

Research Article

An updated synopsis of genus *Chara* L. in India

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ABSTRACT

An updated synopsis of the genus *Chara* L. (Characeae) occurring in India are discussed here in conformity with the available monographs, literatures, related publications, digital herbarium records and online taxonomic databases. The taxonomy and nomenclature are based on the critical review of 51 taxa of *Chara* L. which include 35 species, 9 varieties and 7 forms so far reported from India. Information related to type citations, and range of distribution of each taxon was also included in discussion. The review further marks 9 taxonomically uncertain taxa of India.

Key words: *Chara* L., Taxonomic databases, Type citations, Uncertain taxa, India.

INTRODUCTION

The genus *Chara* L. belonging to the family Characeae is a group of submerged and macroscopic green algae. They are heterotrichous in nature having great phenotypic plasticity (Schneider et al., 2015). Casanova (2005) accorded *Chara* L. as a cohesive group under Charophytes which shows similarities with submerged angiosperms like *Ceratophyllum* and *Myriophyllum* but able to thrive deeper than the mentioned angiosperms (Chambers and Kalff, 1985) in any water body. Morphologically the members of the genus comprise of a peculiar but complex branching system which consists of one main axis with nodes and internodes and having potentiality of unlimited growth (Pal et al., 1962). From each node arises a whorl of branchlets commonly known as laterals of limited growth which also comprise of nodes and internodes (Damska, 1964). Each branchlet possesses distinctive reproductive organs viz. antheridia or globule (male reproductive organ) and oogonia or nucule (female reproductive organ) at the nodes of both main and lateral axis as well with a couple of bracteoles (Allen, 1882; Sundaralingam, 1959; Pal et al., 1962; Mondal et al., 2021). The reproductive bodies in all the members of the *Chara* could be seen with unaided eyes as beads or coloured pearls (Damska, 1964; Krause, 1997). The peculiar and distinctive wall ornamentations in the nucule as well as oospore are a few potent criteria for identification of taxa up to infraspecific level amongst *Chara* (Casanova, 2005; Urbaniak, 2011). Members of the *Chara* though prefer to grow in freshwater habitats, a few species can thrive in brackish to marine environment. However, survivability in calcium (Ca) rich water along with accumulation of CaCO₃ make the members stout and hence, could be designated them as indicator of Ca rich hard water (Mondal et al., 2021).

Since the contemporary period of Linnaeus exploration and taxonomical studies on the genus *Chara* had been carried out by different phycologists (Braun, 1843; Braun, 1849). But in-depth study on morphology and taxonomy of the genus took momentum by the end of 19th century (Urbaniak and Combik, 2013) throughout the globe. In contrast to the pioneer workers who reported altogether 116 different *Chara* spp. from different geographical locations from the entire earth (Allen, 1882; Dixit, 1939; Sundaralingam, 1959; Pal et al., 1962; Proctor et al., 1971). Wood and his co-workers (Wood, 1965; Wood and Imahori, 1965) took the challenge to reduce the number of species from 116 to 19 based on co-relatedness of dioecious and monoecious taxa and morphological flexibility in their book “Revision of Characeae”. Wood’s taxonomy mainly focused on exploration of reliable characters in a scientific way (Subramanian, 2002, 2005; Casanova, 2005).

Explorations of *Chara* were though started in India with the works of Wildenow, 1806; Braun, 1849; Groves, 1924 and others (Subramanian, 2002), taxonomy of this genus in India is indebted to Allen (1925, 1928) as he published a list of 10 species of *Chara* recorded from Uttar Pradesh, India for the first time along with brief description of each species. Later on, Dixit (1931) reported another 4 *Chara* species from a few locations of Salsette of Maharashtra (India). His continuous effort further added another 8 species and 1 forma including *Chara hatei* sp. nov. and *Chara nuda* f. *kolhapurensis* f. nov., respectively as new report from the same state (Dixit, 1939).

Sundaralingam (1959) critically analysed the information available on *Chara* species throughout India and he then summarized the occurrence of only 10 species, 5 varieties and 8 forms including documentation of *Chara vandalorensis* sp. nov. as a new species and

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Chara hydropitys var. *indica* f. *plumosa* f. nov from Southern part of India in his monograph entitled “A Systematic Account on South Indian Characeae” as against 25 species, 3 varieties and 5 forms of *Chara* reported till date covering entire Indian subcontinent. In contrast to the above, Allen (1961) summarized the occurrence of only 13 *Chara* spp. reported from different parts of India.

Pal et al. (1962) in their epoch-making monographic contribution on “Charophyta”, where Sundaralingam was also one of the co-authors, incorporated 22 species, 3 varieties and 8 forms of *Chara* taking synonymic cohesion and diversion into consideration amongst the taxa. Later Mukherjee and Noor (1980) reported *Chara indica* as sp. nov) which was rectified vide their publication again (Mukherjee and Noor 1985) as *Chara biharensis* nom. nov. Another contemporary worker Ray (1985) recorded already known 7 species, 6 forms and 5 varieties under *Chara* from West Bengal. After addition of 3 new varieties viz. *Chara zeylanica* var. *robusta*, *C. socotrensensis* var. *incurvata* and *C. socotrensensis* var. *ebracteata* reported from Tamil Nadu (Subramanian, 2005) into the Indian list of *Chara*, Gupta (2012) collated a list with 28 species, 32 variety, 9 forms of *Chara* without maintaining any consolidated taxonomic information. Very recently, Ingawale et al. (2019) recorded 8 forms of *Chara* from Satara District, Maharashtra (India) which was different and distinct from the species that were reported by Dixit (1939) in the same geographical region. Similarly, Mondal et al. (2021) and Verma et al. (2021) also listed 5 and 13 species of *Chara* from West Bengal and Uttar Pradesh respectively which were already reported by some previous workers from India (Allen, 1928; Dixit, 1939; Wood, 1965; Sarma and Khan, 1965; Ray, 1985; Subramanian, 2002; Gupta, 2012; Ingawale et al., 2019).

Analysing the information available till date in India, the proper listing of *Chara* species in terms of updated taxonomy and distributional range seems to be incomplete as against the mindful of information presently available on Algaebase that a total of 343 taxa throughout the globe have been recognized and flagged as taxonomically accepted on the basis of the updated literature (Guiry and Guiry, 2023). Even though many authors tried to grab our attention by enlisting different *Chara* species occurring in India in different occasions and in different situations, their works are found to be dispersed and assorted. This synopsis is therefore an attempt to update the consolidated information with updated nomenclature of all the taxa under *Chara* reported so far from India with proper verification in accordance with recent algal databases.

MATERIALS AND METHODS

The present communication is based on a critical review of all the 51 Indian taxa of *Chara* incorporating information related to their type citations, synonym, basionym, and habitat information along with the range of distribution of each taxon in India. Habitat information National University of Ireland (Guiry and Guiry, 2023). Types and other specimens were searched in GBIF (Global Biodiversity Information Facility), an online world herbarium database. The digital images of World herbaria BRIT, L, NY, CAT, BM, LD, BUT, MARY, BZ, CHR, FM, NYBG, SP, PH, DS, MEL, LINN,

MICH, P, UNAL, PC, N, S and B were studied. Distribution data of the taxa were compiled from Botanical Survey of India (*Chara* in e- flora of India) along with the Algae base (Guiry and Guiry, 2023), available monographs and publications (Dixit, 1939; Sundaralingam, 1959; Pal et al., 1962; Wood et al., 1965; Wood and Imahori, 1965; Mukherjee and Noor, 1985; Ray, 1985; Chaugule and Patil, 1992; Priyadarsan, 1997; Karande, 1999; Subramanian, 2002; John et al., 2005; Abrol et al., 2006; Talekar, 2009; Raam, 2010; Gupta, 2012; Jaiswal, 2017; Ingawale, 2019; Verma et al., 2021; Mondal et al., 2021).

RESULTS AND DISCUSSION

Synopsis of the taxa:

In the present review, a total of 35 species, 9 varieties and 7 forms of *Chara* have been recorded across the 20 states of India which significantly determines the diversity of the genus. With 23 number of taxa Maharashtra stands in the topmost position followed by Tamil Nadu (21) and Uttar Pradesh (21), West Bengal (12), Bihar (10), Jharkhand (9), Jammu and Kashmir (8), Uttarakhand (8), Karnataka (7), Gujrat (6), Kerala (6), Andhra Pradesh (4), Assam (4), Madhya Pradesh (4) and Punjab (2). Whereas Andaman and Nicobar Island, Arunachal Pradesh, Himachal Pradesh, Manipur and Orissa represented only 1 number of taxa each (Figure 1). Surprisingly, in the rest 10 state of India not a single taxon of *Chara* species has been reported till now. In addition to that, 9 taxa of *Chara* reported previously from India are taxonomically uncertain (Table 1). The taxonomic or nomenclature status of these species were in some way unresolved and required further investigation.

Checklist of the taxa:

1. *Chara aspera* Willdenow (1809)

Heterotypic Synonyms:

Chara delicatula Desvaux (1810) *Notice sur les plantes à ajouter à la flore de France (Flora Gallica) avec quelques corrections et observations.* pp. 1-172; *Chara fallax* C. Agardh (1824) *Systema algarum.* pp. [i]-xxxvii, [1]-312. Lunda [Lund]: *Literis Berlingianis* [Berling]; *Chara pusilla* G. Detharding ex Kützing (1834) *Beschreibung einiger neuer Arten der Gattung Chara.* *Flora (Jena)* 17: 705-707 *Chara asperula* Thuret ex F. Hy (1913) *Les Characées de France.* *Bulletin de la Société Botanique de France* 60 (Mémoires 26): 1-47, pls. I-III;

Habitat: Freshwater

Report from India: As *Chara aspera* Willdenow in Banaras (Allen, 1961), Maharashtra, Uttar Pradesh (Pal et al., 1962)

Type: BERLIN; Holotype; B. country unknown; isotype: Willd, L 0820956 (image!).

Herbarium records: NEW YORK; Long Island; Montauk point; Type: TF Allen, 1881; NY 02011259 (image!). SWEDEN: Lacu ad Iglesjo, Vestrogothiae; Type: F. Lundburg, 1950; BRIT 38642 (image!)

Table 1. List of taxonomically uncertain taxa of *Chara* L. from India

Sl. No	Current name	Previous name	Distribution	References
1.	<i>Chara contraria</i> var. <i>arrudensis</i> (Mendes) Raam, nom. inval. 2010	<i>Chara vulgaris</i> f. <i>arrudensis</i> (E.J. Mendes) R.D. Wood 1962	Maharashtra	Karande, 1999
2.	<i>Chara contraria</i> var. <i>excelsa</i> (T.F. Allen) Raam, nom. inval. 2010	<i>Chara excelsa</i> T.F. Allen 1882	Maharashtra	Talekar, 2009
3.	<i>Chara zeylanica</i> var. <i>elegans</i> (A. Braun ex T.F. Allen) Raam, nom. inval. 2010	<i>Chara zeylanica</i> f. <i>elegans</i> (A. Braun ex T.F. Allen) H. and J. Groves 1911	Maharashtra	Karande, 1999
4.	<i>Chara zeylanica</i> var. <i>compressa</i> (C.S. Kunth) Raam 2010	<i>Chara zeylanica</i> f. <i>humboldtiana</i> (A. Braun) J.S. Zaneveld 1942; <i>Chara zeylanica</i> f. <i>humboldtii</i> (Kützing) H. Groves and J. Groves, nom. illeg. 1911	Maharashtra; Tamil Nadu	Karande, 1999; Gupta, 2012
5.	<i>Chara zeylanica</i> var. <i>robusta</i> D. Subramanian 2005	<i>Chara zeylanica</i> var. <i>robusta</i> D. Subramanian 2005	Tamil Nadu	Subramanian, 2005
6.	<i>Chara keukensis</i> var. <i>curtissii</i> (T.F. Allen ex C.B. Robinson) Raam, nom. inval. 2010	<i>Chara fibrosa</i> f. <i>curtissii</i> (T.F. Allen ex C.B. Robinson) R.D. Wood 1962	Kerela Maharashtra	Priyadarsan, 1997, Karande, 1999
7.	<i>Chara handae</i> var. <i>vandalurensis</i> (V.S. Sundaralingam) Raam, nom. inval. 2010	<i>Chara vandalurensis</i> V.S. Sundaralingam 1959	Tamil Nadu	Gupta, 2012
8.	<i>Chara foliolosa</i> var. <i>michauxii</i> (A. Braun ex Kützing) Raam, nom. inval. 2010	<i>Chara zeylanica</i> f. <i>michauxii</i> (A. Braun) H. Groves and J. Groves 1911	Uttar Pradesh	Gupta, 2012
9.	<i>Chara fibrosa</i> var. <i>burmanica</i> (B.P. Pal) Raam, nom. Inval. 2010	<i>Chara burmanica</i>	Kerela	Sindhu and Panikkar, 1992

2. *Chara australis* R. Brown (1810)**Heterotypic Synonyms:**

Chara plebeja R. Brown ex A. Braun (1843) *Charae Preissianae adiectis reliquis speciebus e Nova Hollandia hucusque cognititis*. *Linnaea* 17: 113-119;

Habitat: Freshwater

Report from India: As *Chara australis* R. Brown in India (Wood and Imahori, 1965)

Type: AUSTRALIA: Victoria, Honeysuckle Creek;

Lectotype: R. Brown, 1810; L 0941177(image!). isolecoto: WELT A9062 n.v., CHRn.v.

3. *Chara bharadwajae* Y.S.R.K. Sarma and M. Khan (1967)

Habitat: Freshwater

Report from India: As *Chara bharadwajae* Y.S.R.K. Sarma and M. Khan in Uttar Pradesh (Sharma and Khan, 1967), Tamil Nadu (Gupta, 2012), in Uttar Pradesh: Bareilly (Verma et al., 2021)

Type: INDIA: Uttar Pradesh, Mirzapur, Sakteshgarh, shallow pond; Holotype: Y. S. R. K. Sarma & M. Khan, 1964 (Sarma & Khan, 1966)

4. *Chara biharensis* S. Mukherjee and M. N. Noor (1985)**Heterotypic synonym**

Chara indica S. Mukherjee & M.N. Noor, nom. ined. (1980) *On a new charophyte from India*. *Hydrobiologia* 68: 81-84.

Habitat: Freshwater

Report from India: As *Chara indica* S. Mukherjee and M. N. Noor, nom. ined. 1980 in Bihar (Mukherjee and Noor, 1980), as *Chara biharensis* S. Mukherjee and M. N. Noor in Bihar: Darbhanga district (Mukherjee and Noor, 1985)

Type: INDIA: Bihar; Holotype: Mukherjee & Noor, 1980; Ranchi University 39 (Mukherjee and Noor, 1985)

5. *Chara brachypus* var. *gracilescens* A. Braun (1849)

Habit: Freshwater

Report from India: As *Chara brachypus* var. *gracilescens* A. Braun in Tamil Nadu (Gupta, 2012).

Type: INDIA: Madras; Holotype: A. Braun, 1849

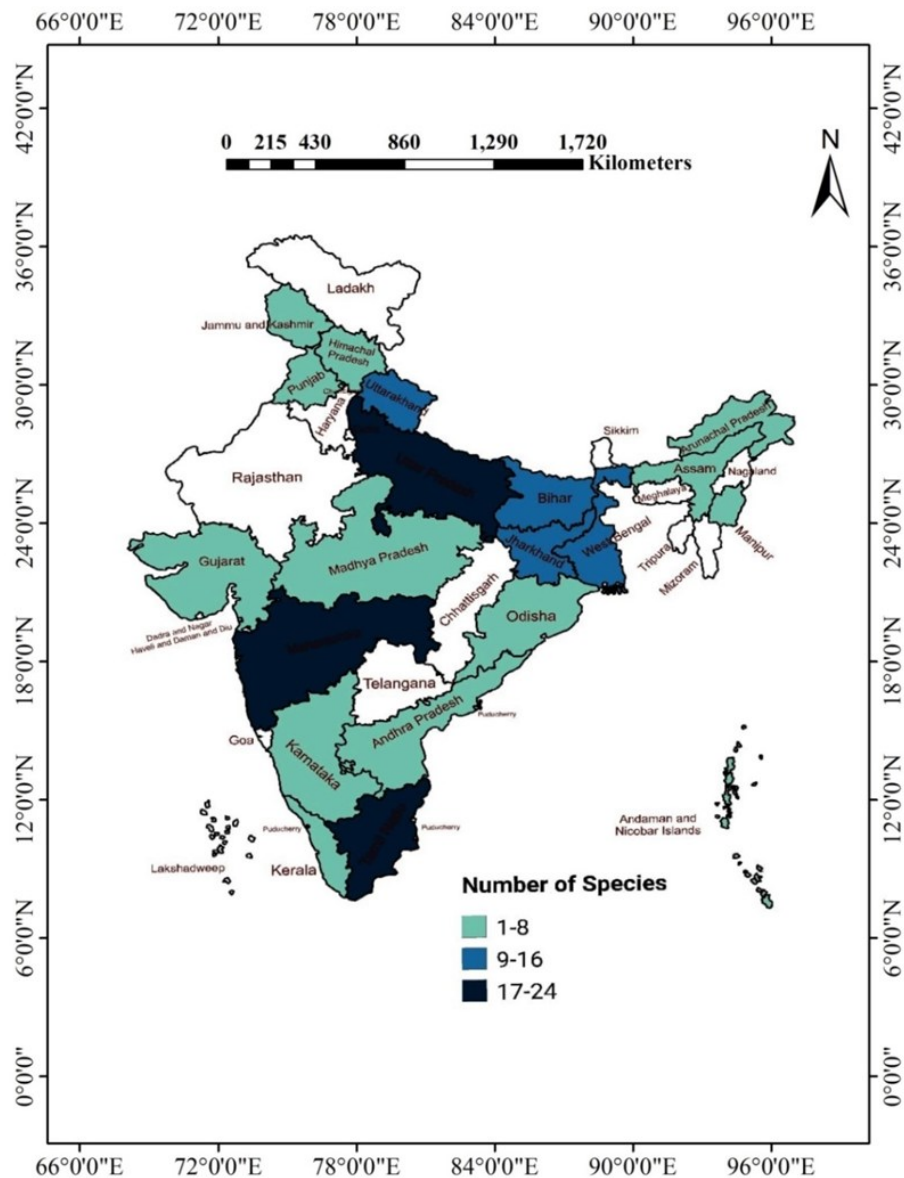


Figure 1. Map showing distribution pattern of *Chara* species in India

6. *Chara braunii* C. C. Gmelin (1826)

Homotypic synonyms:

Nitella braunii (C. C. Gmelin) Rabenhorst (1846) Deutschlands Kryptogamen- Flora oder Handbuch zur Bestimmung der kryptogamischen Gewächse Deutschlands, der Schweiz, des Lombardisch-Venetianischen Königreichs und Istriens. Zweiter Band. Zweite Abteilung: Algen. pp. [ii]-xix, [xx, err.], [1]-200, [201]-216, index. Leipzig: Verlag von Eduard Kummer; *Nitella braunii* (C.C. Gmelin) Rabenhorst (1846) Deutschlands Kryptogamen-Flora oder Handbuch zur Bestimmung der kryptogamischen Gewächse Deutschlands, der Schweiz, des Lombardisch-Venetianischen Königreichs und Istriens. Zweiter Band. Zweite Abteilung: Algen. pp. [ii]-xix, [xx, err.], [1]-200, [201]-216, index. Leipzig: Verlag von Eduard Kummer; *Nitella braunii* (C.C. Gmelin) Rabenhorst (1846) Deutschlands Kryptogamen Flora oder Handbuch zur Bestimmung der kryptogamischen Gewächse Deutschlands, der Schweiz, des Lombardisch-Venetianischen Königreichs und Istriens. Zweiter Band.

Zweite Abteilung: Algen. pp. [ii]-xix, [xx, err.], [1]-200, [201]-216, index. Leipzig: Verlag von Eduard Kummer.

Heterotypic synonyms

Chara flexilis Amici 1823 Osservazioni microscopiche sopra varie piante. Memorie di Matematica e di Fisica della Società Italiana delle Scienze 19(fasc. 1): 234-286, 6 pl. *Chara cortiana* Bertoloni ex Amici (1827) Descrizione di alcune specie nuove di *Chara* ed ossezzazioni microscopiche sulle medesime. Memorie della Reale Accademia di Scienze, Lettere ed Arti di Modena 1(I/II): 199-221, 5 pls. *Chara coronate* Ziz ex Bischoff (1828) Die kryptogamischen Gewächse mit besonderer Berücksichtigung der Flora Deutschlands und der Schweiz. Vol. I. Die Characeen und Equiseten. Nürnberg; *Chara jahnensis* F. Meyen (1835) Reise um die Erde, ausgeführt auf dem Königlich Preussischen Seehandlungs-Schiffe Prinzess Louise, commandiert von Captain W. Wandt, in den Jahren

1830, 1831, und 1832. Zweiter theil. Historischer Bericht mit einem Plane von Canton, zwei Steintafeln und Tabellen. pp. i-vi, 1-411. Berlin: in der Sander'schen Buchhandlung; *Chara stalii* G. Meneghini (1846) Nuova specie di *Chara*. Atti Sci. Ital., Genoa 1846: 553-554.

Habitat: Freshwater

Report from India: As *Chara braunii* C. C. Gmelin in Uttar Pradesh: Benaras (Allen, 1960); Bihar, Jammu and Kashmir, Jharkhand, Karnataka, Maharashtra, Manipur, Orissa, Tamil Nadu, Uttarakhand, West Bengal, Uttar Pradesh (Gupta, 2012); West Bengal (Mukhopadhyay and Ray, 1995); as *Chara braunii* f. *braunii* in Jharkhand: Ranchi (Purak et al., 2018); Karnataka (Gupta and Das 2019); Kerala Bala-krishnan, 2021); Uttar Pradesh: Bareilly (Verma et al., 2021).

Type: EUROPE: Italy, prope Oldenico (dition. Verce-lensis); Isonotype: R.D. Wood, 1856; NY 02011807 (image!). Europe: Italy; Neotype; C.C. Gmel; NY 00945633.

7. *Chara braunii* var. *coromandelina* (A. Braun) Zaneveld (1941)

Homotypic synonyms

Chara coromandelina (A. Braun) R.D. Wood (1965) A revision of the Characeae. First Part. Monograph of the Characeae. pp. ixxiv, 1-904. Weinheim: Verlag von J. Cramer.

Heterotypic synonym

Chara involucrata W. Roxburgh (1832) *Flora Indica, or descriptions of Indian plants*. Vol. 3. Serampore. Basionym: *Chara coronata* f. *coromandelina* A. Braun
Habit: Freshwater

Report from India: As *Chara braunii* var. *coromandelina* Zaneveld in Madras: (Tamil Nadu) (Sundaralingam, 1959), As *Chara braunii* var. *coromandelina* (A. Braun) Zaneveld in India (Wood and Imahori 1965), As *Chara braunii* var. *coromandelina* (A. Braun) Zaneveld in Tamil Nadu (Gupta, 2012).

Type: Information missing (Pal et al., 1962)

8. *Chara braunii* var. *kurzii* Zaneveld (1941)

Homotypic synonyms

Chara kurzii (J.S. Zaneveld) R.D. Wood (1965) A revision of the Characeae. First Part. Monograph of the Characeae. pp. i-xxiv, 1-904. Weinheim: Verlag von J. Cramer. Habitat: Freshwater Report from India: As *Chara braunii* var. *kurzii* Zaneveld in India (Zaneveld, 1941); Maharashtra (Sundaralingam, 1959); Bihar, Karnataka (Gupta, 2012); as *Charabraunii* f. *kurzii* (Zanev.) R.D. Wood in Jharkhand: Ranchi (Purak et al., 2018); Maharashtra: Satara district (Ingawale et al., 2019); Karnataka (Gupta and Das 2019).

Type: Information missing (Pal et al., 1962)

9. *Chara braunii* var. *oahuensis* (Meyen) Zaneveld (1941)

Homotypic synonyms

Chara oahuensis F.J.F. Meyen (1835) Reise um die Erde, ausgeführt auf dem Königlich

Preussischen Seehandlungs-Schiffe Prinzess Louise, commandiert von Captain W. Wandt, in den Jahren 1830, 1831, und 1832. Zweiter theil. Historischer Bericht mit einem Plane von Canton, zwei Steintafeln und Tabellen. pp. i-vi, 1-411. Berlin: in der Sander'schen Buchhandlung;

Heterotypic synonyms

Chara eremosperma Ruprecht (1845) Distributio cryptogamarum vascularium in Imperio Rossico. Beiträge der Pflanzenkunde des Russischen Reiches. Dritte Lieferung. pp. 1-56. Petropoli [St Petersburg]: Buchdruckerei der Kaiserlichen Akademie der Wissenschaften.

Basionym: *Chara oahuensis* F.J. F. Meyen

Habitat: Freshwater

Report from India: As *Chara braunii* f. *oahuensis* (F.J.F. Meyen) R.D. Wood in Bihar, Jharkhand (Gupta 2012).

Type: HAWAIIAN ISLAND: Near Hawaiian Pottery place, small stream on round top side of Manoa Valley Road., Topotype; G. F. Papenfuss, 1940; NY01004046 (image!)

10. *Chara canescens* Loiseleur (1810)

Heterotypic synonyms

Chara crinita Wallroth (1815) Annus botanicus, sivesupplementum tertium ad Curti Sprengelii floram halensem. pp. [i]-xxx, [1]-194, pls I-VI. Halae [Halle]: sumptibus Car. Aug. Kümmerlii.; *Chara karelinii* Lessing (1835) Beitrag zur Flora des südlichen Urals und der Steppen. Linnaea 9(2): 145-213; *Chara pusilla* Floerke ex Kützing, nom. illeg. (1849) Species algarum. pp. [i]-vi, [1]-922. Lipsiae [Leipzig]: F.A. Brockhaus; *Chara sphagnoides* Griffith (1849) Posthumous papers bequeathed to the honorable the East India company, and printed by order of the government of Bengal. Notulae ad plantas asiaticas [Vol. 4], Part II [2]. On the higher cryptogamous plants. Arranged by John M'Clelland, F.L.S., Surgeon, Bengal Service. pp. 257-628, i-vii. Calcutta: Printed by Mr. C.A. Serrao; *Chara condensata* J. Wallman (1853) Försök till en systematisk uppställning af växtfamiljen Characeae. pp. 1-103. Stockholm: P.A. Norstedt & Söner.

Habitat: Terrestrial (Tagad, 2016)

Report from India: As *Chara canescens* Desvaux and Loiseleur in Maharashtra, Pune (Tagad, 2016); as *Chara canescens* Loiseleur in Tamil Nadu (Subramanian, 2018). Parthenogenetic reproduction is common in India.

Type: NORTH AMERICA: Isotype: Loisel, 1897; CAT 2043(image!)

11. *Chara connivens* Salzmänn ex A. Braun (1835)

Heterotypic synonyms

Chara concinna Durieu (1859) Note sur une nouvelle espece du genre *Chara*. Bulletin de la Société Botanique de France 6: 179-186.

Chara duriaei (A. Braun) A. Braun (1868) Die Characeen Afrika's. Monatsberichte der Königlich preussischen Akademie der Wissenschaften zu Berlin. Berlin 1867: 782-872, 873-944. *Chara arcuatifolia* Vilhelm (1928) Characeae Europae orientalis et Asiae ex herbario instituti cryptogamici horti botanici reipublica rossicae (ante Petropolitani). Spisy vydávané Přírodovědeckou fakultou Karlovy University 80: 1-24, 10 figures, 1 plate.

Habitat: Freshwater

Report from India: As *Chara connivens* Salzmann ex A. Braun in Bihar, Uttar Pradesh (Gupta, 2012).

Type: AFRICA: Algeria, Oran; Isotype: A. Braun, 1867; BM 013844591(image!).

Herbarium records: CHINA; Type: P.K. Vorotnikov, 1931; S A2800. AUSTRALIA: Queensland; RD Wood, 1960; NY02012093 (image!).

12. *Chara contraria* A. Braun ex Kützing (1845)

Heterotypic synonyms

Chara fetidissima Rafinesque (1808) Prospectus of Mr. Rafinesque Schmaltz's two intended Works on North-American Botany; the first on the new Genera and Species of Plants discovered by himself, and the second on the Natural History of the Funguses, or Mushroom-Tribe of America. Medical Repository, hexade 2 5: 350-356. *Chara muscosa* J. Groves & Bullock-Webster (1924) Notes on British Charophyta. Journal of Botany (London) 62: 33-35; pl.570. *Chara gobiana* Vilhelm (1928) Characeae Europae orientalis et Asiae ex herbario instituti cryptogamici horti botanici reipublica rossicae (ante Petropolitani). Spisy vydávané Přírodovědeckou fakultou Karlovy University 80: 1-24, 10 figures, 1 plate. *Chara hispidula* (A. Braun) R.D. Wood (1985) A revision of the Characeae. First Part. Monograph of the Characeae. pp. i-xxiv, 1-904. Weinheim: Verlag von J. Cramer.

Habitat: Freshwater

Report from India: As *Chara contraria* Kützing in Uttar Pradesh: Bareilly, Gonda, Oudh, Saharanpur, Chambal reservoir; Gujrat: Barda Hills, Jamnagar; Madhya Pradesh: Kathiawar, Sagar (Pal et al., 1962); as *Chara contraria* Kützing in Uttar Pradesh: Bareilly (Verma et al., 2021)

Type: EUROPE: Germany, Baden-Württemberg; Isotype: A.C.H. Braun, 1839; N 01474889(image!).

Herbarium records: EUROPE: Sweden, Uppland, sol-lentuna; Type: Anders Svenson, 2007; S A5999. MEXICO: Hidalgo, Tula; Type: C.G. Pringle, 1896, NY01020131 (image!).

13. *Chara corallina* Klein ex C.L. Willdenow (1805)

Homotypic synonyms

Nitella corallina (Willdenow) C. Agardh (1824) Systema algarum. pp. [i]-xxxvii, [1]-312. Lundae [Lund]: Literis Berlingianis [Berling].

Heterotypic synonyms

Chara roxburghii A. Braun (1835) Übersicht der genauer bekannten Chara-Arten. Flora 18: 49-73. *Nitella australis* (R. Brown) Kützing (1857) Tabulae phycologicae; oder, Abbildungen der Tange. Vol. VII pp. i-ii, 1-40, 100 pls. Nordhausen: Gedruckt auf kosten des Verfassers (in commission bei W. Köhne).

Habitat: Freshwater

Report from India: As *Chara coralina* in Uttar Pradesh: Banaras (Allen, 1961); as *Chara corallina* Willdenow in

Andhra Pradesh, Maharashtra: Thana, Salesette, Goregaon, Kolhapur, Chiplun, Ratnagiri, Gujrat: Barda Hills, Uttar Pradesh: Vanaras, Gonda, Oudh, Saharanpur, Bareilly, Sultampur; West Bengal: Kolkata, Garia near Kolkata, Sodepur, 24-Parganas (Pal et al., 1962); as *Chara corallina* in Andaman and Nicobar Island, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Uttarakhand (Gupta, 2012); as *Nitella corallina* in Tamil Nadu (Casanova and Karol, 2014); as *Chara corallina* Klein ex C.L. Willdenow in Uttar Pradesh: Sultampur (Verma et al., 2021)

Type: INDIA: Wöppanpasi, Tranquebar (Tharamgambadi), near Madras (Chennai), Tamil Nadu, 7 Jan. 1799, Klein 510. Holotype: B-W 17105; isotype: MEL 2315415 & 2367911.

Herbarium records: INDIA: Uttar Pradesh, United Provinces, Ghazipur, River Goomti; Type: Parsotam, 1934; NY 02017262 (image!). AUSTRALIA: Tasmania; Type: R.D. Wood, 1965; L 4096640(image!).

14. *Chara corallina* var. *kyusyensis* K. Imahori (1954)

Homotypic synonyms *Chara kyusyensis* (K. Imahori) R.D. Wood (1965) A revision of the Characeae. First Part. Monograph of the Characeae. pp. i-xxiv, 1-904. Weinheim: Verlag von J. Cramer.

Habitat: Freshwater

Report from India: As *Chara corallina* var. *corallina* f. *kyusyensis* in Maharashtra (Karande, 1999)

Type: JAPAN: Hukuoka-ken, Kasuga-mura; Isotype: Imahori, 1951; NY 01474863(image!).

15. *Chara corallina* var. *portonovensis* Subramanian (1981)

Habitat: Freshwater

Report from India: As *Chara corallina* var. *portonovensis* Subramanian in Tamil Nadu (Gupta, 2012)

Type: INDIA: Tamil Nadu, South Arcot, Portonova; Holotype: D. Subramanian; 2002; Department of Botany, Annamalai University.

16. *Chara diaphana* (F.J.F. Meyen) R.D. Wood (1965)

Heterotypic synonyms

Chara commersonii A. Braun (1835) Übersicht der genauer bekannten Chara-Arten. Flora 18:49-73. *Chara fertilissima* (A. Braun) C. B. Robinson (1906) The Characeae of North America. Bulletin of the New York Botanical Garden 4(13): 244-308.

Basionym: *Chara armata* var. *diaphana* F. Meyen

Habitat: Freshwater

Report from India: As *Chara diaphana* (F.J.F. Meyen) R.D. Wood in Uttar Pradesh: Bareilly (Verma et al., 2021)

Type: UNITED STATES OF AMERICA: West Virginia; Topotype: R.D. Wood, 1966; NY 01192414(image!).

Herbarium record: JAMAICA; Type: L. Green & W. Taylor; 1964; NY01089297 (image!).

17. *Chara fibrosa* C. Agardh ex Bruzelius (1824)

Heterotypic synonyms

Chara batrachioides F. Müller null Plantae Muelleriana: Characeae. Linnaea 25 (=Bd 9):704-709. *Chara flaccida* A. Braun (1849) Characeae Indiae orientalis et insularum maris pacifici; or characters and observations on the Characeae of the East Indian continent, Ceylon, Sunda Islands, Marians, and Sandwich islands. Hooker's Journal of Botany & Kew Garden Miscellany

1: 292-301.

Chara gymnopitys A. Braun (1853) *Plantae Muelleriana*: Characeae. *Linnaea* 25 (=Bd 9): 704-709. *Chara subtilis* Müller ex Kützing (1857). *Tabulae phycologicae*; oder, *Abbildungen der Tange*. Vol. VII pp. i-ii, 1-40, 100 pls. Nordhausen: Gedruckt auf kosten des Verfassers (in commission bei W. Köhne). *Chara dichopitys* A. Braun (1868) *Die Characeen Afrika's*. Monatsberichte der Königlich preussischen Akademie der Wissenschaften zu Berlin. Berlin 1867: 782-872, 873-944. *Chara psilopitys* A. Braun (1882) *Fragmente einer Monographie der Characeen* von Hrn. A. Braun. Nach den hinterlassenen Manuscripten A. Braun's herausgegeben von Hrn. Dr. Otto Nordstedt. *Abhandlungen der Königlich Preussischen Akademie der Wissenschaften* 1882(1): 1-211, 7 pls. Habitat: Freshwater

Report from India: As *Chara flaccida* Braun in Jammu and Kashmir, Maharashtra, West Bengal, Andhra Pradesh, Madhya Pradesh, Karnataka, Kerala (Pal et al., 1962); as *Chara benthamii* A. Braun in Dum-Dum, Dhaphapi, Agarpara, 24 Paraganas (Pal et al., 1962); As *Chara fibrosa* C. Agardh ex Bruzelius in Tamil Nadu, Jharkhand (Gupta, 2012); as *Chara flaccida* Braun in Karnataka (Gupta and Das, 2019); as *Chara fibrosa* C. Agardh ex Bruzelius in Uttar Pradesh: Bareilly, Sultanpur (Verma et al., 2021).

Type: AUSTRALIA: Victoria; Holotype: Ferd. V. Muller, 1856; LD 1608260 (image!) GUAM: Marianas; Isototype: C. Gaudichaud-Beaupre, 1965; NY00887690 (image!).

18. *Chara fibrosa* f. *erythrogyna* (W. Griffith) R. D. Wood (1962)

Basionym: *Chara erythrogyna* Griffith

Habitat: Freshwater

Report from India: As *Chara erythrogyna* Griffith in Kerala (Sindhu and Panikkar, 1992); as *Chara fibrosa* f. *erythrogyna* in Uttarakhand (Abrol et al., 2006); as *Chara erythrogyna* (W. Griffith) R. D. Wood in Uttar Pradesh (Abrol et al., 2006); as *Chara erythrogyna* (W. Griffith) R. D. Wood in Karnataka, Tamil Nadu, Bihar (Gupta, 2012); as *Chara griffithii* A. Braun and Nordst in West Bengal (Gupta, 2012).

Herbarium records: INDIA: Uttar Pradesh, Saharanpur; Type: R. D. Wood, 1965; 0217522 (image!)

19. *Chara fibrosa* f. *tylacantha* (Nordstedt) R. D. Wood (1962)

Homotypic synonyms

Chara tylacantha (Nordstedt) R. D. Wood (1965) A revision of the Characeae. First Part. Monograph of the Characeae. pp. i-xxiv, 1-904. Weinheim: Verlag von J. Cramer.

Basionym: *Chara gymnopitys* f. *tylacantha* Nordstedt

Habitat: Freshwater.

Report from India: As *Chara fibrosa* f. *tylacantha* in West Bengal Ray 1985, Uttar Pradesh (Abrol et al., 2006); as *Chara fibrosa* f. *tylacantha* in Jharkhand (Purak et al., 2018).

Type: AUSTRALIA; (Index Nominum Algarum)

20. *Chara globularis* Thuiller (1799)

Heterotypic synonyms

Chara capillacea Thuillier (1799) *Flore des environs de Paris*, ou, *Distribution méthodique des plantes qui y croissent naturellement*, Faite d'après le système de

Linnée: avec le nom et la description de chacune et latin et in françoise; l'indications de leur lieu natal, de leur durée, du temps de leur floraison, de la couleur de leurs fleurs, et al citation de Auteurs qui les ont le mieux décrites ou en ont données les meilleures figures. Nouvelle édition: revue corrigée et considérablement augmentée [éd. 2]. pp. 1-595. Paris: Chez l'Auteur et H.L. Peronneau.

Chara fragilis Desvoux (1810) *Notice sur les plantes à ajouter à la flore de France (Flora Gallica)* avec quelques corrections et observations. pp. 1-172, 21 pls. Paris: J.B. Sajou.

Chara pulchella Wallroth (1815) *Annus botanicus, sive supplementum tertium ad Curti Sprengelii floram halensem*. pp. [i]-xxx, [1]-194, pls I-VI. Halae [Halle]: sumptibus Car. Aug. Kummelii. *Chara diffusa* S. Liljebblad (1816) *Utkast til en svensk flora: eller, Afhandling om svenska växternas väsentliga kännetecken och nytta*. Ed. 3. pp. [1-10], i-lviii, 1-761, [1-3]. Upsala: Tryckt hos Zeipel et Palmblad.

Chara viridis C. Hartman (1820) *Handbok i Skandinaviens flora, innefattande sveriges och norrignes vexter, till och med mossorna: Med inledning, af handlande grunderna for botanikens studium, samt tvanne plancher*. pp. 1-32, i-lxiii, 1-488, 12 leaves: ill, 2 folded pl.

Stockholm: Z. Haeggstrom.

Chara hirta F. Meyen (1827) *Beobachtungen und Bemerkungen über die Gattung Chara*. *Linnaea* 2(1): 55-81, pls 2, 3.; *Chara foliolata* C. J. Hartman (1832) *Handbok i Skandinaviens Flora*. Stockholm.; *Chara capillacea* Hartman (1846) *Svensk och norsk excursions-flora: Phanerogamer och Ormbunkar*. pp. i-xvi, 1-191. Stockholom: Z. Hæggström.; *Chara fulcrata* U. Ganterer (1847) *Die Bisher Bekannten österreichischen Charen: vom morphologischen Standpunkte*. pp. [1]-21, 2 pl. Wien [Vienna]: verlag der Carl Haeus'schers Buchhandlung; *Chara trichophylla* Kützing (1881) *Contributiones ad Floram Cryptogamicam Lusitanicam*. Coimbricae. *Chara leptospora* H. Sakayama (2009) *Taxonomic reexamination of Chara globularis (Charales, Charophyceae) from Japan based on oospore morphology and rbcL gene sequences, and the description of C. leptospora sp. nov.* *Journal of Phycology* 45(4): 917-927.

Habitat: Freshwater

Report from India: As *Chara fragilis* Desvoux in Kashmir, Uttar Pradesh, Punjab, West Bengal, Maharashtra, Madhya Pradesh (Pal et al., 1962); as *Chara globularis* Thuiller in Assam (Buragohain, 2018); as *Chara setosa* f. *setosa* in Maharashtra (Ingawale, 2019); as *Chara globularis* Thuiller in Tamil Nadu, Karnataka, Andha Pradesh, Bombay (Balakrishnan, 2021).

Type: FRANCE: Paris; Lectotype: Thuillier; 1799; L 0054649 (image!)

21. *Chara grovesii* B. P. Pal (1932)

Habitat: Freshwater

Report from India: As *Chara grovesii* in Kerala (Subrahmanyam, 1992); as *Chara grovesii* in Maharashtra (Yadav, 2010).

Type: BURMA; Isotype: B. P. Pal; oct. 1928; Holotype: lost (PAL in litt., ref. Wood 1965: 109 spec a); Isotype (Lectotype) [ref. Wood 1965: 109 spec a]: NY, ex herbarium R. D. Wood, ex Herbarium B. P. PAL (Ahmadi et al., 2012).

22. *Chara gymnohylla* (A. Braun) A. Braun (1835)**Heterotypic synonyms:**

Chara squamosa Desfontaines (1799), Flora atlantica, sive historia plantarum, quae in Atlante, agro Tunetano et Algeriensi crescunt. Tomus secundus. pp.161-458, pls 181-261. Parisiis [Paris]: L. G. Desgranges; *Chara patens* Ehrenberg ex A. Braun (1868) Die Characeen Afrika's. Monatsberichte der Königlich preussischen Akademie der Wissenschaften zu Berlin. Berlin 1867: 782-872, 873-944; *Chara pseudogymnohylla* N. Filarszky (1927), Adatok Horvat-Szavonorszag es Balkan nehany mas orszaganak Chara- vegetaciojahoz. Magyar Botanikai Lapok. Budapest (Ungarische Botanische Blatter) 30: 81-99. [in Hungarian /Latin];
Basionym: *Chara foetida* var. *gymnohylla* A. Braun

Habitat: Freshwater

Report from India: As *Chara vulgaris* var. *gymnohylla* f. *gymnohylla* in Maharashtra (Karande, 1999); as *Chara vulgaris* v. and f. *gymnohylla* (A.Br.) in Maharashtra (Ingawale et al., 2019)

Type: Syntype: "Hab. in Sardinia (Miiller, forma atroviensis), et Algeriae (W. Schimper)."; (Braun 1834: 354).
Herbarium records: GREECE. Type: Marcia E. Moore; 1907; BUT 501439 (image!). ITALY: Sardinia. Type: Ascherson & Reinhardt :1863; NY02018379 (image!).

23. *Chara hatei* S.C. Dixit (1940)

Habitat: Terrestrial

Report from India: As *Chara hatei* in Maharashtra (Dixit, 1940; Pal et al., 1962)

Type: Information missing (Pal et al., 1962)

24 *Chara hookeri* A. Braun (1849)**Heterotypic synonyms:**

Chara microphylla F. Mueller ex Kützing (1857), Tabulae phycologicae; oder, Abbildungen der Tange. Vol. VII pp. i-ii, 1-40, 100 pls. Nordhausen: Gedruckt auf kosten des Verfassers (in commission bei W. Köhne).

Habitat: Freshwater

Report from India: As *Chara hookeri* in Uttar Pradesh: Sultanpur (Verma et al., 2021)

Herbarium records: TASMANIA: (Index Nominum Algarum) Type: Gunn, 1832, no. 1001; herb. Hooker; (Index Nominum Algarum).

Herbarium records: AUSTRALIA: Victoria lake condah, Budj Bim Indigenous protected area; Type: Casanova. M.T.; march 2011; S A6796. AUSTRALIA: Tasmania; Type: C. Stuart; 1848; NY02018664 (image!).

25. *Chara hydropithys* Reichenbach (1829)**Heterotypic synonyms:**

Chara nudipes J. Wallman (1853), Försök till en systematisk uppställning af växtfamiljen Characeae. pp. 1-103. Stockholm: P.A. Norstedt & Söner;

Habitat: Freshwater

Report from India: As *Chara hydropithys* in Maharashtra, Punjab, Tamil Nadu, Uttarakhand, West Bengal (Gupta, 2012); as *Chara hydropithys* in Uttar Pradesh: Bareilly, Sultanpur; (Gupta, 2012, Verma et al., 2021); as *Chara hydropityis* var. *indica* f. *major* A Braun in Assam, Punjab and Tamil Nadu (Gupta, 2012).

Herbarium records: REPUBLIC OF SURINAME. (Bueno & al. 2011: 534). USA: New York, Essex Co, Harris Lake; Duplicate Specimen: Robin S. Sleith & Amy J. Havens; 2014; MARY1007464 (image!)

26. *Chara hydropithys* var. *indica* A. Braun (1849)

Habitat: Freshwater

Report from India: As *Chara hydropithys* var. *indica* in Uttarakhand and Uttar Pradesh (Gupta, 2012).

Herbarium records: PHILIPPINES: Pamtay, Rizal Province; Type: M. Ramos; 09 Oct 1916; NY02018764 (image!)

27. *Chara hydropithys* f. *minor* A. Braun (1849)

Habitat: Freshwater

Report from India: As *Chara hydropityis* var. *indica* f. *minor* in Tamil Nadu (Gupta, 2012).

Type: INDIA: coromandel coast; Holotype: A Braun, 1826.

28. *Chara hydropithys* f. *plumosa* Sundaralingam (1959)

Habitat: Freshwater

Report from India: As *Chara hydropityis* var. *indica* f. *plumosa* in Tamil Nadu (Gupta, 2012).

Type: INDIA, seven pogodas; Holotype: Sundaralingam, 1959.

29. *Chara inconstans* A. Braun ex Kützing (1857)

Habitat: Freshwater

Report from India: as *Chara zeylanica* f. *inconstans* (A. Braun ex Kützing) H. Groves and J. Groves in Tamil Nadu (Gupta, 2012).

Herbarium records: NICARAGUA: Managua, Lake Tiscapa; Type: Kenneth B. Armitage; 08 Dec 1953; BUT 502011 (image!)

30. *Chara inconnexa* T. F. Allen (1882)

Habitat: Freshwater

Report from India: As *Chara vulgaris* var. *inconnexa* (T. F. Allen) R. D. Wood in West Bengal (Gupta, 2012).

Type: USA: Iowa: Storm Lake; Holotype: Prof. C. B. Bessey; Aug. 6, 1872; NY00887705 (image!)

31. *Chara infirma* A. Braun in A. Braun and Nordstedt (1883)

Habitat: Freshwater

Report from India: As *Chara infirma* A. Braun in Jammu and Kashmir, Uttarakhand: Kurpurtala (Gupta, 2012; Pal et al., 1962).

Type: AFGHANISTAN; Holotype: Griffith (Guiry and Guiry, 2023). AFGHANISTAN; isoelectotype: Griffith; 1965; NY02286325 (image!)

32. *Chara inermis* J.S.Z anevald (1941)

Habitat: Freshwater

Report from India: As *Chara setosa* var. *setosa* f. *inermis* in Maharashtra (Karande, 1999); As *Chara setosa* f. *inermis* Zanev. R. D. W. in Maharashtra (Ingawale et al., 2019).

Type: INDONESIA: Soemba; Isoelectotype: Iboet, 1925; NY00945621 (image!)

Herbarium records: SOEMBA: Nabeso; (Index Nominum Algarum) Type: Soemba Exped. IBOET 126; 27.III.1925; in swamp; L; (Index Nominum Algarum)
Notes: Bz, cotype (INA)

33. *Chara keukensis* (T. F. Allen) C. B. Robinson (1906)

Basionym: *Chara gymnopityis* var. *keukensis* T. F. Allen
Habitat: Freshwater

Report from India: As *Chara fibrosa* var. *fibrosa* f. *keukensis* (T.F.A.) R.D.W. in Maharashtra (Karande, 1999).

Type: NEW YORK: Lake Keuka; Holotype: C.B. Robinson, 1906; CHR0016413 (image!). USA: New-York; Lectotype: T. F. Allen; NY00887692 (image!). USA: New-York; Isolectotype: T. F. Allen; NY02340528 (image!).

34. *Chara leiopitys* R. M. Whelden (1946)

Habitat: Freshwater.

Report from India: As *Chara globularis* var. *virgata* f. *leiopitys* in Uttar Pradesh (Sharma and Khan, 1967), Tamil Nadu (Gupta, 2012).

Type: ARGENTINA: In Rio Lavagin, 15 km southeast of San Pedro; in still pond in soft clay mud. Alt. 800 m.; Holotype: W.J. Eyerdam & A.A. Beetle; Oct. 11, 1938; FM. ARGENTINA; Isotype: Eyerdam & Beetle; 1938; NY00887708 (image!).

35. *Chara leptosperma* A. Braun (1882)

Habitat: Freshwater

Report from India: As *Chara globularis* var. *globularis* f. *leptosperma* (A. Br.) K.D. W. in Maharashtra (Karande, 1999)

Herbarium records: USA: Arizona, Graham Co., Dankworth Pond; Type: J.D. Hall and R.M. McCourt, 24 May, 2011; MARY1007467 (image!)

36. *Chara longifolia* C. B. Robinson (1906)

Homotypic synonym:

Lamprothamnium longifolium (Robinson). *F. J. Daily* (1967) *Lamprothamnium* in America. *Journal of Phycology* 3: 201-207, 46

Habitat: Freshwater

Report from India: As *Chara hornemanni* f. *longifolia* *Rob. in* Jammu (Pundhir and Gautam, 1994); as *Chara longifolia* (Pundhir and Chauhan, 1997)

Herbarium records: STAFFORD CO: Kansas; (Index Nominum Algarum) Type: M.A. Carleton 302; 11.vii.1891; NYBG; (Index Nominum Algarum)!

37. *Chara nuda* B. S. Pal (1932)

Habitat: Freshwater

Report from India: As *Chara nuda* B.S. Pal in Assam (Bordoloi, 1973) and as *Chara socotrensis* f. *nuda* (B. S.P al) R. D. Wood in Tamil Nadu (Gupta, 2012), Maharashtra (Ingawale et al., 2019), Uttar Pradesh: Bareilly (Verma et al., 2021)

Type: Information missing (Pal et al., 1962).

38. *Chara pseudo-brachypus* J. Groves and L. Stephens (1926)

Habitat: Freshwater

Report from India: As *Chara pseudobrachypus* J. Groves and L. Stephens in Maharashtra: Virar; Gujarat: Baroda (Pal et al., 1962; Gupta, 2012).

Type: Information missing (Pal et al., 1962)

39. *Chara pseudohdropithys* K. Imahori (1950)

Habitat: Freshwater

Report from India: As *Chara pseudohdropithys* K. Imahori in India (Raam, 2010)

Herbarium records: BRASIL: Est de Pernambuco; Type: R.M.T. Bicudo, Aug 15, 1970; SP104863 (image!)

40. *Chara robbinsii* B.D. Halsted (1879)

Habitat: Freshwater

Report from India: As *Chara fibrosa* f. *robbinsii* (B.D. Halsted) R.D. Wood (Gupta, 2012).

Type: USA: Rhode Island; Lectotype: Robbins, 1852; NY00887687 (image!)

Herbarium records: RHODE ISLAND: Washington Co., Type: E. A. Palmatier, Aug 27, 1948; 02019220 (image!)

41. *Chara setosa* Klein ex C. L. Willdenow (1805)

Heterotypic synonyms

Chara brachypus A. Braun. (1849), *Characeae Indiae orientalis et insularum maris pacifici; or characters and observations on the Characeae of the East Indian Continent, Ceylon. Sunda Islands, Marians and Sandwich Islands. Hooker's Journal of Botany and Kew Garden Miscellany 1: 292-301;*

Habitat: Freshwater

Report from India: As *Chara setosa* f. *setosa* A. Br. in Maharashtra (Karande, 1999; Ingawale, 2019); as *Chara setosa* f. *setosa* R.D. Wood in Jharkhand (Gupta, 2012);

as *Chara setosa* Klein ex C.L. Willdenow in Bihar: Samastipur (Prasad and Verma, 1985), Tamil Nadu (Gupta, 2012), Uttar Pradesh: Bareilly, Andhra Pradesh, Karnataka (Subramanian, 2018), West Bengal (Verma et al., 2021); as *Chara brachypus* A. Braun in West Bengal (Gupta, 2012), Madhya Pradesh: Khandesh (Jaiswal, 2017), Bihar, Jammu and Kashmir, Jharkhand, Maharashtra, Tamil Nadu, Uttar Pradesh.

Herbarium records: INDIA: United provinces, Saharanpur District, Shallow Pond; Type: G.O. Allen; 17 Sept 1926, NY 02011693(image!). INDIA: United provinces, tarakhera near Lucknow. Type: Dr. Rao; Feb 1944; PH 00141751(image!)

42. *Chara socotrensis* Nordstedt (1883)

Habitat: Freshwater

Report from India: As *Chara socotrensis* Nordstedt in Maharashtra (Ray, 1985); West Bengal, Tamil Nadu (Mondal et al., 2021).

Herbarium records: AFRICA: Island of Socotra, Yemen; Type: I.B. Balfour; March 1880, NY02019441 (Image!)

43. *Chara socotrensis* f. *pashanii* (S.C. Dixit) R.D. Wood (1962)

Homotypic synonym

Chara pashanii S.C. Dixit. (1935), *The Charophytes of the Bombay Presidency. J. Indian Bot. Soc.* 14(3): 257-263, 2 figures.

Basionym: *Chara pashanii* S.C. Dixit

Habitat: Freshwater

Report from India: As *Chara socotrensis* f. *pashanii* (S.C. Dixit) R.D. Wood in Maharashtra (Karande, 1999; Ingawale, 2019).

Type: INDIA: Malabar, Pashan, near poona, Bombay (in a ditch); Isolectotype: S.C. Dixit; Dec 1930; NY 00945629 (image!)

44. *Chara socotrensis* var. *ebracteata* D. Subramanian in Keshri and Kargupta (2005)

Habitat: Freshwater

Report from India:

As *Chara socotrensis* var. *ebracteata* D. Subramanian in Keshri and Karguptain Tamil Nadu (Subramanian, 2018).

Type: INDIA: Tamilnadu, Pachamalai Hills, paddy field; Holotype: D. Subramanian; 04 July 2000; DS268 (image!) (Subramanian, 2005).

45. *Chara socotrensis* var. *incurvata* D. Subramanian (2005)

Habitat: Freshwater

Report from India: As *Chara socotrensis* var. *incurvata* D. Subramanian in Tamil Nadu (Subramanian, 2018).

Type: INDIA: Tamilnadu, Pachamalai Hills, near Pankalam, paddy field; Holotype: D. Subramanian; 04 July 2000; DS267! (Subramanian, 2005).

46. *Chara virgata* Kützing (1834)

Heterotypic synonyms

Chara delicatula C. Agardh. (1824), *Systema algarum*. pp. [i]-xxxvii, [1]-312. *Lundae* [Lund]: *Literis Berlingianis* [Berling]; *Chara pilifera* (C. Agardh) (1824), *Systema algarum*. pp. [i]-xxxvii, [1]-312. *Lundae* [Lund]: *Literis Berlingianis* [Berling]; *Chara trichodes* Kützing (1834), *Beschreibung einiger neuer Arten der Gattung Chara*. *Flora* (Jena) 17: 705-707; *Chara verrucosa* H. Itzigsohn (1850), *Charologisches. Bot. Zeit.* 8(17): 337-340; *Chara lamjana* M. Soulat-Ribette. (1892), *Famille des Characées. Description et analyse des espèces et des genres observés dans les Départements de la Haute-Vienne, de la Corrèze, de la Creuse, de la Charente et de la Dordogne, avec des notes explicatives servant à préciser les caractères différentiels entre les espèces voisines ou faciles à confondre, à les distinguer entre elles et à donner à chacune le nom qui lui convient*. pp. 1-40 [key]. *Limoges: V.H. Ducourtieux*.

Habitat: Freshwater

Report from India: As *Chara globularis* var. *virgata* in Maharashtra (Karande, 1999); as *Chara virgata* Kützing in Uttar Pradesh (Gupta, 2012)

Type: GERMANY: bei Schleswig; (Index Nominum Algarum) Holotype: Pastor

Fröhlich; L. Europe: Germany; Lectotype: Kützing; 1833; L 0820940!

47. *Chara vulgaris* Linnaeus (1753)

Heterotypic synonyms

Chara elongata K. Wallroth null *Chara elongata* K. Wallroth. *Chara magellanica* A. Braun null *Chara magellanica* A. Braun.; *Chara batrachosperma* Thuillier (1799) *Flore des environs de Paris, ou, Distribution méthodique des plantes qui y croissent naturellement, Faite d'après le système de Linnée: avec le nom et la description de chacune et latin et in française; l'indications de leur lieu natal, de leur durée, du temps de leur floraison, de la couleur de leurs fleurs, et als citation de Auteurs qui les ont le mieux décrites ou en ont données les meilleures figures. Nouvelle édition: revue corrigée et considérablement augmentée* [éd. 2]. pp. 1-595. Paris: Chez l'Auteur et H.L. Perronneau; *Chara montana* Schleicher ex C.H. Persoon (1807), *Synopsis plantarum, seu enchiridium botanicum, complectens enumerationem systematicam specierum hucusque cognitarum. Pars secunda*. pp. [1]-657; *Chara crassicaulis* Schleicher (1821), *Catalogus plantarum in Helvetia cis- et transalpina sponte nascentium quas in continuis fere itineribus in usum botanophilorum collegit et summo studio collatione cum celeberrimorum auctorum*

descriptionibus et iconibus facta, rite redegit. pp. [1]-61; *Nitella batrachosperma* C. Agardh (1824), *Systema algarum*. pp. [i]-xxxvii, [1]-312; *Chara longibracteata* Kützing (1832), *Characeae*. In: *Flora germanica excursoria ex affinitate regni vegetabilis naturali disposita, sive principia synopseos plantarum in Germania terrisque in Europa media adjacentibus sponte nascentium cultarumque frequentius*. Vol. 1. (Reichenbach, L. Eds), pp. 147-150; *Chara foetida* A. Braun (1834), *Esquisse monographique du genre Chara*. *Annales des Sciences Naturelles, Série II, Partie Botanique 1*: 349-357; *Chara refracta* Kützing (1834), *Beschreibung einiger neuer Arten der Gattung Chara*. *Flora* (Jena) 17: 705-707; *Chara polysperma* Kützing (1845), *Phycologia germanica, d. i. Deutschlands Algen in bündigen Beschreibungen. Nebst einer Anleitung zum Untersuchen und Bestimmen dieser Gewächse für Anfänger*. pp. [i]-x, [1]-340 [240]; *Chara pleiospora* U. Ganterer (1847), *Die Bisher Bekannten österreichischen Charen: vom morphologischen Standpunkte*. pp. [1]-21, 2 pl; *Chara sphagnoides* J. Wallman (1853), *Chara sphagnoides* J. Wallman. 1853: 302-303 (non. Griffith 1849); *Chara boveana* A. Braun. (1868), *Die Characeen Afrika's. Monatsberichte der Königlich preussischen Akademie der Wissenschaften zu Berlin*. Berlin 1867: 782-872, 873-944; *Chara tholeyroniana* M. Gandoger (1875), *Flore Lyonnaise et des départements du sud-est ---*. Paris.

Report from India: As *Chara vulgaris* in Uttar Pradesh (Allen, 1961); as *Chara vulgaris* Linnaeus in Bihar, Jammu and Kashmir, Jharkhand, Maharashtra, Uttarakhand, Uttar Pradesh: Bareilly, Sultanpur, West Bengal (Gupta, 2012)

Habitat: Freshwater

Type: AUSTRALIA. Holotype: Casanova M.T; 2000; MEL 2263454A! AUSTRALIA. Isotype: Mueller. F.;1851; MEL 2263455A. "Habitat in Europeae...". [Europe]; (Linnaeus 1753: 1156). LONDON. Lectotype: LINN; 1088.3 (Wood 1960: 220)

48. *Chara vulgaris* f. *atrovirens* (R.T. Lowe) H. Groves and J. Groves (1880)

Homotypic synonyms

Chara atrovirens R.T. Lowe (1838), *Novitiae Flora Maderensis: or notes and gleanings of Maderan botany. Transactions of the Cambridge Philosophical Society* 6: 521-551.

Basionym: *Chara atrovirens* R.T. Lowe

Habitat: Freshwater.

Report from India: As *Chara vulgaris* var. *vulgaris* f. *atrovirens* (R.T. Lowe) H. Groves and J. Groves in Bihar (Gupta, 2012).

Type: PORTUGAL: Madeira; Neotype: G. Mandon; 1959; "Hab. in rivulis aquarum fluentium Madera rariss." [Madeira]; (Lowe 1838: 551). NY 00967963 (image!)

49. *Chara wallichii* A. Braun in A. Braun and Nordstedt (1882)

Habitat: Freshwater

Report from India: As *Chara wallichii* A. Braun in A. Braun and Nordstedt in Uttar Pradesh: Pirgunj, Gonda, Oudh, Lucknow, Vanaras, Bareilly (Allen, 1961; Pal et al., 1962); as *Chara wallichii* in Gujrat (Pal et al., 1962), West Bengal (Mukhopadhyay and Ray, 1995); as *Chara corallina* var. *wallichii* in Uttar Pradesh (Abrolet al., 2006).

Herbarium records: CHINA: Jiangsu, Wuxi, Taihu Lake; Type: K.G. Karol; 18 Oct 2000; NY 02666841 (image!). INDIA: Uttar Pradesh, Varanasi.; Type: Par-sotam; MICH 676850 (image!)

**50. *Chara zeylanica* Klein ex Willdenow (1805)
Heterotypic synonyms**

Chara verticillata Roxburgh (1832), *Flora Indica, or descriptions of Indian plants*. Vol. 3. Serampore; *Chara gymnopus* A. Braun. (1868), *Die Characeen Afrika's. Monatsberichte der Königlich preussischen Akademie der Wissenschaften zu Berlin*. Berlin 1867: 782-872, 873-944.

Habitat: Freshwater

Report from India: As *Chara zeylanica* in Uttar Pradesh (Allen, 1961); as *Chara zeylanica* f. *zeylanica* Klein ex Willdenow in Kerala (Priyadarsan, 1997); as *Chara zeylanica* Klein ex Willdenow in Andhra Pradesh, Arunachal Pradesh, Assam, Gujrat, Jammu and Kashmir, Jharkhand, Maharashtra, Tamil Nadu, Uttarakhand, Uttar Pradesh: Bareilly, Sultanpur, Moradabad, West Bengal (Gupta, 2012); as *Chara gymnopus* var. *macilentata* A. Braun and Nordst. in Assam and Jharkhand (Gupta, 2012), As *Chara zeylanica* Klein ex Willdenow in Bihar, Karnataka (Balakrishnan, 2021).

Type: VENEZUELA: Bolivarian Republic of. Holotype: Kunth; 1816; P00669235(image!). Côte de Malabar [Malabar Coast, India]; (Willdenow 1805: 86) Lectotype (designated by Wood & Imahori 1965: 224): B; Coll. 508 (Wood & Imahori 1965: 224).

51. *Chara zeylanica* f. *kilikolluriensis* P.D. Prasad and Panikkar (2000)

Habitat: Freshwater

Report from India: As *Chara zeylanica* f. *kilikolluriensis* P.D. Prasad and Panikkar in Kilikollur (Kollam District) Kerala (Prasad and Panikkar, 2000 and Gupta, 2012)

Type: INDIA: Kerala, Kollam, Kilikollur.

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