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BOTANICAL HISTORY

The forgotten Hermann Herbarium: A 17th century collection of useful plants from Suriname

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Abstract The National Herbarium of the Netherlands houses a 17th century, bound herbarium containing 51 dried specimens from Suriname, which was composed by the well-known botanist Paul Hermann (1646–1695). This is considered as the oldest documented herbarium collection not only for Suriname but for the Guianas region. Most specimens are accompanied by (pre-Linnaean) Latin or vernacular names and sometimes by Latin descriptions of the plants and their uses. To assess the importance of this collection for the present-day flora and ethnobotany of Suriname, we identified all specimens (one by using ancient DNA analysis), translated the Latin texts, traced back the origin of the herbarium in national archives, 17th century and modern literature and compared plant names and uses with present-day ethnobotanical data. We digitized the entire herbarium and made it available online (<http://www.hermann-herbarium.nl>). The specimens were probably collected around 1687 by a certain Hendrik Meyer, who had a keen interest in botany and indigenous plant use. The 48 species in the herbarium are almost all useful plants: cultivated crops, wild edible fruits, medicinal plants, timber trees, fish poison, colorants and roof thatch material. Most species are used similarly today, and more than half of the vernacular names still exist in the region. The presence of *Abelmoschus esculentus* and *Sesamum indicum* in the herbarium prove the early establishment of African food plants in the emerging plantation economy of Suriname. Unlike Hermann's collections from Ceylon and the Cape, this herbarium was never seen by Linnaeus and therefore does not contain any type specimens.

Keywords ancient DNA; ethnobotany; historical collections; Paul Hermann; Suriname

Supplementary material The Electronic Supplement is available in the Supplementary Data section of the online version of this article. (<http://ingentaconnect.com/content/iapt/tax>).

INTRODUCTION

Historical plant collections represent physical evidence of the occurrence of a species at a particular time and place, provide us with information on the botanical interest of past centuries and, in some cases, tell us something about the history of plant names and uses. Moreover, several historical collections were used by Linnaeus to serve as a basis for his *Species Plantarum* (1753), which means they possibly contain type specimens (Jarvis, 2007). The National Herbarium of the Netherlands, now part of the Naturalis Biodiversity Center, possesses various old herbaria. Amongst these is a late 17th century bound herbarium, containing dried specimens from Suriname. The specimens are in most cases—three exceptions—accompanied by at least a vernacular name, a pre-Linnaean Latin name or a description in Latin of the characteristics or use of the plant. Affixed to the inside cover of the book, there is a small piece of paper with a typed text reading: “Herbarium with Surinamese plants, collected by Hendrik Meyer in the years 1687–1689 and given by him to the Leiden Botany Professor Paul Hermann (1646–1695). This herbarium came in possession of the Leiden Herbarium, which gave it to the Utrecht Botanical Museum and Herbarium to celebrate

the 25-year professorship of A.A. Pulle in 1939.” The author of this text is not known.

Hermann was born in 1646 in Halle (Germany), studied theology and medicine in Wittenberg and botany in Leipzig. After graduating in 1670 from medical school at the University of Padua (Italy), he became employed in 1672 by the Dutch East India Company and travelled to Ceylon (now Sri Lanka) as a botanist and medical doctor. Hermann accepted the offer to become Professor of Botany in Leiden in 1679, where he stayed from 1680 until his death in 1695 (Veendorp & Baas Becking, 1938). He became famous for his catalogues of the Leiden botanic garden (e.g., Hermann, 1687, 1698) and his collections from the South African Cape and Ceylon. The extensive collections of plants and drawings from the latter two regions are generally known as “The Hermann Herbarium”. The majority is now housed at the Natural History Museum in London (see <http://www.nhm.ac.uk/research-curation/research/projects/hermann-herbarium>), while two volumes of Sri Lankan material are stored in the Leiden herbarium (Van Oostroom, 1937). Hermann's Suriname herbarium served as a present for the famous politician and botanist Hieronymus van Beverningk (1614–1690), who had been a constant protector of the Leiden botanic garden and had enabled Hermann to travel

to Ceylon (Veendorp & Baas Becking, 1938). Based on the size of the book, the binding and the handwriting, all similar to the Ceylon volumes, the herbarium is thought to be composed by Paul Hermann himself (Van Ooststroom, 1939). Although Hermann must have mounted the specimens in the book and written the accompanying texts, he did not collect the plants in person, as he never visited Suriname.

Hermann's Suriname herbarium was not mentioned by Linnaeus in his *Plantae Surinamenses* (1785), because he was not aware of its existence. There is no reference to this collection in Jarvis's extensive work (2007) on pre-Linnaean collections used by Linnaeus for his taxonomic studies. For his description of Surinamese species, Linnaeus mostly used the collections of the Swedish plantation holder Carl Gustav Dahlberg (Dahlberg, ca. 1771; De Moraes, 2012) and the drawings of entomologist and artist Maria Sybilla Merian (Merian, 1705; Jarvis, 2007). The only person to publish about Hermann's Suriname herbarium was Van Ooststroom (1939). He identified 43 of the 51 specimens present in the book, but did not translate the Latin text accompanying the plants. Hermann's Suriname herbarium was also mentioned in the unpublished M.Sc. thesis of Jaap Brinkman (1980), which contains archival documents with lists of plants sent from Suriname to the Netherlands in the 17th century. Brinkman did not check Van Ooststroom's identifications, but speculated on the history of the herbarium.

Here we present the current identification of this 17th century Surinamese plant collection, trace its origin and compare its ethnobotanical information with present-day plant use in the region. Our main aim was to assess the importance of this herbarium for the present-day flora and ethnobotany of Suriname. Therefore, we sought to answer the following questions: Which plant species are present in this herbarium and why these? What is mentioned in the Latin text accompanying the dried specimens? What is the history of this collection? Which vernacular names and uses from the late 17th century are still in use in Suriname today?

■ MATERIALS AND METHODS

Plant identification. — To identify the fragile specimens of this 17th century collection, we first took high resolution photographs of the entire herbarium. Names mentioned by Van Ooststroom (1939) were updated using The Plant List (<http://www.theplantlist.org>). The digitized images and the original specimens were compared to herbarium vouchers present in the Leiden herbarium (L). Vernacular names and uses were compared with recent ethnobotanical studies from the Guianas (Guyana, Suriname and French Guiana; Van Anel, 2000; Van 't Klooster & al., 2003; Van Anel & Ruysschaert, 2011). The only specimen (fol. 19) that could not be identified to family level was subjected to DNA analysis.

For DNA extraction, we ground a small part (<1 cm²) of a leaflet with a Retsch mill. Further processing was done using a silica adsorption protocol (Rohland & Hofreiter, 2007). Extraction was carried out in the ancient DNA facility of Leiden University following established protocols (Cooper & Poinar,

2000). PCRs were carried out on a PTC 200 DNA engine in a 20 µl volume containing 2 µl of DNA extract, 0.5 µM of each primer, 60 µM of each dNTP, 1× Phire reaction buffer and 2 units of Phire Hot Start II DNA polymerase. The primers used for both amplification and sequencing were Z1aF and 19bR that amplify a fragment of ca. 157 basepairs (bp) of the *rbcL* gene (Hofreiter & al., 2000). Positive and negative controls were included simultaneously in the amplifications to check for contamination. The thermal cycling profile started with a 3 min. denaturation step at 98°C, followed by 40 cycles of 5 s denaturation at 98°C, 20 s annealing at 55°C, and 30 s elongation at 72°C, with a final extension step of 2 min at 72°C. The PCR product was purified using the Wizard SV and PCR Clean-up systems. DNA sequencing was done on a 96-capillary 3730xl DNA Analyzer automated sequencer 3730XL using standard dye-terminator chemistry.

Archival, herbarium and literature research. — To get an overview of historic plant collectors in the Guianas, we consulted both recent and 17th century literature. We checked websites of the Natural History Museum in London (BM), the Bodleian Library in Oxford (OXF) and the Burman Herbarium (G-Burman) for the presence of (digitized) historical collections from the Guianas. We consulted several 17th century herbaria (H.S. 91, 95, 96, 162, 221, 291) stored at the Sloane Herbarium (BM). To obtain more information on the personal background of historic plant collectors, we consulted the Regional Archive of Leiden and the National Archive in The Hague. All possible spellings for the suggested collector were entered separately in the search engine on archives' website. In the Archive of the Society of Suriname (part of the National Archive), eight successive books with all the Society's correspondence from 16 November 1683 to 21 June 1689 were scanned for lists of passengers returning from Suriname on ships of the Dutch West Indian Company (Nl-HaNa, Sociëteit van Suriname, 1.05.03 inv. nr. 212–219). We consulted the curator's archive of the Leiden University Library to obtain early records from the Leiden botanic garden and compared two digitized, handwritten manuscripts from the Bodleian Library with the collections and accompanying descriptions in the Hermann herbarium. We translated the Latin text that accompanied the plant specimens by using a Latin–English dictionary (Lewis & Short, 1975). Hermann's Suriname herbarium is presently housed in the treasure room of the National Herbarium of the Netherlands and can be consulted on request. All digitized specimens in the herbarium, their Latin descriptions and translations in English and Dutch are made available on the internet (<http://www.hermann-herbarium.nl>).

■ RESULTS

The herbarium versus the Bodleian manuscripts. — A total of 48 plant species are preserved in Hermann's Suriname herbarium. The Electronic Supplement contains the original Latin descriptions, their English translations, present-day vernacular names and uses, prior identifications by Van Ooststroom, current identifications and information from the Bodleian Library. Two handwritten manuscripts from the Bodleian Library (MS 174

and MS 184) from the legacy of William Sherard (1659–1728) appeared to be species lists that corresponded to the collections in the Leiden Suriname herbarium. MS 184 is a bound book named *Manuale Hermanni*, which consists of several plants lists (Clokje, 1964: 182). One page is entitled: “Plantae in Surinam sponte nascentes” (Plants occurring in Suriname) and contains descriptions of *Eryngium foetidum* L., *Solanum americanum* Mill., and an unknown species with the local name *carazini*. This page does not refer to Hermann's Suriname herbarium, but MS 184 also contains a one-page list with vernacular plant names that do correspond to those in the herbarium. The list has one line of text at the top that reads “Plantas siccas ex Surinama ad Dn. van Beverningk missa” (Dried plants from Suriname sent to Mr. van Beverningk). The handwriting was identified as Hermann's (Brinkman, 1980).

MS 174 is a five-page manuscript with vernacular names and descriptions. The first line reads “a Sirinam a Dno. Mayero” (from Suriname from Mr. Mayer). Clokje, who made an account of all herbaria in Oxford, referred to the manuscript with the remark: “I have not been able to find out to which specimens these names belong” (Clokje, 1964: 80). It is likely that both manuscripts belonged to Paul Hermann, who was Sherard's close friend and teacher. We have made the digitized manuscripts available online (<http://www.hermann-herbarium.nl/Documents/BodleianLibrary.pdf>).

Although the order in which the plants are listed in the Bodleian manuscripts is somewhat different from the arrangement of the vouchers in the herbarium, both vernacular names and descriptions correspond largely with the specimens. In some cases, MS 174 is more detailed: for *Tephrosia sinapou* (Buc'hoz) A. Chev. (fol. 22), the manuscript provides a Latin description of its local use as a fish poison, while the actual specimen inside the herbarium is not accompanied by any text. Its vernacular name, however, is written on a separate scrap of paper, which is stuck between the pages of the herbarium. A similar piece that reads “marmades ab Indis vocata” (called *marmades* by the Indians) is attached to fol. 11 (*Duroia eriopila* L. f.), which has written “*marmadas*” below the specimen. Folio 19 (*Pachira aquatica* Aubl.) has a similar scrap of paper attached to the page, with illegible text, as has fol. 48 (*Pterocarpus officinalis* Jacq.), on which the name “Sanquis draconis Bom” (dragonblood tree) is written. According to Brinkman (1980), these must have been the original pieces of paper that were attached to the specimens sent from Suriname. It seems, however, that the labels were written by Hermann himself on scraps of paper that he had used before, as on the reverse names of European plants are written.

MS 174 also contains a description for which no voucher is present in the herbarium: “Mangerwood. Est arbor crescens in locis ubi cancri suos habent cuniculos” (Mangerwood is a tree that grows in places where crabs have their holes). This specimen, which is probably also mentioned by the name *Mangelhud* in MS 184, must have been lost. Its local name and habitat (salt water mud) may point towards a mangrove tree (*Rhizophora* sp.), known presently as *mangro* (*udu*) in Suriname. MS 184 further lists the local name *kaiissa*, for which there is no corresponding specimen.

Identification of the specimens. — Of the 49 scientific names provided by Van Ooststroom (1939) for the specimens in the herbarium, 29 are still valid, 12 are synonyms and 5 were wrongly identified. Six vouchers were not identified up to genus level. Van Ooststroom counted 51 species, but fol. 49 appeared to contain material belonging to specimens from fol. 19 (*Pachira aquatica*), *Carica papaya* L. was collected twice, and the specimen of *Heliconia spathocircinata* Aristeg. was divided over several different pages: two with parts of a leaf and one with an inflorescence, instead of representing two different species. Although half of the specimens are sterile, the accompanying Latin texts often describe the appearance and smell of the plants or the taste of their fruits (Fig. 1). We were able to identify all but one specimen to species level by comparing them to the Guianas collection of the Leiden herbarium. As several leaflets of the compound leaves of fol. 19 (*Pachira aquatica*) were missing (but mounted on fol. 49), this specimen was identified by means of ancient DNA analysis. The first blast results yielded 34 Malvaceae species with a 100% match. However, only nine of those occurred in Suriname and just one of them (*P. aquatica*) had compound leaves. The 51 specimens represent 48 different species, which belong to 30 different plant families, with Fabaceae as the best represented family (19%).

Plant uses. — Although not all specimens in this herbarium are accompanied by a description of their local applications, most represent useful plants. Table 1 gives an overview of the main use categories of the species. The various commonly cultivated fruit trees (*Anacardium occidentale* L., *Annona muricata* L., *Carica papaya*, *Psidium guajava* L.), the tuber crop *Xanthosoma sagittifolium* (L.) Schott, the cotton plant *Gossypium barbadense* L. and the colorant *Bixa orellana* L. must have been collected to document their uses, but the associated information has probably been lost. The selected species and their use descriptions suggest that the collector has been communicating with local indigenous people. Most vernacular names are in the Carib Indian language. The collector had probably also been in contact with African slaves. Two of the specimens (fol. 1 and fol. 25) are plants of African origin. *Abelmoschus esculentus* (L.) Moench. (Fig. 2) and *Sesamum indicum* (L.) were important West African food crops in the 17th century and both are still grown in Suriname today.

Vernacular names. — No less than 29 of the 49 vernacular names (59%) listed in the herbarium and the two Bodleian manuscripts are still in use for the same species in Suriname today, although their spelling has changed. A few local names in the herbarium were probably mismatched in the 1680s. The term *tasi* is generally used for another source of roof thatch (*Geonoma baculifera* (Poit.) Kunth), *bolletri* is the name for *Manilkara bidentata* (A. DC.) A. Chev., *tamutu* for *Ischnisiphon obliquus* (Rudge) Körn. and *kopaya* for *Copaifera* spp. The names *baszezam*, *aruwahi*, *kurimiaku* and *surisakissa*, probably of Indian origin, appear to be no longer in use. The term *piñon* or *pinon* is still used for *Jatropha curcas* L. in Hispanic countries (White, 2003). The names *kokp* and *walhunne*, whose language is not clear, could not be traced back in the literature. The 12 pre-Linnaean Latin names have also gone out of use, except for *herba mimosa* still used for the Fabaceae genus

Mimosa L. and the term *Cuscuta* for a parasitic genus in the family Convolvulaceae. The two African names in the herbarium have also survived. The word *okra* for *Abelmoschus esculentus* stems from *okwuru*, the word for the vegetable in the Nigerian Igbo language (Burkill, 1997), while *bowangala* (now called *boangila* by Aucan Maroons in Suriname) is related to the term *bonanguila* for the same species in the Beembé and Doondo languages from Congo-Brazzaville (Adjanohoun & al., 1988).

Collectors in Suriname before 1690. — The first plants from Suriname that arrived in the Netherlands probably came as seeds (Table 2). After the botanical gardens of Leiden and Amsterdam had acquired their first heated greenhouses, they actively tried to collect tropical seeds from the Dutch colonies. The Danzig merchant and botanist Jacob Breyne (1637–1697) was probably the first to receive Surinamese seeds. He reported that seeds of “*Nux moschata Surinamensis*” (*Viola*



Fig. 1. Specimen of *Eryngium foetidum*. The Latin text reads: “Snake herb. Snake flight. Has sweet taste, with a strong smell. Used in case of hysteria.” The herb is still a popular medicine in Suriname: the leaves are used in herbal baths to calm down when suffering from panic attacks and convulsions.

Table 1. Main use categories of the specimens present in the Suriname Hermann herbarium.

| Use category | Species |
|---------------|---|
| Edible fruits | <i>Duroia eriopila</i> , <i>Garcinia madruno</i> , <i>Paullinia pinnata</i> , <i>Terminalia catappa</i> , <i>Tilesia baccata</i> |
| Food crops | <i>Abelmoschus esculentus</i> , <i>Manihot esculenta</i> , <i>Sesamum indicum</i> |
| Medicinal use | <i>Crescentia cujete</i> , <i>Eryngium foetidum</i> , <i>Jatropha curcas</i> , <i>Pterocarpus officinalis</i> , <i>Scoparia dulcis</i> , <i>Sesamum indicum</i> |
| Construction | <i>Cyclanthus bipartitus</i> , <i>Eschweilera subglandulosa</i> , <i>Euterpe oleracea</i> |
| Other | basketry (<i>Ischnosiphon obliquus</i>), ink (<i>Renealmia alpinia</i>), fish poison (<i>Tephrosia sinapou</i>) |



Fig. 2. Specimen of *Abelmoschus esculentus*. The Latin text reads: “The immature fruits of this (plant) are eaten after being cooked with oil and vinegar.”

surinamensis (Rol. ex Rottb.) Warb.), a Surinamese nutmeg relative, were sent by a certain Antony Chasteleyn “with several other Guianan plants” (Breyne, 1689: 77). Chasteleyn (1613–1664) was a Dutch merchant who became Governor of the East Indian Company in 1652 (Elias, 1963). According to Ek (1991), Chasteleyn collected voucher specimens in Suriname around 1661. Specimens were said to be stored at the herbaria OXF, BM or G-Burman. After contacting these institutes, only the Sloane Herbarium (BM) was able to trace a single Chasteleyn specimen in their collection. Examination of the digitized voucher revealed that it was a *Syzygium* (Myrtaceae), collected by Chasteleyn’s grandson Antonio in the “Malachian Insula”, an island near the Asian Moluccas. None of his grandfather’s Suriname collections seem to have survived. We could not find evidence that he travelled to Suriname. According to Wijnands (1983: 55), a ship’s captain named Tak was reported to have introduced some living *Ananas comosus* (L.) Merr. plants from Surinam in 1680 to the botanical gardens of Leiden and Amsterdam, but nothing is known about their fate or their collector.

On 9 September 1684, the Society of Suriname in Amsterdam wrote a letter to Cornelis van Aerssen van Sommelsdijck, Governor of Suriname from 1682 until his death in 1688, which contained a request for plants or seeds of rare crops to serve as an ornament for the city garden. On 8 March 1685, Van Aerssen sent his first package of seeds of 21 species to Daniël DesMarets, who from 1685 was supervisor of the gardens of Governor William III of Orange, accompanied by a list of local

Table 2. Seventeenth century Suriname plant collectors.

| Collector | Period | Plant material | Location | Reference |
|---|------------------|--|--------------------------------------|---|
| Antony Chasteleyn | 1661? | Seeds | – | Breyne (1689); Ek (1991) |
| Captain Tak (not the collector but the transporter) | 1680 | Living plants | Amsterdam and Leiden botanic gardens | Wijnands (1983) |
| Cornelis van Aerssen van Sommelsdijck (sender) | 1685, 1686, 1687 | Seeds, living plants | Amsterdam botanic garden | Brinkman (1980); Ek (1991); Wijnands (1983) |
| Hendrik Meyer | 1686?–1689 | Seeds, herbarium vouchers | L, Leiden botanic garden | Hermann (1687); Sherard’s MS 174; Brinkman (1980); Hunt & de Jong (1988); Ek (1991) |
| Johannes de Haen | 1687–1689 | Probably seeds and herbarium vouchers | BM? | Hunt & de Jong (1988); Ek (1991) |
| Maria Sybilla Merian | 1699–1701 | Drawings, ^a seeds and bulbs | – | Ek (1991) |

^a A hand-coloured copy of Merian’s *Metamorphosis insectorum Surinamensium* (1705) is held by the special collections section of the University of Amsterdam, the Netherlands. Merian’s plant collections have not survived.

names (Brinkman, 1980). He asked for cinnamon, nutmeg and clove trees in return, which he was denied, as the export of living spice-producing plants from the East Indies was prohibited. On repeated requests for exotic plants by Amsterdam, the governor replied that there were too few people in the colony who were interested in botany that could help him to collect seeds. Still, more shipments of seeds followed in 1686 to a total of 46 species (Brinkman, 1980: 32, 38, appendix IV: 6). The seed lists sent by Van Aerssen contained several short descriptions of the plants, their uses, pre-Linnaean and vernacular names in Dutch Creole and Indian languages. According to Brinkman (1980), the collector, who probably worked for the governor, must have been someone with a keen botanical interest.

The mysterious Hendrik Meyer. — We know very little about the collector of the Suriname Hermann herbarium. Meyer, also spelled Mayer(o), Meijer or Meier(o), was sent to Suriname by the Dutch government with the special task to buy and collect Surinamese crops (Brinkman, 1980). In his *Horti Academici Lugduno-Batavi*, a catalogue of plants present in the Leiden botanic garden from 1681 to 1686, Hermann (1687: 214) reported a shipment from Suriname that contained seeds of the species “*Apocynum Americanum arbor*” (an unidentified tree of the family Apocynaceae) and “*Canna Americana*” (*Canna indica* L.). The seeds of the latter species, which grew into a plant with “shiny bright scarlet flowers”, were among “other beautiful seeds sent by Mr. *Henrico Meiero*, who is very skillful in the field of botany”. These quotes prove that Meyer must have been collecting in Suriname before 1687. Hermann also reported to have received seeds of “*Cardiaca Americana annua*” (*Leonotis nepetifolia* (L.) R. Br.), “*Eryngium Americanum foetidum*” (*Eryngium foetidum*), *Bixa orellana* and “*Annona Americana*” (*Annona* sp.), but did not specify the sender (Hermann, 1687: 236, 464, 645). The commissioner of the Amsterdam medicinal garden, Jan Commelin (1629–1692), mentioned 25 species of living Surinamese plants present in his collection in the 1680s (Commelin, 1689). Although Commelin listed plant descriptions with Dutch Creole and Indian names, he did not refer to the source of the material, but he likely received the seeds or cuttings from Governor Van Aerssen.

Archival research on personal details about Hendrik Meyer gave few results. The archive of the Society of Suriname in The Hague holds a passenger list of the ship *De Coninginne Hester* (the Queen Hester) on which a “Henderick Mayer” is mentioned. The ship left Suriname just after 6 March 1689 and arrived in the Netherlands before the 19th of August in the same year (NI-HaNa, Sociëteit van Suriname, fol. 255, inv. nr. 219). The Queen Hester had been in Suriname before: it arrived in Paramaribo on 16 March 1685 with more than 480 African slaves aboard and left for the Netherlands on 22 April 1686 with a shipment of plants and seeds, probably collected by Meyer (NI-HaNa, Sociëteit van Suriname, fol. 105, inv. nr. 214). Hendrik Meyer may have been related to Hieronymus Meijer, the curator of the Leiden botanic gardens under Paul Hermann (Hunt & De Jong, 1988). The names Mayer, Meyer and Meijer appear on archival data on Surinamese plantations, both for land owners and slaves, but the information does not date back to the 1680s (Ten Hove & al., 2003).

Johannes de Haen. — Johannes de Haen was sent to Suriname in 1687 to collect specimens for William III and received 50 Dutch guilders for this effort (Hunt & De Jong, 1988). He supposedly sent specimens from Suriname to Daniël DesMarets in 1687, 1688 and 1689 (Ek, 1991). An entire herbarium volume (H.S. 291), consisting of 99 folios with Surinamese plants is stored at the DesMarets collection in the Sloane Herbarium in London (BM). Although on the first page it is written “Plants gathered at Surinam for Mr. DesMarets, at whose auction in Holland they were bought”, no dates or collector information are mentioned anywhere on the pages. The collection contains well-preserved fertile specimens of *Byrsonima* Rich. ex Kunth (Malpighiaceae), *Psychotria* L. (Rubiaceae) and *Miconia* Ruiz & Pav. (Melastomataceae). There are also several pages with branchless leaves of rainforest trees, like *Virola* Aubl. (Myristicaceae), *Aniba* Aubl. (Lauraceae), *Protium* Burm. f. (Burseraeae) and several Fabaceae, which were probably collected from the forest floor. Although De Haen's name was nowhere mentioned in Dandy's detailed inventory of the Sloane Herbarium (1958), H.S. 291 probably contains De Haen's collections. In the archive of the Society of Suriname, De Haen appears on the passenger list of the ship *Gordina*, which left Paramaribo on 3 May 1689, only two months after Meyer left the country (NI-HaNa, Sociëteit van Suriname, fol. 405–405V, inv. nr. 219). Since De Haen was sent to Suriname in 1687, he could not have collected the seeds that were sent to the Netherlands before that date.

Several other volumes in the Sloane Herbarium contain Surinamese specimens (H.S. 91, 95, 96, 162, and 221). The volumes H.S. 91, 95 and 96 belonged to Leonard Plukenet (1641–1706), a British botanist who obtained his Suriname specimens from Paul Hermann (collected by the British garden designer George London [ca. 1640–1715] in the Leiden botanic gardens) and Daniel DesMarets (Dandy, 1958). Plants provided by DesMarets could have been either collected by De Haen in Suriname or grown in the greenhouses of William III from seeds sent by Van Aerssen. Plukenet's volumes are better labeled than the other H.S. volumes with Surinamese plants, and even contain some Surinamese vernacular names (e.g., *itubu*, starweed and fitweed for *Eryngium foetidum*, and *cassavie* for *Manihot esculenta* Crantz). H.S. 162 belonged to another British botanist, James Petiver (1658–1718), who obtained the specimens from Franz Kiggelaer (1648–1722), a Dutch apothecary who worked as the curator of the garden of Simon van Beaumont in Leiden and owned a large botanical collection himself (Kiggelaer, 1690). One of these collections is H.S. 221, which mentions “CXIV Specimina Plantarum ex Surinam a missarum 1690 being the X Vol. of Kiggelaer's collection”. A total of 61 pages contain “poor specimens, mostly unnamed and unlabelled” (Dandy, 1958: 150). When we inspected this volume, it struck us that it contained several fertile herbs, many of European rather than Surinamese origin. We did not find any records that Kiggelaer travelled to Suriname. However, Van Beaumont had sent a gardener to “America” to search and bring home rare plants (Wijnands, 1983: 45). The name of this gardener remains unknown, but Kiggelaer's collections probably contain several of his specimens or plants grown from seeds he had sent to Van Beaumont from Suriname. These

plants were probably mounted together with European herbs from Beaumont's garden in the bound volumes that are now housed by the Sloane Herbarium.

Breyne (1689: 18, 77, 82) and Hermann (1698) also mentioned receiving herbarium vouchers from Philippus de Flines (1640–1700) of *Virola surinamensis*, “Arbor canellifera sylvestris” (Lauraceae?) and “Apocynum erectum latifolium” (*Calotropis gigantea* (L.) Dryand.), “with several other dried Surinamese plants which are still unknown”. This wealthy Amsterdam silk trader never travelled to Suriname, but grew exotic plants in his garden in Sparenhout near Haarlem. He probably had grown them from seeds given to him by Hermann. All vouchers from De Flines have been lost. Towards the end of the 17th century, many Dutch private gardens contained specimens from Suriname, like the Hortus Beaumontianus, Hortus Bentingianus, Hortus Flagelianus and Hortus De Flines. Herbarium vouchers from these plants were in great demand and distributed among the wealthy European elite (Brinkman, 1980; Wijnands, 1983).

■ DISCUSSION

Suriname's oldest plant collection. — For a long time after the Americas were discovered in 1492, there was little interest in the ‘wild coast’ of the Guianas. The first European traders came around 1630 to Suriname to barter products with local Indians and to grow tobacco around their temporary settlements. After the Governor of Barbados, Lord Willoughby, invaded the country in 1650, it became English property. According to one of the country's earliest chroniclers, George Warren (1667), there were around 50 plantations in 1663, on which most of the work was done by native Indians and some 3000 African slaves. According to Van Lier (1971), however, the country counted only 23 plantations with 564 slaves in 1688. Shortly after Suriname officially came into Dutch hands in 1667, settlements quickly expanded and thousands of slaves were imported from West Africa. In the 17th century, the population along the Surinamese coast was culturally diverse, with European plantation holders, Brazilian Jews, African slaves from different tribes and Carib and Arawak Indians (Van Lier, 1971). Some 35 years after the first European settlements and only 20 years after Suriname became Dutch property, the first botanists entered the country. Hermann's Suriname Herbarium can be considered the oldest known plant collection from Suriname. The specimens in the DesMarets collection of the Sloane Herbarium (H.S. 291) were probably collected in the same period by Johannes de Haen, but we have not found solid proof for this assumption.

Taxonomic importance. — When Linnaeus wrote his *Flora Zeylanica* (1747) and his *Species Plantarum* (1753), he consulted Hermann's original Ceylon collections to describe the species, using the abbreviation “Hermann herb.” As a result, Hermann's Sri Lankan collection is now very rich in type specimens (Jarvis, 2007). Linnaeus spent a highly productive time in the Netherlands, so the only possible explanation that he did not use Hermann's Suriname herbarium for his *Plantae*

Surinamenses (1785) is that he had no access to it or did not know of its existence. Hermann constructed the herbarium as a gift for Hieronymus van Beverningk, who died in 1690, shortly after receiving it. Since Van Beverningk had no children, his herbaria went to a relative, Melchior Gerard van Rietveld. What happened to these collections in the period after Van Rietveld's death in 1700, and when they were bought by the Leiden University library in 1741 is unknown. Linnaeus stayed in the Netherlands in the years 1735 to 1738, before Van Beverningk's collections arrived at Leiden. It is therefore unlikely that Linnaeus could have studied them during that period. A missed opportunity: the book could have been full of type specimens. Instead, Linnaeus based his descriptions of species from Suriname mainly on the spirit collections of Carl Gustav Dahlberg, collected around 1755 in Suriname (Dahlberg, ca. 1771; Jarvis, 2007; De Moraes, 2012).

Historical importance. — Rare and exotic plant collections were in great demand during the Dutch Golden Age. Scientists were anxious to study unknown tropical plants in order to draft new taxonomic concepts (Hunt & De Jong, 1988). European physicians, botanists, and wealthy politicians started their own natural history collections and exchanged living and dried material amongst each other to fill their curiosity cabinets with as many rare and exotic species as possible (Schiebinger, 2005). After the invention of the heated greenhouse, material from the colonies was in particular demand. Another reason was their economic value: priority was given to the importation of commercially exploitable plants from the areas controlled by the Dutch East and West India Companies. The Amsterdam botanic garden especially acted as a clearing house for such plants, trying to establish them in cultivation in the colonies (Wijnands, 1983). A third reason for colonial bioprospecting was the discovery of effective medicinal plants. It became obvious that medicines prepared in Europe and sent to the tropics often lost their healing properties. Botanists abroad, who were often trained physicians or apothecaries, were urged to look for local medicinal plants to remedy the tropical diseases that proved so fatal to the colonial population (Hunt & De Jong, 1988; Schiebinger, 2005). Hermann's Suriname herbarium and the related correspondence from the Society of Suriname clearly reflect the image of 17th century colonial botany: the demand for rare plants to serve as ornamentals for the Dutch gardens, the denied request for Asian spice trees to be grown in Suriname, the avid exchange in seeds and specimens among scientists, merchants and politicians, and the curiosity about the herbal medicines used by local Indians.

Ethnobotanical importance. — Information on plant use in the Guianas from the 17th century is extremely scarce. The earliest ethnobotanical records from Suriname are generally ascribed to Merian (1705), followed by detailed descriptions of useful plants and indigenous remedies by Rolander (Van Andel & al., 2012), Fermin (1765) and Dahlberg (De Moraes, 2012). Although we know very little about Hendrik Meyer, we can consider him as the first Dutch ethnobotanist in the New World after Willem Piso, who documented his observations on the Brazilian nature, tropical diseases and indigenous therapies in his famous *Historia Naturalis Brasiliae* (Piso & Marcgrav,

1648). As these early naturalists often reported on similar species, research on corresponding plant uses would provide more insight in the generality of ethnobotanical practices in the 17th century.

Hermann's Suriname Herbarium gives us insight on how plant names and uses change in the course of history. Even though several of the Indian plant names seem to have gone extinct, more than half of the 17th century vernacular names are still in use today. Species that were cultivated in the 1680s as food crops are still grown in Suriname. The wild edible fruits and timber trees have also kept their function. All medicinal species mentioned in the herbarium are still used as herbal remedies today, but mostly in different ways. The fragrant leaves of *Sesamum indicum* and *Eryngium foetidum* now mainly figure in spiritual baths, tea from *Scoparia dulcis* L. is currently drunk to alleviate high blood pressure and diabetes. The poisonous fruit pulp of *Crescentia cujete* L. is now only used externally as an ointment against skin parasites (Van An del & Ruyschaert, 2011). Ideas on health and illness have changed dramatically over the past 325 years. Hysteria is no longer a disease and clysters have gone out of use. However, seeds of *Jatropha curcas* are still sold in Paramaribo for their laxative properties, while Indians in Guyana continue to drink the diluted red sap of *Pterocarpus officinalis* for diarrhea (Van An del, 2000).

This small sample of medicinal plants from the 1680s contains two plants to control women's fertility: *Eryngium foetidum* was "suitable to suffocate the womb", while the cyanide-containing juice of calabashes (*Crescentia cujete*) was drunk to stimulate menstruation. Both plant uses point towards the use of herbal remedies to induce abortion, a common practice among African and Amerindian women suffering the harsh life of slavery, even though this was strictly forbidden by their masters. Enslaved women did not want their children to grow up as slaves like themselves, and their low fertility rates created the need for the continuing import of new workforce from West Africa (Schiebinger, 2004). Similar herbal abortifacients were reported by Meyer's successors Merian (1705), Rolander (1754–1756; see Rolander, 2008) and Dahlberg (ca. 1771).

African crops in 17th century Suriname. — Historians have documented the purchase of West African food crops by slave traders in order to feed their living cargo during their journey to the New World (Carney & Rosomoff, 2009). After their arrival in the New World, slaves smuggled leftover seeds from the ships and cultivated them on their provision grounds behind the plantations (Carney, 2005). Hidden between the seeds of food crops were numerous, but largely unreported seeds of weedy herbs and shrubs (Voeks, 2012). The specimens of okra (*Abelmoschus esculentus*) and sesame (*Sesamum indicum*) are the first physical evidence of African crops in Suriname. Just 30 years after the first slaves were imported to work on the plantations, African plants were not only grown in Suriname, but also so abundantly present that they were noticed by the first botanist (Meyer) that entered the country. The archives of the Society of Suriname reveal that okra seeds were sent to the Netherlands years before the first voucher was made (Brinkman, 1980). Other seeds from species of African origin

that Van Aerssen sent to the Dutch Botanic gardens included *Leonotis nepetifolia*, *Ricinus communis* L. and *Abelmoschus moschatus* Medik.

Several specimens of sesame and okra were collected in exactly the same period in Jamaica by the Irish physician and naturalist Sir Hans Sloane (1660–1753), whose digital collections are available at <http://www.nhm.ac.uk/research-curation/research/projects/sloane-herbarium/index.htm>. In his description of *Abelmoschus esculentus* (Sloane, 1707: 222), Sloane mentioned the same vernacular names (*ocra* and *quigombo*) as those reported from Suriname by Plukenet (1696) and Commelin (1689). These records may indicate that sesame and okra were grown in the Caribbean region before the 1680s, but they had been noticed much earlier in Brazil by Piso and Marcgrav, who listed them under the names *quingombo* and *gangila* in their *Historia Naturalis Brasiliae* (Piso & Marcgrav, 1648; Pickel, 2008).

■ CONCLUSIONS

Apart from being the first plant collection from the entire Guianas region, Hermann's Suriname herbarium is of limited taxonomic importance. The specimens are either well known cultivated plants or common species from Suriname's coastal forests. If Linnaeus had known of its existence, he would probably have described his first Surinamese species from this collection, and the herbarium would now be a book full of type specimens. Notwithstanding, Hermann's Suriname herbarium is of great ethnobotanical value. It shows how local names and uses have changed over the past 325 years, but also which knowledge and practices have withstood the test of time. From the correspondence between the plants lists in the Bodleian manuscripts and the herbarium, and Hermann's remarks on his botanical skills, we may assume that the specimens were collected by Hendrik Meyer before 1689. He was one of the first persons to document local names and uses accompanied by botanical vouchers from South America. The specimens of okra and sesame in the herbarium are solid proofs for the presence of African food crops in the early days of the Dutch plantation society. The collection also holds a great historical value, as it reflects not only the motivation to collect exotic specimens in the 17th century, but also reveals the devoted interest in botany and local plant knowledge of a Dutch naturalist whose identity we will probably never learn.

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