

CHECKLIST OF MOSSES (BRYOPHYTA) OF GANGETIC PLAINS, INDIA

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Abstract

An updated account of 79 taxa of mosses of Gangetic plains, representing 40 genera and 19 families, is provided. The family Pottiaceae with 17 taxa belonging to 9 genera appears most dominant and diversified family in the area while at generic level, the genus *Fissidens* (Fissidentaceae) with 19 species shows maximum diversity, followed by *Hyophila* and *Physcomitrium* each with five species.

Introduction

In our earlier publications, boundaries of 'Central Indian bryo-geographical zone' and 'Panjab and Rajasthan plains bryo-geographic zone' were proposed along with a checklist of mosses in these areas (Alam *et al.*, 2015; Rawat *et al.*, 2015). In present paper the boundaries of 'Gangetic plains bryo-geographic zone' is redefined for ease in distributional analysis, and provided updated checklist of mosses recorded from here.

Materials and Methods

The present compilation is based on the all available literature on mosses of Gangetic plains till date and gets its foundation from extra-ordinary work of Gangulee (1969-72; 1972-76; 1976-78), who has provided the most elaborative, informative and reliable data of moss diversity of India. In enumeration, the taxa reported earlier without specific epithet, have been excluded. The summary of various families and genera is followed by alphabetical list of taxa. The accepted names are cited in bold. Format of the enumeration of taxa follows Alam *et al.* (2015). The classification scheme broadly follows Goffinet *et al.* (2008). The extant of 'Gangetic plains bryo-geographic zone' described here is broadly based on Erenstein *et al.* (2007), with some modifications.

Results and Discussion

Earlier, entire Uttar Pradesh, Delhi, Bihar (including Jharkhand) and almost entire West Bengal (except Darjeeling) have been broadly treated as part of Gangetic Plains bryo-geographic zone. However, some parts of this region, due to somewhat different geo-physical properties and climatic conditions, shows more affinity to neighbouring zones, hence need re-assessment and refinement of boundaries of this unique bryo-geographical zone. The extant of 'Gangetic Plains bryo-geographic zone' described in present work is broadly followed Erenstein *et al.* (2007), however, some modifications are made on account of the unique geo-climatic conditions meet in the region. The southern region of Uttar Pradesh [particularly the Bundelkhand region (Jalaun,

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Jhansi, Lalitpur, Hamirpur, Mahoba, Banda, Chitrakoot districts) and Sonbhadra district] is a plateau and hence shows contrasting difference from the alluvial plains in geo-physical properties, hence treated in Central Indian bryo-geographic zone. Similarly, Purulia district of west Bengal, consisting of easternmost segments of Chhota nagpur plateau is now treated under Central Indian bryo-geographical zone (Alam *et al.*, 2015). Entire Uttarakhand state, on the other hand is being treated in Western Himalayan zone, however, most of the part of Haridwar and Udham Singh Nagar districts of Uttarakhand is either plain or terai (foot hills), hence need to be incorporated in Gangetic Plain region. Hilly areas of Darjeeling districts has been considered as part of Eastern Himalayan zone, however, Jalpaiguri and Koch Bihar district of West Bengal are proposed to be included in Brahmaputra plains which itself can be treated as a separate bryo-geographic zone, subject to further studies. Earlier reports of mosses from Gangetic Plains (from Delhi) have now been transferred to Rajasthan and Panjab plains zone (Rawat *et al.*, 2015).

Therefore, in present work we propose Haridwar and Udham Singh district of Uttarakhand, Shahdara zone or East Delhi, Uttar Pradesh (except southern plateau region of Uttar Pradesh including Bundelkhand region and Sonbhadra district), Bihar and West Bengal (excluding Purulia, Kooch Bihar, Jalpaiguri districts and plains of Darjeeling district) as parts of 'Gangetic plains bryo-geographic' zone (Fig. 1).



Fig. 1. Map of India showing the proposed extant of 'Gangetic plains bryo-geographic zone'.

The present document provides updated accounts of 105 taxa of mosses reported so far from this zone, out of which 79 are still valid. Distributional details with relevant references are also given, which may be useful for future workers and will encourage bryo-floristic studies in neglected areas.

Taxonomic Enumeration

Archidium birmannicum Mitt. ex Dixon, J. Indian Bot. 2: 175. 1921. UTTAR PRADESH: Allahabad (Lal, 2007; Singh, 2013), Lakhimpur-Kheri, Pilibhit, Shahjahanpur (Sahu and Asthana, 2015); WEST BENGAL: Hoogly, Ramnagar (Gangulee, 1969-72; Lal, 2007).

Aulacopilum luzonense E.B. Bartram, Philipp. J. Sci. 68: 169. 1939. WEST BENGAL: Kolkata, Shantiniketan, Midnapore (Lal, 2007).

Barbula arcuata Griff., Calcutta J. Nat. Hist. 2: 491. 1842. WEST BENGAL: Kolkata, BIHAR (Lal, 2007).

Barbula consanguinea (Thwaites & Mitt.) A. Jaegr. → *Hydrogonium consanguineum* (Thwaites & Mitt.) Hilp.

Barbula constricta Mitt. → *Didymodon constrictus* (Mitt.) Saito

Barbula gangetica C. Muell. → *Hydrogonium arcuatum* (Griff.) Wijk. & Margad

Barbula indica (Hook.) Spreng. Nomencl. Bot. 2: 72. 1824. *Tortula indica* Hook., Musci Exot. 2, 135. 1819. BIHAR (Lal, 2007); UTTAR PRADESH: Allahabad, Pratapgarh, Raebareli, Saharanpur, Varanasi (Aziz and Vohra, 2008) Lakhimpur-Kheri, Pilibhit (Sahu and Asthana, 2015); WEST BENGAL (Lal, 2007).

Barbula javanica Dozy & Molk. → *Hydrogonium javanicum* (Doz. & Molk.) Hilp.

Bartramidula roylei (Hook. f.) Bruch & Schimp., Bryol. Eur. 4: 55. 1846. Gangetic plains (Lal, 2005).

Brachymenium indicum (Dozy & Molk.) Bosch & Sande Lac. Bryol. Jav. 1: 141. 1860. *Bryum indicum* Dozy ex Molk., Musci Fr. Ined. Archip. Indici 1: 22. 1845. WEST BENGAL: Namkhana, Sundarban (Gangulee, 1974-78; Lal, 2007).

Bryum apiculatum Schwaegr. → *Bryum mildeanum* Jur.

Bryum coronatum Schwaegr., Sp. Musc. Frond, suppl. 1(2): 103. 1816. WEST BENGAL: Burdwan, Howrah, Hoogly, Kolkata, Midnapore (Gangulee, 1974-78; Lal, 2007).

Bryum indicum Doz. ex Molk., → *Brachymenium indicum* (Dozy & Molk.) Bosch & Sande Lac.

Bryum kliggraeffii Schimp., Höh. Crypt. Preuss. 81. 1858. UTTAR PRADESH: Allahabad (Lal, 2007).

Bryum mildeanum Jur., Verh. Zool.-Bot. Ges. Wien 12: 967. 1862. *Bryum apiculatum* Schwaegr., Sp. Musc. Frond., suppl. 1, 2: 102. 1816. Gangetic plains (Lal, 2005 as *B. apiculatum*).

Bryum plumosum Dozy & Molk. → *Gemmabryum apiculatum* (Schwägr.) J.R. Spence & H.P. Ramsay

Calymperes calcuttense E.B. Bartram & Gangulee → *Syrrhopodon burmensis* (Hamp.) Reese & Tan

Calymperes sundarbanense Gangulee → *Heliconema peguense* (Besch.) L.T. Ellis & A. Eddy

Calymperes tenerum var. *tenuicola* Gangulee, Mosses E. India 1: 600. 1972, WEST BENGAL: Kolkata (Gangulee 1969-72; Lal, 2007).

- Campyodontium flavescens* (Hook.) Bosch. & Sande Lac., Bryol. Jav. 2: 128.1865. Gangetic plains (Lal, 2005).
- Ceratodon purpureus* (Hedw.) Brid., Bryol. Univ. 1: 480.1826. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015); Raebareli (Sinha et al., 1990; Lal, 2007; Singh, 2013).
- Ceratodon stenocarpus* Bruch & Schimp., Bryol. Eur. 2: 146.1849. UTTAR PRADESH: Raebareli (Kumar and Kazmi, 2004, 2006; Singh et al., 2005; Singh, 2013).
- Conomitrium bengalense* Hamp. → *Fissidens xiphioides* Fleisch.
- Diaphanodon blandus* (Harv.) Renauld & Cardot, Bull. Soc. Roy. Bot. Belgique 38(1): 23.1900. WEST BENGAL: Kolkata (Chopra, 1975, Lal, 2007).
- Diaphanodon procumbens* (Müll.) Renauld & Cardot, Bull. Soc. Roy. Bot. Belgique 38(1): 24.1900. WEST BENGAL: Kolkata (Chopra, 1975; Lal, 2007).
- Dicranella macrospora* Gangulee, Nova Hedwigia 8: 145.1964. UTTAR PRADESH: Lakhimpur-Kheri (Sahu and Asthana, 2015).
- Didymodon constrictus* (Mitt.) Saito, J. Hattori Bot. Lab. 39: 514.1975. *Barbula constricta* Mitt., J. Proc. Linn. Soc. Bot., suppl. 1: 33. 1859. UTTAR PRADESH: Faizabad (Singh and Kumar 2003 as *B. constricta*).
- Entodontopsis tavoyense* (Hook. ex Harv.) W.R. Buck & R.R. Ireland, Nova Hedwigia 41: 105. 1985. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015).
- Entosthodon nutans* Mitt., J. Proc. Linn. Soc. Bot., suppl. 1: 55. 1859. UTTAR PRADESH: without locality (Gangulee, 1974-78; Lal, 2007); WEST BENGAL: Champadanga, Howrah, Hoogli, Kalyani, Konnagar, Nadia, Ranaghat (Gangulee, 1974-78; Lal, 2007).
- Entosthodon wichurae* M. Fleisch., Musci Fl. Buitenz., 2:481.1904. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015).
- Erpodium mangiferae* Müll. Hal., Linnaea 37: 178.1872. UTTAR PRADESH: Allahabad, Saharanpur (Gangulee, 1974-78; Lal, 2007; Singh, 2013), Lakhimpur-Kheri (Sahu and Asthana, 2015); WEST BENGAL: Birbhum, Hoogli, Kalyani, Kolkata, Midnapore, Nadia (Gangulee, 1974-78).
- Fissidens bengalensis* Par. → *Fissidens zollingeri* Mont.
- Fissidens bilaspurensis* Gangulee, Bull. Bot. Soc. Beng. 11: 66. 1957. WEST BENGAL: Midnapore (Gangulee 1969-72; Lal, 2007).
- Fissidens bryoides* Hedw., Sp. Musc. Frond. 153.1801. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015); WEST BENGAL: Kalyani, Kolkata (Gangulee 1969-72; Lal, 2007).
- Fissidens ceylonensis* Dozy & Molk., Ann. Sci. Nat., Bot., ser. 3, 2: 304. 1844. *Fissidens perpusillus* Dozy & Molk., J. Proc. Linn. Soc., Bot., suppl. 2: 141. 1859. *Fissidens bicolor* Thwaites & Mitt., J. Linn. Soc. Bot. 13: 322. 1873. *Fissidens pennatulus* Thwaites & Mitt., J. Linn. Soc. Bot. 13: 325. 1873. *Fissidens ceylonensis* var. *jhargramii* Gangulee, Bull. Bot. Soc. Bengal 11: 72. 1957. WEST Bengal: Jhargram, Tarapheni (Gangulee, 1969-72; Lal, 2005).
- Fissidens crenulatus* Mitt., Musc. Ind. Or. 140. 1859 var. *crenulatus*. UTTAR PRADESH: Pilibhit, Sahajahanpur (Sahu and Asthana, 2015).

- Fissidens crenulatus* Mitt. var. *titlyanus* (Müll. Hal.) Gangulee, Mosses E. India 3: 506. 1972. *Fissidens titlyanus* Müll. Hal., Linnaea 37: 165.1872. WEST BENGAL: 24-Pargana, Dooars, Jhargram (Gangulee, 1969-72; Lal, 2007).
- Fissidens crispulus* var. *crispulus* Brid., Musc. Rec. suppl. 4: 187. 1819. *Fissidens sylvaticus* var. *zippelianus* (Dozy & Molk.) Gangulee, Mosses E. India 1: 537. 1972. WEST BENGAL: Jhargram (Gangulee, 1969-72; Lal, 2007; both reported as *F. sylvaticus* var. *zippelianus*).
- Fissidens curvatoinvolutus* Dixon, Notes Roy. Bot. Gard. Edinburgh 19: 279. 1938. UTTAR PRADESH: Raebareli, Saharanpur (Sinha et al., 1990; Singh et al., 2005; Lal, 2007; Singh, 2013).
- Fissidens diversifolius* Mitt., J. Proc. Linn. Soc., Bot., suppl. 2: 140. 1859. BIHAR: North Bihar, WEST BENGAL: Thakuranpahari (Gangulee 1969-72; Lal, 2005).
- Fissidens flaccidus* Mitt., Trans. Linn. Soc. London 23: 56. 1860. *Fissidens splachnobryoides* Broth. in Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Suedsee: 81. 1900. UTTAR PRADESH: Lakhimpur-Kheri, Pilibhit (Sahu and Asthana, 2015); WEST BENGAL: 24-Parganas, Bolpur, Kolkata (Gangulee 1969-72; Lal, 2007 as *Fissidens splachnobryoides*).
- Fissidens involutus* Wilson ex Mitt., J. Proc. Linn. Soc., Bot., suppl. 2: 138.1859. UTTAR PRADESH: Pilibhit, Saharanpur (Sahu and Asthana, 2015).
- Fissidens kurzii* Müll. Hal., Linnaea 37: 163. 1872. North Bengal plains (Gangulee, 1969-72; Lal, 2005).
- Fissidens orishae* Gangulee, Nova Hedwigia 8: 140. 1964. WEST BENGAL: Belpahari, Jhargram, Midnapore (Gangulee, 1969-72; Lal, 2007).
- Fissidens ranchiensis* Gangulee, Bull. Bot. Soc. Beng. 11: 68. 1957. WEST BENGAL: Belpahari, Jhalgram (Gangulee, 1969-72).
- Fissidens semperfalcatus* Dixon, J. Siam Soc., Nat. Hist. suppl. 10: 2.1935. WEST BENGAL: Jhargram (Gangulee, 1969-72; Lal, 2005).
- Fissidens splachnobryoides* Broth. → *Fissidens flaccidus* Mitt.
- Fissidens subpalmatus* C. Muell., Linnaea 37: 164.1872. BIHAR: Purnea. WEST BENGAL: 24-Parganas, Bolpur, Kharagpur (Gangulee 1969-72; Lal, 2007).
- Fissidens sylvaticus* Griff. var. *calcuttense* Gangulee, Mosses E. India, 2: 538. 1971. WEST BENGAL: Jhargram, Kolkata (Gangulee, 1969-72; Lal, 2007).
- Fissidens sylvaticus* var. *teraicola* (Müll. Hal.) Gangulee, Mosses E. India, 2: 539.1971. *Fissidens teraicola* Müll. Hal., Linnaea 37: 164.1872. WEST BENGAL: Kalyani (Gangulee, 1969-72; Lal, 2007 as *Fissidens teraicola*).
- Fissidens sylvaticus* var. *zippelianus* (Dozy & Molk.) Gangulee, → *Fissidens crispulus* Brid. var. *crispulus*
- Fissidens teraicola* Müll. Hal. → *Fissidens sylvaticus* var. *teraicola* (C. Muell.) Gangulee
- Fissidens titlyanus* Müll. Hal. → *Fissidens crenulatus* var. *titlyanus*
- Fissidens virens* Thwaites & Mitt., J. Linn. Soc., Bot. 13: 324.1873. WEST BENGAL: Jhargram (Gangulee, 1969-72).
- Fissidens xiphioides* Fleisch. → *Fissidens zollingeri* Mont.
- Fissidens zollingeri* Mont. Ann. Sci. Nat. ser. 3,4: 114.1845. *F. xiphioides* Fleisch., Hedwigia 38: 125. 1899. *Fissidens bengalensis* Par., Index Bryol. 461. 1896. *Conomitrium bengalense* Hamp.,

Linnaea 39: 364.1896. UTTAR PRADESH: Lakhimpur-Kheri, Pilibhit, Shahjahanpur (Sahu and Asthana, 2015); WEST BENGAL: Bengal plains (Gangulee 1969-72; Lal, 2007 as *Fissidens xiphioides*).

Funaria hygrometrica Hedw., Sp. Musc. Frond. 172.1801. UTTAR PRADESH: Raebareli (Singh et al., 2005; Kumar and Kazmi, 2006).

Garckea flexuosa (Griff.) Margad. & Nork., J. Bryol. 7:440. 1973. WEST BENGAL: Midnapore (Lal, 2007).

Garckea phascoides(Hook.) C. Muell. Bot. Zeit. 3:865. 1845. WEST BENGAL: Midnapore (Gangulee, 1969-72).

Gemmabryum apiculatum (Schwägr.) J.R. Spence & H.P. Ramsay, Phytologia 87: 65. 2005. *Bryum plumosum* Dozy & Molk., Ann. Sci. Nat., Bot., ser. 3(2): 301. 1844. WEST BENGAL: Kolkata, Howrah (Gangulee, 1974-78; Lal, 2007 as *Bryum plumosum*).

Glossadelphus zollingeri (Müll. Hal.) M. Fleisch., Musci Buitenzorg 4: 1355. 1923. WEST BENGAL: Howrah (Lal, 2007).

Gymnostomiella vernicosa (Hook. ex Harv.) M. Fleisch., Musci Buitenzorg 1: 310. 1904. UTTAR PRADESH: Allahabad, WEST BENGAL: 24-Pargana, Howrah, Kolkata (Gangulee, 1974-78; Lal, 2007; Singh 2013).

Gymnostomum calcareum Nees & Hornsch., Bryol. Germ. 1: 153. 1823. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015).

Heliconema peguense (Besch.) L.T. Ellis & A. Eddy, J. Bryol. 15: 730. 1989. *Calymperes sundarbanense* Gangulee, Mosses E. India 3: 611. 1972. WEST BENGAL: Sundarban (Gangulee 1969-72 as *C. sunderbanense*).

Hydrogonium arcuatum(Griff.) Wijk. & Marg., Taxon 7: 289.1958. *Barbula gangetica* C. Muell. Linnaea, 37: 177.1872. *Hydrogonium gangeticum* (C. Muell.) Chen, Hedwigia 80: 237.1941. UTTAR PRADESH: Upper Gangetic Plains (Gangulee1969-72; Lal 2005 as *H. gangeticum*), Lakhimpur-Kheri, (Sahu and Asthana, 2015). WEST BENGAL: Lower Bengal, Birbhum (as *H. gangeticum*) (Gangulee1969-72).

Hydrogonium consanguineum (Thwaites et Mitt.) Hilp., Beih. Bot. Centralbl. 50(2): 626.1933 - *Barbula consanguinea* (Thwaites & Mitt.) A. Jaegr., Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1877-78: 490.1880. BIHAR: Darbhanga (Aziz and Vohra, 2008); UTTAR PRADESH: Upper Gangetic plains (Gangulee 1969-72), Raebareli (Kumar and Kazmi, 2004, 2006 as *B. consanguinea*), Varanasi (Aziz and Vohra, 2008); WEST BENGAL: Howrah, Kolkata, Midnapore, Titlaya (Aziz and Vohra, 2008).

Hydrogonium gangeticum (C. Muell.) Chen → ***Hydrogonium arcuatum*** (Griff.) Wijk. & Marg.

Hydrogonium javanicum (Doz. & Molk.) Hilp., Beih. Bot. Centralbl. 50(2): 632.1933. *Barbula javanica* Doz. & Molk. in Ann. Sci. Nat. Bot. ser. 3,2: 300.1884. UTTAR PRADESH: Allahabad, Kanpur (Jajmau), Raebareli, WEST BENGAL: North Bengal plains (Gangulee, 1969-72; Sinha et al, 1990; Singh et al., 2005; Kumar et al., 2007; Lal, 2007; Singh, 2013, all reported as *Barbula javanica*, however, Aziz & Vohra, 2008 treated *B. javanica* as synonym of *Hydrogonium javanicum*).

Hyophila involuta (Hook.) A. Jaegr., Ber. S. Gall. Naturew. Ges. 1871-72: 356.1873. BIHAR: North Bihar; UTTAR PRADESH: Upper Gangetic Plains (Gangulee 1969-72), Allahabad (Lal,

2007; Aziz and Vohra, 2008; Singh 2013); Lucknow (Aziz and Vohra, 2008; Nath et al., 2010; Singh 2013); WEST BENGAL: Lower Bengal (Gangulee 1969-72).

Hyophila nymaniana (M. Fleisch.) M. Menzel, Willdenowia 22: 198.1992. UTTAR PRADESH: Allahabad, Lakhimpur-Kheri, Pilibhit (Sahu and Asthana, 2015).

Hyophila rosea Williams, Bull. NewYork Bot. Gard. 8: 341.1941. UTAR PRADESH: Allahabad (Lal, 2007; Singh 2013).

Hyophila spathulata (Harv.) A. Jaegr., Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1871-72: 353.1873. UTTAR PRADESH: Allahabad (Lal, 2007; Singh 2013), Lakhimpur-Kheri, Shahjahanpur (Sahu and Asthana, 2015).

Hyophila walkeri Broth., Rec. Bot. Surv. India 1: 317.1899. UTTAR PRADESH: Faizabad (Singh and Kumar, 2003).

Octoblepharum albidum Hedw., Sp. Musc. Frond. 50.1801. WEST BENGAL: Howrah (Gangulee, 1969-72; Lal, 2007).

Philonotis falcata (Hook.) Mitt., J. Proc. Linn. Soc., Bot., suppl. 1: 62.1859. WEST BENGAL: Midnapore (Lal, 2007).

Philonotis hastata (Duby) Wijk. & Margad., Taxon 8: 74.1959. WEST BENGAL: Kolkata, Howrah (Gangulee, 1974-78; Lal, 2007).

Philonotis mollis (Dozy & Molk.) Mitt., J. Proc. Linn. Soc., Bot., suppl. 1: 60, 1859. UTTAR PRADESH: Lakhimpur-Kheri, Pilibhit, Shahjahanpur (Sahu and Asthana, 2015).

Physcomitrium coorgense Broth., Rec. Bot. Surv. India 1(12): 319. 1899. UTTAR PRADESH: Allahabad (Lal, 2007; Singh, 2013).

Physcomitrium cyathicarpum Mitt. → *Physcomitrium immersum* Sull.

Physcomitrium eurytomum Sendtn., Denkschr. Bayer. Bot. Ges. Regensburg 3: 142. 1841. UTTAR PRADESH: Allahabad (Lal, 2007; Singh 2013), Lakhimpur, Pilibhit (Sahu and Asthana, 2015); WEST BENGAL: Burdwan, Hoogli (Gangulee, 1974-78).

Physcomitrium immersum Sull., Manual 648, 1848. *Physcomitrium cyathicarpum* Mitt., J. Proc. Linn. Soc., Bot., suppl. 1: 54. 1859. BIHAR: Patna; UTTAR PRADESH: Allahabad; WEST BENGAL: Barasat, Hoogli, Kolkata, Nadia (Gangulee, 1974-78; Lal, 2007; Singh 2013; all as *Physcomitrium cyathicarpum*).

Physcomitrium indicum (Dix.) Gangulee, Bull. Bot. Soc. Bengal 23: 131. 1969. *Physcomitrellopsis indica* Dix. in Gupta. J. Indian Bot. Soc. 13: 122. 1933. UTTAR PRADESH: Unnao (Shuklaganj), Pratapgarh (Kalakankar) (Lal, 2007, Sinha et al., 1990; Kumar and Kazmi 2004, 2006; Singh et al., 2005), Varanasi (Gupta, 1933 as *Physcomitrellopsis indica*); WEST BENGAL: Hoogli, Nadia, Maldah, Murshidabad (Gangulee, 1974-78; Lal, 2007).

Physcomitrium japonicum (Hedw.) Mitt., Trans. Linn. Soc. London, Bot. 3: 164. 1891. UTTAR PRADESH: Gorakhpur (Gangulee, 1974-78; Lal, 2007), Pratapgarh (Kalakankar), Raebareli, Unnao (Shuklaganj) (Lal, 2007, Sinha et al., 1990; Kumar et al., 2007; Singh et al., 2005; Kumar and Kazmi, 2006; Singh, 2013).

Pinnatella alopecuroides (Mitt.) M. Fleisch. var. *calcutensis* (M. Fleisch.) Gangulee. Mosses E India 5: 1440. 1976. *Urocladium calcutense* Müll. Hal., J. Bot. 50: 152. 1912. *Pinnatella calcutensis* M. Fleisch., Hedwigia 45: 84. 1906. Gangetic plains (Lal, 2005 as *Pinnatella*

calcutensis M. Fleisch.) WEST BENGAL: Kolkata “Culcutta” (type of *Urocladium calcutense*, however, locality doubted by Gangulee 1974-78).

Pinnatella calcutensis M. Fleisch. → *Pinnatella alopecuroides* (Mitt.) M. Fleisch. var. *calcutensis* (M. Fleisch.) Gangulee

Pohlia flexuosa Hook., Icon. Pl. Rar. 1: 19. 1836. WEST BENGAL: Kolkata (Gangulee, 1974-78; Lal, 2007).

Semibarbula orientalis (F. Weber.) Wijk. & Margad, Taxon 8: 75. 1959. UTTAR PRADESH: Lucknow (Nath et al., 2010); Bengal plains (Gangulee, 1969-72).

Splachnobryum bengalense Gangulee, Mosses E India 4:865. 1974. WEST BENGAL: Konnagar (Gangulee, 1974-78; Lal, 2007).

Splachnobryum indicum Hampe & Müll. Hal. → *Splachnobryum obtusum* (Brid.) Müll. Hal.

Splachnobryum obtusum (Brid.) Müll. Hal., Verh. K.K. Zool.-Bot. Ges. Wien 19: 504. 1869. *Splachnobryum indicum* Hampe & Müll. Hal., Linnaea 37: 174. 1972. UTTAR PRADESH: Allahabad (Gangulee, 1974-78; Lal, 2007; Singh 2013; all as *Splachnobryum indicum*), Lakhimpur-Kheri, Pilibhit (Sahu and Asthana, 2015); WEST BENGAL: Hoogli, Howrah, Kolkata (Gangulee, 1974-78; Lal, 2007; Singh 2013; all as *Splachnobryum indicum*).

Stereophyllum tavoyense (Hook. ex Harv.) A. Jaegr., Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1877-78: 279. 1880. BIHAR: tropical plains (Gangulee, 1978-80; Lal, 2007)

Stereophyllum wightii (Mitt.) A. Jaegr, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1877-78: 279. 1880. WEST BENGAL: Bengal plains, 24-pargana, Maldah (Gangulee, 1978-80; Lal, 2007)

Syrrophodon burmensis (Hamp.) Reese & Tan, Taxon 35(4): 693. 1986. *Calymperes calcuttense* Bartr. & Gangulee, J. Bombay Nat. Hist. Soc. 60: 632. 1963. WEST ENGAL: Sonarpur near Kolkata (Gangulee 1969-72; type of *Calymperes calcuttense*).

Taxithelium nepalense (Schwägr.) Broth., Monsunia 1: 51. 1899. WEST BENGAL: Kolkata, Howrah, Hoogli, Nadia (Gangulee, 1978-80; Lal, 2007).

Trachyphyllum inflexum (Harvey) Gepp. in Hiren, Cat. Weln. Afr. Pl. 2, 21: 299. 1901. UTTAR PRADESH: Pilibhit (Sahu and Asthana, 2015).

Trachypodopsis serrulata (P. Beauv.) Fleisch., Hedwigia 45: 67. 1906. WEST BENGAL: Kolkata (Chopra, 1975; Lal, 2007).

Trematodon capillifolius Müll. Hal. ex G. Roth., Aussereur. Laubm. 296: 28. 1911. UTTAR PRADESH: Unnao (Shuklaganj), Kanpur (Jajmau), Raebareli (Dalmau) (Sinha et al., 1990; Lal, 2007).

Urocladium calcutense Müll. Hal. → *Pinnatella alopecuroides* (Hook.) Fleisch. var. *calcutensis* (M. Fleisch.) Gangulee

Vesicularia montagnei (Schimp.) Broth., Nat. Pflanzenfam. 1(3): 1094. 1908. WEST BENGAL: Howrah, Kolkata (Gangulee, 1978-80; Lal, 2007).

Weissia controversa Hedw., Spec. Musc. Frond. 67, 1801. UTTAR PRADESH: Shahjahanpur (Sahu and Asthana, 2015).

Summary of Family wise representation of mosses of Gangetic plains:

Archidiaceae: *Archidium* (1)

Bartramiaceae: *Bartramidula* (1), *Philonotis* (3)

Bruchiaceae: *Trematodon* (1)

Bryaceae: *Brachymerium* (1), *Bryum* (3), *Gemmabryum* (1)

Calymperaceae: *Calymperes* (1), *Heliconema* (1), *Octoblepharum* (1), *Syrrophodon* (1)

Dicranaceae: *Dicranella* (1)

Ditrichaceae: *Ceratodon* (2), *Garckea* (2)

Erpodiaceae: *Aulacopilum* (1), *Erpodium* (1)

Fabroniaceae: *Campylodontium* (1)

Fissidentaceae: *Fissidens* (19)

Funariaceae: *Entosthodon* (2), *Funaria* (1), *Physcomitrium* (5)

Hypnaceae: *Glossadelphus* (1), *Vesicularia* (1)

Meteoriaceae: *Diaphanodon* (2), *Trachypodopsis*(1),

Mniaceae: *Pohlia* (1)

Neckeraceae: *Pinnatella* (1)

Plasiadelphaceae: *Taxithelium* (1)

Pottiaceae: *Barbula* (2), *Didymodon* (1), *Gymnostomiella* (1), *Gymnostomum* (1) *Hydrogonium* (3), *Hyophila* (5), *Semibarbula* (1), *Splachnobryum* (2), *Weissia* (1)

Pterigynandraceae: *Trachyphyllum*(1)

Stereophyllaceae: *Entodontopsis* (1) *Stereophyllum* (2)

Doubtful records:

Barbula tenuirostris Brid., Bryol. Univ. 1: 826.1827. Lal (2005) listed it in Gangetic plains without locality, however, Aziz & Vohra (2008) did not reported its occurrence in Indian region.

Ganguleea angulosa (Broth. & Dix.) Zander, Phytologia 65: 427.1989. UTTAR PRADESH: Lucknow (Bansal et al., 2015; reported without specimen number and herbarium name, which makes the record dubious)

Excluded record:

Archidium birmanicum var. *pariharii* Lal, in Nath & Asthana, Current Trends in Bryology, 133, 2008. UTTAR PRADESH: Allahabad, (Lal, 1995, 2007; Singh 2013) nom. inval. (ICN art.39.1, no Latin diagnosis; art. 40.1, no Type; art. 40.7, no Herbarium specified)

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