



Notes on the nomenclatural types of *Notoceras bicornе* (Cruciferae) and its heterotypic synonyms

P. PABLO FERRER-GALLEGO^{1,2*} & EMILIO LAGUNA^{1,3}

¹ Servicio de Vida Silvestre, Centro para la Investigación y la Experimentación Forestal (CIEF), Generalitat Valenciana, Avda. Comarques del País Valencià 114, E-46930 Quart de Poblet, Valencia, Spain.

² ✉ flora.cief@gva.es; <https://orcid.org/0000-0001-7595-9302>

³ ✉ laguna_emi@gva.es; <https://orcid.org/0000-0002-9674-2767>

*Author for correspondence

Abstract

The names *Erysimum bicornе* (basionym of *Notoceras bicornе*), *Notoceras hispanicum*, and *Diceratium prostratum* are discussed. A specimen preserved at BM and collected by Francis Masson in 1778 in Canary Islands (Spain) was indicated as the type of *N. bicornе*. This specimen at BM is the only original material found for this name. However, as cannot exclude that there were more than one specimen of this taxon, we consider this specimen in this work as the lectotype of the name, admitting that the specimen might well be the holotype of *N. bicornе*. A plant collected by Mariano Lagasca y Segura in 1819 in Orihuela (Alicante province, Spain) and preserved at G (G-DC) is designated as the neotype of *Diceratium prostratum*. Finally, the name *Notoceras hispanicum* published by Candolle in 1821 is an illegitimate name because it was nomenclaturally superfluous when published.

Keywords: Aiton, Brassicaceae, *Erysimum bicornе*, Lagasca, lectotype, neotype, nomenclature

Introduction

Notoceras bicornе (Aiton) Amo (1873: 536) [≡ *Erysimum bicornе* Aiton (1789: 394), basionym] (Cruciferae) is a plant distributed in SE Iberian Peninsula (Alicante, Almeria and Murcia provinces), Canary Islands, N Africa, and SW Asia. This species inhabit dry places, and is an annual plant, spreading or ascending, branched mostly from the base, up to 30 cm; leaves lanceolate or linear-lanceolate, entire; racemes short, dense, 15-30-flowered; pedicels up to 2 mm in fruit, stout; siliqua 4–8 × c. 1–5 mm, erect; valves torulose, terete-oblong, hairy; with a strong mid-rib, each ending into a horn at the apex; horns 0.5–1 mm (Willdenow 1801, Jahandiez & Maire 1932, Quézel & Santa 1962, Ball 1964, Jafri 1973, Bolòs & Vigo 1989, Galán Cela 1993, African Plants Database 2020).

On the other hand, *N. hispanicum* was described by Candolle (1821: 204), and it was treated as a variety of *N. bicornе* by Willkomm (1880: 827). This taxon has been mentioned as present in SE Iberian Peninsula and North of Africa (see e.g., Bolòs & Vigo 1989). However, the name *N. hispanicum* was nomenclatural superfluous when published because Candolle cited the legitimate name *Diceratium prostratum* Lagasca (1816: 20) as a synonym. *Diceratium prostratum* was described from material collected in SE Spain, and it was mentioned by Carlos Pau as *N. bicornе* var. *prostratum* (Lag.) Pau (1931: 148), as a plant distributed in north of Africa. However, these two plants differ from *N. bicornе* only by the unequal petals and prostrate stems (see Lagasca 1816, Candolle 1821, Pau 1931). In this sense, Candolle (1821) mentioned in the protologue “petalis inaequalibus” and Lagasca (1816) included in the protologue “corolla irregularis [...]. Petala lutea, exteriora duo calyce longiora submarginata”.

From the taxonomic point of view, *D. prostratum* is included within *N. bicornе* s.l. (see Boissier 1867, Jahandiez & Maire 1932, Galán Cela 1993), and therefore this name can be treated as heterotypic synonym of the Aiton’s name *Erysimum bicornе*, currently accepted as *Notoceras bicornе*.

The types of the names *Notoceras bicornе* and *D. prostratum* are discussed in this work as a good complement and the starting point of the taxonomic study. The type designation of the name *D. prostratum* is investigated herein and some comments on the type of *N. bicornе* are included.



FIGURE 1. Lectotype [or perhaps holotype] of *Notoceras bicorne* (Aiton) Amo (BM, barcode BM000583715). Photography by courtesy of Herbarium BM; reproduced with permission.

Materials and methods

This work is based on the analysis of the respective protologues, the examination of relevant literature, and on the study of the specimens conserved in several herbaria. The identity of the designated types is verified with the current use of their respective names. The names in current use are set in bold italics typeface. The heterotypic synonyms are indicated with the symbol =, and the homotypic synonyms are indicated with the symbol ≡. Acronyms of the herbaria consulted are according to Thiers (2020 [continuously updated]).

Background and typification of the names

Notoceras bicornis Aiton (1789: 394)

Aiton's protologue (1789: 394) of *Erysimum bicornis* consisted of a short diagnosis ("6. E. [Erysimum] lanceolatis pilosis, siliquis apice bicornibus") followed by six annotations: 1) "Horned Hedge-mustard"; 2) "*Nat.* of the Canary Islands. Mr. Francis Masson."; 3) "*Introd.* 1779"; 4) "*Fl.* August and September"; 5) "G. H." [indicating that this species is cultivated in the Green House at Kew (see Aiton, 1789: page xxx, abbreviations)]; and 6) "O" [indicating that this species is annual [O] (see Aiton, 1789: page xxx, abbreviations)], and a complete description of the plant: "Descr. Flores parvi, flavi. Calyx flavescens, extus pilosus. Siliquae approximatae, adpressae, ex ancipiti tetragonae, pilosae, tri-vel quadrilineares, apice bicornes. Stylus persistens, capillaris, longitudine cornuum. Stigma capitatum, integrum". William Aiton set to work in the 1780s to catalogue every plant being grown at Kew. The result, published in 1789, was called *Hortus kewensis* and included information on the country of origin of every plant, and who first cultivated it in Britain. The botanical descriptions in the *Hortus kewensis* were not made by the Aitons (William Aiton [1731–1793] and William Townsend Aiton [1766–1849]), but by Daniel Carl Solander, Jonas Carlsson Dryander and Robert Brown, based on material from Kew. On the other hand, some of the new taxa described in the first edition of the *Hortus kewensis*, published in 1789, originated from L'Héritier (so indicated) and the types of those taxa are in the L'Héritier herbarium at G-DC. Concretely, as indicated by Britten (1912) and Krok (1925), the diagnoses in *Hortus kewensis* vols. 1 & 2 were largely written by Dryander, who used a manuscript left by Solander, and this manuscript is present at the Botany Library at BM. Accordingly, in the Art. 46.8 Ex. 43 of the *Shenzhen Code* (ICN; Turland *et al.* 2018) is indicated "Although the descriptions in Aiton's *Hortus kewensis* (1789) are generally considered to have been written by Solander or Dryander, the names of new taxa published there are attributed to Aiton, the stated author of the work, except where a name and description were both ascribed in that work to somebody else" (see Turland *et al.* 2018).

Concretely, *Erysimum bicornis* was offered to the Kew Gardens by Francis Masson, it was brought from the Canary Islands in 1778. Francis Masson (1741–1805) was a British plant collector and gardener at Kew. 1760s he travelled to London where he got a gardening job at Kew which was directed by Sir Joseph Banks, i.e., as plant collector for Kew and working for Banks (Fry 2013).

Masson's living plants went to Kew and his herbarium specimens (mainly) to Banks and now are preserved at BM, and duplicates of Masson's collections are in several herbaria, e.g., BR, CGE, DBN, HAL, LD, LINN, MO, PH, UPS (incl. Thunberg herbarium) (Stafleu & Cowan 1981: 361). No such specimen of this species from Masson's collections and collected in Canary Islands, however, is present at K. The Royal Botanic Gardens at Kew had no herbarium in the 18th century. In addition, as indicated by Stafleu & Cowan (1976: 25) almost all types of both editions of the *Hortus kewensis* are in the Banksian herbarium at BM (Banks herbarium).

Fortunately, in the herbarium BM there is a relevant specimen of this author collected in Canary Islands in 1778, with barcode BM000583715. The sheet bears a well preserved specimen, four complete plants, with leaves, flowers and fruits, and a handwritten label: "Insula Canaria. Fr. Masson 1778". The geographical locality "Insula Canaria" and the author "Fr. Masson" agrees with the locality and author given in the protologue. Therefore, this specimen is undoubtedly original material of *E. bicornis* and it was used by Aiton for its description. We have not been able to locate any further original material in other herbaria (e.g., BR, CGE, DBN, G, HAL, LD, LINN, MO, PH, UPS) and possibly the specimen at BM is the only original material used by Aiton in the description of *N. bicornis*. However, as we cannot exclude that there were more than one specimen of this taxon, we consider the specimen as the lectotype of the name, admitting that the specimen might well be the holotype (see McNeill 2014). The specimen BM000583715 is well preserved and complete, and represents the traditional concept and current use of the name (see e.g., Ball 1964, Galán Cela 1993). This specimen was indicated as "type" of *N. bicornis* by Jafri (1973: 194) "Type: Canary Island, Masson (BM) (see http://www.efloras.org/florataxon.aspx?flora_id=5&taxon_id=250063814).

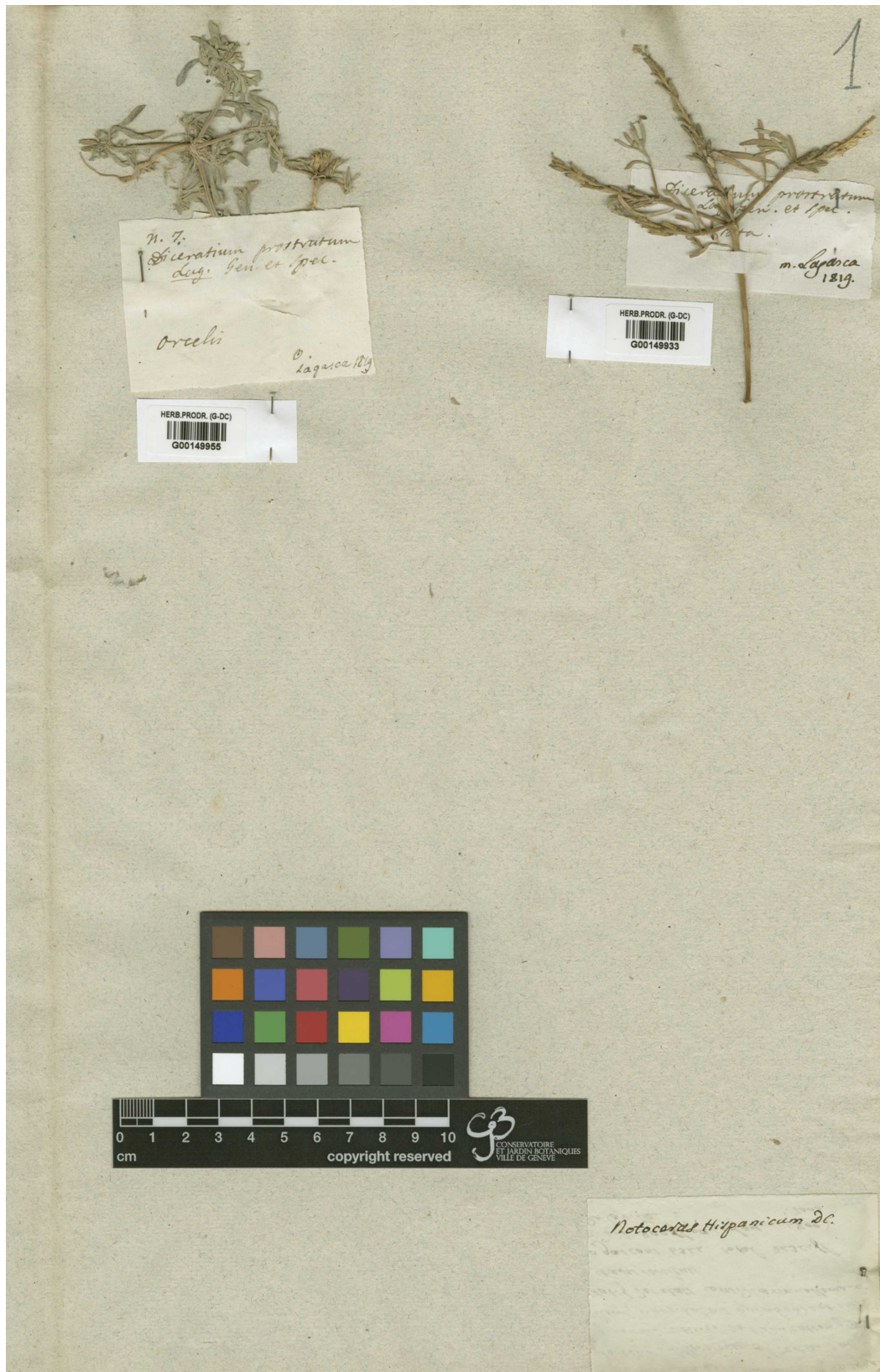


FIGURE 2. Neotype of *Diceratium prostratum* Lag. and *Notoceras hispanicum* DC. (G-DC, barcode G00149955). Photography by courtesy of Herbarium G; reproduced with permission.

***Diceratium prostratum* Lagasca (1816: 20)**

The protologue of *Diceratium prostratum* (Lagasca 1816: 20) consists of a complete description “257. Dic. [Diceratium]. prostratum: Planta herbacea, parvula, prostrata, pilis albis, adpresis scabriusculis undique obsita. *Folia* lanceolata,

integra, extrorsum latiora, sparsa. *Spicae* solitariae, extraaxillares breves; primaria radicalis. *Calycis* foliola iutus sub apice fornicata ut in *Hemiaria*. *Petala* lutea, exteriora duo calyce longiora submarginata. *Siliquae* adpressae, pedicello brevissimo, ferè turbinato, compresso-tetragono sustentatae” followed by a name and the question mark: “¿*Erysimum* bicorne. Willd. sp. pl.?” and the provenance “Venit locis ruderatis arenoso-calcareis, Orcelis juxta Coenobium Sancti Francisci, alibique; et Murciae in tuguriorum Lazareto del Llano de la Luz dicto. D. D. Simon de Rojas Clemente eamdem plantam in Granatensi Regno offendidit”, and finally the comment “Floret toto anno”.

We have not found any original material of *Lagasca* in the herbaria consulted (e.g., BM, K, MA, MPU, P, SE). In the Candolle herbarium at G (collection G-DC) there are a relevant herbarium sheet, with two complete plants collected by *Lagasca*, with barcodes G00149933 and G00149955, with leaves and fruits. The plant with barcode G00149955 was collected by Mariano *Lagasca* in 1819 in Orcelis -latin ancient name of Orihuela, province of Alicante, Spain-, this plant is accompanied by a label, annotated as “n. 7 / *Diceratium prostratum* / Lag. Gen. et Spec. / Orceli / *Lagasca* 1819” and handwritten by *Lagasca*. On the other hand, the plant identified with barcode G00149933 is accompanied by a label, annotated as “*Diceratium prostratum* / Lag. Gen. et Spec. / rota” handwritten by *Lagasca*, and “m. *Lagasca* / 1819” handwritten by Candolle. The sheet bears also a label handwritten by Candolle “*Notoceras hispanicum* DC.” (Fig. 2).

Unfortunately, these two plants were collected after 1816, and therefore are post-protologue. However, the date collected in the label that accompanied the plant G00149933 was handwritten by Candolle, and not by *Lagasca*, and maybe this plant was used by *Lagasca* to describe *Diceratium prostratum*. Nevertheless, this hypothesis cannot be demonstrated and at the moment it cannot be considered as original material.

In conclusion, we designate as the neotype of the name *Diceratium prostratum* the specimen with barcode G00149955 (Fig. 2). The information annotated on the label that accompanied the plant match with the protologue “Venit locis ruderatis arenoso-calcareis, Orcelis [...]”, and the plant match with the current use of the name, treated in this work as a synonym of *N. bicorne*.

***Notoceras hispanicum* Candolle (1821: 204)**

Candolle (1821: 204) published the name *Notoceras hispanicum* included a description “N. [*Notoceras*] siliquis bicornibus, petalis inaequalibus, foliis integris, pilis strigosis centro adfixis bipartitis confertissimis”, followed by the name “*Diceratium prostratum* Lag! el. hort. madr. 1815. p. 20.*”, the provenance “Hab. locis ruderatis arenoso-calcareis Orcelis Murciae et Granatensis regni (Lag.). fl. per. totum annum (v. s. sp.)”, and the comment “Priori nimis affinis. Differre tamen videtur habitu minore rigidior magis prostrato; superficie totâ pilis multo magis confertis canescente; foliis angustioribus ferè linearibus; petalis (ex cl. *Lagasca*) duobus exterioribus calyce undè corolla irregularis evadit.”

As Candolle cited “*Diceratium prostratum*. Lag! el. [*Elenchus*] hort. madr. 1815. p. 20”, this phrase is a citation of the previously validated name by *Lagasca* (1816: 20) supplied with a direct reference to a place of its validation since “*Elenchus plantarum*” includes complete text of simultaneously published “*Genera et species plantarum*” with the same pagination (see Stafleu & Cowan 1979: 721, available at <https://www.sil.si.edu/DigitalCollections/tl-2/browse.cfm?vol=2#page/747>). Therefore, the name *N. hispanicum* is an illegitimate superfluous name for *D. prostratum* (Art. 52.2(e) of the ICN, see Turland *et al.* 2018).

***Notoceras bicorne* (Aiton) Amo (1873: 536)**

≡ *Erysimum bicorne* Aiton (1789: 394) [basionym]

Type (lectotype [or perhaps holotype], indicated by Jafri (1973: 194) as “type”):—Spain, Canary Islands, *Francis Masson s.n.*, 1778 (BM, barcode BM000583715) (Fig. 1).

= *Diceratium prostratum* *Lagasca* (1816: 20)

≡ *Notoceras hispanicum* Candolle (1821: 204), *nom. illeg.* (Art. 52.2(e) of the ICN, see Turland *et al.* 2018)

≡ *Notoceras bicorne* β [var.] *hispanicum* Willkomm (1880: 827) (see ICN Art. 58.1)

≡ *Notoceras bicorne* var. *prostratum* (Lag.) Pau (1931: 148), *nom. illeg.* (ICN Art. 52.1)¹

Type (neotype, designated here):—Spain, Orcelis [Orihuela, Alicante province], 1819, *Lagasca* 7 (G-DC, barcode G00149955) (Fig. 2).

1 *Notoceras bicorne* var. *hispanicum* is not illegitimate under ICN Art. 58.1 (see Ex. 3) (Turland *et al.* 2018). Furthermore, it makes illegitimate the homotypic combination *N. bicorne* var. *prostratum* (Lag.) Pau (1931: 148) published 51 years after Willkomm’s one that takes priority at varietal rank being a replacement name.

Acknowledgements

We thank the staff of the cited herbaria for their help in the study of the herbarium sheets. Thanks to two anonymous reviewers for their suggestions and valuable remarks that have helped improve the manuscript. Thanks to Dr. Karol Marhold for his help in revising the manuscript.

References

- African Plants Database (2020) (version 3.4.0) (2019) Conservatoire et Jardin botaniques de la Ville de Genève & South African National Biodiversity Institute, Pretoria. Available from: <http://www.ville-ge.ch/musinfo/bd/cjb/africa/> (accessed 1 February 2020)
- Aiton, W. (1789) *Hortus kewensis, or, a catalogue of the plants cultivated in the Royal Botanic Garden at Kew by William Aiton Gardener to his Majesty*. Vols. 1-2. George Nicol, London.
<https://doi.org/10.5962/bhl.title.116053>
- Amo y Mora, M. del (1873) *Flora fanerogámica de la Península Ibérica*, vol. 6. Imprenta de D. Indalecio Ventura, Granada, 758 pp.
- Ball, P.W. (1964) *Notoceras* R.Br. In: Tutin, T.G., Heywood, V.H., Burges, N.A., Valentine, D.H., Walters, S.M. & Webb, D.A. (Eds.) *Flora Europaea*, vol. 1. Cambridge University Press, Cambridge, pp. 280–281.
- Boissier, E. (1867) *Flora Orientalis*, vol. 1. H. Georg, Basil, 1017 pp.
- Bolòs, O. de & Vigo, J. (1989) *Flora dels Països Catalans* 2. Barcino, Barcelona, 921 pp.
- Britten, J. (1912) The history of Aiton's "*Hortus Kewensis*". *Journal of Botany* 50 (Suppl. 3): 1–16.
- Candolle, A.P. de (1821) *Regni vegetabilis sistema naturale*, vol. 2. Treuttel et Würtz, Paris, 747 pp.
- Fry, C. (2013) *The plant hunters: the adventures of the world's greatest botanical explorers*. University of Chicago Press & Kew, Chicago and London, 63 pp.
- Galán Cela, P. (1993) *Notoceras* R.Br. In: Castroviejo, S., Aedo, C., Gómez Campo, C., Lainz, M., Montserrat, P., Morales, R., Muñoz Garmendia, F., Nieto Feliner, F.G., Rico, E., Talavera, S. & Villar, L. (Eds.) *Flora iberica*, vol. 4. CSIC, Madrid, pp. 95–96.
- Jafri, S.M.H. (1973) Brassicaceae In: Nasir, E. & Ali, S.I. (Eds.) *Flora of West Pakistan*, vol. 55. Ferozsons, Karachi, pp. 1–308.
- Jahandiez, E. & Maire, R. (1932) *Catalogue des Plantes du Maroc (Spermatophyta et Pteridophyta) 2. Dicotylédones Archichlamydées*. Impr. Minerva, Alger, 557 pp.
- Krok, T.O.B.N. (1925) *Bibliotheca botanica suecana*. Almqvist & Wiksell, Uppsala & Stockholm, 799 pp.
- Lagasca y Segura, M. (1816) *Genera et species plantarum, quae aut novae sunt aut nondum recte cognoscuntur*. Ex Typographia Regia, Madrid, 35 pp.
- McNeill, J. (2014) Holotype specimens and type citations: General issues. *Taxon* 63 (5): 1112–1113.
<https://doi.org/10.12705/635.7>
- Pau, C. (1931) Plantas de mi herbario mauritánico. *Cavanillesia* 4: 145–157.
- Quézel, P. & Santa, S. (1962) *Nouvelle flore de l'Algérie*, vol. 1. C.N.R.S, Paris, 570 pp.
- Stafleu, F.A. & Cowan, R.S. (1976) *Taxonomic literature*. Ed. 2. Vol. 1. Bohn, Scheltema & Holkema, Utrecht, 1136 pp.
- Stafleu, F.A. & Cowan, R.S. (1979) *Taxonomic literature*. Ed. 2. Vol. 2. Bohn, Scheltema & Holkema, Utrecht, 991 pp.
- Stafleu, F.A. & Cowan, R.S. (1981) *Taxonomic literature*. Ed. 2. Vol. 3. Bohn, Scheltema & Holkema, Utrecht, 980 pp.
- Thiers, B. (2020 [continuously updated]) *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available from: <https://sweetgum.nybg.org/ih/> (accessed 14 January 2020)
- 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>
- Willdenow, C.L. (1801) *Species plantarum*, vol. 3. G.C. Nauk, Berolini, 849 pp.
- Willkomm, M. (1880) Cruciferae L. In: Willkomm, M. & Lange, J. (Eds.) *Prodromus florae hispanicae*, vol. 3. E. Schweizerbart, Stuttgartiae, pp. 747–870.