Caspar Bauhin's life (1560–1624) – Academic career, achievements as a botanist and his herbarium

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Caspar Bauhin was born 1560 in Basel as a refugee child from a distinguished Protestant family which escaped persecution of the Huguenots in France. He studied Medicine and Botany at the University in Basel, in Italy and France and became the first professor for medical Anatomy and Botany in Basel. He is the founder of one of the first Botanical Gardens north of the Alps, and the first to offer regularly botanical excursions and courses in systematics and taxonomy for medical students. In his many publications, C. Bauhin aimed to give a systematic overview of all c. 5600 plant species known at the time, based on meticulous comparison and descriptions by himself, renaming them by distinguishing clearly between genus and species and by adding the synonyms of other authors. Thereby Caspar Bauhin was paving the way for botany as an independent scientific discipline and for Linnaeus, who heavily relied on him for the further development of botanical systematics and nomenclature more than a century later. His herbarium, which today is kept at the University of Basel, served him as working tool and included more than 4000 species, which he collected himself or through exchange with a wide net of correspondents. Not the least of Bauhin's achievements is the publication in 1622 of one of the first comprehensive local floras, which until today is used as a reference for floristic changes in the surroundings of Basel.

Keywords
Carl von Linné, Classification, Herbals, Medieval botany, Renaissance botany, University of Basel

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Caspar Bauhin was born on January 15, 1560 in Basel, where he died on December 5, 1624 at the age of 64. He originated from a distinguished Protestant family from Picardy (France), whose members held high offices in Paris. His father Johannes Bauhin (1511–1582) fled the political persecution of the Huguenots and arrived in Basel in 1543/1544, where he practiced as a wound surgeon and became a naturalized citizen. As a medical doctor, Caspar Bauhin's father showed great interest in medicinal plants and maintained a small, private botanical garden (Fuchs-Eckert 1977, Reeds 1991).

Caspar Bauhin was the seventh and youngest child and the second son of the Bauhin couple. His brother Johannes Bauhin (1541–1613), who was almost 20 years older, was also interested in botany and studied in Universities of northern Italy and in Montpelier, paving the way for his brother Caspar in later years. Johannes Bauhin became a city doctor in Lyon and then in Montbéliard (France). He made a name for himself, among other things, as the author of a botanical encyclopaedia (Historia plantarum universalis), which remained incomplete at his death, was then completed by his son-in-law Johann Heinrich Cherler (1570–1609), but published in 1650 in Yverdon (Switzerland), only (Fuchs-Eckert 1979, 1981, 1982).

Education and academic career

In 1575, Caspar Bauhin enrolled at the Faculty of Medicine at the University of Basel. He studied medicine under Felix Platter (1536–1614) and Theodor Zwinger (1533–1588). In 1577, Cas-

Fig. 1. Portrait of Caspar Bauhin from the rectorate year 1598. Rectorate register of the University of Basel, vol. 2, f. 71r.

par Bauhin went to Padua (to Jacobus Antonius Cortusius), to Bologna (to Ulisse Aldrovandi), Montpellier and Paris (among others to Jean Robin) to study Medicine and Botany. The contacts during this „Grand Tour" at Universities became the backbone of his network of correspondences, which later in his life fed his botanical studies. In 1580, Caspar Bauhin returned to Basel, and visited Tübingen the same year. In February 1581, he publicly dissected a corpse during five days, passed his doctoral examination in April and then held his disputation. As he demonstrated exceptional didactical skills in a botanical course, Caspar Bauhin was commissioned to offer botanical excursions for students in Medicine. In April 1582 he was elected as a professor for Greek language, and from now on devoted himself intensively to medical practice, anatomical research and botanical studies. On September 10, 1589, at the age of 29, Caspar Bauhin was appointed the first professor for Medical Anatomy and Botany at the University of Basel, a chair established at his request, and after he had declined to accept the professorship for Theoretical Medicine after the death of Theodor Zwinger. A Theatrum anatomicum for courses in dissecting and a botanical garden (Hortus medicus) were set up for his teaching activities. Botanical excursion became a regular and important part of his activity, in which he not only made the students familiar with spontaneously growing plants, but confronted his students with the confusing diversity of plant names and the mistakes in contemporary herbals. The field excursions also fed his interest as a researcher. In his publications, unlike other herbalists, he emphasized description, nomenclature, and classification of plants rather than their medicinal properties (Reeds 1991). As early as 1586 he wrote in a letter to one of his friends that he was working on a „compendium of synonyms" and an arrangement of plants into classes. The task became the preoccupation for the rest of his life. Caspar Bauhin held the chair for Anatomy and Botany until 1614. When Felix Platter died in the same year, Bauhin became his successor as a professor for Practical Medicine and became also City Physician, but he remained preoccupied with plants until his death in 1624.

In the course of his life, Caspar Bauhin worked his way up both materially and socially and gained an international reputation as a scientist (Fig. 1). He was married three times. From his first marriage (1581–1594) to Barbara Vogelmann, daughter of a high official from Mömpelgard (today Montbéliard, France), whom he had met during a visit to his older brother living there, only one daughter remained alive longer. His second short marriage (1596–1597) to Maria Brüggler from Bern (Switzerland) remained childless. With his third wife Magdalena Burckhardt, who survived him, he had a son and two daughters. Caspar Bauhin's personality was characterized by diligence, meticulous work mentality and ambition (Burckhardt 1917). On the other hand, he lacked (according to Burckhardt 1917) the amiability and humanistic „joie de vivre" of his older colleagues Felix Platter and Theodor Zwinger.

Caspar Bauhin's merits as a physician

Caspar Bauhin must have had enormous creative power. He published around 30 scientific treatises, about half with medical or botanical content. With the establishment of a Theatrum anatomicum and his public autopsies, he made medical anatomy in Basel a centre of attraction for foreign students (698 awarded doctorates in Medicine). His achievements in medicine were based on the improvement and systematisation of anatomical terminology, especially in his book „Theatrum Anatomicum" published 1605. This comprehensive and handy textbook of anatomy was based on his lectures and anatomical-pathological demonstrations. In this book Bauhin comprehensively arranged the anatomical knowledge of the time and illustrated it with many figures. Of practical importance was also his pharmaceutics, in which he described the usual remedies of the time in details with regards to their composition, preparation and prescription method, drawing on his profound, practical knowledge.

Caspar Bauhin's merits as a botanist

Compared to his merits as a physician, Caspar Bauhin acquired far greater historical fame as a botanist. It is thanks to him that the University of Basel founded one of the first Botanical Garden north of the Alps, offered regularly botanical excursions in the surrounding of Basel for the practical knowledge of plants in nature, and botanical lectures on systematics and taxonomy within the Faculty of Medicine at the University of Basel. In 1622, Caspar Bauhin published one of the first comprehensive local floras in the world (Bauhin 1622), which until today remains a reference for judging floristic and vegetational changes and losses in the surroundings of Basel (Fig. 2–4; Meier-Küpfer 1985). Bauhin maintained a European wide network of contacts with the leading botanists of his time, and left the presumably largest botanical correspondence of that time (thousands of unpublished letters) as his legacy. In his botanical publications, Caspar Bauhin aimed to give a complete overview of all plants known at the time and to arrange them systematically, based on meticulous morphological inspection of specimens by himself. In doing so, he critically examined each entry and aspired to provide the corresponding herbarium specimen to other botanists' plant names in order to clarify their taxonomic affiliation. In this way, he achieved that his herbarium finally contained about two thirds of the plant species known in the early 17th century AD, many of them with the specimens collected by contacts from Caspar Bauhin's network. This herbarium formed his actual working and research tool and served as the basis for the development of his classification.

During his lifetime, Caspar Bauhin published original botanical books by himself, and edited, revised and commented on three important herbals (Matthioli 1598, Tabernaemonta-

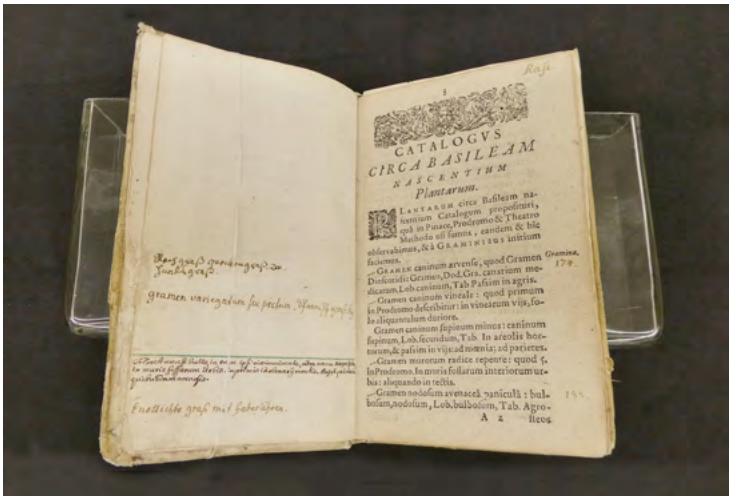

Fig. 2. Open first page of Caspar Bauhin's Flora of Basel, the „Catalogus plantarum circa Basileum sponte nascentium" from the year 1622 (Library of the Botanical Institute, University of Basel).

Fig. 3. *Thymelaea passerina* from the Herbarium of Caspar Bauhin *(Lithospermum Linariae folio germanicum)*. Bauhin collected this plant around Basel, where it does not occur any more. Today the species is on the Red List of Switzerland and is considered as endangered (Herbarium of the University of Basel, BAS-B11-076).

Fig. 4. *Androsace lactea* from the Herbarium of Caspar Bauhin *(Sedum alpinum gramineo folio, lacteo flore)*, who collected this plant «ob Monte Wasserfallen», a mountain near Basel, which he visited on botanical excursions (Herbarium of the University of Basel, BAS-B13-018).

nus 1613, Bauhin (ed) 1601). His final intention was to publish a comprehensive, richly illustrated encyclopaedia of all known plants, Theatrum Botanicum, by critically revising the confusion between the identity of plants and their given names by classical and contemporary authors. In the „Pinax Theatri Botanici“ (Bauhin 1623), intended as an index to the „Theatrum Botanicum“, Bauhin listed some 5600 plants (only 300 less than Linnaeus' in „Species Plantarum“ in 1753), divided in 12 „liber" (books), each with six sections. He referred to all important earlier authors that mentioned them and gave the plants a new, succinct diagnostic name on the basis of his own observations, an effort which then was enormously useful for botanical science, and still is today. His nomenclature was a ground-breaking advance because he was the first to establish the clear distinction between genus and species and grouped them together. His short species names could still contain several words, but they were structured hierarchically (Selosse 2005). Only the first volume of the intended 12 of the „Theatrum Botanicum“ appeared posthumously in 1658, after being edited by his son Johann Caspar. The Pinax had two forerunners. The „Phytopinax“ (Bauhin 1596) contained the first 8 books of the „Pinax“, but in a much shorter form. It famously contains the first scientific description of the potato. Bauhin described it as *Solanum tuberosum* (amended to *Solanum tuberosum esculentum* in the Pinax), a name that was adopted by Linnaeus and is still used today. In the „Prodromus“ (Bauhin 1620) about 600 plants are described and 138 are pictured accurately for the purpose of diagnostic recognition, many for the first time.

Bauhin's publications were „extremely important" (Jarvis 2007) to Carl von Linné (Linnaeus 1707–1778), the founder of modern plant nomenclature. When Linnaeus compiled „Species Plantarum“ (Linnaeus 1753), the earliest work of nomenclatural relevance (Turland et al. 2018), Bauhinian names were still widely in use, and more than one thousand are cited in it. Linnaeus interpreted these based on the herbarium of Bauhin's student Joachim Burser (1583–1639), which was arranged and labeled according to the „Pinax“, assembled in collaboration with Bauhin, and available to Linnaeus in Uppsala. More than 300 Burser specimens are formally designated Type specimens for Linnean names (Jarvis 2007), as are a large number of illustrations in Bauhin's works, including *Cardamine resedifolia* L., *Fagonia cretica* L. and *Peucedanum alsaticum* L. from the „Prodromus“ and *Cyperus esculentus* L. and *Phalaris utriculata* L. from the „Theatrum Botanicum“. Thus, through his botanical publications and via his influence on Burser's herbarium, Bauhin greatly influenced Linnaeus, who heavily relied on him for the further development of plant systematics and nomenclature.

Caspar Bauhin's herbarium

In the second half of the 16th century, herbaria became an essential working tool for the developing scientific botany. According to Caspar Bauhin's own information (Praefatio of the „Pinax" 1623), his herbarium finally contained more than 4000 plant species, of which about half survives to today. We discern four phases in the history of Bauhin's herbarium: assembly (1577–1624), family possession (1624–1772), major revisions (1772–1908), current day (1908–present). The first phase started when Bauhin collected his first plants, probably during his trips to Montpellier and Italy in the 1570s. After returning to Basel, Bauhin amassed his great herbarium through collecting and through exchange of specimens, seeds, and propagules with 65 correspondents (Reeds (1991) and Benkert (2020) detail these processes). Other herbaria of his time, such as that of his teacher in Basel, Felix Platter (1536–1614), were usually bound into books, but Bauhin kept the pressed plants loose in folded sheets of paper. Each specimen was labeled with the name according to his „Pinax" (1623), selected synonyms, and frequently also their origin, often together with printed illustration of plants mainly from the herbals of Tabernaemontanus and Clusius (Reeds 1991). This loose form of the herbarium facilitated the comparison and systematic ordering of the plants but became only later widely adopted (cf. Linnaeus 1751, section 11).

The second phase entails the period that his herbarium was inherited within the Bauhin family (1624–1772), a period of slow disintegration. Via his only son Johann Caspar I (1606–1685) and probably Friedrich Bauhin (1656–1696), it ended up in the possession of the merchant Johann Caspar II (1690–1753; Andreae 1763). The latter had been unwilling to let botanists study the herbarium, because he considered selling it to „an Englishmen" for a hefty sum (perhaps to Hans Sloan; letter of Emanuel König to Albrecht von Haller, 29 December 1735). Nevertheless, his son Emanuel Bauhin (1715–1746), a student of Haller's friend Professor Emanuel König (1698–1752), was persuaded to let König send multiple parcels of Bauhin's herbarium to Albrecht von Haller (1708–1777), Switzerland's most influential botanist, who was a practicing physician in Bern at the time (letters of König to Haller from December 1735 to 1736 that had thus far been overlooked). This allowed Haller to study the herbarium in great depth (Haller 1736, footnote in section 12) and to incorporate numerous fragments of specimens of Bauhin into his own herbarium (Zoller 1958), before returning the fascicles. Suggestions in the literature that Haller visited and plundered the Bauhin herbarium in Basel around 1728 appear to be erroneous: Haller's diaries do not indicate him studying the herbarium in Basel (Hintzsche 1968). In 1763, apothecary Johann Andreae observed that the herbarium „must have occasionally been brutally abused" (Andreae 1763). It was stored in the attic of the home of Sarah Socin (1697–1770), the widow of Johann Caspar II, and organized in fascicles exactly

by sections in the „Pinax". Of the 72 expected fascicles, only 55 were found, plus „2 or 3" unmarked fascicles. Andreae blames poor storage conditions and its loose-leaf state for the herbariums condition; on the other hand, he had just visited Johannes Gesner's immense, beautifully bound herbarium in Zurich six weeks prior (Andreae 1763), possibly making Bauhin's herbarium unimpressive in comparison. Socin was unwilling to sell it to Andreae at the time.

The third phase of the herbarium, that of major rearrangements, started in April 1772 at the latest, when the herbarium became in the possession of Wernhard Lachenal (1736–1800), who became Professor of Botany and Anatomy at the University of Basel in 1777 (letter of Lachenal to Haller, 11 Apr 1772). Lachenal filed the Bauhin's specimens within his own, large herbarium. After Lachenal bequeathed his collections to the University of Basel, A.-P. de Candolle revised it in 1818 by adding contemporary names for many specimens, that still only carried Bauhinian labels (de Candolle 1904). Burckhardt (1917) claims that the Lachenal and Bauhin specimens were separated again during the tenure of Röper (1801–1885; Prof. of Botany 1827–1836). In the early twentieth century, shortly after arriving in Basel in 1902, Professor Alfred Fischer ordered as head of the „botanical committee" to thoroughly revise the herbaria of the University and „in particular to remove everything bad, decayed, and eaten by insects" (Binz, 1908). August Binz (1870–1963) was appointed and meticulously executed the task, retaining the 639 labels of the rejected specimens.

Today, the herbarium of Caspar Bauhin is kept as a separate collection at the University of Basel, Herbaria Basel (Index Herbariorum: BAS), in the systematic order that Binz imposed. It consists of 20 boxes with 1921 species folders, each containing one or more original, folded sheets of paper with unmounted plants, usually one label in Bauhin's hand, and often illustrations and other annotations (mostly by de Candolle and/or Binz; total folded sheets: 2357). In addition, some 650 herbarium labels without plants exist. The number of vouchers and labels outside BAS is not known. The herbarium is imaged; a current project (2023–2024) improves metadata capturing and will make the specimens of this invaluable herbarium collection available online.

Original botanical publications by Caspar Bauhin

Bauhin C (1596) **Phytopinax** seu Enumeratio Plantarum ab Herbariis nostro seculo descriptarum cum earum differentiis, cum plurimarum hactenus ab iisdem non descriptarum succinctae descriptiones et denominationes accessere: additis aliquot hactenus non sculptarum Plantarum vivis Iconibus. Basilea, per Sebastianum Henricpetri. 669 pp.

Full text: https://www.biodiversitylibrary.org/item/30648

The „Phytopinax" is a plant directory of 2460 known and 164 new plants in „liber" (books) of six sections each, corresponding to the first eight of the „Pinax". The genera are briefly characterised. The polynomial names of the individual species are practically without exception of Caspar Bauhin himself. For the already known species, the synonyms of the authors, who described the species for the first time, are listed. Caspar Bauhin presents here for the first time his innovations in botanical systematics and nomenclature.

Bauhin C (1620) **Prodromus Theatri Botanici,** in quo plantae sura sexcentae ab ipso primum descriptae cum plurimis figuris proponuntur. Francofurti a. Main, Typis Pauli Jacobi, impensi Johann. Treudelii. 160 pp. 10.3931/e-rara-25436. Full text: https://www.biodiversitylibrary.org/item/14431

In the „Prodromus", Bauhin describes 618 species, 138 of which are illustrated. Among them are many species from America, which Bauhin received by exchange from European colleagues. The classification and nomenclature correspond to that of the „Pinax". This work probably comes close to what Bauhin intended to do in the planned „Theatrum Botanicum". The descriptions of new plants are methodical, very precise, mirror his skilful observations and are often complemented with illustrations.

Bauhin C (1622) **Catalogus Plantarum** circa Basileam sponte nascentium cum earundem Synonymiis et locis, in quibus reperiuntur: in usum Scholae Medicae, quae Basileae est. Basilea, Typus J.J. Genathii. 111 pp. 10.3931/e-rara-28834. Full text: https://www.biodiversitylibrary.org/item/30649

The „Catalogus" is an index of the plants growing naturally in the vicinity of Basel (radius of a German mile, approx. 7500 m, plus the nearby Wasserfallen region in the Swiss Jura Mountains). Bauhin's Basel Flora contains c 800 species. The „Catalogus" is a pocket flora intended for excursions, in this form one of the first local floras worldwide.

Bauhin C (1623) **Pinax Theatri Botanici** sive Index in Theophrasti, Dioscoridis, Plinii et Botanicorum, qui a Seculo scripserum Opera: Plantarum circiter sex millium ab ipsis exhibitarum nomina cum earundum Synonymiis et differentiis methodice secundum earum et genera et species proponens. Opus XL. annorum hactenus non editum, summopere epetitum ad auctores intelligendos plurimum faciens. Basilea, Sumptibus et typis Ludovic. Regis. 522 pp. 10.3931/e-rara-26291. Full text: https://www.biodiversitylibrary.org/item/14431

The «Pinax» is a plant directory of all 5640 plant species known at that time, a more systematic and complete version of the Phytopinax, clearly structured in 12 „liber" (books) of 6 sections each, and more useful thanks to a detailed index. The

individual species are accompanied by a complete list of synonyms, overcoming the Babylonian confusion of the time when naming plant species. The Pinax is Caspar Bauhin's most important work and had a great influence on Linné's „Species Plantarum" (1753).

Bauhin C (1658) **Theatri botanici** sive Historiae Plantarum ex Veterum et Recentiorum placitis propriaque observatione concinatae. Liber Primus. Johann Caspar Bauhin Basilea, Ioannem König 340 pp. 10.3931/e-rara-73659. Full text: https://www.biodiversitylibrary.org/item/ 30654

This is the first volume of the „Theatrum Botanicum", on which Caspar Bauhin worked throughout his life, and for which „Phytopinax", „Prodromus" and „Pinax" were only intended as preliminary contributions. Systematics and nomenclature correspond to the first liber of Bauhin's system, as in the „Pinax", mostly treating grasses and other monocots. The description of each species is extensive, and contains detailed information on distribution and (medicinal) use. Caspar Bauhin's son, Johann Caspar Bauhin (1606–1685), published this work. What happened to the other planned volumes, of which at least the second volume was already ready for printing, remains currently unknown.

Sixteenth century herbals edited and revised by Caspar Bauhin

Matthioli PA (1598) **Opera quae extant omnia:** Hoc est, Commentari in VI. libros Pedacij Dioscoridis Anazarbei de Medica materia … nunc a Caspara Bauhin aucti. Nicolaus Bassaeus Frankfurt am Main. https://www.e-rara.ch/zut/doi/10.3931/e-rara-4171. Full text: https://www.digitale-sammlungen.de/de/view/bsb10209643?page=7

Since the first edition in 1544, the commentary of Matthioli on Dioscorides circulated in many editions and translations. Caspar Bauhin checked the text for mistakes, compared earlier editions, added comments on confusions with earlier authors, listed more synonyms, described more than 300 new plants, and added illustrations.

Tabernaemontanus J Th (1613) Neuw vollkommentlich Kreuterbuch/ Mit schönen und künstlichen Figuren aller Gewächs der Bäumen/ Stauden und Kräutern ... mit sonderem Fleiss gemehret durch Casparum Bauhinum. Nicolai Bassaeus, Johann Dreutels, Nicolaus Hoffman, Frankfurt am Mayn. Full text: https://www.digitale-sammlungen.de/de/view/bsb11057665?page=7

This book was for a wider public. Caspar Bauhin corrected errors, added references to other herbals, more details for identification, and added new plants and illustrations. The edition by Caspar Bauhin of Tabernaemontanus became very popular and was reprinted several times.

Bauhin C (editor) (1601) **Animadversiones in Historiam generalem plantarum Lugduni editam.** Item Catalogas plantarum circiter quadrigentarum eo in opera bis terue positarum. Frankfurt. Excudebat Melchor Hartmann, Impensis Nicolai Bassaei, Bibliopolae. Full text: https://www.digitale-sammlungen.de/de/view/bsb10954094?page=,1.

Herbal prepared by students of Guillaume Rondelet (Montpellier, France), anonymously published 1586/1587 with many mistakes and illustrations taken from earlier herbals. Caspar Bauhin made corrections, added comments and pointed to illustration faults.

References

Andreae JGR (1763) Briefe aus der Schweiz. Joh. Caspar Füessli, Zürich und Winterthur. 345 pp

Benkert D (2020) Ökonomien botanischen Wissens: Praktiken der Gelehrsamkeit in Basel um 1600. Schwabe Verlag, Basel. 352 pp

Binz A (1908) Die Herbarien der Botanischen Anstalt Basel. Verh Naturf Gesellschaft in Basel 19: 137–155

Burckhardt A (1917) Geschichte der medizinischen Fakultät zu Basel 1460–1900. Verlag Friedrich Reinhardt, Basel. 494 pp

de Candolle C (1904) L'herbier de Gaspard Bauhin déterminé par AP de Candolle. Bulletin de l'herbier Boissier (Seconde Série) 4:201–216 & 4:297–342 & 5:459–474 & 8:721–754.

Fuchs-Eckert (1977) Die Familie Bauhin in Basel. Teil I: Johann Bauhin, pater und Johann Bauhin, fil. Bauhinia 6(1): 13–48

Fuchs-Eckert (1979, 1981, 1982) Die Familie Bauhin in Basel. Caspar Bauhin – Erster ordentlicher Professor der Anatomie und Botanik an der Universität Basel. Bauhinia 6(3): 311–329; 7(2): 45–62; 7(3): 135–153

Haller A von (1736) De methodico studio botanices absque praeceptore. Göttingen: Abramum Vandenhoeck. 36 pp

Hintzsche E (1968, ed) Albrecht von Haller: Tagebuch seiner Studienreise nach London, Paris, Strassburg und Basel: 1727–1728 (= Berner Beiträge zur Geschichte der Medizin und der Naturwissenschaften. Band 2). Huber, Bern/Stuttgart

Jarvis C (2007) Order out of chaos. Linnaean plant names and their types. 1st ed. The Linnean Society of London in association with the Natural History Museum, London, UK

Linnaeus C (1751) Philosophia botanica. G. Kiesewetter, Stockholm

Linnaeus C (1753) Species plantarum 1st ed. Lars Salvius, Stockholm. 2 vol. 1231 pp

Meier-Küpfer H (1985) Florenwandel und Vegetationsveränderungen in der Umgebung von Basel seit dem 17. Jahrhundert. Beiträge zur geobotanischen Landesaufnahme der Schweiz. Heft 62. 448 pp

Reeds K (1991) Botany in medieval and renaissance universities. Garland, New York, 316 pp

Selosse P (2005) The underlying pattern of the Renaissance botanical genre pinax. In: Skaffari et al. (eds) Opening windows on texts and discourses of the past. pp 161–178. John Benjamins, Amsterdam

Turland N J, Wiersema J H, Barrie F R, Greuter W, Hawksworth D L, Herendeen P S, ... & Smith, G (2018) International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. Koeltz botanical books

Zoller H (1958) A l'occasion du 250e anniversaire de Albrecht von Haller, quelques remarques sur son oeuvre botanique et ses collections. Bulletin du Museum national d'histoire naturelle, 2ème Série 30: 305–312