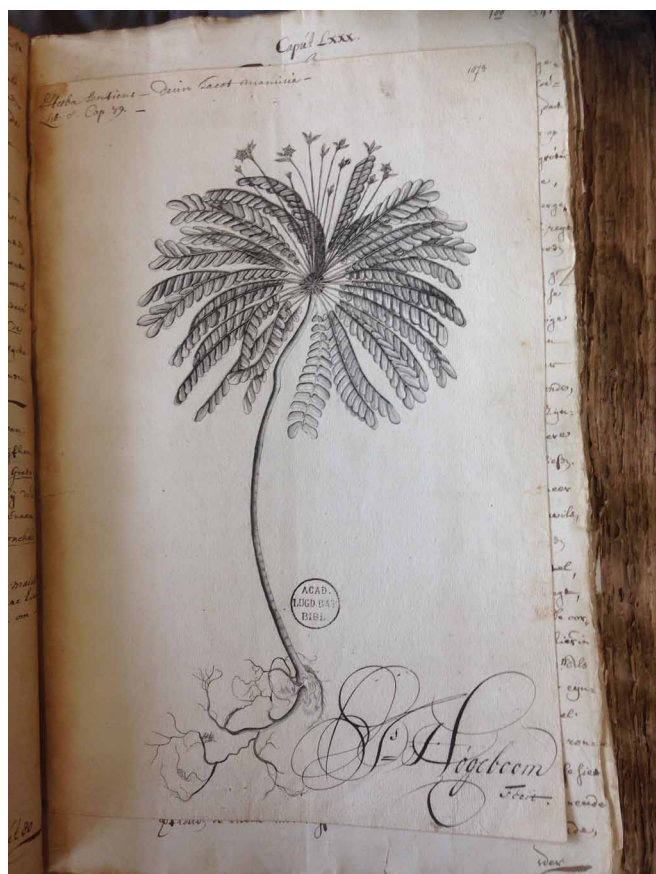


Fig. 10 Original drawing of *Biophytum sensitivum* on page 187a in Rumphius' manuscript BPL314 (1692) in the Leiden University Library. — Photograph: Tinde van Andel.

Amsterdam (Veldkamp 2002, Baas & Veldkamp 2013). Rumphius became blind in 1670, two years before Hermann was stationed in Sri Lanka, while on 11 January 1687 a fire destroyed his precious library, his collections, and most of his manuscripts (Buijze 2004, 2006). The questions are how did Hermann obtain these four specimens and how did he know about the Rumphius names. The possible options are: 1) Hermann had access to parts of the *Herbarium Amboinense* manuscripts long before they were sent to The Netherlands; or 2) Hermann somehow received specimens from Rumphius.

It is known that Rumphius sent plant material, manuscripts and illustrations to The Netherlands (Veldkamp 2002). Hermann must have been aware of Rumphius' publication on *Biophytum sensitivum* (Rumphius 1685) when he received the specimen of this plant, years after his return from Sri Lanka. In his *Paradisus Batavus* (Hermann 1698), an inventory of the Leiden Botanical Garden published shortly after his death, Hermann wrote that he had received a drawing from Batavia of the orchid *Flos susannae*, named by Rumphius after his wife (Rumphius 1743: 286) and now known as *Pecteilis susannae* (L.) Raf. Hermann published a reproduction of this illustration as 'Orchis amboinensis' (Hermann 1698: 209) and mentioned that the plant did not flower in the Amsterdam Garden, so he probably had received some living material as well (Veldkamp 2002). However, the other works by Rumphius published before Hermann's death in 1695 (see Buijze 2006: 111 for an overview) were about other species than the ones discussed in this paper.

In the *Herbarium Amboinense*, Rumphius referred several times to Hermann's publications from 1687 and 1691 and mentions his position as a Professor in Botany in Leiden (Buijze 2004). Hermann's publications are generally catalogues without much detail, but Rumphius cited Hermann on specific aspects of plant morphology, Sinhalese names and uses that cannot be traced



Fig. 11 Illustration of *Biophytum sensitivum* from the printed version of the *Herbarium Amboinense* (Rumphius 1747: 301).

in Hermann's publications. Therefore, Buijze (2004: 124) suggests that Rumphius and Hermann must have been in contact.

Although there is no clear evidence of direct correspondence (Veldkamp 2002), there may have been indirect communication through, for example, the Governor General in Batavia, Joannes Camphuys (1634–1695), who was a patron of science, and with whom Rumphius was on amicable terms as Camphuys was the one who had ordered the copies of the *Herbarium Amboinense* to be made in Batavia (Veldkamp 2002: 15). Other options of indirect contact between Hermann and Rumphius are through Andreas Cleyer (1634–1696), who managed the pharmacy of the VOC in Batavia, or through Robert Padtbrugge (1637–1703), a Dutch VOC doctor stationed from 1671–1675 in Sri Lanka. No corroborating correspondence has been found so far (Buijze 2004). Rumphius also sent manuscripts to Hendrik d'Acquet (1632–1706), mayor of Delft (Veldkamp 2002, Buijze 2006), but this seems to have happened after Hermann's death. A possible indirect source of Hermann's 'Rumphius specimens' could also have been Sri Lanka, from where botanical material from all Dutch territories in western Asia was shipped each year to The Netherlands. Stimulated by the botanist and VOC governor of the Malabar Coast Hendrik Adriaan van Reede tot Drakenstein (1636–1691), seeds, bulbs and medicinal herbs were transported from Colombo to The Netherlands for more than hundred years (Heniger 1986).

The facts that the London, Erfurt and Paris collections do not have any references to Rumphius in Hermann's handwriting and that *Helminthostachys zeylanica*, *Colocasia esculenta* and



**Fig. 12a** Drawing of *Biophytum hermannii* by an anonymous artist in Sri Lanka around 1700. Manuscript BPL 126 D, Leiden University Library Special Collections. — Photograph: Leiden University.



**Fig. 12b** Handwritten text by a VOC scribe, describing *Biophytum hermannii*, its local names and medicinal uses. Manuscript BPL 126 D, Leiden University Library Special Collections. — Photograph: Leiden University.

*Biophytum sensitivum* are not included in these collections, indicate that the specimens and the names were available to Hermann when the binding of the second volume of the book now held in Leiden was (almost) finished. The 'Rumphius' specimens in Hermann's herbarium were not used to produce any of the illustrations in Rumphius' manuscripts or printed works. However, the possible presence of Rumphius specimens greatly increases the scientific relevance of the Leiden Hermann collections, as these four are the only known herbarium specimens possibly associated with Rumphius. The remarks by Van Ooststroom (1937) on his discovery of specimens attributed to Rumphius, confirmed in this paper, have been overlooked for decades by the many researchers on Rumphius' legacy.

Although the London Hermann collection contains many holotypes of Linnaean names (Jarvis 2007), the four 'Rumphius' specimens (and many of the other specimens in the Leiden Hermann collection) serve as isotype specimens for these Linnaean names.

Apart from being part of the first major collections of the botany of the East Indies, the 'Rumphius' specimens in Hermann's Leiden herbarium also reflect the efforts by Rumphius, Hermann and Van Reede tot Drakenstein in the making and circulation of knowledge through negotiations with local Asian groups, not only for the VOC or scientists in Europe, but also for the use and service to those who lived in the East Indies (Raj 2007). This circulated knowledge consisted not only of letters and manuscripts, but also of living and dried plant material. The four specimens in this paper represent the physical evidence of such knowledge circulation.

Future research in the VOC archives should focus on correspondence or indirect exchange of information or specimens between Rumphius, Van Reede and Hermann. The digitisation and botanical revision of the Hermann collections in Erfurt and Paris and the possible Rumphius specimens in Florence may shed further light on the relationship between these pioneering botanists in the heyday of the Dutch East India Company and the hundreds of lesser-known botanists, artists and local people that worked for them in the field.

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## APPENDICES



**Appendix 1** Watermark with the initials 'PvL', present in c. 25 % of the pages in Volume II of the Leiden Hermann Herbarium. Most of the pages have no watermark. — Photo: Tinde van Andel.



**Appendix 2** Watermark with a rooster and the letters H and D, present only on page 165 in Volume II of the Leiden Hermann Herbarium. — Photo: Tinde van Andel.