Prologue

Biodiversity is deteriorating worldwide. According to the United Nations Environment Programme, biodiversity loss, alongside climate change and pollution, represents one of three major global crises. The 15th meeting of the Conference of the Parties to the Convention on Biological Diversity adopted the Kunming-Montreal Global Biodiversity Framework, which sets goals and targets for the next decade and 2050 to ensure that biodiversity loss is reversed. Understanding biodiversity is the first prerequisite for biodiversity research and conservation. The advancement of biodiversity informatics, biodiversity distribution data provides a robust support for biodiversity research and conservation. It notably facilitates the study of large-scale biodiversity patterns, conservation planning, biodiversity response to global change, and the prediction of invasive alien species dispersal. Creating a species checklist is the primary task in understanding biodiversity spatial-temporal patterns and a critical first step in the field of biodiversity informatics. It is essential for biodiversity conservation, research, management, monitoring and sustainable use. Additionally, the number of native and exotic species serves as a crucial statistical indicator of a country's biodiversity.

Asia is one of the richest continents in terms of biodiversity. With its myriad ecosystems and climatic zones, Asia stands as a global hotspot for plant diversity. The continent boasts an awe-inspiring array of flora, encompassing a wide spectrum of life forms, from the smallest mosses to the towering trees, and from delicate wildflowers to robust grasses. The variety of plant species in Asia reflects the continent's geographic expanse and the complex interplay of ecological, geological, and climatic factors.

However, plant cataloguing and the availability of occurrence data in Asia remain inadequate. In response to this, Mapping Asia Plants (MAP) was initiated at the Working Group Meeting of the Asia Biodiversity Conservation and Database Network (ABCDNet) in November 2015, organized by the Biodiversity Committee, Chinese Academy of Sciences (CAS). MAP aims to establish an online data platform for Asian botanical information, providing comprehensive foundational knowledge and an interdisciplinary data mining environment for the conservation and research of Asian plant diversity. The first step of MAP is to establish a database on the inventory and distribution of plant species in Asia and to develop an online platform for data management and mining. The plant species checklists and their distribution database are the cores of MAP at its current stage. The main sources inculde:

1. Floras, plant checklists and related publications;
2. Plant distribution maps;
3. Plant specimens, including photographs of plants with reliable identification;
4. Vegetation survey plots;
5. Plant investigation data;
6. Plant observation data, including data published by plant enthusiasts and parataxonomists;
7. Digitized online datasets.

Through cooperation with experts from many Asian countries and beyond, MAP overcame multiple language barriers, compiled research progress on plant diversity in Asia, integrated the floras and checklists, and established a database of Asian plant species. A series of plant species checklists have been completed and will be gradually released. According to our current research progress, there are 435 families, 6,838 genera and about 119,000 species (excluding subspecies) in Asia. Based on the plant species

checklists, a comprehensive data platform will be further developed to support research on plant ecology, evolutionary botany, plant geography, conservation biology and global change biology. It is also planned to create a data clearing and mining kit and an analysis platform for plant species distribution maps, plant diversity distribution maps, the revision of plant names and species distribution models.

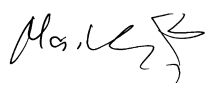
For a plant species checklist developed based on multiple sources, it is essential to perform taxonomic cleaning against a standard global plant checklist. Several global species checklists created by taxonomists are available for this purpose, such as Leipzig Catalogue of Vascular Plants, the World Checklist of Vascular Plants, World Flora Online (successor of The Plant List, TPL), World Plants and Catalogue of Life (CoL).

In this series of checklists, we present a meticulous compilation of plant species, organized taxonomically into families, genera, and species, with additional details on subspecies and varieties where applicable. The aim is to provide researchers, botanists, conservationists, and enthusiasts with a valuable resource for understanding and appreciating the remarkable flora of the Asian continent.

The MAP series presents the first-ever Asian catalogue for liverworts (Marchantiophyta), hornworts (Anthocerotophyta) and mosses (Bryophyta). It includes 2,777 species in 246 genera, representing 74 families from the two phyla of liverworts and hornworts. For mosses, the catalogue includes 4,039 species in 597 genera, representing 99 families. In the checklist of North Asia, there are 162 families, 1,151 genera, 6,459 species of vascular plants. Central Asia's checklist includes 139 families, 1,198 genera and 9,643 species of vascular plants. Related research has advanced in Southeast, South and West Asia, where plant biodiversity research is more complex, making it more challenging and time-consuming to complete the species checklist. To complete the MAP series, we conducted extensive data collection, and taxonomic literature review. Several review papers have been published for South Asia, West Asia, Central Asia, Northeast Asia and Russia respectively.

China, as one of the megadiversity countries in the world, plays an extremely important role in biodiversity conservation. China accounts for 21.5% of Asia's land area and 35% of Asia's plant species, and has published the world's largest flora. Meanwhile, China has established several platforms such as the BioONE (An Integrated Big BioData Infrastructure for CASEarth) and the National Specimen Information Infrastructure (NSII), which covers plant distribution data in China and many nearby countries. Based on these achievements, we have gained a comprehensive understanding of plant diversity in Asian countries, laying the foundation for biodiversity conservation and research at the regional level in Asia. Our work was supported by the Bureau of International Cooperation, CAS, the Alliance of International Science Organizations (ANSO) (ANSO-PA-2020-10), the Strategic Priority Research Program of CAS (No. XDA19050404) and the Southeast Asia Biodiversity Research Institute of CAS.

However, due to factors such as language barriers and the discovery and publication of new plant species or revisions of certain taxa, the MAP series may not be perfect publications at the moment. Suggestions and comments from all colleagues and experts are sincerely welcome to keep the checklists updated.



Keping MA
Editor in Chief
November 10th, 2023

Preface

1. Background

Asia is the largest and most populous continent, covering 8.7% of the Earth's total area (or 29.4% of the total land area). It is home to over 4 billion people, accounting for approximately 60.5% of the world's total population.

The vast majority of Asia is located in both the northern and eastern hemispheres. The boundary between Asia and Africa is the Suez Canal, with Asia lying to the east. The dividing lines between Asia and Europe are the Urals, the Caspian Sea, the Greater Caucasus, the Turkish Straits, and the Black Sea. Asia extends east to Cape Dezhnev (66°4′45″N, 169°39′7″W), south to Cape Piai (Tanjung Piai) (1°16′N, 103°31′E), west to Cape Baba (39°27′N, 26°3′E), and north to 77°43′N, 104°18′E, with the highest peak being Everest. The extensive latitudinal and longitudinal span results in a time difference of up to approximately 9 hours between the eastern and western extremes of Asia. Asia is connected to Europe in the west, forming the largest continent of Eurasia.

Asia is typically divided into six regions on the basis of geographical location: East Asia, Southeast Asia, South Asia, West Asia, Central Asia, and North Asia. Each of these regions has a distinctive natural environment.

— East Asia includes China, the Democratic People's Republic of Korea, the Republic of Korea, Mongolia, and Japan.

— Southeast Asia encompasses Vietnam, Laos, Cambodia, Myanmar, Thailand, Malaysia, Singapore, Indonesia, the Philippines, Brunei, East Timor, and other countries.

— South Asia includes Sri Lanka, the Maldives, Pakistan, India, Bangladesh, Nepal, and Bhutan.

— West Asia, also called Southwest Asia, includes Iran, Türkiye, Cyprus, Syria, Lebanon, Palestine, Israel, Jordan, Iraq, Kuwait, Saudi Arabia, Yemen, Oman, the United Arab Emirates, Qatar, Bahrain, Georgia, Armenia, Azerbaijan, and Afghanistan.

— Central Asia comprises Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, and Kazakhstan.

— North Asia refers to Siberia, part of Russia.

Asia's terrain is varied and undulating, with high elevations in the center and lower elevations elsewhere. The eastern part features a longitudinal chain of island arcs. Excluding Antarctica, Asia is the world's highest continent, with an average elevation of about 950 meters.

The Asian continent spans cold, warm, and hot climate zones. The climate is complex and diverse, featuring a typical monsoon climate and notable continental characteristics. The eastern part of Asia has a humid temperate and subtropical monsoon climate, while Southeast and South Asia have humid tropical monsoon climates. Central Asia, West Asia, and parts of East Asia are arid regions. Between these humid monsoon areas and the inland arid areas, part of North Asia is sub-humid and semi-arid.

The first species of Leucobryum was described by Bridel (1798) as *Sphagnum javense* (Yamaguchi, 1993). This is probably the earliest report of Asian mosses. In 1999, Crosby et al. published the World List of Bryophytes, including 12,800 species of mosses. This is currently the most authoritative number on the diversity of moss plants in the world. But so far, the number of mosses on each continent has not been reported. No one can yet answer any questions about how many mosses are

distributed in Asia. Although a large number of papers and works have been published on the taxonomic, floristic, and systematic studies of mosses in Asia, we still do not know the diversity of mosses in Asia or even the estimated number. Therefore, this book is the first comprehensive report on the number, distribution and diversity of mosses in Asia, which will fill the gap in diversity research in this region, play a positive role in promoting the study of moss diversity in Asia, and contribute to the study of moss diversity in the world.

2. Structure and format of the Catalogue

The systematic arrangement used in this book follows the "Syllabus of Plant Families (Part 3 Bryophytes and Seedless Vascular Plants)", published in 2009, while incorporating the latest research findings. Families are arranged systematically, with genera and species ordered alphabetically.

Each accepted species includes a Latin scientific name, basionyms, and other synonyms. Distribution information within the Asian region is recorded according to national units. The type specimens' information, including type localities of species in Asia, is listed for both accepted names and synonyms.

3. Brief outline of mosses in Asia

According to the literature, authors here present the first-ever Asian catalogue for mosses (Bryophyta) that includes 4,039 species in 597 genera representing 99 families. In Asia, there are 22 families which include more than or equal to 10 genera, and 25 genera including more than or equal to 30 species (see Table 1 and Table 2). There are 71 genera which are endemic to Asia, they are *Achrophyllum* Vitt & Crosby, *Actinothuidium* (Besch.) Broth., *Benitotania* H. Akiyama, T. Yamag. & Suleiman, *Bissetia* Broth. ex M. Fleisch., *Bonnosukea* H. Akiyama, *Boulaya* Cardot, *Brachymeniopsis* Broth., *Calymperopsis* (Müll. Hal.) M. Fleisch., *Chrysocladium* M. Fleisch., *Clastobryella* M. Fleisch., *Ctenidiadelphus* M. Fleisch., *Curvicladium* Enroth, *Dimorphocladon* Dixon, *Dixonia* Horik. & Ando, *Dolichomitra* Broth., *Donnellia* Austin, *Dozya* Sande Lac., *Endotrichellopsis* During, *Eumyurium* Nog., *Filibryum* W. Kim & T. Yamag., *Foreauella* Dixon & P. de la Varde, *Gammiella* Broth., *Handeliobryum* Broth., *Hydrocryphaea* Dixon, *Indothuidium* A. Touw, *Juratzkaeella* W.R. Buck, *Koponobryum* Arts, *Leptobarbula* Schimp., *Leptocladium* Broth., *Mawenzhangia* Enroth, Shevock & Ignatov, *Metadistichophyllum* Nog. & Z. Iwats., *Meteoriella* S. Okamura, *Micralsopsis* Buck, *Microgammiella* H. Akiyama, *Microtheciella* Dixon, *Mitrobryum* H. Rob., *Miyabea* Broth., *Nanomitriella* E.B. Bartram, *Nanothecium* Dixon & P. de la Varde, *Neobarbella* Nog., *Neodolichomitra* Nog., *Neonoguchia* S.H. Lin, *Noguchiodendron* T.N. Ninh & Pócs, *Orthoamblystegium* Dixon & Sakurai, *Orthodontopsis* Ignatov & B.C. Tan, *Osterwaldiella* Broth., *Palisadula* Toyama, *Pararhexophyllum* Jan Kučera, *Penzigiella* M. Fleisch., *Penzigiella* M. Fleisch., *Phantomia* S. He & W.R. Buck, *Podperaea* Z. Iwats. & Glime, *Pseudocryptogonium* H. Akiyama & B.C. Tan, *Pseudokindbergia* M. Li, Y.F. Wang, Ignatov. & B.C. Tan, *Pseudospiridentopsis* (Broth.) M. Fleisch., *Pseudotrismegistia* H. Akiy. & Tsubota, *Rheoshevockia* Ignatov, W.Z. Ma & D.G. Long, *Sakuraia* Broth., *Sasaokaea* Broth., *Scabridens* E.B. Bartram, *Sclerohypnum* Dixon, *Shevockia* Enroth & M.C. Ji, *Sinocalliergon* Sakurai, *Stenotheciopsis* M. Fleisch., *Steppomitra* Vondr. & Hadač, *Taxiphyllopsis* Higuchi & Deguchi, *Taxitheliella* Dixon, *Trolliella* Herzog, *Webera* Hedw., *Yakushimabryum* H. Akiyama, Y. Chang, T. Yamag. & B.C. Tan and *Yunnanobryon* Shevock, Ochyra, S. He & D.G. Long.

Table 1 Families including more than or equal to 10 genera in Asia

Families	Number of genera in the world	Number of genera in Asia
Pottiaceae	86	54
Hypnaceae	53	38
Brachytheciaceae	46	28
Neckeraceae	32	25
Meteoriaceae	23	22
Pylaisiadelphaceae	21	21
Sematophyllaceae	28	20
Amblystegiaceae	24	18
Ditrichaceae	24	16
Thuidiaceae	16	15
Pterobryaceae	24	15
Mniaceae	15	13
Hylocomiaceae	15	13
Leskeaceae	15	12
Polytrichaceae	18	11
Oncophoraceae	13	11
Leucobryaceae	14	11
Funariaceae	16	11
Orthotrichaceae	19	10
Dicranaceae	25	11
Daltoniaceae	14	10
Bryaceae	12	10

Table 2 Genera including more than or equal to 30 species in Asia

Genera	Number of species in the world	Number of species in Asia	Number of variety in Asia	Number of subspecies in Asia	Number of form in Asia
Fissidens	444	197	20	4	1
Bryum	440	98	26	1	0
Macromitrium	364	76	6	5	0
Sphagnum	300	75	24	3	0
Brachythecium	153	76	28	1	0
Orthotrichum	107	71	12	3	1
Ectropothecium	204	55	5	0	1
Pohlia	138	50	6	0	0
Syrrhopodon	102	44	4	2	1

Continued

Genera	Number of species in the world	Number of species in Asia	Number of variety in Asia	Number of subspecies in Asia	Number of form in Asia
Tortula	197	50	16	2	0
Grimmia	51	51	7	0	1
Dicranum	92	45	8	0	1
Entodon	114	44	1	0	0
Barbula	350	45	8	0	0
Acroporium	68	43	14	0	0
Dicranella	158	39	5	0	0
Pogonatum	58	38	2	3	0
Didymodon	130	40	10	1	0
Philonotis	186	36	11	0	0
Campylopus	150	35	6	3	0
Chaetomitrium	64	34	0	0	0
Hypnum	40	34	7	1	0
Distichophyllum	100	34	6	2	1
Isopterygium	147	31	4	0	0
Vesicularia	116	30	3	0	0

Some genera have been treated as synonyms of other genera, but few species are still used under old names of genera. Those names represent taxa that have not been studied recently and have not been recognized in any recent treatment.

Hymenostomum, *Semibarbula*, and *Mniobryum* have been treated as *Weissia*, *Barbula,* and *Pohlia* respectively. So the following names require further taxonomic study: *Hymenostomum siamense* Dixon, *Semibarbula ranuii* Gangule, and *Mniobryum latifolium* Schiffn.

In Asia, the top ten countries in the number of species are China, Japan, India, Vietnam, Indonesia, Türkiye, Malaysia, Thailand, Sri Lanka, and the Philippines (see Table 3).

Table 3 Top ten countries of number of species in Asia

Country	Number of species
China	2,115
Japan	1,515
India	1,159
Vietnam	849
Indonesia	844
Türkiye	819
Malaysia	711

Continued

Country	Number of species
Thailand	592
Sri Lanka	570
the Philippines	546

Our data show that East and South Asia are the most diverse regions of mosses in Asia; West Asia and Central Asia are areas where studies of moss diversity are very weak.

Asia is a vast region, spanning many climatic zones and supporting rich bryophytes. However, there are still many countries with weak surveys. We believe that there will be more data as the survey scope expands.

This work was supported by the Alliance of International Science Organizations (Grant No. ANSO-PA-2020-10) and the Strategic Priority Research Program of the Chinese Academy of Sciences (Grant No. XDA19050404).

Due to the age of many original and cited papers, it remains difficult to obtain some documents despite our efforts to provide comprehensive references. To assist readers in locating the literature, the original format has been preserved at the back of the book, and any errors have not been corrected. This book includes a large number of known mosses worldwide. Some references contain old place names, administrative divisions, and other historical information that have not been updated. We lack the time and resources to investigate these historical changes. We hope that interested political scientists and geographers will pursue further research in this area.

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I.
Bryophyta Schimp.

Takakiopsida M. Stech & W. Frey

Takakiales M. Stech & W. Frey

Takakiaceae M. Stech & W. Frey

This family consists of 1 genus in the world.

Takakia S. Hatt. & Inoue, J. Hattori Bot. Lab. 19: 137. 1958.

Type: *T. lep*idozioides S. Hatt. & Inoue

This genus consists of 2 species in the world, 2 species in Asia.

Takakia ceratophylla (Mitt.) Grolle, Oesterr. Bot. Z. 110(4): 444. 1963.

Lepidozia ceratophylla Mitt., J. Proc. Linn. Soc. Bot. 5: 103. 1861. **Type:** India, Sikkim, 11,000ft, *J. D. Hooker 1416* (holotype: BM).

Distribution: China (Jia & He, 2013), India (Mitten, 1861, as *Lepidozia ceratophylla*), Nepal (Hattori, 1975), N. America.

Takakia lepidozioides S. Hatt. & Inoue, J. Hattori Bot. Lab. 19: 137. 1958. **Type:** Japan, Mt. Shiroum, on rock with humus, 2,400m, Aug. 1957, *H. Inoue s.n.* (holotype: NICH).

Distribution: China (Jia & He, 2013), Indonesia (Jia & He, 2013), Nepal (Hattori, 1975), Japan (Iwatsuki, 2004), Malaysia (Menzel, 1988), N. America.

Sphagnopsida Schimp.

Sphagnales Limpr.

Sphagnaceae Dumort.

This family consists of 1 genus in the world.

Sphagnum L., Sp. Pl. 1106. 1753.

Type: *S. palustre* L.

This genus consists of 300 species in the world, 75 species, 3 subspecies, and 24 varieties in Asia.

Sphagnum acutifolioides Warnst., Hedwigia 29: 192. 1890. **Type:** India, Assam, in herb. Mitten.

Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Vietnam (Tan & Iwatsuki, 1993).

Sphagnum acutum var. **hakusanense** Warnst., Pflanzenr. 51: 192 (Sphagnol. Univ. 192). 1911.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum angustifolium (C.E.O. Jensen ex Russow) C. Jens *in* Tolf, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 16. Afd. 3(9): 46. 1891.
Sphagnum recurvum subsp. *angustifolium* C.E.O. Jensen ex Russow, Sitzungsber. Naturf.-Ges. Dorpat 9: 112. 1890.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Suzuki, 2016), Korea (Jia & He, 2013), Mongolia (Tsegmed, 2001), Türkiye (Çetin, 1988b; Uyar & Çetin, 2004), Europe, N. America.

Sphagnum annulatum var. **porosum** (Schlieph. & Warnst.) Maass & Isov., Nova Hedwigia 14: 189. 1967 [1968].
Distribution: Japan (Iwatsuki, 2004).

Sphagnum antarense Wijk & Zanten, Nova Guinea, Bot. 10(16): 266. pl. 23: f. 1. 1964.
Type: Indonesia [New Guinea]. Irian Barat: Mt. Antares, W summit, 3350m, *Zanten 681* (holotype: L; isotype: GRO).
Distribution: Indonesia (Gradstein et al., 2005), New Guinea.

Sphagnum aongstroemii C. Hartm., Handb. Skand. Fl. (ed. 7) 399. 1858.
Sphagnum insulosum Åongström in. Schimp. Syn. Musc. Eur. 683. 1860.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Iwatsuki, 2004), Türkiye (Çetin, 1988b; Uyar & Çetin, 2004), USA, Canada.

Sphagnum auriculatum Schimp., Mém. Hist. Nat. Sphaignes 79–80, pl. 24. 1857.
Distribution: Türkiye (Uyar & Çetin, 2004), Europe.

Sphagnum balticum (Russow) C.E.O. Jensen, Festskr. Bot. Foren. Kjøbenhavn 100. 1890.
Distribution: Far East of Russia (Ignatov et al., 2000), USA, Canada.

Sphagnum calymmatophyllum Warnst. & Cardot, Bull. Herb. Boissier, sér. 2, 7: 711. 1907.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum capillifolium (Ehrh.) Hedw., Fund. Hist. Nat. Musc. Frond. 2: 86. 1782.
Sphagnum palustre subsp. *capillifolium* Ehrh., Hannovr. Mag. 18: 235. 1780. **Type:** Europe.
Sphagnum acutifolium Ehrh. ex Schrad., Spic. Fl. Germ. 58. 1794.
Sphagnum acutifolium var. *capillifolium* (Ehrh.) Funck Deutschlands Moose 5. 1820.
Sphagnum nemoreum Scop., Fl. Carniol., (ed. 2) 305. 1772.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), India (Gangulee, 1969, as *S. nemoreum*), Japan (Iwatsuki, 2004), Korea (Jia & He, 2013), Mongolia (Tsegmed, 2001, as *S. nemoreum*), Syria (Frey & Kürschner, 1991), Türkiye (Uyar & Çetin, 2004), N. America, Chile (He, 1998), Brazil (Yano, 1995), Africa.

Sphagnum capillifolium var. **tenellum** (Schimp.) H.A. Crum, Contr. Univ. Michigan Herb. 11: 90. 1975.
Sphagnum acutifolium var. *tenellum* Schimp., Mém. Hist. Nat. Sphaignes 63. 1857.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum capillifolium var. **tenerum** (Sull. & Lesq. ex Sull.) H.A. Crum, Contr. Univ. Michigan Herb. 11: 90. 1975.
Sphagnum tenerum Sull. & Lesq., Manual (ed. 2) 611. 1856.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum centrale C.E.O. Jensen, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 21 Afd. 3(10): 34. 1896.
Distribution: Türkiye (Abay et al., 2009).

Sphagnum ceylonicum Mitt. ex Warnst., Hedwigia 29: 195. 4 f. 7; f. 14. 1890.
Distribution: Sri Lanka (O'Shea, 2002).

Sphagnum chinense Brid., Bryol. Univ. 1: 750. 1827. **Type:** China.
Distribution: China (Jia & He, 2013).

Sphagnum compactum Lam. & Cand., Fl. Franc., ed. 2, 2: 443. 1805.
Sphagnum compactum var. *imbricatum* Warnst., Bot. Gaz. 15: 226. 1890.
Sphagnum cymbifolium (Ehrh.) Hedw. var. *compactum* (Lam. & DC.) Schultz, Suppl. Fl. Starg. 64. 1819.
Sphagnum strictum Sull., Musci Allegh. 49. 1846.
Distribution: China (Jia & He, 2013), Japan (Iwatsuki, 2004), Türkiye (Četin, 1988b; Uyar & Četin, 2004), Far East of Russia (Ignatov et al., 2000).

Sphagnum compactum var. **brachycladum** Roll, Webbia 4: 127. 1913.
Distribution: Türkiye (Uyar & Četin, 2004).

Sphagnum connectens Warnst. & Cardot, Bull. Herb. Boissier, sér. 2, 7: 711. 1907.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum contortum Schultz, Prodr. Fl. Starg. Suppl. 64. 1819.
Sphagnum subsecundum Nees ex Sturm var. *contortum* (Schultz) Huebener, Muscol. Germ. 27. 1833.
Distribution: China (Jia & He, 2013), Japan (Iwatsuki, 2004), Mongolia (Tsegmed, 2001), Türkiye (Kirmaci & Kürschner, 2013), Europe, N. America.

Sphagnum cuspidatulum Müll. Hal., Linnaea 38: 549. 1874. **Type:** India, Khasia, *Hooker & Thomson 1284*.
Sphagnum rufulum Müll. Hal., Linnaea 38: 549. 1874.
Distribution: Bhutan (Long, 1994), Myanmar (Jia & He, 2013), China (Jia & He, 2013), India (Gangulee, 1969), Indonesia (Gradstein et al., 2005; Ho et al., 2006), Laos (Dixon, 1936a), Malaysia (Menzel & Schultze-Motel, 1991; Yong et al., 2013), Nepal (Noguchi & Iwatsuki, 1975), Philippines (Jia & He, 2013), Thailand (Dixon, 1932), Vietnam (Jovet-Ast & Schmid, 1958; Pósc, 1965).

Sphagnum cuspidatum Ehrh. ex Hofm., Deutschl. Fl. 2: 22. 1796.
Sphagnum laxifolium Müll. Hal., Syn. Musc. Frond. 1: 97. 1848.
Distribution: Myanmar (Tan & Iwatsuki, 1993), Cambodia (Tan & Iwatsuki, 1993), China (Jia & He, 2013), India (Gangulee, 1969), Indonesia (Ho et al., 2006), Japan (Iwatsuki, 2004), Malaysia (Menzel & Schultze-Motel, 1991; Yong et al., 2013), Nepal (Iwatsuki, 1979c), Thailand (Dixon, 1932; Tan & Iwatsuki, 1993), Vietnam (He & Nguyen, 2012), New Guinea, Europe, N. America, Peru (Menzel, 1992a), Chile (He, 1998), Australia, Africa.

Sphagnum cuspidatum var. **flaccidifolium** (Dixon ex A. Johnson) A. Eddy, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 416. 1977.
Sphagnum flaccidifolium Dixon ex A. Johnson, Gard. Bull. Singapore 17(2): 316. f. 1: a-b. 1959.
Distribution: Indonesia (Ho et al., 2006).

Sphagnum cuspidatum var. **serrulatum** (Schlieph.) Schlieph., Irmischia 2: 67. 1882.
Sphagnum laxifolium var. *serrulatum* Schlieph., Verh. K.K. Zool.-Bot. Ges. Wien 15: 397. 1865.
Distribution: Nepal (Iwatsuki, 1979c).

Sphagnum cuspidatum var. **submersum** Schimp., Mém. Hist. Nat. Sphaignes 67, 68. 16 b. 1857.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum cuspidatum var. **subrecurvum** (Warnst.) A. Eddy, Bull. Brit. Mus. (Nat. Hist.), Bot. 5: 413. 1977.
Sphagnum subrecurvum Warnst., Alleg. Bot. Z. Syst. 1: 134. 1895.
Distribution: Malaysia (Menzel & Schultze-Motel, 1991).

Sphagnum denticulatum Brid., Bryol. Univ. 1: 10. 1826.
Sphagnum acuriculatum Schimp., Mém. Acad. Sci. Sav. Inst. Fr. 15: 80. 1857.
Sphagnum subsecundum Nees ex Sturm var. *acuriculatum* (Schimp.) Schlieph., Verh. Zool. Bot. Ges. Wien 15: 411. 1865.
Sphagnum subsecundum var. *gravetii* (Russow) C.E.O. Jensen, Bot. Faeros Dan. Invest. 139. 1901.
Sphagnum subsecundum var. *gravetii* (Russow) C.E.O. Jensen fo. *hypisopora* Russ. ex Broth. in Handel-Mazzetti, Symb. Sin. 4: 8. 1929.
Sphagnum subsecundum var. *rufescens* (Nees & Hornsch.) Huebener, Muscol. Germ. 26. 1833.
Sphagnum subsecundum var. *yunnanense* C.E.O. Jensen ex Broth. in Handel-Mazzetti, Symb. Sin. 4: 8. 1929. **Type:** China, Yunnan, Weixi Co., 3450m, *Handel-Mazzetti 8493* (holotype: H-BR).
Distribution: China (Jia & He, 2013), Türkiye (Uyar & Četin, 2004, as *S. subsecundum* var. *rufescens*), Europe, N. America, Africa.

Sphagnum dicladum Warnst., Hedwigia 47: 109. 1907.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum drepanocladum var. **latilimbatum** Warnst., Pflanzenr. 51: 251 (Sphagnol. Univ. 251). 1911.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum dusenii var. **majus** Cardot, Bull. Soc. Hist. Nat. Autun 10: 289 [Répert. Sphagnol. 57]. 1897.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum falcatulum Besch., Bull. Soc. Bot. France 32: LXVII. 1885.
Sphagnum lanceolatum Warnst., Hedwigia 29: 219. 1890.
Distribution: China (Jia & He, 2013), Australia, New Zealand, Chile (He, 1998).

Sphagnum fallax (H. Klinggr.) H. Klinggr., Topogr. Fl. Ost. West Preuss. 128. 1880.
Sphagnum cuspidatum var. *fallax* H. Klinggr., Schriften Königl. Phys.-Ökon. Ges. Königsberg 13: 7. 1872.
Sphagnum cuspidatum Ehrh. ex Hofm. var. *fallax* H. Klinggr., Schrift. Phys.-Ökon. Ges. Königsberg 13: 7. 1872.
Sphagnum apiculatum H. Lindb. *in* Bauer, Sitz.-ber. Deuts. Nat.-Med. Ver. Böhmen Lotos 51: 123. 1903, *nom. superfl.*
Sphagnum cuspidatum var. *brevifolium* Lindb. ex Braithw., Sphag. Eur. N. Am. 84. 1880.
Sphagnum flexuosum var. *fallax* (H. Klinggr.) Hill ex A. Smith, J. Bryol. 9: 394. 1977.
Sphagnum recurvum var. *brevifolium* (Lindb. ex Braithw.) Warnst., Flora 67: 608. 1884.
Sphagnum recurvum var. *fallax* (H. Klinggr.) Paul in Koppe, Abh. Landesmus. Westfal. 10(2): 12. 1939.
Sphagnum recurvum var. *mucronatum* (Russ.) Warnst., Bot. Gaz. 15: 218. 1890.

Distribution: China (Jia & He, 2013), Far East of Russia (Jia & He, 2013), Japan (Iwatsuki, 2004), Mongolia (Tsegmed, 2001), Türkiye (Kirmaci & Kürschner, 2013), Europe, N. America.

Sphagnum fimbriatum Wilson, Fl. Antarctica 398. 1847.

Distribution: Himalayas (Chopra & Kumar, 1981); Japan (Iwatsuki, 2004), Mongolia (Tsegmed, 2001), Syria (Frey & Kürschner, 1991), Far East of Russia (Ignatov et al., 2000).

Sphagnum fimbriatum var. **compactum** Warnst., Eur. Torfm. 115. 1881.

Distribution: Japan (Iwatsuki, 2004).

Sphagnum fimbriatum var. **laxifolium** Warnst., Pflanzenr. 51: 56 (Sphagnol. Univ. 56). 1911.

Distribution: Japan (Iwatsuki, 2004).

Sphagnum fuscum (Schimp.) H. Klinggr., Schriften Königl. Phys.-Ökon Ges. Köningsberg 13(1): 4. 1872.

Sphagnum acutifolium Schrad. var. *fuscum* Schimp., Mém. Aca. Sci. Sav. Inst. Fr. 15: 64. 1857.

Sphagnum acutifolium Schrad. subsp. *fuscum* (Schimp.) Herib., Mém. Acad. Sci. Clermont-ferrand, sér. 2, 14: 444. 1899.

Distribution: China (Jia & He, 2013), Far East of Russia (Jia & He, 2013), Japan (Jia & He, 2013), Mongolia (Tsegmed, 2001), Europe, N. America.

Sphagnum girgensohnii Russow, Beitr. Torfm. 46. 1865.

Sphagnum acutifolium subsp. *girgensohnii* (Russow) Cardot, Bull. Soc. Bot. Belgique 25(1): 90. 117. 1886.

Sphagnum acutifolium Schrad. var. *tenue* Nees & Hornsch., Bryol. Germ. 1: 21. 1823.

Sphagnum nemoreum subsp. *girgensohnii* (Russow) Bott., Atti Reale Accad. Lincei, Mem. Cl. Sci. Fis., ser. 3, 13(1): 19. 1919.

Sphagnum warnstorfii Röll, Flora 69: 105. 1886.

Distribution: Bhutan (Noguchi, 1971a), China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), India (Gangulee, 1969), Indonesia (Jia & He, 2013), Japan (Iwatsuki, 2004), Korea (Jia & He, 2013), Mongolia (Tsegmed, 2001), Nepal (Jia & He, 2013), Türkiye (Četin, 1988b; Uyar & Četin, 2004), Ukraine, Europe, N. America, Greenland.

Sphagnum girgensohnii var. **squarrosulum** Russow, Arch. Nat. Liv-Ehst-Kurlands, Ser. 2, Biol. Naturk. 7: 125. 1865.

Distribution: Japan (Iwatsuki, 2004).

Sphagnum guwassanense Warnst., Pflanzenr. 51: 424. 74E (Sphagnol. Univ. 424. 74E). 1911.

Sphagnum takedae S. Okamura, Icon. Pl. Koisik. 3(5): 109, pl. 200. 1917. **Type:** Japan, Nagano Pref., Suwa, *H. Takeda s.n*. (isotype: TNS).

Distribution: Japan (Iwatsuki, 1991).

Sphagnum henryense Warnst., Hedwigia 39: 107. 1900.

Distribution: Japan (Iwatsuki, 2004).

Sphagnum imbricatum Hornsch. ex Russow, Beitr. Torfm. 99. 1865.

Sphagnum austinii Sull. in Austin, Musci Appal. 1: 3. 1870.

Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Japan (Iwatsuki, 2004), Korea (Jia & He, 2013), Nepal (Noguchi & Iwatsuki, 1975), Siberia of Russia (Jia & He, 2013), Europe, America.

Sphagnum incertum Warnst. & Cardot, Bull. Herb. Boissier, sér. 2, 7: 710. 1907.

Distribution: Japan (Iwatsuki, 2004).

Sphagnum inexspectatum Flatberg, Lindbergia 30: 61. 2005.
Sphagnum subsecundum var. *junsaiense* (Warnst.) H.A. Crum, N. Amer. Fl. 11: 61. 1984.
Distribution: Japan (Iwatsuki, 2004, as *S. subsecundum* var. *junsaiense*).

Sphagnum inundatum Russow, Arch. Naturk. Liv-Ehst-Kurlands, ser. 2, Biol. Naturk. 10: 390. 1894. **Type:** Europe.
Sphagnum auriculatum var. *inundatum* (Russow) M.O. Hill, J. Bryol. 8: 439. 1975.
Sphagnum denticulatum var. *inundatum* (Russow) Kartt., Ann. Bot. Fenn. 29: 121. 1992.
Sphagnum inundatum var. *perfibrosum* P. De la Varde, Rev. Bryol. Lichénol. 10: 136. 1938.
Sphagnum lescurii var. *inundatum* (Russow) Düll, Bryol. Bei. 4: 11. 1984.
Sphagnum subsecundum var. *inundatum* (Russow) C.E.O. Jensen, Bot. Faeros Dan Invest. 1: 139. 1901.
Sphagnum subsecundum subsp. *inundatum* (Russow) Meyl., Bull. Soc. Vaud. Sci. Nat. 41: 72. 1905.
Sphagnum subsecundum subsp. *inundatum* (Russow) A. Eddy, J. Bryol. 9: 313. 1977., *hom. illeg.*
Distribution: Türkiye (Henderson & Prentice, 1969), Europe, N. America.

Sphagnum jensenii H. Lindb., Acta Soc. Fauna Fl. Fenn. 18(3): 13. 1899.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Jia & He, 2013), Europe, N. America.

Sphagnum junghuhnianum Dozy & Molk., Natuurk. Verh. Kon. Akad. Wetensch. Amsterdam 2: 8. 1854. **Type:** Indonesia, Java, *Junghuhn s.n*.

Sphagnum junghuhnianum subsp. **junghuhnianum**
Sphagnum gedeanum Dozy & Molk., Nat. Verh. Kon. Akad. Wetensch., Amsterdam 2(5): 7, 1 f. 1–2. 1854.
Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Indonesia (Gradstein et al., 2005; Ho et al., 2006), Japan (Iwatsuki, 2004), Malaysia (Menzel & Schultze-Motel, 1991; Yong et al., 2013), Philippines (Jia & He, 2013), Thailand (Dixon, 1932, as *S. gedeanum*), Vietnam (Tan & Iwatsuki, 1993), Papua New Guinea (Tan, 2000a).

Sphagnum junghuhnianum subsp. **pseudomolle** (Warnst.) H. Suzuki, Jap. J. Bot. 15: 194. 1956.
Sphagnum pseudomolle Warnst., Beih. Bot. Centralbl. 16: 247. 1904. **Type:** China, Taiwan, Taitum, *Faurie 48*.
Sphagnum junghuhnianum Dozy & Molk. var. *pseudomolle* (Warnst.) Warnst., Sphagn. Univ. 117. 1911.
Sphagnum kiiense Warnst., Sphagn. Univ. 82. 1911.
Distribution: China (Jia & He, 2013), India (Jia & He, 2013), Indonesia (Jia & He, 2013), Japan (Iwatsuki, 2004), Malaysia (Jia & He, 2013), Philippines (Jia & He, 2013), Thailand (Jia & He, 2013).

Sphagnum khasianum Mitt., J. Proc. Linn. Soc. Bot. Suppl. 1: 156. 1859. **Type:** India, Khasia, *Hooker & Thomson 1282*.
Sphagnum subsecundum Nees Strum. var. *khasianum* (Mitt.) C.E.O. Jensen ex Broth. Symb. Sin. 4: 8. 1929. **Type:** China, Sichuan: Yunnanfu, 2250m, *Handel-Mazzetti 13054*; Sichuan, Ningyuen, 2700m, *Handel-Mazzetti 1530*.
Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Nepal (Hattori, 1975), Thailand (Jia & He, 2013).

Sphagnum kushiroense H. Suzuki, J. Jap. Bot. 16: 258. 1958.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum lenense H. Lindb. ex Pohle, Acta. Horti Bot. Acad. Sci. (ante Petrop.) 33: 14. 1915. **Type:** Russia: Siberia, *A. K. Cajander s.n*. 1901.
Sphagnum lindbergii subsp. *lenense* (H. Lindb. ex Pohle) Podp., Consp. Musci Eur. 33. 1954.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Iwatsuki, 2004), Europe, Greenland, N. America.

Sphagnum lescurii Sull., Manual (ed. 2): 611. 1856.
Distribution: Türkiye (Četin, 1988b).

Sphagnum lindbergii Schimp., Öfvers. Förh. Kongl. Svenska Vetensk.-Akad. 14: 126. 1857.
Distribution: Far East of Russia (Ignatov et al., 2000), Japan (Iwatsuki, 2004).

Sphagnum luzonense Warnst., Bot. Centralbl. 76: 388. 1898. **Type:** Philippines, Luzon, *Loher 1047*.
Sphagnum densirameum Dixon, J. Siam Soc. Nat. Hist. Suppl. 9: 4. 1932.
Sphagnum luzonense var. *macrophyllum* Warnst., Sphagn. Univ. 398.1911.
Sphagnum luzonense var. *sordidum* Warnst., Sphagn. Univ. 398.1911.
Sphagnum subsecundum Nees var. *luzonense* (Warnst.) C.E.O. Jensen ex Broth., Symb. Sin. 4: 8. 1929.
Distribution: China (Jia & He, 2013), Philippines (Tan & Iwatsuki, 1991), Thailand (Dixon, 1932, as *S. densirameum*), Vietnam (He & Nguyen, 2012).

Sphagnum magellanicum Brid., Muscol. Recent. 2 (1): 24. 1798.
Sphagnum medium Limpr., Bot. Centralbl. 7: 313. 1881.
Sphagnum wallisii Müll. Hal., Linnaea 38: 573. 1874.
Distribution: Bhutan (Long, 1994), China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), India (Gangulee, 1969), Japan (Iwatsuki, 2004), Indonesia (Jia & He, 2013), Mongolia (Tsegmed, 2001), Türkiye (Kirmaci & Kürschner, 2013), Europe, Africa, Madagascar, N. America, Peru (Menzel, 1992a), Chile (He, 1998), Brazil (Churchill, 1998).

Sphagnum majus (Russow) C.E.O. Jensen, Festskr. Bot. Foren. Kjøbenhavn 106. 1890.
Sphagnum cuspidatum var. *majus* Russow, Beitr. Torfm. 58, f. 50, 65. 1865.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum microporum Warnst. ex Cardot, Beih. Bot. Centralbl. 17: 3. f. 1. 1904. **Type:** Korea.
Sphagnum oligoporum Warnst. & Cardot, Bull. Herb. Boissier, sér. 2, 7: 711. 1907.
Distribution: China (Jia & He, 2013), Japan (Iwatsuki, 2004), Korea (Jia & He, 2013).

Sphagnum molle Sull., Musci Allegh. 205 [Schedae 50]. 1846.
Distribution: Türkiye (Abay & Keceli, 2014).

Sphagnum multifibrosum X.J. Li & M. Zang, Acta Bot. Yunnan. 6(1): 77. 1984. **Type:** China, Xizang, Yadong Co., 2300–3200m, *Zang Mu 195* (holotype: KUN); *Zang Mu 127* (paratype: KUN).
Distribution: China (Li, 1984).

Sphagnum nepalense H. Suzuki, Fl. E. Himalaya 1: 540. f. 32. 1966.
Distribution: India (Gangulee, 1969), Nepal (Noguchi, 1966).

Sphagnum obtusiusculum Lindb. ex Warnst., Hedwigia 29: 196. 1890.
Sphagnum ericetorum Besch., Ann. Sci. Nat., Bot., sér. 6, 10: 328. 1880.
Distribution: China (Jia & He, 2013), South Africa, Madagascar.

Sphagnum obtusum Warnst., Bot. Zeitung (Berlin). 35: 478. 1877.

Sphagnum recurvum var. *obtusum* (Warnst.) Warnst., Hedwigia 23: 121. 1884.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Iwatsuki, 2004), Mongolia (Tsegmed, 2001), South Africa, Madagascar.

Sphagnum orientale L.I. Savicz, Bot. Mater. Otd. Sporov. Rast., Bot. Inst. Komarova Akad. Nauk SSSR 7: 206. 1951.
Distribution: Mongolia (Tsegmed, 2001).

Sphagnum ovatum Hampe, Linnaea 38: 546. 1874. **Type:** India, Darjeeling, *Kurz 2104*.
Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Nepal (Jia & He, 2013), Thailand (Jia & He, 2013), Vietnam (Zhang et al., 2016).

Sphagnum pallens Warnst. & Cardot, Bull. Herb. Boissier, sér. 2, 7: 710. 1907.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum palustre L., Sp. Pl. 2: 1106. 1753.
Sphagnum cymbifolium (Ehrh.) Hedw., Fund. Hist. Nat. Musc. Frond. 2: 86. 1782.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000), Japan (Iwatsuki, 2004), Nepal (Jia & He, 2013), Thailand (Jia & He, 2013), Türkiye (Robinson & Godfrey, 1960; Četin, 1988b), Brazil (Yano, 1995).

Sphagnum palustre subsp. **pseudocymbifolium** (Müll. Hal.) A. Eddy, Bull. British Mus. (Nat. Hist.), Bot. 5: 376. 1977.
Sphagnum pseudocymbifolium Müll. Hal., Linnaea 38: 547. 1874.
Sphagnum siamense Dixon, J. Siam Soc., Nat. Hist. Suppl. 9(1): 3. 1932.
Distribution: Bhutan (Long, 1994), India (Gangulee, 1969, as *S. pseudocymbifolium*), Thailand (Dixon, 1932, as *S. siamense*).

Sphagnum papillosum Lindb., Contr. Fl. Crypt. As. 280. 1827.
Distribution: China (Jia & He, 2013), India (Gangulee, 1969), Japan (Iwatsuki, 2004), Europe, Greenland, N. America.

Sphagnum papillosum var. **confertum** Braithw., Monthly Microscop. J. 215. 1873.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum papillosum var. **riparium** Grav., Bull. Soc. Bot. Belgique 23(2): 155. 1884.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum perichaetiale Hampe, Linnaea 20: 66. 1847.
Sphagnum attenuatum Dixon, J. Bot. 79: 57. 1941.
Sphagnum beccarii Hampe, Nuovo Giorn. Bot. Ital. 4: 278. 1872.
Sphagnum fleischeri Warnst., Hedwigia 57: 77. 1915.
Sphagnum griffithianum Warnst., Hedwigia 30: 151. 1891.
Sphagnum holttumii A. Johnson, Gard. Bull. Singapore 17: 320. 1959.
Sphagnum japonicum Warnst. var. *Philippinesnse* Warnst., Sphagn. Univ. 520. 1911.
Sphagnum pauciporosum Warnst., Hedwigia 39: 109. 1900.
Sphagnum roseotinctum A. Johnson, Gard. Bull. Singapore 17: 320. 1959.
Distribution: Cambodia (Jia & He, 2013), China (Jia & He, 2013), India (Gangulee, 1969, as *S. beccarii*), Indonesia (Ho et al., 2006), Malaysia (Menzel & Schultze-Motel, 1991; Yong et al., 2013), Philippines (Jia & He, 2013), Thailand (Jia & He, 2013), Vietnam (He & Nguyen, 2012), Europe, Peru (Menzel, 1992a), Brazil (Churchill, 1998), Colombia (Churchill, 1998), Africa, Madagascar.

Sphagnum platyphylloides Warnst., Hedwigia 30: 21. 1891.
Distribution: China (Jia & He, 2013), C. S. America.

Sphagnum platyphyllum (Lindb.) Warnst., Flora 67: 481. 1884.
Sphagnum laricinum var. *playtphyllum* Lindb., Not. Sallsk. Fauna Fl. Fenn. 13: 403. 1874, *nom. inval*. Lindb. ex Braithw., Monthly Microscope. J. 13: 230. 1875.
Sphagnum contortum var. *platyphyllum* (Lindb.) Åberg Ark. Bot. 23 A: 34. 5–6. 1937.

Sphagnum isophyllum Russ., Arch. Naturk. Liv-Ehst-Kurlands, ser. 2, Biol. Naturk., 10: 415. 1894.
Sphagnum subsecundum var. *platyphyllum* (Lindb.) Cardot, Bull. Soc. Bot. Belg. 25(1): 73.1886.
Sphagnum subsecundum subsp. *platyphyllum* (Lindb.) Hérib, Mém. Acad. Sci. Clermont-Ferrand 14: 454. 1899.
Distribution: China (Jia & He, 2013), Far East of Russia (Jia & He, 2013), Japan (Iwatsuki, 2004), Türkiye (Četin, 1988b; Uyar & Četin, 2004), Europe, Greenland, N. America.

Sphagnum portoricense Hampe, Linnaea 25: 359. 1852.
Distribution: China (Jia & He, 2013), N. America.

Sphagnum pulchrum (Lindb.) Warnst., Bot. Centralbl. 82: 42. 1900.
Sphagnum intermedium var. *pulchrum* Lindb., Sphagnac. Eur. 81, pl. 25, f. g. 1878.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum pungifolium X.J. Li, Acta Bot. Yunnan. 15(2): 257. 1993. **Type:** China, Yunnan, Bijiang Co., *Zang Mu 5817* (holotype: KUN).
Distribution: China (Li, 1993).

Sphagnum quinquefarium (Lindb.) Warnst., Hedwigia 25: 222. 1886.
Sphagnum acutifolium Schrad. var. *quinquefarium* Lindb. ex Braithw., Sphagnac. Eur. N. Amer. 71. 1880.
Sphagnum acutifolium subsp. *quinquefarium* (Lindb.) Hérib. Mém. Acad. Sci. Clermont-Ferrand 14: 445. 1899.
Sphagnum plumulosum Röll var. *quinquefarium* (Lindb.) Röll, Flora 69: 89. 1886.
Sphagnum plumulosum subsp. *quinquefarium* (Lindb.) Bott., Atti Reale Accad. Lincei, Mem. Cl. Sci. Fis., ser. 3, 13(1): 20. 1919.
Sphagnum plumulosum Röll var. *microphyllum* Röll, Hedwigia 46: 210.1907.
Distribution: China (Jia & He, 2013), Japan (Iwatsuki, 2004), Europe, N. America.

Sphagnum recurvum P. Beauv., Prodr. Aethéogam 88. 1805.
Sphagnum amblyphyllum (Russow) Zick., Bull. Soc. Nat. Mosc., II, 14: 278. 1900.
Sphagnum amblyphyllum (Russow) Warnst., Sphagn. Univ. 212. 1911, *hom. illeg*.
Sphagnum apiculatum H. Lindb., Sitzungsber. Deutsch. Naturwiss.-Med. Vereins Böhmen "Lotos" Prag 51: 130.1903.
Sphagnum flexuosum Dozy & Molk., Prodr. Fl. Bat. 2(1): 76. 1851.
Sphagnum flexuosum var. *recurvum* Dozy & Molk., Prodr. Fl. Bat. 2(1): 77. 1851.
Sphagnum fallax H. Klinggr., Schrift. Naturf. Gas. Danzig ser. 2, 5(1): 209. 1881.
Sphagnum recurvum P. Beauv. var. *amblyphyllum* (Russ.) Warnst., Bot. Gaz. 15: 219. 1890.
Sphagnum pseudocuspidatum G. Roth, Eur. Torfm.75. 1906. *hom. illeg*.
Sphagnum pseudorecurvum Röll, Bot. Centralbl. 39: 340. 1889.
Sphagnum recurvum P. Beauv. var. *amblyphyllum* (Russow) Warnst., Bot. Gaz. 15: 219. 1890.
Distribution: China (Jia & He, 2013), Far East of Russia (Ignatov et al., 2000, as *S. flexuosum*), India (Gangulee, 1969), Japan (Iwatsuki, 2004), Nepal (Jia & He, 2013), Türkiye (Ören et al., 2017, as *S. flexuosum*), Europe, N. America, Peru (Menzel, 1992a), Chile (He, 1998), New Zealand.

Sphagnum recurvum var. **brevifolium** (Lindb.) Warnst., Flora 67: 608. 1884.
Distribution: Japan (Iwatsuki, 2004).

Sphagnum recurvum var. **tenue** H. Klinggr., Schriften Königl. Phys.-Ökon. Ges. Königsberg 13: 5. 1872.