
Encalypta tianschanica (Musci: Encalyptaceae), a New Species from Western China, with a Key to the Species of *Encalypta* in Xinjiang

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ABSTRACT. *Encalypta tianschanica*, a new Chinese endemic from Xinjiang province, is described, illustrated, and compared with *E. buxbaumioidea* T. Cao, C. Gao & X.-L. Bai, an Inner Mongolian endemic that has narrowly pyriform capsules and a strongly excurrent costa. The new species is distinguished by its ovoid capsules, which are abruptly contracted to a very small mouth, and by its costa ending well below the leaf apex. The presence of distally "warty" spores places the new species in section *Rhabdotheca* C. Müller. A key to the six species of *Encalypta* Hedwig in Xinjiang is included.

While working through our bryophyte collections made in Xinjiang Uygur Autonomous Region (Xinjiang), we encountered an interesting moss that belongs to *Encalypta*. This discovery has led us to present the following discussion on the genus.

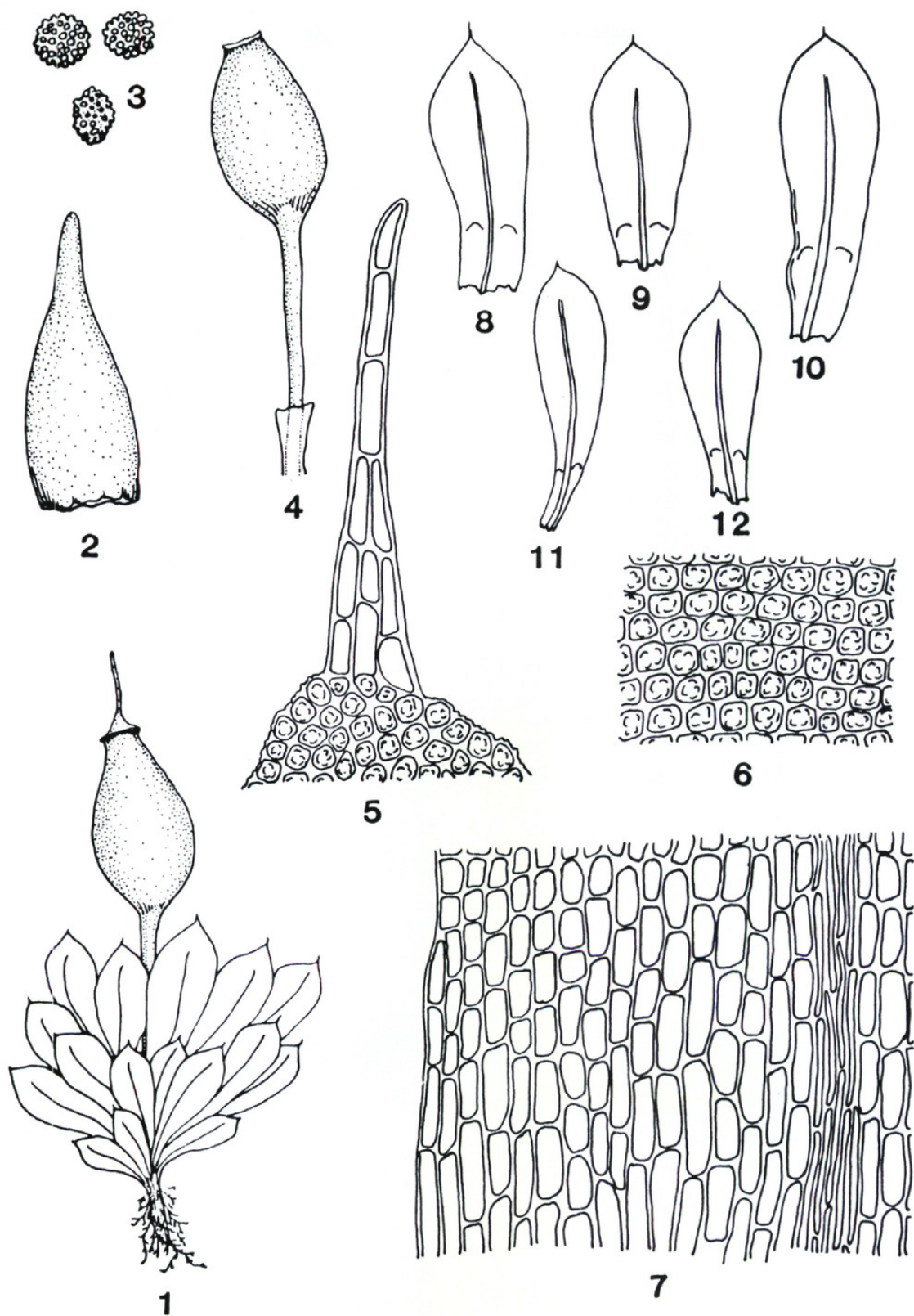
The genus *Encalypta* is characterized by a prominent and usually persistent, campanulate, non-plicate calyptra covering the whole capsule, by quadrate upper leaf cells that are obscure with dense papillae, and by elongate basal leaf cells that are often reddish with markedly thickened transverse walls. The species of *Encalypta* are predominantly distributed in the Northern Hemisphere, where they are characteristic components of northern and montane vegetation. In a world-wide revision of the Encalyptaceae, Horton (1982, 1983) accepted 19 species and 4 subspecies in *Encalypta*. Six or seven species were recognized from China by T. Cao et al. (1992) and T. Cao and C. Gao (1996), respectively, although Redfearn et al. (1996) listed eleven species of *Encalypta* from China. *Encalypta sibirica* (Weinmann) Warnstorf was reported as new to China by Horton (1983), but it was not included in T.

Cao and C. Gao (1996). The latter study, however, includes two previously untreated species, *Encalypta spathulata* C. Müller and *E. vulgaris* Hedwig, by T. Cao et al. (1992). Tan et al. (1995) reported five species of *Encalypta* from Xinjiang. Unlike other Chinese species, which tend to have excurrent or at least percurrent costae and cylindric or pyriform capsules that are not contracted or only gradually contracted to a small mouth, the new collection we made in the Tianshan Mountains has costae ending well below the leaf apex and ovoid capsules that are abruptly contracted to a small mouth. This moss does not match any of the species already described from China (T. Cao et al., 1992; T. Cao & C. Gao, 1996), nor is it identical to any other species of *Encalypta* reported for Xinjiang (Tan et al., 1995). It is described below as a new species.

Encalypta tianschanica J.-C. Zhao, R.-L. Hu & S. He, sp. nov. TYPE: China. Xinjiang: Tianshan Mountain Range, Guongnes forest station, near Guongnes river, 43°15'N, 84°45'E, J.-C. Zhao 953288-b, 30 July, 1995 (holotype, HBNU; isotypes, HSNU, MO). Figures 1–12.

Plantae *Encalyptae buxbaumioideae* T. Cao, C. Gao et X.-L. Bai similis. Differt ab *E. buxbaumioidea* foliis et capsulis. Folia obtusa vel late rotunda, costa supene angusta, longe infra apiceum folii evanida. Capsula ovoidea vel ovato-oblonga, symmetrica, ca. 1.7–1.9 mm longa et ca. 1.0–1.1 mm crassa.

Plants small, to 6–8 mm tall, green to yellowish green above, bright brown below, in dense tufts. Stems simple or sparsely branched; central strand indistinct. Leaves slightly tortuose when dry, erect-spreading when moist, 2.2–3.5 mm long, obovate or spatulate, abruptly narrowed to a hyaline hair-



Figures 1–12. *Encalypta tianschanica* J.-C. Zhao, R.-L. Hu & S. He. —1. Plant ($\times 13$). —2. Calyptra ($\times 16$). —3. Spores ($\times 160$). —4. Capsule ($\times 16$). —5. Apical leaf cells ($\times 160$). —6. Median leaf cells ($\times 160$). —7. Basal leaf cells ($\times 160$). —8–12. Vegetative leaves ($\times 16$). All drawn from the holotype, J.-C. Zhao 953288-b (HBNU).

point at the apex, hairpoint 0.5 mm long, nearly smooth; upper leaf margins plane or nearly so; costa single, strong, ending well below the leaf apex; upper leaf cells small, irregular quadrate to rounded-

quadrate, 18–25 μm diam., densely papillose, basal cells oblong with thickened transverse walls, 20–24 $\mu\text{m} \times 52\text{--}68 \mu\text{m}$, brownish yellow; 3–4 rows of basal marginal cells linear, 11–14 $\mu\text{m} \times$

45–58 μm , thin-walled, pale in color. Autoicous. Perichaetial leaves the same as or slightly smaller than the upper stem leaves. Setae very short, 1.5–1.7 mm long, erect or slightly inclined, brownish yellow; capsules ovoid, smooth, suddenly contracted from a broad base to a very small mouth; peristome absent; annuli undifferentiated; opercula low conic-rostrate, with a long, slightly oblique beak; calyptrae covering the whole capsules, smooth, often ragged at base, with an obtuse rostrum, ca. $\frac{1}{3}$ the calyptra length. Spores 38–45 μm diam., heteropolar, with large, verrucate protuberances (warty papillae) on the distal surface, radially plicate on the proximal surface.

Habitat. On soils at base of trees under *Picea schrenkiana* forest; altitude 2000 m.

Encalypta tianschanica is named after Tianshan, the largest mountain in the central part of Eurasia. The new species is notable for its distally “warty” spores, which clearly place it in section *Rhabdotheca* (Horton, 1983: 413–414). Among the species in the section, *E. tianschanica* is similar to *E. buxbaumioidea* and *E. spathulata* in having hyaline hair-pointed leaves, undifferentiated annuli, and no peristome teeth (T. Cao & C. Gao, 1990). Between the two related species, *Encalypta tianschanica* appears closest to *E. buxbaumioidea* since both have very short setae (less than 2.0 mm long) and share peculiarly shaped capsules that are gasterpodous and become contracted to a small mouth. It differs from the latter species by its ovoid capsules that are abruptly contracted to a small mouth, by its costa ending well below the leaf apex, and by its upper leaf margins that are plane or nearly so. In *Encalypta buxbaumioidea*, however, the capsules are narrowly pyriform and gradually contracted to a small mouth, the costa is excurrent in a rather long awn, and the upper leaf margins are distinctly incurved.

KEY TO THE SPECIES OF *ENCALYPTA* IN XINJIANG

- 1. Spores nearly smooth on the distal surface 2
- 1'. Spores with large, verrucate protuberances on the distal surface 3
- 2(1). Peristome absent; upper leaves gradually tapered to narrowly acute or stoutly apiculate at the apex; calyptrae with a shorter rostrum, ca. $\frac{1}{4}$ – $\frac{1}{3}$ the calyptra length *E. alpina* Smith
- 2'. Peristome present; upper leaves \pm abruptly narrowed and mucronate at the apex; calyptrae with a longer rostrum, ca. $\frac{1}{2}$ the calyptra length *E. ciliata* Hedwig
- 3(1). Capsules ovoid, smooth, abruptly contracted to a small mouth; costa ending well below the leaf apex *E. tianschanica* J.-C. Zhao, R.-L. Hu & S. He
- 3'. Capsules cylindric to elliptic-cylindric, fur-

- rowed, only slightly contracted below the mouth; costa excurrent or percurrent 4
- 4(3). Peristome teeth well developed; annuli differentiated *E. rhapsocarpa* Schwaegrichen
- 4'. Peristome absent or vestigial, white to hyaline; annuli undifferentiated 5
- 5(4). Leaf apex hair-pointed; costa excurrent; calyptrae pale-golden and transparent, fringed at the base *E. spathulata* C. Müller
- 5'. Leaf apex often muticous or apiculate; costa percurrent; calyptrae golden brown and translucent, fringe absent *E. vulgaris* Hedwig

Specimens examined. CHINA. **Inner Mongolia:** (*Encalypta buxbaumioidea*), Haunggangliang forest centre, Keshike Qi (Banner) near Chifeng City, 21. X. 1985, X.-L. Bai 70 (holotype, Dept. of Biol., Univ. of Inner Mongolia; isotype, IFSBH). **Xinjiang:** (*E. alpina*), Mt. Bogda, near Tian-chi, J.-C. Zhao 2234, 2831-b (XJU), K.-J. Guan 4375 (PE); Fukang Co., J.-C. Zhao 3185 (XJU); Miquan Co., J.-C. Zhao 99 (XJU). (*E. ciliata*), Mt. Tianshan, Tian-chi, 2300–2500 m, J.-C. Zhao 2869, 2955, 3010 (XJU). (*E. rhapsocarpa*), Mt. Tianshan, Tianchi, J.-C. Zhao 3281, 2808 (XJU); Miquan Co., J.-C. Zhao 17 (XJU). (*E. spathulata*), Mt. Bogda, 3300 m, grassland, J.-C. Zhao 2258-a (XJU); Miquan Co., J.-C. Zhao 4229 (XJU); Urumqi Co., J.-C. Zhao 3171-b (XJU). (*E. vulgaris*), Mt. Altai, J.-C. Zhao 1669 (XJU); Mt. Bogda, J.-C. Zhao 4709, 4514-b (XJU).

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