

Notes on Chinese Geocalycaceae (Hepaticae). 1

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The distinguishing characters of *Heteroscyphus planus* (Mitt.) Schiffn. and *H. tener* (Steph.) Schiffn. are discussed. Both species are illustrated and range extensions in China are given. *Lophocolea magniperianthia* Horik. is synonymized with *Chiloscyphus costatus* (Nees) Engel & Schust.

Key words: China, Geocalycaceae, Hepaticae, *Heteroscyphus*, taxonomy

This paper on the Chinese Geocalycaceae belongs to my studies on the Asian taxa of the family (Piippo 1985, 1989, 1992, 1993). According to Piippo (1990), 30 species of Geocalycaceae are recorded for China, one in *Harpanthus* Nees, one in *Geocalyx* Nees, two in *Saccogynidium* Grolle, 10 in *Heteroscyphus* Schiffn., and 16 in *Chiloscyphus* Corda. In the present paper one species of *Chiloscyphus* is excluded from the Chinese flora.

1. *Chiloscyphus costatus* (Nees) Engel & Schust.

Nova Hedwigia 39: 413. 1984. — *Jungermannia costata* Nees, Hep. Javan. 69, no. 94. 1830. — *Lophocolea costata* (Nees) Gott., Bot. Zeit. 16, Beitr. 38. 1858. — Type: Indonesia. Habitat inter muscos locis montosis Javae, *Blume s.n.*, ex hb. Lehmann (S!, isotype).

Lophocolea magniperianthia Horik., J. Sci. Hiroshima Univ., Ser. B, Div. 2, 2: 166. 1934, *syn.nov.* — Type: Taiwan. Prov. Takao: Mt. Daijurin, 1932 *Horikawa 10712* (not seen).

Kuo & Chiang (1988) synonymized *Lophocolea magniperianthia* Horik. with *Chiloscyphus semiteres* (Lehm.) Lehm. & Lindenb. In this paper *Lophocolea magniperianthia* is synonymized with *Chiloscyphus costatus* (Nees) Engel & Schust.

C. semiteres does not at all occur in China. The latter has leaf apices entire or 2-toothed, but otherwise marginal teeth are absent. Leaves are symmetrical with both the ventral and dorsal sides arched (see the description and illustration in Grolle 1959). Underleaves are 2-lobed and variously toothed but always with a distinct sinus between the lobes. Perianths do not have wings. Both *Lophocolea magniperianthia* and *Chiloscyphus costatus* have numerous marginal teeth in their leaves. Leaves are asymmetrical: dorsal side almost straight and ventral side arched. Underleaves have numerous teeth and there is no apical lobing. Perianths have broad wings. The distinguishing characters of *C. costatus* were discussed by Piippo (1985).

Illustrations: Lindenberg 1839–43: Tab. XXVI as *Plagiochila costata*, Piippo 1985: 157 (fig. 15a–j).

Range in China (Piippo 1990): Taiwan.

Total range (Piippo 1985): Taiwan, Malaysia, Indonesia, Borneo, Philippines, Papua New Guinea.

2. *Heteroscyphus planus* (Mitt.) Schiffn. (Fig. 1)

Österr. Bot. Zeitschr. 60: 171. 1910. — *Chiloscyphus planus* Mitt., J. Proc. Linn. Soc. London 8: 157. 1865. — Type: Japan. Nagasaki, *Oldham s.n.*, ex hb. K (G, not seen).

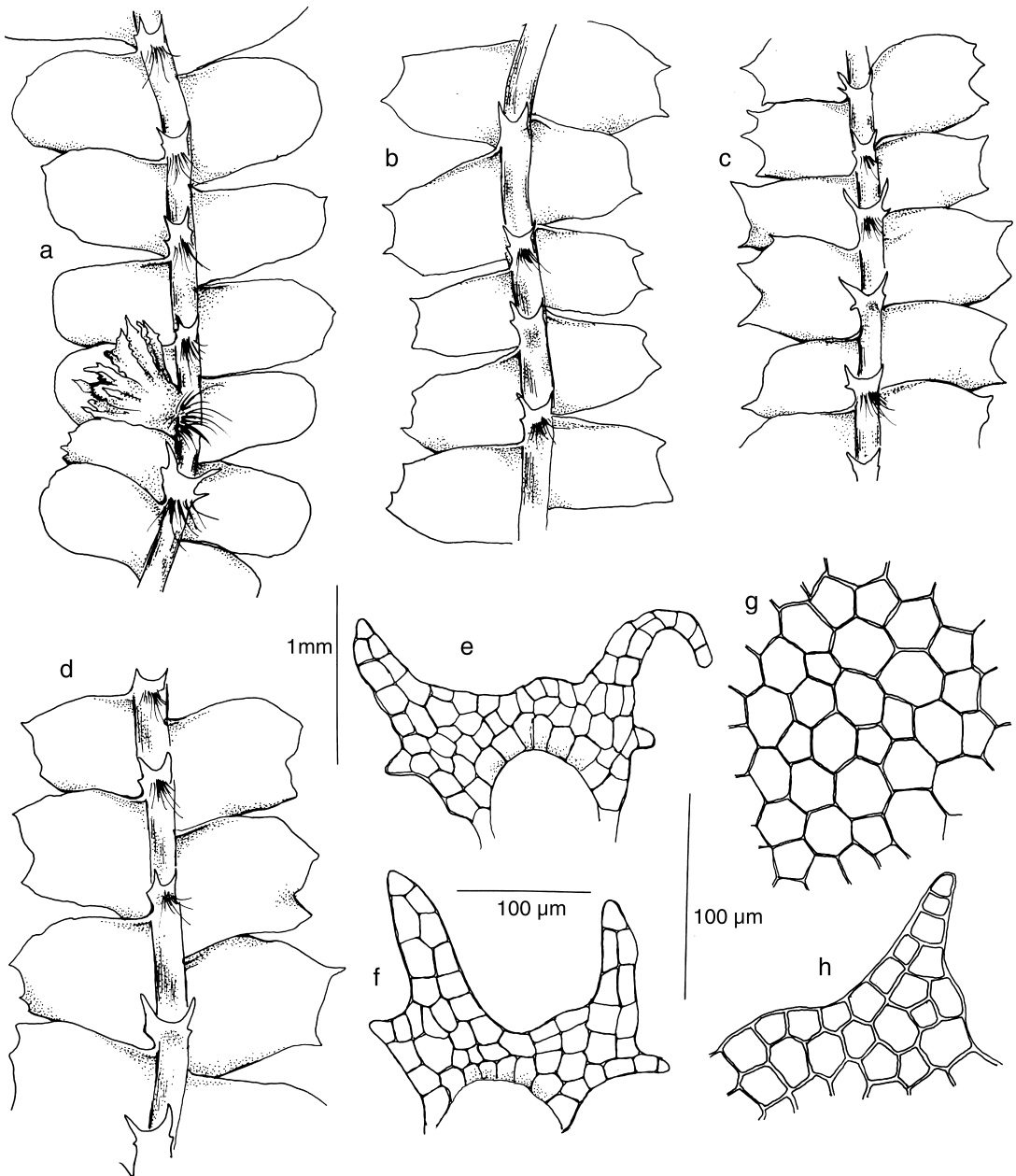


Fig. 1 a–h. *Heteroscyphus planus* (Mitt.) Schiffn. — a–d: Habits from ventral side, a with female organ. — e, f: Underleaves. — g: Cells from median portion of leaf. — h: Apical tooth and cells. — a, e from *Expedition team 584*, b, d, f–h from *Lin 4611*, c from *Expedition team 264* (all IBSC). Use the 1 mm scale for a–d, the longer 100 μm scale for g and h, and the shorter 100 μm scale for e and f.

Plants olive green, dark green, greyish green or dark yellowish green, rarely pale green, ca. 1–2 cm long and 1–2 mm wide; leaves approximate, occasionally distant, to 0.6–0.8 mm long and 0.3–0.8 mm

wide, apex usually 2–3-toothed, occasionally 4–5 small teeth or only one tooth, sometimes leaves entire, teeth 1–4 cells long, apices with or without an irregular V- or U-shaped sinus. Cells at leaf api-

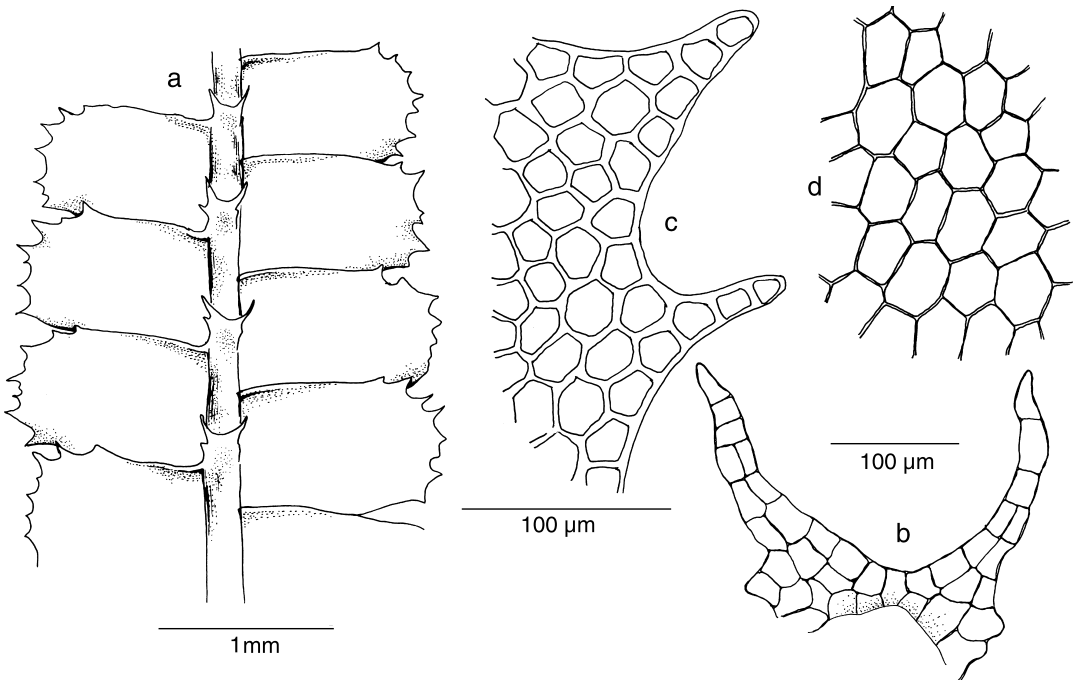


Fig. 2a–d. *Heteroscyphus argutus* (Reinw. et al.) Schiffn. — a: Habit from ventral side. — b: Underleaf. — c: Apical teeth and cells. — d: Cells from median portion of leaf. — Drawn from *Dao 36099* (IBSC). Use the 1 mm scale for a, the longer 100 µm scale for c and d, and the shorter 100 µm scale for b.

ces 13–20(–25) µm long and 15–28(–30) µm wide, median and basal cells 20–33(–38) µm long and 20–28(–38) µm wide, trigones absent or tiny, cell walls thick at apices and margins, less so in the median cells, cuticle smooth. Underleaves almost rectangular, 2-lobed and both margins with one tooth, lobes long or shorter. Gynoecial branches ventral intercalary, without normal leaves, bracts and bracteoles with toothed margins. Perianth deeply lobed and toothed. For the description of sporophyte, see Inoue (1974).

Illustrations: Hattori 1944a: 47 (fig. 27), 1944b: 40 (fig. 16), Inoue 1974: 85 (pl. 42).

Heteroscyphus planus (Mitt.) Schiffn. is very closely related to *H. argutus* (Reinw. et al.) Schiffn. (Figs. 1 & 2). They both share the dark colour. Usually they are not translucent as *H. coalitus* (Hook.) Schiffn. and *H. zollingeri* (Gott.) Schiffn. The distinguishing characters of the latter two species were given by Piippo (1985). The only differences between *H. argutus* and *H. planus* can be found at their leaf apices: those of *H. argutus* have in average more

numerous teeth than *H. planus*. *H. argutus* is, however, variable, having as few as 1–5 teeth at its leaf apices (Piippo 1993). Variability is characteristic of the leaf apices of *H. planus*: the teeth are irregular, not usually as well developed as in *H. argutus* and there is a typically irregular U- or V-shaped sinus between the teeth in some leaves of a shoot. Some leaves may, however, be even entire or 2-toothed similarly as in *H. coalitus*. The latter is, however, always translucent and the leaf apices are regularly 2-toothed. Its leaves are usually also longer than those of *H. argutus* and *H. planus*.

Range in China (the order of the provinces follows Piippo 1990): Henan (*nov.*): S of Tongbai Co., 1960 *Xin-Xiang Normal College 130* (PE). Sichuan (Piippo 1990). Hubei (*nov.*): Wuchang City, Lojia Mt., 1953 *Yx 3* (PE). Anhui, Jiansu, Yunnan (Piippo 1990). Guizhou (*nov.*): Bijie, 1964 *Li 524* (PE); Near Guiyang City, 1959 *Guiyang Normal College 121* (PE), 1964 *Guiyang Normal College 6390* (PE). Guangxi (*nov.*): Rongshan Co., 1964 *Wu & Lin 202, 304, 946* (IBSC). Hunan (Piippo 1990). Guangdong (*nov.*): Lechang Co., Dianxianshang Mt., 1986 *Wang 6* (IBSC); Guangzhou Co., Botanical Garden, 1961 *Lin 138* (IBSC). Hainan (*nov.*): Diaoluoshan Mt., 600 m, 1977 *Expedition team 3164* (IBSC);

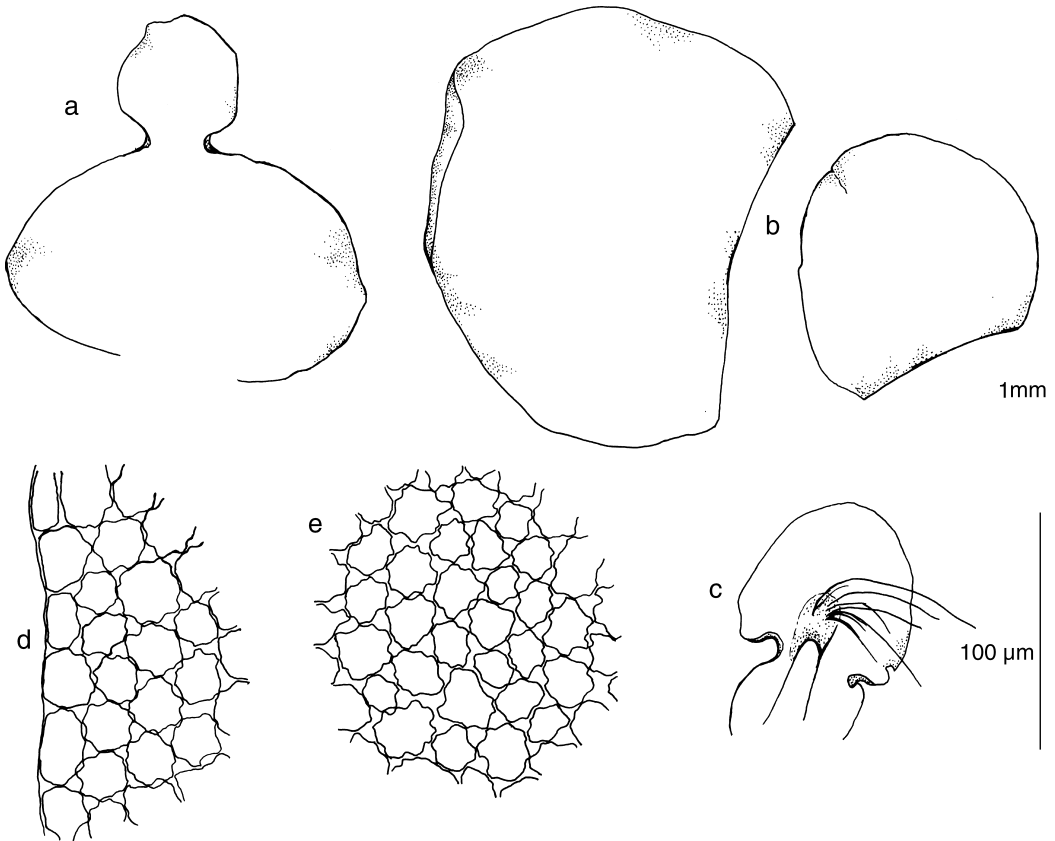


Fig. 3a–e. *Heteroscyphus tener* (Steph.) Schiffn. — a: Underleaf and leaves. — b: Leaves. — c: Underleaf. — d: Marginal cells. — e: Cells from median portion of leaf. — Drawn from Wu & Lin 941 (IBSC). Use the 1 mm scale for a–c, and the 100 µm scale for d and e.

Bawangling Mt., 810 m, 1984 Zheng 103 (IBSC). Taiwan (Piippo 1990).

Total range: China, Japan.

3. *Heteroscyphus tener* (Steph.) Schiffn. (Fig. 3)

Österr. Bot. Zeitschr. 60: 172. 1910. — *Chiloscyphus tener* Steph., Spec. Hep. 3: 205. 1907. — Type: China. Schensi, Giraldi s.n., hb. Levier 1804 (G-3733).

Saccogyna curiosissima Horik., J. Sci. Hiroshima Univ., Ser. B, Div. 2, 1: 79. 1932. — Type: Japan. Honshiu: Prov. Shinano, Mt. Yatsugadake, ca. 2 800 m, 1930 Sato (not seen). — Synonymized by Grolle (1960: 65).

Plants greyish, brownish, translucent or not, ca. 2 cm long and to ca. 3 mm wide; leaves imbricate, always totally or somewhat clasping, connate on dorsal side, undulating, fragile, to 1.9 mm long and 2.1 mm wide, margins toothless but occasionally

crenulate. Cells at the outermost marginal cell row of leaves often widened, 8–33 µm long and 18–30 µm wide, median and basal cells 15–38 µm long and wide, trigones very large, bulging, confluent with small intermediate thickenings, cell walls thick and obscure because of thickenings, cuticle smooth. Underleaves rounded, ca. 3–4 × stem width, apices entire or shallowly 2-lobed, margins entire to crenulate. No reproductive organs seen.

Illustrations: Horikawa 1932: pl. 11 (figs. 1–5), 80 (fig. 3) as *Saccogyna curiosissima*.

The leaves of *Heteroscyphus tener* (Steph.) Schiffn. are undulating and distinctly clasping so that the leaves are curved to dorsal side of shoot making the plants look very obscure. Usually the plants are translucent, but they may also be too brown or yellowish to be translucent.

Heteroscyphus tener is related to *H. splendens* (Lehm. & Lindenb.) Grolle, also occurring in China, but the leaves of *H. splendens* are less rounded than those of *H. tener*, underleaves have more numerous teeth, trigones are more regular in shape, and cells usually lack intermediate thickenings. *H. splendens* is not translucent. *H. tener* is more fragile, trigones are large and irregular, and the cells in the outermost marginal row are often much wider than long. Underleaves often lack lobes or teeth.

Range in China (the order of the provinces follows Piippo 1990): Shaanxi, Anhui (Piippo 1990). Guangxi (*nov.*): Rongshan Co., 590–1 750 m, 1964 *Wu & Lin* 134, 318, 499C, 683, 941, 1371 (IBSC); Miadershan Mt., 2142 m, 1974 *Gao, Lin et al.* 1512 (IBSC). Hainan (*nov.*): Limuling Mt., 1981 *Lin et al.* 144 (IBSC). Fujian (*nov.*): Wuyi Mt., 1980 *Lin* 2776, 2782, 2921 (IBSC). Taiwan (Piippo 1990).

Total range (Grolle 1960): China, Japan, Sri Lanka.

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