

On *Macromitrium microstomum*, a notable moss species and its geographic distribution

CAO Tong¹, SHI Chun-Lei¹, GUO Shui-Liang¹,
WANG Dong-Sheng², LIU Feng²

(1. College of Life and Environment Sciences, Shanghai Normal University, Shanghai 200234, China; 2. Nabanhe National Nature Reserve, Jinghong 666110, China)

Abstract: A notable moss *Macromitrium microstomum*, which has been recorded from Taiwan, Hainan and Yunnan as *Macromitrium reinwardtii*, is newly reported from the Nabanhe Nature Reserve. Based on examination of the type and ordinary specimens as well as survey of literature concerned, *M. microstomum* was described and illustrated. The characteristics of pantropical distribution pattern of the species are discussed and a world distribution map is also presented.

Key words: Moss; Orthotrichaceae; *Macromitrium microstomum*; distribution

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Macromitrium is the largest genus of the moss family Orthotrichaceae, with about 368 species recognized in the world (Crosby *et al.*, 1999), and is mainly distributed in more montane, higher elevation sites in tropical and subtropical regions (Ramsay & Vitt, 1984; Vitt, 1983). The regional revisions of the genus *Macromitrium* have been made in New Zealand and Australia by Vitt (1983) and Vitt & Ramsay (1985a, b, 1986); Papua New Guinea by Vitt *et al.* (1995); Mexico by Vitt (1994), South Africa by Rooy & Wyk (1992) and Japan by Noguchi (1967). The greatest distribution centre of this genus is round the Pacific Ocean. In China, 44 species have been recorded up to now (Li, 2005; Guo *et al.*, 2007a, b; Xiong, 2000).

During our study of mosses collected from Nabanhe Nature Reserve in Xishangbanna, Yunnan Province, we found an interesting specimen which is identical to *Macromitrium microstomum* (Hook et Grev) Schwaegr. After checking the literature concerned, it is found that this species has been recorded from Taiwan (Iwatsuki & Sharp, 1970; Lai & Wang, 1976; Kuo & Chiang, 1987; Lin, 1988), Hainan Island (Lin *et al.*, 1992), and

Yunnan (Li *et al.*, 2003), but under the name of *Macromitrium reinwardtii* Schwaegr. For understanding this notable species better, some types and ordinary specimens from China and other countries were examined by Guo S. L. during his visit to the herbarium of Missouri Botanical Garden (MO). Based on examination of the specimens as well as literature, *Macromitrium microstomum* is newly reported from the Nabanhe Nature Reserve, Xishangbanna and described, and its geographic distribution in the world is presented here.

Macromitrium microstomum (Hook. & Grev.) Schwaegr., *Spec. Musc. Suppl.* 2(2): 130. 1827. *Orthotrichum microstomum* Hook. & Grev., *Edinb. J. Sci.* 1: 114. 1824. TYPE: "Van Dieman's Land [sic]; Dr. Spence (Lectotype, E-Grev! selected by Vitt 1985a), "Dr. Spence and W. r. Neill 1824)" (Fig. 1).

Macromitrium reinwardtii Schwaegr., *Spec. Musc. Suppl.* 2(2): 69. 173. 1826. TYPE: "In Java leit et misit cl. Prof. Reinwardt." (Lectotype, G-Schwaegr! selected by Vitt, 1985a).

Plants small to moderately size, slender, delicate. Stem creeping, prostrate, with numerous erect bran-

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作者简介: 曹同(1946-), 男, 教授, 博士生导师, 从事苔藓植物系统与生态学研究, (E-mail) ct1946@263.net.

ches, up to 9 mm high. Stem leaves ovate-lanceolate, acuminate-subulate. Branch leaves often flexuous twisted, incurved to enrolled when dry, keeled, spiral arrangement, giving the shoots a ropelike appearance, spreading when moist, 1.3–2.4 mm long, lanceolate, gradually narrowed to a slender acute or short-acuminate apex; leaf margins plane above, recurved below, entire; costa slender, ending 10–12 cells below the apex to short excurrent. Upper lamina cells 8–9 μm wide, rounded with occasional cells subquadrate, shortly-elliptic, or irregularly quadrate, firm-walled, smooth and flat; median lamina cells 10–20 \times 8.0–10.0 μm , elliptic to rectangular, flat and smooth; basal lamina cells elongate, 24.0–55.0 \times 7.0–8.0 μm , with evenly-thickened walls. Inner perichaetial leaves oblong-lanceolate to ovate-oblong, quickly contracted to a slender acuminate-sharply cuspidate apex. Seta 15–25 mm long, straight or flexuose, slender, smooth. Capsule oblong, 8-plicate, sharply puckered at darker mouth; stomata superficial on neck. Peristome single, exostome consists of 16 narrow, lanceolate, pale, well developed teeth, coarsely papillose, endostome absent. Calyptrae cucullate, naked and small. Spore large, isosporous, 30–54 μm in diameter.

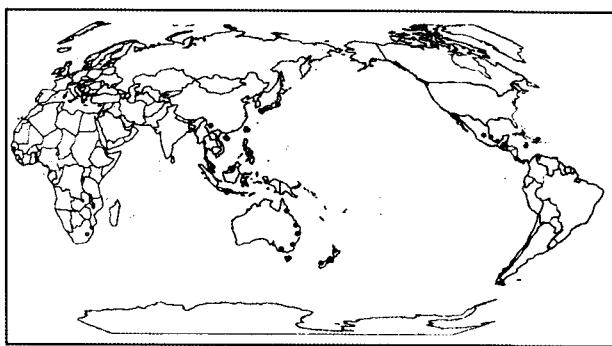


Fig. 1 *Macromitrium microstomum* (Hook. & Grev.) Schwaegr. 1–7. Branch leaves; 8, 9. Perichaetial leaves; 10. upper cells of perichaetial leaf; 11. Medial cells of perichaetial leaf; 12. Basal cells of perichaetial leaf; 13. Upper cells of branch leaf; 14. Upper and medial cells of branch leaf; 15. Medial cells of branch leaf; 16. Medial and basal cells of branch leaf; 17. Basal cells of branch leaf; 18, 19. Capsules. Line scale: A=10 μm (10–17); B=100 μm (1–9); C=500 μm (18, 19).

The diagnostic features of *Macromitrium microstomum* are: (1) small, olive-green, lustrous plants; (2)

branch leaves spiral arrangement, giving the shoots a ropelike appearance when dry; (3) all leaf cells smooth, flat and clear; (4) acute leaf apices with costae ending in the apex; (5) capsules narrowed to a puckered mouth on long setae; (6) calyptra cucullate and naked.

Macromitrium microstomum is similar to *M. angustifolium* Dozy & Molke and *M. fasciculare* Mitt. It could be separated from *M. angustifolium* by its smooth upper lamina cells and straight (not sigmoid) linear-rectangular basal lamina cells and from *M. fasciculare* by its smooth and naked calyptrae.

Specimens examined from China: YUNNAN: Xishuangbanna, Nabanhe National Nature Reserve, Mandian Station, on fallen tree trunks beside mountain road, alt. 700 m, Cao Tong & Song Guo-Yuan 060194 (SHTU); HAINAN: Changjiang County, Vic. Bawanglin Forestry Station. Ca 2.6 km ESE of the Station, along logging road up mountain. On fallen tree branch, 19°15' N, 109°15' E, alt. 1360 m, W. D. Reese no. 17645, Mar. 16 1990 (MO); Chang Jiang County, Vic. Bawanglin Forestry Station. Ca 2.6 km ESE of the Station, along logging road up mountain, fallen branch on mountain top, 19°15' N, 109°15' E, alt. 1525 m, W. D. Reese no. 17656, Mar. 16 1990 (MO).

Distribution: *Macromitrium microstomum* is widely distributed in the Pacific Ocean area, from Hawaii southward and westward to at least Java. This species is known from Mexico (Chiapas, Mexico, Veracruz), Guatemala, Costa Rica, Cuba, Jamaica, the Dominican Republic, Hawaii, Java (Vitt, 1994), Cairns, south to Tasmania, eastern Australia (Vitt, 1985a, b), New Zealand (Vitt, 1983), Western Melanesia (Papua New Guinea, New Guinea, Malaysia) (Vitt & Ramsay, 1995; Eddy, 1996). Recently, Wilbraham (2007) placed *Macromitrium seemannii* Mitt., *M. macropelma* Müll. Hal. and *M. nitidum* Hook in synonymy with *M. microstomum* and increased the range of *M. microstomum* to include Brazil (St. Helena), South Africa and Malawi. This species is recorded under the name of *Macromitrium reinwardtii* from Japan (Honshu, Kyushu) (Noguchi, 1994, Iwatsuki, 2004), Philippines (Luzou, Mindoro, Panay) (Bartram, 1972), China, including Taiwan (Lai & Wang, 1976; Kuo & Chiang, 1987a; Li,

1988; Iwatsuki & Sharp, 1970; Noguch, 1967), Hainan Island (Lin *et al.*, 1992), Yunnan (Li *et al.*, 2003). Now it is reported from Xishuangbanna, China too herewith.

According to world map on Index Muscorum (Wijk *et al.*, 1959), the range of geographic distribution of *Macromitrium microstomum* is: **Am2**: Mexico, Guatemala, Costa Rica. **Am3**: Cuba, Jamaica, the Dominican

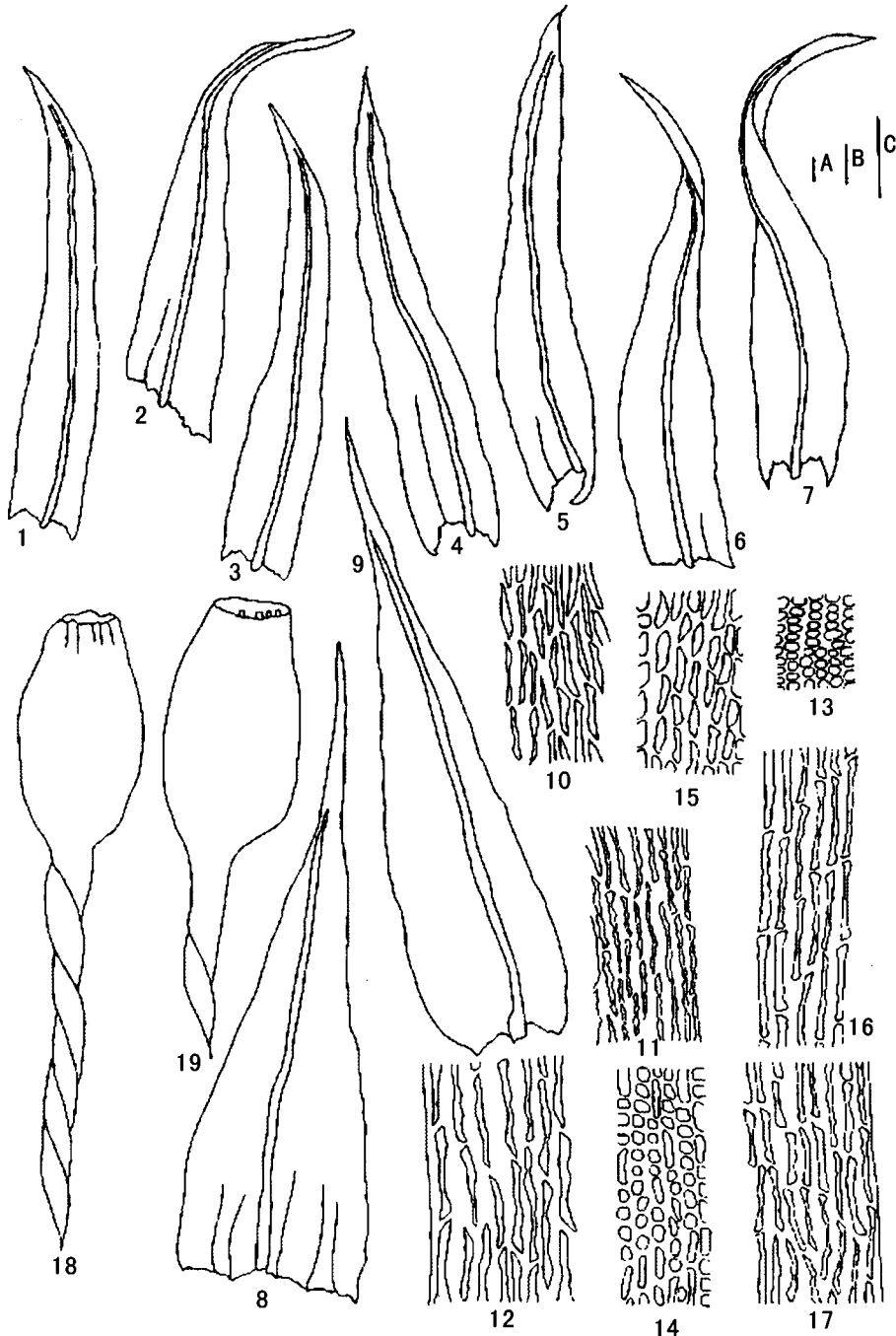


Fig. 2 Distribution map of *Macromitrium microstomum* (Hook. & Grev.) Schwaegr. in the world

Republic. **Am5**: Brazil. **Oc.**: Hawaii. **Af4**: South Africa. **Austr 1 & 2**: Cairns, south to Tasmania, eastern Australia, New Zealand. **As4**: Indonesia (Java), Philippines, Malaysia, Papua New Guinea, New Guinea. **As2**: Japan (Honshu, Kyushu), China (Taiwan, Hainan Island,

Yunnan). The distribution map (Fig. 2) showed *M. microstomum* is a typical species with pantropical distribution.

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一种值得关注的藓类植物:长柄藓及其地理分布

曹 同¹, 施春蕾¹, 郭水良¹, 王东升², 刘 峰²

(1. 上海师范大学 生命与环境科学学院, 上海 200234; 2. 纳板河国家级自然保护区, 云南 景洪 666110)

摘 要: 长柄藓(*Macromitrium microstomum* (Hook. & Grev.) Schwaegr.) 曾以 *Macromitrium reinwardtii* 的学名在我国台湾, 海南和云南有记录。报道了该种在西双版纳纳板河国家自然保护区的新分布。在查检模式标本和相关国内外标本和文献的基础上, 对长柄藓进行了描述和图示, 讨论了该种泛热带的地理分布特点, 并提供了世界分布图。

关键词: 藓类植物; 木灵藓科; 长柄藓; 地理分布