

NOMENCLATURE

Typification and authorship of *Drosera intermedia* (Droseraceae)Andreas Fleischmann^{1,2}  & Paulo M. Gonella³ 1 *Botanische Staatssammlung München (SNSB-BSM), Menzinger Strasse 67, 80638 Munich, Germany*2 *GeoBio-Center LMU (Center of Geobiology and Biodiversity Research, Ludwig-Maximilians-University), Munich, Germany*3 *Instituto Nacional da Mata Atlântica, Santa Teresa, Espírito Santo, Brazil*Address for correspondence: *Andreas Fleischmann, fleischmann@bio.lmu.de*DOI <https://doi.org/10.1002/tax.12158>

Abstract *Drosera intermedia* is lectotypified with the herbarium specimen on which the type drawing in the 1798 protologue was based. The collection history of the specimen, the history of the botanical drawing as original material, and the correct nomenclatural author and publication date of the name are presented based on historical notes and literature. Additionally, the global distribution of the species is given, including the first record from Africa.

Keywords botanical history; carnivorous plants; Flora Europaea; Flora Neotropica; herbarium F.G. Hayne; lectotypification; nomenclature; North American Flora; sundew

■ INTRODUCTION

Drosera intermedia (Droseraceae) is a widespread species, occurring in tropical South America, the Caribbean, eastern North America (western North American records are based on misidentifications, see Rice, 2019), Europe and Asia Minor (Diels, 1906; Lowrie & al., 2017; Robinson & al., 2017). Although not previously reported from Africa, we have seen material from a single locality in Liberia where the species has likely been introduced (*Barker 1247* [K!], *Bos 1988* [WAG.1783033 photo!], *Kunkel 26* [WAG.1783035 photo!], *Wit 9127* [WAG.1783036 photo!]). The species has been recognized since the late 18th century (Hayne in Dreves & Hayne, 1798; Hayne, 1800), and has been included in numerous taxonomic treatments (e.g., Planchon, 1848; Diels, 1906; Hamet, 1907; Lowrie & al., 2017; Robinson & al., 2017) as well as in regional and country Floras (e.g., Fries, 1828; Koch, 1837; Holzner & Naegele, 1904; Wynne, 1944; Webb, 1964; Duno de Stefano, 1995; Correa & Silva, 2005; Mellichamp, 2015). Given how widespread and well-studied *D. intermedia* is, it is astonishing that the name has remained untypified until today. *Drosera intermedia* is typified here, including a discussion of the history of the name and original material, and the correct nomenclatural author and year of publication of the binomial.

■ MATERIALS AND METHODS

Specimens of *Drosera intermedia* matching the criteria of original material were searched for by the authors at B, BM, G,

K, M, P and W. Additionally, information about such material was requested from staff at B, BM, GOET, H, HAL, HBG, K, PCR and S (see Acknowledgements). The nomenclatural articles quoted in this text follow the *ICN* (Turland & al., 2018). All specimens examined were studied under the stereomicroscope and annotated by the authors.

■ TYPIIFICATION OF *DROSERA INTERMEDIA*

The quest for Hayne's original material. — The protologue of *Drosera intermedia* (Hayne in Dreves & Hayne, 1798: 18) cited two localities: “Hamburg. Auf der Huthung hinter der Eppendorfer Mühle zwischen dem Moore und der Landstraße, und auch zwisc[h]en Wandsbeck und dem Hintschenfelder Gehölze” (in the English version of Dreves & Hayne, 1798: 22 given as: “Near Hamburg [Hamburg] on the pasture beyond the Eppendorf mill, between the moor and the high - road, [and] also between Wandsbeck and the Hin[t]schenfeld wood”). It also included an illustration (Hayne in Dreves & Hayne 1798: t. 3B; Fig. 1B herein), which constitutes original material. While the illustration could serve as type, we attempted to locate a physical specimen since these are generally preferred over illustrations when considering the typification of a name.

Unfortunately, locating herbarium specimens that represent original material of *D. intermedia* is challenging, because the herbaria of F.G. Hayne (1763–1832) or [J.]F.[P.] Dreves (1772–1816) both seem to be largely unpreserved. The whereabouts of Dreves's herbarium remain unknown (Stafleu & Cowan, 1976). The same holds true for the largest part of

Article history: Received: 28 Mar 2019 | returned for (first) revision: 29 May 2019 | (last) revision received: 11 Jun 2019 | accepted: 17 Jul 2019 | published online: 7 Jan 2020 | **Associate Editor:** James C. Lendemer | © 2020 The Authors.

TAXON published by John Wiley & Sons Ltd on behalf of International Association for Plant Taxonomy.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.



Fig. 1. **A**, Lectotype of *Drosera intermedia* Hayne, from the Herbarium Schreberianum (M), which entered Munich herbarium in 1813. The handwritten label is by Schreber (note that he considered the *D. intermedia* of Hayne [*D. intermedia* Haynii] to represent Linnaeus's *D. longifolia*). The pencil-written “—partim” was added by H. Ross in Feb 1907, after consultation of the monograph by Diels (1906). The numbered tag “43” on the specimen does not constitute an original collection number, but has been added to the specimen later (ca. 1900) by Munich herbarium worker A. Töpfer; **B**, *Drosera intermedia* as shown in t. 3B in Hayne in Dreves & Hayne (1798) (= original material of *D. intermedia*), illustration drawn by F.G. Hayne and engraved by J.S. Capioux. Images courtesy of the Botanische Staatssammlung München and the SLUB Dresden/Digitale Sammlungen/Botan.471-3, reproduced with kind permission.

Hayne's herbarium, yet some of his material is known to be held at BM (JSTOR Global Plants, 2019), H (Stafleu & Cowan, 1979; Pigott & Sell, 1995), PRC (Thiers, 2019) and S (Cuccuini & Luccioli, 1995). However, neither those herbaria, nor any other likely herbaria we initially contacted (see Material and Methods), were found to hold any potential original material of *D. intermedia* (i.e., specimens of the taxon collected prior to 1800 and/or from the locations cited in the protologue, or annotated by Hayne). Further, we confirmed there are no extant specimens of taxa described by Hayne from Hamburg in HBG, and the oldest material of *D. intermedia* present at HBG was collected in 1815 (M. Schultz, pers. comm. 2019), long after Hayne's description was published.

Diels (1906: 84) cited as type of *D. intermedia* an unnumbered gathering made by Hayne and indicated that he had personally examined it (“Hamburg bei Eppendorf (Hayne – Original der Art!)”). However, no such specimen, or any other material from Hayne, was listed in the collector index at the end of his monograph (Diels, 1906: 129–132). Further, we were unable to locate any such material at B (or B-W), where Diels's material is housed. It should be noted that the Droseraceae collection at B is among the portions of that herbarium that were not destroyed during WWII.

A “holotype” was cited by Correa & Silva (2005) as “Dreves & Hayne s.n.; Alemania. Niedersachsen (H?)”, and this citation is repeated in the listing on Tropicos (2019). The location given in that citation does not match the provenance given in the protologue, as Hamburg is not located in

the state of Niedersachsen. Further, no such material could be located at H (H. Väre, pers. comm. 2019). It seems likely that the citation published by Correa & Silva (2005) was based on Duno de Stefano (1995: 85), who stated the location of the type with some doubt (“Holotipo H, probablemente”), and without having indicated that he examined any original material. It is possible that this earlier type citation may have been simply based on the location of Hayne's herbarium according to Stafleu & Cowan (1979).

It's a match: Hayne's habitus drawing is mirrored by a specimen at M; the rest of his illustration was copied from other works. — Initially we believed it would be necessary to select the illustration published in the protologue as the lectotype. However, we were surprised to discover a specimen in M that strongly matched the habitus drawing of Hayne's t. 3B in Dreves & Hayne (1798) in minute detail (Fig. 1). The only differences between the specimen (M-0244240) and the illustration are that (1) the left inflorescence has one more capsule present in the herbarium specimen, (2) the illustration has two open flowers on the left inflorescence where the specimen has young seed capsules and (3) the roots in the illustration are not present on the specimen. However, the flowers and roots produced in the illustration do not agree with general *Drosera* morphology, and both seem to have been freely added by the draughtsman as artistic license. This was common practice in the making of 18th century botanical illustrations (Nickelsen, 2006). Hence, we assert that M-0244240 is original material, which

was studied and drawn by Hayne for his description of *D. intermedia*. Further evidence for the status of M-0244240 as original material comes from the collection locality, which agrees with the published data from Hayne in Dreves & Hayne (1798). Unfortunately, there is no original annotation or handwritten label by Hayne with the specimen, although there are labels by contemporary botanists Schreber and Roth (see the proceeding sections for additional discussions).

The microscopic details of seed, dehiscing capsules, anther and gynoecium in Hayne's illustration cannot be discerned from the specimen at M. However, these details were not illustrated by Hayne, or his engraver Capieux, on the basis of any physical specimen. Instead they were evidently copied and slightly modified from Schkuhr (1791: t. 87; as "*Drosera longifolia* L."; Fig. 2 herein). It has already been shown that for several of his other illustrations, Hayne copied from contemporary botanists (Nickelsen, 2006).

The drawing published by Schkuhr (1791: t. 87) as part of his illustration of '*Drosera longifolia* L.' depicts *D. intermedia*, rather than *D. longifolia* L. (nom. rej.) in the sense of its lectotypification (Heath, 1992, 1998; Cheek, 1998), which is taxonomically congruent with *D. anglica* Hudson. Hayne (in Dreves & Hayne, 1798: 18) did mention the illustration by Schkuhr (1791) as a previous depiction of his new species, but did not cite it as the actual source of his flower, capsule and seed illustrations. In the same work, Hayne also referred to what seems to be the first published illustration of *D. intermedia* in Dodoens (1583: 471), commenting it was a "very good figure!". As we discuss below, the habitus drawing of *D. intermedia* published in the protologue was Hayne's own work (drawn by Hayne himself), and was clearly based on the material at M that we here select as lectotype.

From Hamburg to Munich: The specimen's odyssey. — J.C.D. Schreber (1739–1810), whose herbarium entered M

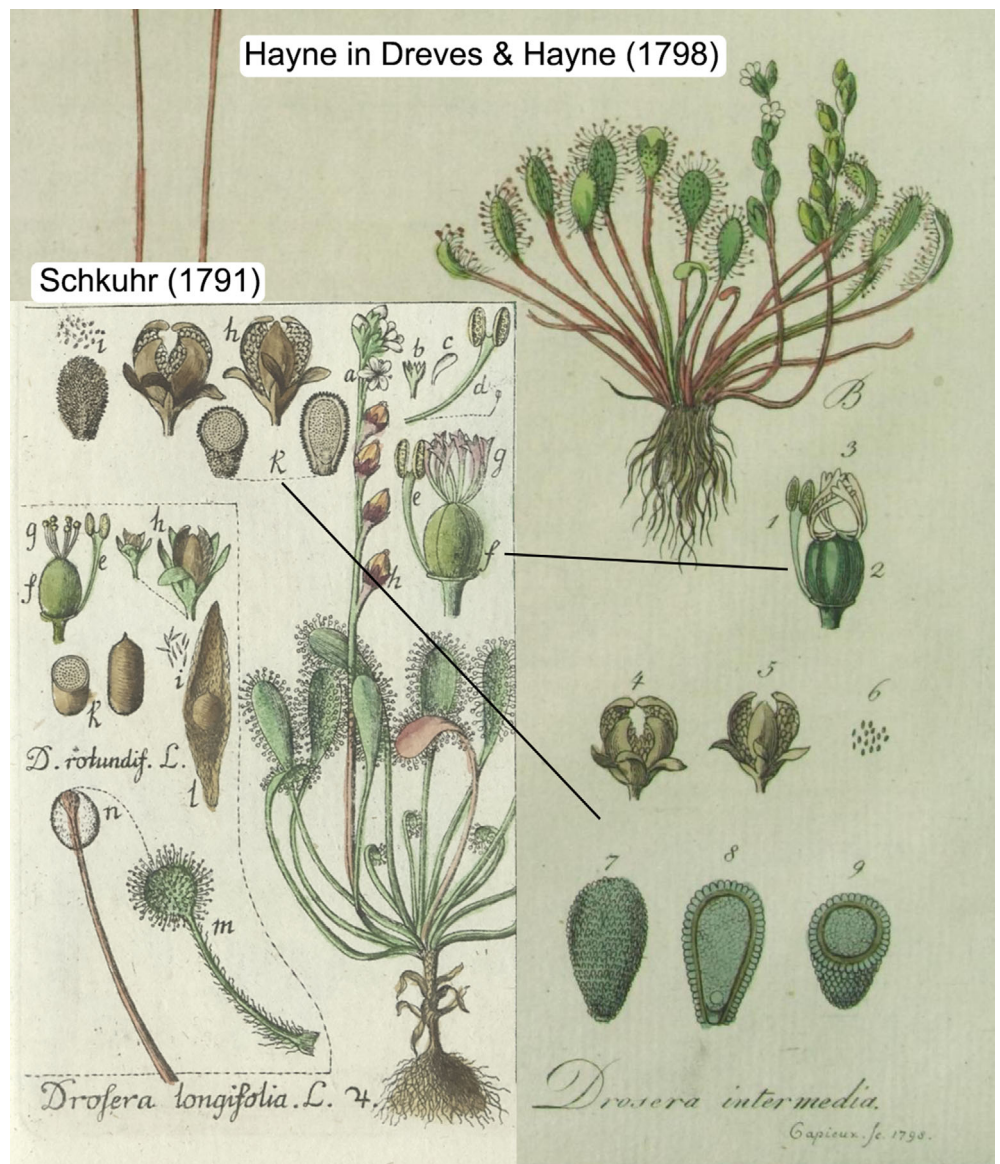


Fig. 2. Left: Illustration of *Drosera intermedia* (as "*Drosera longifolia* L.") from t. 87 in Schkuhr (1791). The details e–k were very evidently reproduced slightly modified by Hayne as figs. 1–9 in his t. 3B in Dreves & Hayne (1798) (right). Images courtesy of the Universitäts- und Landesbibliothek (ULB) Sachsen-Anhalt in Halle (Saale) and of the SLUB Dresden/Digitale Sammlungen/Botan.471-3, both reproduced with kind permission.

in 1813, traded with or bought plants from many contemporary botanists, including plants from northern Germany obtained from A.W. Roth (Hertel & Schreiber, 1988). The original material of *Drosera intermedia* that we located in M (M-0244240) forms part of Schreber's herbarium. The identification label of that specimen is not in Hayne's handwriting, but instead is that of Schreber (confirmed by S. Dressler) and the specimen is mounted on a sheet bearing the handwriting of A.W. Roth (1757–1834): "*Drosera longifolia*. Roth. Beiträge zur Botanik 1ter Theil ad pag. 60. NB: Folia inflexa tenent insecta mortua". The latter is a reference to Roth (1782) and a note: "the incurved leaves hold dead insects". Roth (1782: 73) noted that Schreber opposed as "unbelievable" the fact that some plants may catch insects to obtain nutrients from them – a hypothesis put forward by Roth almost 100 years before Darwin (1875). Hence, Roth may have sent these specimens to Schreber in order to support his observations.

Apparently, Hayne personally sent some *Drosera* specimens to Roth, and these almost certainly included his original material of *D. intermedia*. Published evidence that Hayne sent Roth specimens of his *Drosera* collected in Hamburg comes from Roth (1800: 31–32 [translated from Latin]): "My esteemed friend, renowned Hayne, a tireless investigator of plants, already several years ago has assured me in a letter that under the *Drosera longifolia* of most authors two different species are hiding, and his observations made in Hamburg he has communicated to me with specimens." The Latin original text "cum speciminibus communicavit" clearly indicates that Hayne sent physical specimens to Roth. Further, Roth (1800; but written earlier, cf. Roth's book preface dated 24 Feb 1799) mentions that this had happened "already several years ago". Consequently, Hayne must have sent Roth the original material that his drawing was based on quite promptly after its initial collection, before or soon after publication of the *Botanisches Bilderbuch* vol. 3, which reads as 1798.

The specimen entered Schreber's herbarium via Roth together with other specimens in Roth's possession, as is evident from Munich herbarium's entry catalog: "intermedia Hayne e Schrad. (Herb. Schreber a Rothis e Mecklenburg, Hamburg: 42. 43)", which reads as "Herbarium Schreber via Roth, from Mecklenburg and Hamburg, corresponding to Munich herbarium internal number tags 42 and 43, respectively". The Hayne specimen from Hamburg (M-0244240; number tag 43) came with another specimen of *D. intermedia* from Mecklenburg (M-0244241; number tag 42) and four specimens of *D. anglica* Hudson (M-0244242). These latter five, clearly collected by Roth himself, are mounted together with the original sheet bearing Roth's handwriting on a separate sheet, but also bearing the same annotation labels by Schreber as the solely mounted M-0244240.

Given that the specimen M-0244240 matches the published illustration (see Fig. 1), is from the type locality (as given by Hayne in Dreves & Hayne, 1798), and was almost certainly collected by Hayne himself prior to the description of *D. intermedia*, it is a logical choice to serve as lectotype.

Drosera intermedia Hayne in Dreves & Hayne, Bot. Bilderb. 3: 18, t. 3B. 1798 ≡ *Rorella intermedia* (Hayne) Nieuwl., in Amer. Midl. Naturalist 4: 56. 1915–**Lectotype (designated here)**: [GERMANY. Hamburg], Vom Eppendorfer Moor bey Hamburg [from the Eppendorf bog near Hamburg], without year [but very likely 1797], Hayne s.n. (M barcode M-0244240!).

Nieuwland (1915) gave the basionym citation as "Hayne 1800: 37", however that combination is validly published, see ICN Art. 41.3. For an image of the lectotype, see Fig. 1A.

Additional possible original material. – We also located a second specimen, at GOET, that could comprise original material. Since this specimen is part of the herbarium of G.F.W. Meyer (1782–1856), the collection year, given by the original collector as "97", has to be 1797, not 1897. This gathering, consisting of four specimens of *Drosera intermedia*, was collected at the type locality and antedates the publication of the protologue. It bears the original collector's identification "*Drosera longifolia* var. *pumila*. *Drosera* species?" on the herbarium label in the same handwriting (not that of Hayne) as the locality data and year. In two different handwritings, two later annotations have been made, namely "est *D. intermedia*" (by a "Dr. Wiebel" – this could refer to the collector A.W.E.C. Wiebel [1775–1813], whose herbarium is part of the herbarium G.F.W. Meyer; M. Appelhans pers. comm.) on the original collector's label, and "*Drosera intermedia* Hayne" on a separate annotation slip. Since the specimen at GOET does not indisputably comprise original material, it is not the best choice to serve as lectotype. Nonetheless, we include note of it here to draw attention to the existence of this historical material.

Additional specimen examined. – [GERMANY. Hamburg,] pr[o]p[ri]e. Eppendorf, [17]97, collector unknown, in Herb. G.F.W. Meyer (GOET barcode GOET022963 photo!).

■ WHEN WAS *DROSERA INTERMEDIA* REALLY PUBLISHED, AND BY WHOM?

The date of publication is 1798, not 1800. — In his monographic treatment of *Drosera*, Diels (1906) interpreted the author of *D. intermedia* to be Hayne (1800: 37), a concept which has been followed in most taxonomic and floristic literature until today (e.g., Hamet, 1907: 58; Nieuwland, 1915: 56; Wynne, 1944: 166, 167, 173; Duno de Stefano, 1995: 86; Cheek, 1998: 749; Mellichamp, 2015: 423), including nomenclatural databases (e.g., IPNI, 2019; Tropicos, 2019). The publication date of Hayne (1800) has also occasionally been misinterpreted as 1801 (e.g., Cheek, 1998; Mellichamp, 2015), however, Schrader's *Journal für die Botanik* vol. for 1800, part 1, which contains the *Drosera* description, was issued in June 1800.

The citation of Hayne (1800) as the protologue of *D. intermedia* is, however, an error as there is an earlier valid description of the taxon that has been widely overlooked, probably because the booklet *Botanisches Bilderbuch* by Dreves

& Hayne (1798) remained largely unknown to many contemporary botanists. Hayne himself apparently was aware of this, as he explained (Hayne, 1800: 16) this to be reason for republishing the descriptions of new taxa published in 1798 once again in his 1800 work. Further confusion was likely caused by the fact that Dreves & Hayne republished their 1798 work again in 1802 as *Choix de plantes d'Europe* vol. 3 (Dreves & Hayne, 1802), and that 1802 publication once again included the description and illustration of *D. intermedia* (Dreves & Hayne, 1802: 43, t. 75B). The 1802 work apparently gained much wider attention – especially among French-speaking botanists – than the previous ones, and probably led contemporary botanists to the erroneous conclusion that Hayne (1800) constituted the first publication, which seemingly had been subsequently referred to by Dreves & Hayne (1802).

Candolle (1824: 318) and Planchon (1848: 198–199) mentioned both Dreves and Hayne as the authors of *D. intermedia* and incorrectly interpreted the later French work “pl. Europ.” (i.e., Dreves & Hayne, 1802) as the source of the binomial. Early 19th century works of Roth (1802: 184), Dietrich (1803: 698) and Smith (1804: 347) referred to “*D. intermedia* Dreves et Hayne” and the 1798 publication. Yet more than two decades later, Fries (1828: 83) and Koch (1837: 89) gave Hayne as sole taxonomic author, however without giving publication reference details. Curiously, two recent works (Silva & Giuliotti, 1997; Correa & Silva, 2005) erroneously gave the author of *D. intermedia* as “Dreves & Hayne in Hayne (1800)”, probably because of a misinterpretation of the literature reference following the Latin diagnosis in Hayne (1800: 37): “*Drosera intermedia*, scapis adscendentibus, foliis ovalibus [sic!]. Drev. und Hayn. Abb. u. Zergl. deutsch. Gew. I. p. 18. t. 3. f. B.” The latter part, “Drev. und Hayn. Abb. [...]”, does not refer to any botanical authority (Hayne, 1800 does not state authors for any taxa throughout his work), but is a reference to the illustration in, and a citation of, Dreves & Hayne (1798).

Following the principle of priority (Turland & al., 2018), the first publication of the name *D. intermedia* that provided an illustration and diagnosis was Hayne in Dreves & Hayne (1798). The above errors and confusion in dates of publication and authorship do not render the combination *Rorella intermedia* (Hayne) Niewl. (Nieuwland, 1915: 56) invalid. Although Nieuwland cited the wrong publication when referring to Hayne (1800: 37) for the basionym, this is considered an indirect reference to the basionym which is sufficient for valid publication prior to Jan 1953 (ICN Art. 41.3).

The correct authority is Hayne, not Dreves & Hayne. — Botanist F.G. Hayne and teacher J.F.P. Dreves published the *Botanisches Bilderbuch* vol. 3 together; however, it is obvious from various sources that Hayne authored the species descriptions alone. Conclusive evidence for this comes from a handwritten letter from Hayne to his publisher L. Voss (kept at the Universitätsbibliothek Leipzig, Germany), dated 31 Jan 1798, in which Hayne discussed some arrangements before printing of the *Botanisches Bilderbuch* 3 (all six parts of which were issued 1798; Stafleu & Cowan, 1976). In that letter, Hayne explained that he prepared the taxon descriptions

and drawings (including *Drosera intermedia*, which he highlighted to be a new species from his hands), while Dreves’s role was mainly translation of the text (Fig. 3).

The above was obviously known to contemporary botanist H.A. Schrader (1799: 403), who argued in a review of the *Botanisches Bilderbuch* that volume 3 of the series gained a much more scientific form by the inclusion of Hayne as an author (the first two volumes were produced by Dreves alone). Further, Schrader (1799: 405) summarized for *Drosera intermedia*: “Herrn Hayne gehört der Verdienst, sie zuerst der Vergessenheit entrissen zu haben; und er liefert hier eine getreue Abbildung dieses Gewächses [...]”, literally translated: “It is the merit of Mr. Hayne to have it [the species] first recovered from oblivion; and he provides here a faithful figure of this plant [...]”.

Further arguments that Hayne was the sole author of the species descriptions in Dreves & Hayne (1798) later came from Hayne himself (Hayne, 1800: 16–17): “Die von mir hier beschriebenen und genauer aus einander gesetzten Gewächse [...]”, which can be literally translated as: “The plants herewith described and looked into detail by myself [...]. Of some of those, I have already communicated the description in a different place¹⁾ [Hayne’s footnote 1 refers to the preceding publication, Dreves & Hayne, 1798], however, as they might remain unnoticed there: I don’t think I would do anything superfluous, if I added them here once again, referring myself to the illustrations given there.” In a later work, Hayne (1813: explanation for plate 28, under *Drosera longifolia*) repeated referring to “meine *Drosera intermedia*”, i.e., “my *Drosera intermedia*”, instead of calling it “our *D. intermedia*”. Schrader, in his editorial footnote 2 under *D. intermedia* in Hayne (1800: 37), also confirms Hayne being the sole nomenclatural author, when writing (concluding about the identity of *Drosera longifolia*, in respect to *D. anglica* and *D. intermedia*) about “Herrn Hayne’s *D. intermedia*”, i.e., the *D. intermedia* of Mr. Hayne.

This all clearly demonstrates that the descriptions in Dreves & Hayne (1798) were produced by Hayne – whom can be correctly interpreted as the nomenclatural author, i.e., “Hayne in Dreves & Hayne”. These facts were already correctly recognized by some later botanists. For instance, Holzner & Naegele (1904: 14) refer to “*Drosera intermedia* Hayne”, but cite as (figure) reference Dreves & Hayne (1798). This suggests that Holzner & Naegele considered the name to have been authored by Hayne alone, while they recognized Hayne and Dreves as authors of the entire work.

In his very elaborate treatment, Schaeftlein (1960: 80) also cited the publication as Hayne in Dreves & Hayne (1798). Nomenclatural databases that correctly referred to the earlier 1798 publication date and correct nomenclatural author are the Florenliste von Deutschland (Buttler & al., 2018; as “*D. intermedia* Hayne in Dreves & Hayne”), Euro +Med PlantBase (Jury, 2009; as “*D. intermedia* Hayne in Dreves”), the Alabama Plant Atlas (Keener & al., 2019) and WCSP (2019; as “*D. intermedia* Hayne in J.F.P.Dreves”) – the latter three not giving the fully correct authority for the *Botanisches Bilderbuch* vol. 3, which was co-edited by both Dreves and Hayne. The entries in these databases were

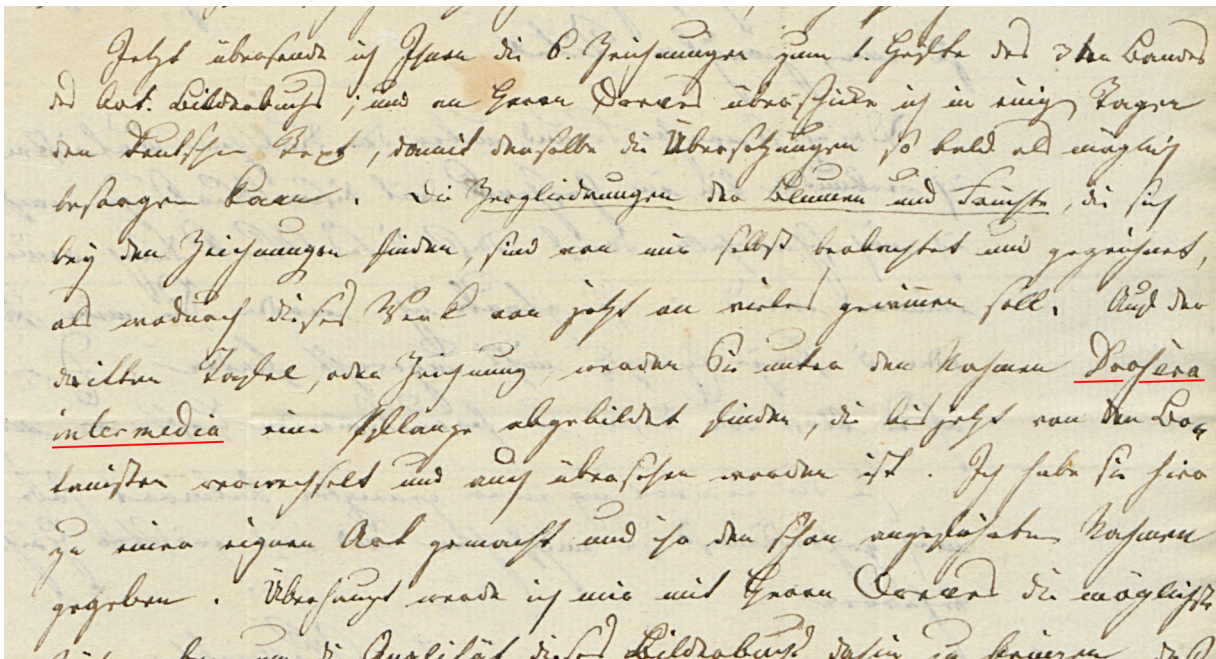


Fig. 3. Excerpt from a handwritten letter by F.G. Hayne to his publisher L. Voss from 31 Jan 1798 (original kept at the Universitätsbibliothek Leipzig, Bereich Sondersammlungen and reproduced with kind permission). The pictured text reads: “Jetzt übersende ich Ihnen die 6. Zeichnungen zur 1. Hälfte des 3ten Bandes des Bot. Bilderbuch; und an Herrn Dreves übersende ich in einigen Tagen den deutschen Text, damit ebenfalls die Übersetzungen so bald als möglich besorgen kann. Die Zergliederungen der Blumen und Früchte, die sich bey den Zeichnungen finden, sind von mir selbst beobachtet und gezeichnet, als wodurch dieses Werk von jetzt an wieder gewinnen soll. Auf der dritten Tafel, oder Zeichnung, werden Sie unter dem Nahmen *Drosera intermedia* eine Pflanze abgebildet finden, die bis jetzt von den Botanikern verwechselt und auch übersehen worden ist. Ich habe sie hier zu einer eigenen Art gemacht und so den schon angeführten Nahmen gegeben. [...]” (Now I send you the 6 illustrations for the 1st half of the 3rd volume of the “Bot. Bilderbuch”; and to Mr. Dreves I will send in a few days the German text, so that [he] can do the translations as soon as possible. The analyses of the flowers and fruits, which are found with the drawings, are observed and drawn by myself, by which this work shall gain again from now on. On the third table, or drawing, you will find under the name *Drosera intermedia* pictured a plant, which so far has been confused and also neglected by the botanists. I have made it a species of its own here and thus given the aforementioned name).

probably based on the Droseraceae treatment in the *Flora Europaea* by Webb (1964), who correctly referred to 1798 as the publication year, but assigned the work to Dreves alone (“*D. intermedia* Hayne in Dreves 1798”).

■ AUTHORSHIP AND PUBLICATION OF *UTRICULARIA INTERMEDIA*

The only new names effectively published in Dreves & Hayne (1798) are *Drosera intermedia* and *Utricularia intermedia* – curiously both denoting a carnivorous plant, both with the same epithet, and both later republished by Hayne (1800). Based on the information presented above, the same date of publication and author should be applied to both names. This was correctly stated by Sohma (1975: 170); however, Astuti & Peruzzi (2018: 172) recently listed “Dreves & Hayne (1798)”. Likewise, *U. intermedia* has long been considered to have been published in Hayne (1800: 18), yet the first publication of the name was by Hayne in Dreves & Hayne (1798: 104, t. 17). However, in addition to the fact that the name was actually published first in 1798, the latter description in Hayne (1800) would likely not be considered valid according to *ICN*

Art. 36.1. This is because Hayne there described *U. intermedia* as a new species, but apparently raised doubt as to the distinctiveness of his taxon in the same work (Hayne, 1800: 22): “Da die *Utricularia intermedia* aber auch vielleicht als Abart von der *U. minor* angesehen werden könnte, so muss ich auch diese noch genauer von ihr unterscheiden.” (But as *Utricularia intermedia* might perhaps be viewed as aberration of *U. minor*, I will also need to distinguish it in more detail from it).

■ AUTHOR CONTRIBUTIONS

AF designed the research, analyzed specimen data and historic information, prepared the illustrations and wrote the initial manuscript; AF and PMG collected data and studied herbarium specimens; both authors revised the manuscript. — AF, <https://orcid.org/0000-0002-4917-4736>; PMG, <http://orcid.org/0000-0001-8332-5326>

■ ACKNOWLEDGEMENTS

Arne Anderberg (S), Marc Appelhans (GOET), Uwe Braun (HAL), Norbert Holstein (BM), Patrik Mráz (PRC), Matthias Schultz (HBG), Henry Väre (H), and Robert Vogt (B) are thanked for

confirming that no original material of Hayne's *Drosera intermedia* is housed at their institutions. Siegfried Springer (LMU München), Hajo Esser (M), and Stefan Dressler (FR) are thanked for help with old handwritings and collection history. Kärin Nickelsen (LMU München) is thanked for information on 18th century drawing practices. Jan Schlauer is thanked for helpful comments. The digitization team of the Universitätsbibliothek Leipzig – Bereich Sondersammlungen is thanked for providing a scan of the handwritten letter of F.G. Hayne to L. Voss. The SULB Dresden – Digitale Sammlungen gave permission to reproduce an image from *Botanisches Bilderbuch*, the ULB Sachsen-Anhalt in Halle (Saale) for an image from *Botanisches Handbuch*.

■ LITERATURE CITED

- Astuti, G. & Peruzzi, L. 2018. Notes on the typification of the names *Utricularia bremsii* Heer and *U. intermedia* Dreyes & Hayne (Lentibulariaceae). *Phytotaxa* 350: 172–176. <https://doi.org/10.11646/phytotaxa.350.2.7>
- Buttler, K.-P., Thieme, M. & al. 2018. Florenliste von Deutschland – Gefäßpflanzen, Version 10 (August 2018). <http://www.kp-buttler.de/florenliste/index.htm> (accessed Jan 2019).
- Candolle, A.P. de 1824. *Podromus systematis naturalis regni vegetabilis*, vol. 1. Parisii [Paris]: sumptibus sociorum Treuttel et Würtz, Paris. <https://doi.org/10.5962/bhl.title.286>
- Cheek, M. 1998. (1371) Proposal to reject the name *Drosera longifolia* (Droseraceae). *Taxon* 47: 749–750. <https://doi.org/10.2307/1223604>
- Correa, M.D. & Silva, T.R.S. 2005. *Drosera* (Droseraceae). Flora Neotropica Monograph 96. New York: The New York Botanical Garden Press.
- Cuccuini, P. & Luccioli, E. 1995. Tipificazione di *Ornithogalum spathaceum* Hayne (Liliaceae) e presenza di *Gagea spathacea* (Hayne) Salisb. nella flora italiana. *Webbia* 49: 253–264. <https://doi.org/10.1080/00837792.1995.10670586>
- Darwin, C.R. 1875. *Insectivorous plants*. London: John Murray. <https://doi.org/10.5962/bhl.title.99933>
- Diels, L. 1906. *Droseraceae*. In: Engler, A. (ed.), *Das Pflanzenreich* IV.112 (Heft 26). Leipzig: Engelmann.
- Dietrich, F.G. 1803. *Vollständiges Lexicon der Gärtnerei und Botanik*, vol. 3. Weimar: gedruckt und verlegt bei den Gebrüder Gädicke. <http://mdz-nbn-resolving.de/urn:nbn:de:bvb:12-bsb10294851-5>
- Dodoens, R. 1583. *Stirpium historiae pemptades sex; sive Libri XXX*. Antverpiae [Antwerp]: ex officina Christophori Plantini. <https://doi.org/10.5962/bhl.title.855>
- Dreyes, F. & Hayne, F.G. 1798. *Botanisches Bilderbuch für die Jugend und Freunde der Pflanzenkunde*, vol. 3 [= *Getreue Abbildungen und Zergliederungen deutscher Gewächse*, vol. 1]. Leipzig: bei Voss & Compagnie. <http://digital.slub-dresden.de/id435316869/1>
- Dreyes, F. & Hayne, F.G. 1802. *Choix de plantes d'Europe, décrites et dessinées d'après nature*, vol. 3. Leipzig: chez Voss et Compagnie.
- Duno de Stefano, R. 1995. El genero *Drosera* (Droseraceae) en Venezuela. *Acta Bot. Venez.* 18: 67–95.
- Fries, E.M. 1828. *Novitiae florae Svecicae*, edit. altera [2nd ed.]. Londini Gothorium [Lund]: ex officina Berlingiana. <https://bibdigital.rjb.csic.es/idurl/1/11730>
- Hamet, R. 1907. Observations sur le genre *Drosera*. *Bull. Soc. Bot. France* 54: 26–38, 52–76. <https://doi.org/10.1080/00378941.1907.10831228>
- Hayne, F.G. 1800. Genauere Auseinandersetzung einiger deutscher Gewächse. *J. Bot. (Schrader)* 1800(1): 15–46, t. V–VII.
- Hayne, F.G. 1813. *Getreue Darstellung und Beschreibung der in der Arzneykunde gebräuchlichen Gewächse*, vol. 3. Berlin: auf Kosten des Verfassers. https://archive.org/details/b24923497_0002
- Heath, P.V. 1992. The type of *Drosera longifolia* Linné. *Calyx* 2: 79.
- Heath, P.V. 1998. Commentary on the proposal to reject the name *Drosera longifolia* Linné. *Calyx* 6: 38–39.
- Hertel, H. & Schreiber, A. 1988. Die Botanische Staatssammlung München 1813–1988: Eine Übersicht über die Sammlungsbestände. *Mitt. Bot. Staatssamm. München* 26: 81–512.
- Holzner, G. & Naegele, F. 1904. Vorarbeiten zu einer Flora Bayerns: Die bayerischen Droseraceen. *Ber. Bayer. Bot. Ges.* 9: 1–18.
- IPNI 2019. *Drosera intermedia*. In: The International Plant Names Index. <https://www.ipni.org/n/84157-2> (accessed Feb 2019).
- JSTOR Global Plants 2019. Global Plants on JSTOR. <https://plants.jstor.org> (accessed Feb 2019).
- Jury, S. 2009. Droseraceae. In: Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=100215&PTRefFk=7500000> (accessed Feb 2019).
- Keener, B.R., Diamond, A.R., Davenport, L.J., Davison, P.G., Ginzburg, S.L., Hansen, C.J., Major, C.S., Spaulding, D.D., Triplett, J.K. & Woods, M. 2019. *Drosera intermedia* Hayne. In: Alabama Plant Atlas. <http://www.floraofalabama.org/Plant.aspx?id=1703> (accessed Feb 2019).
- Koch, W.D.J. 1837. *Synopsis florum Germanicae et Helveticae*. Francofurti ad Moenum [Frankfurt am Main]: sumptibus Friederici Wilmans. <https://doi.org/10.5962/bhl.title.6696>
- Lowrie, A., Robinson, A.S., Nunn, R., Rice, B.A., Bourke, G., Gibson, R., McPherson, S. & Fleischmann, A. 2017. *Drosera of the World*, vol. 2, *Oceania, Asia, Europe, North America*. Dorset: Redfern Natural History.
- Mellichamp, T.L. 2015. Droseraceae Salisbury. Pp. 418–425 in: Flora of North America Editorial Committee (eds.), *Flora of North America*, vol. 6. New York & Oxford: Oxford University Press.
- Nickelsen, K. 2006. *Draughtsmen, botanists and nature: The construction of Eighteenth-Century botanical illustrations*. Archimedes 15. Netherlands: Springer.
- Nieuwland, J.A. 1915. Notes on our local plants - XI. *Amer. Midl. Naturalist* 4: 53–71. <https://doi.org/10.2307/2992767>
- Pigott, C.D. & Sell, P.D. 1995. Nomenclature of the European species of *Tilia*. I. *Tilia europaea* L. *Kew Bull.* 50: 135–139. <https://doi.org/10.2307/4114618>
- Planchon, J.-E. 1848. Sur la famille des Droséracées. *Ann. Sci. Nat. Bot.*, Sér. 3, 9: 79–99, 185–207, 285–309.
- Rice, B.A. 2019. The genus *Drosera* L. (Droseraceae) in the western USA. *Phytologia* 101: 25–37.
- Robinson, A.S., Gibson, R., Gonella, P.M., McPherson, S., Nunn, R. & Fleischmann, A. 2017. *Drosera of the World*, vol. 3, *Latin America & Africa*. Dorset: Redfern Natural History.
- Roth, A.W. 1782. Von der Reizbarkeit der Blätter des sogenannten Sonnenhaues (*Drosera rotundifolia*, *longifolia*). *Beytr. Bot.* 1: 60–76.
- Roth, A.W. 1800. *Catalecta botanica: Quibus plantae novae et minus cognitae descriuntur atque illustratur*, fasc. 2. Lipsiae [Leipzig]: in Bibliopolio Io. Fr. Gleditschiano. <https://doi.org/10.5962/bhl.title.124909>
- Roth, A.W. 1802. *Neue Beyträge zur Botanik*, vol. 1. Frankfurth am Mayn [Frankfurt am Main]: bei Friedrich Wilmans. <https://doi.org/10.5962/bhl.title.129892>
- Schaeftlein, H. 1960. *Drosera* (Sonnentau) auf der Turracher Höhe. *Carinthia II* 150/70: 61–81.
- Schkuhr, C. 1791. *Botanisches Handbuch der mehresten theils in Deutschland wildwachsenden, theils ausländischen in Deutschland unter freyem Himmel ausdauernden Gewächse*, vol. 1. Wittenberg: auf Kosten des Verfassers. <http://digitale.bibliothek.uni-halle.de/vd18/content/titleinfo/14502537>
- Schrader, H.A. (ed.) 1799. III Litteratur. *J. Bot. (Schrader)* 1799(2): 357–452.
- Silva, T.R.S. & Giuletta, A.M. 1997. Levantamento das Droseraceae do Brasil. *Bol. Bot. Univ. São Paulo* 16: 75–105. <https://doi.org/10.11606/issn.2316-9052.v16i0p75-105>

- Smith, J.E.** 1804. *Flora Britannica*, vol. 1. Londini [London]: typis J. Davis. https://archive.org/details/b21901272_0001
- Sohma, K.** 1975. Pollen morphology of the Japanese species of *Utricularia* L and *Pinguicula* L. with notes on fossil pollen of *Utricularia* from Japan. *J. Jap. Bot.* 50: 164–179.
- Stafleu, F.A. & Cowan, R.S.** 1976. *Taxonomic literature*, 2nd ed., vol. 1. Regnum Vegetabile 94. Utrecht: Bohn, Scheltema & Holkema. <https://doi.org/10.5962/bhl.title.48631>
- Stafleu, F.A. & Cowan, R.S.** 1979. *Taxonomic literature*, 2nd ed., vol. 2. Regnum Vegetabile 98. Utrecht: Bohn, Scheltema & Holkema. <https://doi.org/10.5962/bhl.title.48631>
- Thiers, B.** 2019. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/science/ih/> (accessed Feb 2019).
- Tropicos** 2019. *Drosera intermedia*. In: Tropicos.org. Missouri Botanical Garden. <https://www.tropicos.org/Name/11400003> (accessed Feb 2019).
- Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F. (eds.)** 2018. *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. Regnum Vegetabile 159. Glashütten: Koeltz Botanical Books. <https://doi.org/10.12705/Code.2018>
- WCSP** 2019. *Drosera intermedia*. In: World Checklist of Selected Plant Families. https://wmsp.science.kew.org/namedetail.do?name_id=64392 (accessed Feb 2019).
- Webb, D.A.** 1964: *Drosera* L. P. 350 in: Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (eds.), *Flora Europaea*, vol. 1. Cambridge: Cambridge University Press.
- Wynne, F.E.** 1944. *Drosera* in eastern North America. *Bull. Torrey Bot. Club* 71: 166–174. <https://doi.org/10.2307/2481416>