

A checklist of Characeae of the British Isles

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ABSTRACT

We provide for the first time a checklist of charophytes of the British Isles (comprising Great Britain, Ireland, the Isle of Man and the Channel Islands) that includes in the synonymy all the basionyms and all the other names known to us to have been used in the British and Irish literature, and the literature references to all the places of publication of these names. The taxa are all included in one family, Characeae, which is divided into two tribes, five genera and 34 species, plus six extra varieties. One new combination is made: *Chara virgata* Kütz. var. *annulata* (Lilj.) N. F. Stewart & J. A. Bryant, **comb. nov.**

INTRODUCTION

Although now usually considered to be a distinct phylum of algae (Charophyta), or at least a distinct class (Charophyceae) of the green algae or Chlorophyta, the charophytes, charads or stoneworts were traditionally studied along with vascular plants by 19th Century field naturalists because in their macroscopic dimensions and gross morphology they superficially resembled such plants as *Equisetum* and *Potamogeton*. Moreover they can be preserved as herbarium specimens like vascular plants, and are the only algae to be included under the term 'macrophytes' by freshwater ecologists. Hence, by little more than historical accident, they are listed alongside vascular plants in *BSBI Strategy 2000*, which sets out the aims and objectives of the Botanical Society of the British Isles.

Checklists of charophytes were first provided in the fifth edition (Watson & Syme 1857) of *The London Catalogue of British Plants* (1844–1925). The development in our understanding of the taxa in the British Isles over a 68 year period can be seen by comparing the list in the fifth edition (16 species in one genus) with that in the eleventh edition (Hanbury 1925) (34 species in five genera). The latter list differs only in detail from the present one; one species of *Chara* was not included, one extra split was recognised, and several nomenclatural differences are evident. Charophytes were also included in the two checklists of Druce (1908, 1928), but were omitted from those of Dandy (1958) and Kent (1992). The standard reference work to our charophytes is *The British Charophyta* by Groves & Bullock-Webster (1920, 1924), whose scheme was followed very closely by the 11th edition of the *London Catalogue* (1925), by Druce (1928) and by Allen (1950). However, a radically different approach was adopted by Moore (1986), who attempted to reconcile the taxonomy of Groves & Bullock-Webster with the world monograph by Wood (1965). Hence Moore recognised only 25 species, the others being reduced to varietal level. Today the consensus of opinion amongst charologists is that Wood's broad species concept, where many

erstwhile species are reduced to varieties and forms, is untenable. A reversion to the species concepts of Groves & Bullock-Webster has been adopted in the charophyte *Red Data Book* (Stewart & Church 1992) and in the present paper. The latter agrees exactly with the treatment of charophytes in *The Freshwater Algal Flora of the British Isles* (Bryant & Stewart 2002). We consider that the publication of this checklist is timely because of its coincidence with the latter floristic account.

The data included here are part of the B.S.B.I. Database (Leicester), and are contained in the file TAXA along with the comparable data on vascular plants, part of which was published as the *List of Vascular Plants of the British Isles* (Kent 1992). For the first time the present checklist of charophytes includes in the synonymy all the basionyms and all the other names known to us to have been used in the literature of the British Isles (comprising Great Britain, Ireland, the Isle of Man and the Channel Islands), as well as the literature references to all the places of publication of these names. Abbreviations of authorities follow Brummitt & Powell (1992), of book titles TL2 (Stafleu & Cowan 1976–2000), and of journal titles BPH (Lawrence *et al.* 1968; Bridson 1991). The genera have been placed in the generally accepted systematic sequence, but the species and varieties have been ordered alphabetically due to the absence of any widely accepted specific sequence. Accepted names are in boldface and synonyms in italics. Where an accepted name has a basionym the latter is the first synonym listed, all the other synonyms following in date (not alphabetical) order.

It should certainly not be inferred that all the taxonomic concepts and nomenclatural conclusions concerning our charophytes are fixed. The varietal concept is particularly contentious. During the preparation of this list J.A.B. and N.F.S. examined the type specimen of *C. hispida* L. in LINN and concluded that it represents another species, *C. aspera* Dethard. ex Willd. However, we have not emended the names in our list according to this conclusion, but instead a proposal to conserve the names of these two familiar taxa according to their current concepts is being prepared by the above two authors. There is also much confusion surrounding the status and nomenclature of the species here named as *C. aculeolata* Kütz., a name which has also been used in the sense of *C. hispida*. Further study is necessary to clarify the correct application of this name.

THE CHECKLIST

Signs: * – alien; † – extinct

CHARACEAE Tribe CHAREAE

CHARA L., *Sp. Pl.* 1156 (1753)

C. aculeolata Kütz. in Rchb., *Fl. Germ. Excurs.* 843 (1832)

Chara hispida L. var. *pseudocrinita* A. Braun, *Ann. Sci. Nat. Bot., Sér. 2*, **1**: 355 (1834)

C. pedunculata Kütz., *Flora* **17**: 706 (1834)

C. polyacantha A. Braun, nom. illegit. in A. Braun, Rabenh. & Stizenb., *Charac. Eur.* 48 (1859)

C. hispida L. forma *polyacantha* (A. Braun) R. D. Wood, *Taxon* **11**: 9 (1962)

C. aspera Dethard. ex Willd., *Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesamnten Naturk.* **3**: 298 (1809)

Chara delicatula Desv. in Loisel., *Not. Fl. France* 137 (1810)

C. aspera Dethard. ex Willd. var. *subinermis* Kütz., *Sp. Alg.* 521 (1849)

C. aspera Dethard. ex Willd. var. *capillata* A. Braun, *Consp. Charac. Europ.* 6 (1867)

C. aspera Dethard. ex Willd. var. *lacustris* H. Groves & J. Groves, *J. Bot.* **18**: 129 (1880)

C. globularis Thuill. var. *aspera* (Dethard. ex Willd.) R. D. Wood, *Taxon* **11**: 11 (1962)

C. aspera Dethard. ex Willd. var. *aspera* sensu J. A. Moore, *Charoph. Gr. Brit. Ireland* 73 (1986)

C. baltica Bruzelius, *Observ. Charae* 11 (1824)

Chara baltica Bruzelius var. *rigida* J. Groves & Bull.-Webst., *J. Bot.* **62**: 34 (1924)

C. hispida L. var. *baltica* (Bruzelius) R. D. Wood, *Taxon* **11**: 9 (1962)

†***C. braunii** C.C. Gmel., *Fl. Bad.* **4**: 646 (1826)

Chara coronata Ziz ex Bisch., *Krypt. Gew.* t.1 (1828)

- C. canescens** Desv. & Loisel. in Loisel., *Not. Fl. France* 139 (1810)
Chara crinita Wallr., *Annus Bot.* 190 (1815)
- C. connivens** Salzm. ex A. Braun, *Flora* 18: 73 (1835)
Chara globularis Thuill. forma *connivens* (Salzm. ex A. Braun) R. D. Wood, *Taxon* 11: 10 (1962)
- C. contraria** A. Braun ex Kütz., *Phycol. Germ.* 258 (1845)
var. contraria
Chara vulgaris L. forma *contraria* (A. Braun ex Kütz.) R. D. Wood, *Taxon* 11: 8 (1962)
C. vulgaris L. var. *contraria* (A. Braun ex Kütz.) J. A. Moore, nom. inval., *Charoph. Gr. Brit. Ireland* 53 (1986)
- var. hispidula** A. Braun, *Neue Denkschr. Allg. Schweiz. Ges. Gesamten Naturwiss.* 10: 16 (1847)
Chara vulgaris L. forma *hispidula* (A. Braun) R. D. Wood, *Taxon* 11: 8 (1962)
C. vulgaris L. var. *hispidula* (A. Braun) J. A. Moore, nom. inval., *Charoph. Gr. Brit. Ireland* 53 (1986)
- C. curta** Nolte ex Kütz., *Tab. Phycol.* 7: 22 (1857)
Chara aspera Dethard. ex Willd. var. *curta* (Nolte ex Kütz.) A. Braun ex Leonh., *Verh. Naturf. Vereins Brünn* 2: 205 (1864)
C. desmacantha (H. Groves & J. Groves) J. Groves & Bull.-Webst., *Brit. Charoph.* 1: 94 (1920)
C. globularis Thuill. forma *curta* (Nolte ex Kütz.) R. D. Wood, *Taxon* 11: 11 (1962)
- C. denudata** A. Braun, *Neue Denkschr. Allg. Schweiz. Ges. Gesamten Naturwiss.* 10: 5 (1847)
Chara dissoluta A. Braun ex Leonh., *Verh. Naturf. Vereins Brünn* 2: 182 (1864)
C. vulgaris L. var. *denudata* (A. Braun) R. D. Wood, *Taxon* 11: 9 (1962)
C. vulgaris L. forma *dissoluta* (A. Braun ex Leonh.) R. D. Wood, *Monogr. Char.* 128 (1965)
- C. fragifera** Durieu, *Bull. Soc. Bot. France* 6: 185 (1859)
Chara globularis Thuill. forma *fragifera* (Durieu) R. D. Wood, *Monogr. Char.* 177 (1965)
- C. globularis** Thuill., *Fl. Env. Paris, éd. 2*, 472 (1799)
Chara capillacea Thuill., *Fl. Env. Paris, éd. 2*, 474 (1799)
C. fragilis Desv. in Loisel., *Not. Fl. France* 137 (1810)
C. pulchella Wallr., *Annus Bot.* 184 (1815)
C. fragilis Desv. var. *hedwigii* (C. Agardh ex Bruzelius) Kütz., *Phycol. General.* 319 (1843)
C. fragilis Desv. var. *fulcrata* (Ganterer) Bréb., *Fl. Normandie, éd. 3*, 382 (1859)
C. fragilis Desv. var. *capillacea* (Thuill.) H. Groves & J. Groves, *J. Bot.* 18: 102 (1880)
C. fragilis Desv. var. *sturrockii* H. Groves & J. Groves, *J. Bot.* 22: 2 (1884)
C. globularis Thuill. var. *capillacea* (Thuill.) Zaneveld, *Blumea* 4: 195 (1940)
C. vulgaris L. forma *sturrockii* (H. Groves & J. Groves) R. D. Wood, *Monogr. Char.* 104 (1965)
C. sturrockii (H. Groves & J. Groves) R. D. Wood, nom. inval., *Monogr. Char.* 765 (1965)
C. globularis Thuill. var. *hedwigii* (Agardh ex Bruzelius) J. A. Moore, nom. inval., *Charoph. Gr. Brit. Ireland* 30 (1986)
- C. hispida** L., *Sp. Pl.* 1156 (1753)
Chara hispida L. forma *major* Hartm., *Handb. Skand. Fl.* 376 (1820)
C. hispida L. var. *gymnoteles* A. Braun, *Ann. Sci. Nat. Bot., Sér. 2*, 1: 355 (1834)
C. hispida L. var. *macracantha* Kütz., *Sp. Alg.* 525 (1849)
C. horrida auct., non Nordst. & Wahlst., *Bidr. Skand. Charac.* 24 (1862)
C. baltica Bruzelius var. *affinis* H. Groves & J. Groves, *J. Bot.* 19: 353 (1881)
C. major (Hartm.) Hy, *Bull. Soc. Bot. France Mém.* 26: 37 (1913)
C. hispida L. var. *major* (Hartm.) R. D. Wood, *Taxon* 11: 9 (1962)
- C. intermedia** A. Braun in A. Braun, Rabenh. & Stizenb., *Charac. Eur.* 46 (1859)
Chara papillosa Kütz., *Tab. Phycol.* 7: 28 (1857), non Kütz., *Flora* 17: 707 (1834)
C. contraria × *hispida* sensu H. Groves & J. Groves, *Characeae Britannicae Exsiccatae* 2: 42 (1900)
C. contraria × *hispida* sensu J. Groves & Bull.-Webst., *British & Irish Charophyta* 2: 33 (1924)
- †**C. muscosa** J. Groves & Bull.-Webst., *J. Bot.* 62: 33 (1924)
Chara vulgaris L. forma *muscosa* (J. Groves & Bull.-Webst.) R. D. Wood, *Taxon* 11: 8 (1962)
- C. rudis** (A. Braun) Leonh., *Verh. Naturf. Vereins Brünn* 2: 185 (1864)
Chara hispida L. var. *rudis* A. Braun in A. Braun, Rabenh. & Stizenb., *Charac. Eur.* 4 (1857)
Chara hispida L. subsp. *rudis* (A. Braun) A. Braun & Nordst., *Fragm. Monogr. Charac.* 102 (1882)
C. hispida L. forma *rudis* (A. Braun) R. D. Wood, *Taxon* 11: 9 (1962)

C. tomentosa L., *Sp. Pl.* 1156 (1753)

Chara latifolia Willd., *Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk.* **3**: 298 (1809)

C. ceratophylla Wallr., *Annus Bot.* 192 (1815)

C. virgata Kütz., *Flora* **17**: 705 (1834)

Chara globularis Thuill. var. *virgata* (Kütz.) R. D. Wood, *Taxon* **11**: 10 (1962)

var. annulata (Lilj.) N. F. Stewart & J. A. Bryant, **comb. nov.**

Basionym: *Chara diffusa* Lilj. taxon *annulata* Lilj., *Utkast Sv. Fl.*, ed. 3, 684 (1816)

Other synonyms: *Chara delicatula* C. Agardh, non Desv., nom. illegit. var. *annulata* (Lilj.) J. Groves & Bull.-Webst., *Brit. Charoph.* **2**: 68 (1924)

C. globularis Thuill. var. *annulata* (Lilj.) J. A. Moore, nom. inval., *Charoph. Gr. Brit. Ireland* **72** (1986)

var. virgata

Chara capillacea auct., non Thuill., *Fl. Env. Paris*, éd. 2, 474 (1799)

C. delicatula C. Agardh, *Syst. Alg.* 130 (1824), nom. illegit., non Desv. in Loisel., *Not. Fl. France* 137 (1810)

C. delicatula Desv. var. *barbata* (Ganterer) J. Groves & Bull.-Webst., *Brit. Charoph.* **2**: 68 (1924)

C. vulgaris L., *Sp. Pl.* 1156 (1753)**var. crassicaulis** (Schleich. ex A. Braun) Kütz., *Sp. Alg.* 523 (1849)

Chara foetida A. Braun var. *crassicaulis* Schleich. ex A. Braun, *Ann. Sci. Nat. Bot., Sér.* **2**, **1**: 355 (1834)

Chara crassicaulis (Schleich. ex A. Braun) Kütz., *Tab. Phycol.* **7**: 25 (1857)

C. vulgaris L. forma *crassicaulis* (Schleich. ex A. Braun) R. D. Wood, *Taxon* **11**: 8 (1962)

var. longibracteata (Kütz.) J. Groves & Bull.-Webst., *Brit. Charoph.* **2**: 24 (1924)

Chara longibracteata Kütz. in Rchb., *Fl. Germ. Excurs.* **2**: 843 (1832)

Chara vulgaris L. forma *longibracteata* (Kütz.) H. Groves & J. Groves, *J. Bot.* **18**: 133 (1880)

var. papillata Wallr. ex A. Braun, *Monatsber. Königl. Preuss. Akad. Wiss. Berlin* **1867**: 910 (1867)**var. vulgaris**

C. foetida A. Braun, *Ann. Sci. Nat. Bot., Sér.* **2**, **1**: 354 (1834)

C. gymnophylla auct., non A. Braun, *Flora* **18**: 62 (1835)

C. vulgaris L. var. *atrovirens* (Lowe) H. Groves & J. Groves, *J. Bot.* **18**: 133 (1880)

C. vulgaris L. var. *gymnophylla* auct., non (A. Braun) Nyman, *Consp. Fl. Eur. Suppl.* **1**: 875 (1884)

C. vulgaris L. var. *refracta* (Kütz.) J. Groves & Bull.-Webst., *Brit. Charoph.* **2**: 25 (1924)

LAMPROTHAMNIUM J. Groves, *J. Bot.* **54**: 337 (1916)

Lamprothamnus A. Braun, *Abh. Königl. Akad. Wiss. Berlin* **1882**: 100 (1882), nom. illegit., non Hiern in Oliv., *Fl. Trop. Afr.* **3**: 130 (1877) (Rubiaceae)

L. papulosum (Wallr.) J. Groves, *J. Bot.* **54**: 337 (1916)

Chara papulosa Wallr., *Fl. Crypt. Germ.* **2**: 107 (1833)

Chara wallrothii Rupr., *Distr. Crypt. Vasc. Ross.* 12 (1845)

C. alopecuroides Delile ex A. Braun, nom. illegit., *Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss.* **10**: 13 (1847)

Lychnothamnus alopecuroides (Delile ex A. Braun) H. Groves & J. Groves, *J. Bot.* **18**: 161 (1880)

Lamprothamnus alopecuroides A. Braun, *Abh. Königl. Akad. Wiss. Berlin* **1882**: 100 (1882)

L. papulosus (Wallr.) Bég. & Formigg., *Boll. Soc. Bot. Ital.* **1907**: 108 (1907)

NITELLOPSIS Hy, *Bull. Soc. Bot. France* **36**: 398 (1889)**N. obtusa** (Desv.) J. Groves, *J. Bot.* **57**: 127 (1919)

Chara obtusa Desv. in Loisel., *Not. Fl. France* 136 (1810)

Chara stelligera F.A. Bauer in Mössler, *Handb. Gewächsk.*, ed. 2, 1595 (1830)

Lychnothamnus stelligera (F.A. Bauer) A. Braun, *Abh. Königl. Akad. Wiss. Berlin* **1882**: 77 (1882)

Tribe NITELLEAE Leonh., *Lotos* **13**: 69 (1863)**NITELLA** C. Agardh, *Syst. Alg.* xxvii (1824)†**N. capillaris** (Krock.) J. Groves & Bull.-Webst., *Brit. Charoph.* **1**: 96 (1920)

Chara capillaris Krock., *Fl. Siles.* **3**: 62 (1814)

Nitella capitata (Nees) C. Agardh, *Syst. Alg.* 125 (1824)

N. syncarpa (Thuill.) Chevall. var. *capitata* (Nees) Kütz., *Phycol. Germ.* 256 (1845)

- N. confervacea** (Bréb.) A. Braun ex Leonh., *Lotos* **13**: 146 (1863)
Nitella gracilis (Sm.) C. Agardh var. *confervacea* Bréb., *Fl. Normandie, éd. 2*, 338 (1849)
Nitella batrachosperma (Thuill.) A. Braun, nom. illegit., *Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss.* **10**: 10 (1847)
N. nordstediana J. Groves, *J. Bot.* **28**: 66 (1890)
- N. flexilis** (L.) C. Agardh, *Syst. Alg.* 124 (1824)
Chara flexilis L., *Sp. Pl.* 1157 (1753)
Nitella flexilis (L.) C. Agardh var. *crassa* A. Braun in Nordst. & Wahlst., *Charac. Scand. Exs.* 14 (1871)
N. flexilis (L.) C. Agardh var. *fryeri* J. Groves & Bull.-Webst., *J. Bot.* **57**: 102 (1919)
N. flexilis (L.) C. Agardh var. *flexilis* sensu J. A. Moore, *Charoph. Gr. Brit. Ireland* 88 (1986)
- N. gracilis** (Sm.) C. Agardh, *Syst. Alg.* 125 (1824)
Chara gracilis Sm. in Sowerby, *Engl. Bot.* **30**: t.2140 (1810)
- †**N. hyalina** (DC.) C. Agardh, *Syst. Alg.* 126 (1824)
Chara hyalina DC. in Lam. & DC., *Fl. Franç., éd. 3*, **6**: 247 (1815)
- N. mucronata** (A. Braun) Miq. in H. C. Hall, *Fl. Belg. Sept.* **2**: 428 (1841)
Chara mucronata A. Braun, *Ann. Sci. Nat. Bot., Sér. 2*, **1**: 351 (1834)
Nitella furcata (Roxb. ex Bruzelius) C. Agardh subsp. *mucronata* (A. Braun) R. D. Wood, *Monogr. Char.* 497 (1965)
- var. gracillima** J. Groves & Bull.-Webst., *J. Bot.* **55**: 324 (1917)
- var. mucronata**
Nitella mucronata (A. Braun) Miq. var. *heteromorpha* (A. Braun) Kütz., *Phycol. Germ.* 256 (1845)
- N. opaca** (C. Agardh ex Bruzelius) C. Agardh, *Syst. Alg.* 124 (1824)
Chara opaca C. Agardh ex Bruzelius, *Observ. Charae* 23 (1824)
Nitella syncarpa auct., non (Thuill.) Chevall., *Fl. Gén. Env. Paris* **2**: 125 (1827)
N. opaca (C. Agardh ex Bruzelius) C. Agardh var. *attenuata* H. Groves & J. Groves, *J. Bot.* **19**: 356 (1881)
N. opaca (C. Agardh ex Bruzelius) C. Agardh var. *brachyclema* J. Groves & Bull.-Webst., *J. Bot.* **62**: 33 (1924)
- †**N. spanioclema** J. Groves & Bull.-Webst. ex Bull.-Webst., *J. Bot.* **57**: 1 (1919)
Nitella flexilis (L.) C. Agardh var. *spanioclema* (J. Groves & Bull.-Webst. ex Bull.-Webst.) R. D. Wood, *Taxon* **11**: 15 (1962)
- N. tenuissima** (Desv.) Kütz., *Phycol. General.* 319 (1843)
Chara tenuissima Desv., *J. Bot. (Desvaux)* **2**: 313 (1809)
Chara flexilis L. var. *stellata* Wallr., *Annus Bot.* 178 (1815)
Chara stellata (Wallr.) Gray, *Nat. Arr. Brit. Pl.* **2**: 28 (1821)
- N. translucens** (Pers.) C. Agardh, *Syst. Alg.* 124 (1824)
Chara translucens Pers., *Syn. Pl.* **2**: 531 (1807)
- TOLYPELLA** (A. Braun) A. Braun, *Abh. Königl. Akad. Wiss. Berlin* **1856**: 338 (1857)
Nitella subgen. *Tolypella* A. Braun, *Hooker's J. Bot. Kew Gard. Misc.* **1**: 194, 199 (1849)
- T. glomerata** (Desv.) Leonh., *Lotos* **13**: 129 (1863)
Chara glomerata Desv. in Loisel., *Not. Fl. France* 135 (1810)
Chara smithii Bab., *Ann. Mag. Nat. Hist., Ser. 2*, **5**: 86 (1850)
Tolypella giennensis Prósper, *Carofit. España* 83 (1910)
T. glomerata (Desv.) Leonh. var. *erythrocarpa* J. Groves & Bull.-Webst., *J. Bot.* **57**: 225 (1919)
T. nidifica (O. Müll.) Leonh. var. *glomerata* (Desv.) R. D. Wood, *Taxon* **11**: 23 (1962)
- T. intricata** (Trentep. ex Roth) Leonh., *Lotos* **13**: 57 (1863)
Chara intricata Trentep. ex Roth, *Catal. Bot.* **1**: 125 (1797)
Chara polysperma A. Braun, *Ann. Sci. Nat. Bot., Sér. 2*, **1**: 352 (1834)
- T. nidifica** (O. Müll.) Leonh., *Verh. Naturf. Vereins Brünn* **2**: 176 (1864)
Conferva nidifica O. Müll. in Oeder et al., *Fl. Dan.* **5(13)**: t.761 (1777)
Nitella flexilis (L.) C. Agardh var. *nidifica* (O. Müll.) Hartm. ex Wallman, *Förs. Syst. Uppställn. Charac.* 34 (1853)
Tolypella nidifica (O. Müll.) Leonh. var. *nidifica* sensu J. A. Moore, *Charoph. Gr. Brit. Ireland* 108 (1986)

- T. prolifera** (Ziz ex A. Braun) Leonh., *Lotos* **13**: 57 (1863)
Chara prolifera Ziz ex A. Braun, *Ann. Sci. Nat. Bot., Sér. 2*, **1**: 352 (1834)
Chara borrieri Bab., *Ann. Mag. Nat. Hist., Ser. 2*, **5**: 87 (1850)
Tolypella intricata (Trentep. ex Roth) Leonh. forma *prolifera* (Ziz ex A. Braun) R. D. Wood, *Taxon* **11**: 23 (1962)

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REFERENCES

- ALLEN, G. O. (1950). *British stoneworts*. Haslemere Natural History Society, Haslemere.
 BRIDSON, G. D. R. (1991). *Botanico-Periodicum-Huntianum/Supplementum*. Hunt Institute, Pittsburgh.
 BRUMMITT, R. K. & POWELL, C. E. (1992). *Authors of plant names*. Royal Botanic Gardens, Kew.
 BRYANT, J. A. & STEWART, N. F. (2002). Order Charales, in JOHN, D. M., WHITTON, B. A. & BROOK, A. J., eds. *The freshwater algal flora of the British Isles*, pp. 593–612. Cambridge University Press, Cambridge.
 DANDY, J. E. (1958). *List of British vascular plants*. British Museum, London.
 DRUCE, G. C. (1908). *The British plant list*. Clarendon Press, Oxford.
 DRUCE, G. C. (1928). *British plant list*, 2nd ed. Buncle & Co., Arbroath.
 GROVES, J. & BULLOCK-WEBSTER, G. R. (1920, 1924). *The British Charophyta*. The Ray Society, London.
 HANBURY, F. J. (1925). *The London Catalogue of British Plants*, 11th ed. George Bell, London.
 KENT, D. H. (1992). *List of vascular plants of the British Isles*. Botanical Society of the British Isles, London.
 LAWRENCE, G. H. M., BUCHHEIM, A. F. G., DANIELS, G.S. & DOLEZAL, H. (1968). *Botanico-Periodicum-Huntianum*. Hunt Institute, Pittsburgh.
 MOORE, J. A. (1986). *Charophytes of Great Britain and Ireland. BSBI Handbook 5*. Botanical Society of the British Isles, London.
 STAFLEU, F. A. & COWAN, R. S. (1976–2000). *Taxonomic literature*, 2nd ed., **1–7**, plus Supplements **1–6**. International Association for Plant Taxonomy.
 STEWART, N. F. & CHURCH, J. M. (1992). *Red data books of Britain and Ireland: Stoneworts*. Joint Nature Conservation Committee, Peterborough.
 WATSON, H. C. & SYME, J. T. B. (1857). *The London Catalogue of British plants*, 5th ed. Botanical Society of London, London.
 WOOD, R. D. (1965). *A revision of the Characeae, 1. Monograph of the Characeae*. J. Cramer, Weinheim.

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