Chiloscyphus subgenus Phaeochiloscyphus (Hepatophyta, Geocalycaceae) from southern South America

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Abstract: Chiloscyphus subgenus Phaeochiloscyphus J. J. Engel & R. M. Schust. is revised and shown to contain two species, C. durus (Steph.) Hässel, comb. nov. and C. magellanicus Steph. Study of additional material has shown that Chiloscyphus hookeri J.J. Engel must be treated as a new synonym of C. durus, as is Leptoscyphus decipiens Mitt., nom. inval. Chiloscyphus lobatus Steph. is treated as a new synonym of C. magellanicus. The two accepted species are distinguished by a key; typification and synonymy are presented in full and all specimens studied from Chile and Argentina are cited along with a summary of distribution and ecology. Finally, C. magellanicus is fully described and illustrated for the first time.

Key words: Hepaticopsida, Liverwort, Geocalycaceae, taxonomy, Chile, Argentina.

Chiloscyphus subgenus Phaeochiloscyphus J. J. Engel & R. M. Schust., was established by Engel & Schuster (1984) to include Chiloscyphus hookeri J. J. Engel and its two varieties. This is an easily distinguishable taxon, reported by Engel (1972:150) from Chile (Magallanes, Desolación I., Newton I., and B. Tekenuka) and from Argentina (Tierra del Fuego and Malvinas Is.), and reported by the same author (1978:152) from the Brunswick Peninsula and (1990:115) from Malvinas Is. The correct name of this taxon is C. durus (Steph.) Hässel because its basionym Lophocolea dura Steph., has priority over C. hookeri J. J. Engel, a name slipped before into the synonymy of “Leptoscyphus expansus” (Grolle, 1962: 62).

Chiloscyphus magellanicus Steph. was placed by Engel & Schuster (1984: 400) in the genus Heteroscyphus Schiffn. The first defining character of this genus -“the androecia are consistently on abbreviated spicate intercalary branches, that totally lack normal vegetative leaves”- as indicated by Engel & Schuster (1984: 400), is not displayed by this particular species, as shown in the description and illustration presented below (Fig. 2.1).

The purpose of this study is to reinstate the name Chiloscyphus magellanicus Steph. in Chiloscyphus Corda to which it truly belongs, and to add a new synonym, which had been wrongly placed in synonymy in another genus. Chiloscyphus magellanicus should also be included in subgenus Phaeochiloscyphus because it shares some characters with C. hookeri J. J. Engel, a taxon which must now be called C. durus (Steph.) Hässel.


Plants brown; leaves ovate, convex, entire, occasional basal distal teeth present, or bifid leaves on the same plant; antheridia stalks 2-seriate; gynoecia most frequently borne on short lateral intercalary branches; perianth originally trigonous, cylindrical, campanulate to cupulate, mouth wide, broadly dentate to laciniate. Sporophyte only known from C. durus (Steph.) Hässel [Engel (1972:152 under C. hookeri J. J. Engel)]. No asexual reproduction known.

Type species: Chiloscyphus hookeri J. J. Engel
At present two taxa belong to this subgenus:

1) Plants robust, light green to light brown; stem 18-20 cells wide; leaves alternate, dorsal margin flat, dorsal stem middle line (free of leaves) up to 8 cells wide; central leaf cells 47-70 x 35-47 μm in diam.; cell walls thin, trigones small; amphigastria connate on one side to one leaf; perianth obscurely trigonous at apex, ventral portion infolded, mouth with ± 40 lacinae all around, lateral portions obscurely bifid with additional straight to curved, elongated, unequal lacinae, at their base 4-10 cells wide, apex a uniseriate filament 3-9 cells long

2) Plants delicate, when dry brown or red brown; stem (6)-16 cells in diam.; leaves subopposite, dorsal margin slightly recurved, dorsal stem middle line (free of leaves) 2 (3) cells wide; central leaf cells 51-80 x 44-61 μm in diam., cells walls thickened on dorsal surface, trigones conspicuous; amphigastria connate on both sides to leaves; perianth cupulate, mouth wide, with ± 16 lacinae all around, lateral portions obscurely bisibid with additional lacinae, each lacina triangular elongated curved, at their base 4-10 cells wide, apex a uniseriate filament 4-10 cells long

\[ \text{...Chiloscyphus durus (Steph.) Hässel}\]

**Chiloscyphus durus** (Steph.) Hässel comb. nov.

\[ \text{Lophocolea dura Steph., Kongl. Svenska Vetenskapsakad. Handl. 46(9): 43, fig. 16 a-d, 1911; basionym. Typos: Chile, Patagonia Austr., Canal Gajardo, Strandfelsen am Inga Gletscher, Skottsberg 1908 [G 17780 holotypus of Lophocolea dura Steph. (Grolle 1962: 65) S, UPS isotypi].} \]

\[ \text{Lophocolea decipiens Mitt. nom. nud., London J. Bot. 3: 358, 1851. syn. nov. Original material: Cape Horn, Dr. Hooker (NY as Chiloscyphus chiloscyphoides with Lophocolea pallidoviorens Taylor).} \]

\[ \text{Chiloscyphus hookeri J. J. Engel, J. Hattori Bot. Lab. 36: 150. Figs. 1 (1-6); 2 (1-10), 1972, syn. nov. Typos: Chile, Magellanes, I. Hermite, Hooker 12. p. p. (NY holotypus, mixed with Juengermannia pallidoviorens Hook.f. & Taylor; BM, G isotypi).} \]

\[ \text{Chiloscyphus hookeri var. constantifolius J. J. Engel, J. Hattori Bot. Lab. 36: 155, 1972. Typos: Chile, Tierra del Fuego, Bahia Tekenika, C. Skottsberg ser. III, n° 33 as Leioscyphus horizontalis (Hook.) Steph. (S-PA holotypus).} \]

**Description**

This species has been well-described and illustrated by Engel (1972: 150) under Chiloscyphus hookeri J. J. Engel.

**Discussion**

In the diagnosis of the subgenus *Phaeochiloscyphus* J. J. Engel & R. M. Schust. (Engel & Schuster, 1984) it is indicated that the small lateral intercalary branches, bearing perianths, are devoid of leaves. This is incorrect, as in *C. durus* (Steph.) Hässel, (including *C. hookeri* J. J. Engel, the type species of this subgenus), these branches can be longer and are nearly all provided with leaves.

*Lophocolea dura* Steph. was placed by Grolle (1962: 62) in the synonymy of “Leptoscyphus expansus (Lehm.) Grolle”. This placement was accepted by Engel (1978: 179) and Engel and Schuster (1984: 428). The type of *Lophocolea dura* Steph. consists of dark brown (in the dry condition) female plants. The leaves are entire or occasionally have one basal distal tooth, are recurved ventrally and although quite imbricate leave dorsally a conspicuous middle line along the stem free of leaves; the leaf cells have small trigones. The amphigastria, with 2 divergent principal segments, have lateral teeth on the lamina sides. Several young perianths are present on short leafy branches, (with 2-3 cycles of leaves under the bracts). The young perianths, 2-3 mm high, have a trigonous structure with pronounced dorsal and ventral-lateral keels, the ventral smaller portion is infolded, the mouth is 3-lobate and dentate, these teeth are triangular-acuminate, at their base 2-4 cells wide. These specimens are reminiscent of *C. magellanicus* Steph., but the perianth form and teeth are quite different, as in the latter one the perianth mouth has conspicuous lacinia, rather than teeth.

Specimens from Peninsula Brunswick, Cabo San Isidro collected by Roivainen 2395 (at H), determined first by S. Arnell as *Lophocolea pallidoviorens*, then later by Engel (1978: 152) as *Chiloscyphus hookeri* var. *constantifolius* J. J. Engel, belong to *Leptoscyphus*, while Roivainen 2401 (H) identified by Engel (l.c.) as *Chiloscyphus hookeri* var. *constantifolius*, contains three species; *Leptoscyphus* sp. (c. per.), *Leptoscyphus chiloscyphoides* (c. per.) and *Chiloscyphus durus* (masc. c. per.).

The holotype of *C. hookeri* var. *constantifolius* J. J. Engel (at S-PA) consists of female plants which have long stems, with entire leaves, which sometimes alternate with leaves with one basal tooth, one of the characters that defines the species; this situation is most common and therefore it is not necessary to maintain the name of the variety as it cannot be distinguished from the type variety.
Specimens examined

CHILE: Chiloé, Cordillera de Piuchué. Alerzal 500 m.s.m., Villagrán 15, id 22 (VILLAGRAN). Baie de L’Isthme, Savatier 207 (VER as Lophocolea pallidouirensis). Canal Gajardo, Caleta Inga, Skottsberg 1908 (c. per.) (G 17780 holotype of Lophocolea dura Steph. S. UPS, isotypii). Anción Sin Salida, Seno Unión, G.H.M.2 TBPA-B 655; id 656; id 820. Piazza I., Caleta Ocasión, G.H.M. TBPA-B 914a; id 1118. Vidal Gormaz I., G.H.M. TBPA-B 1500. Pto. Bellavista, Lago Azul, Schiavone TBPA-B 2086; id 2092; id 2096 (c. per); Pto. Bellavista, Cerro Morro, Schiavone TBPA-B 2182; id 2207; id 2294a; id 2299 (masc. c. per.); Pto. Toro, Rio Serrano, Schiavone TBPA-B 2495 (masc. c. per); Pto. Toro, al pie del Cerro Balmaeda, Schiavone TBPA-B 2558b. Sabavet 1782 (VER as Chiloscyphus pallidouirens?). York Bay, Lechler 1362 (NY with Chiloscyphus pallidouirensis). Chatham I., Engle 5358A p.p. (MSC). Newton I., Dusen 95 (M, S). Brunswick Península, B. San Nicolás, Engle 6360 p. (MSC). Riesco I., C.A. y G.H.M. 453. Desolación, Pto. Angosto, Dusen 385 (BA 30583). Tierra del Fuego, Halle (NY as Chiloscyphus amphibolius); id, Furia I., Hyvönen 2975a-b (NY). Sarmiento Bay, Spegazzini 273(4) (VER as Chiloscyphus grandifolius); id 240 (VER as Chiloscyphus surrens). Hoste I., Hyades (VER as Chiloscyphus pallidouirensis?); id, Hariat 170 (VER as Chiloscyphus pallidouirensis?); id Hahn 130 (VER as Chiloscyphus pallidouirensis?). Basket I., Darwin Sound, Spegazzini 177 (VER as Chiloscyphus grandifolius); id 218 p. p. (VER as Chiloscyphus grandifolius). Wollaston I., Hariat 90 (VER as Leitoscyphus chiloscyphoides var. major?). Herrime I., Hooker 12 p. p. [NY holotype of Chiloscyphus hookeri J. J. Engel, with Jungermannia pallidouirensis Hook.f. & Taylor BM (c. per), G isotypii]. Cape Horn, Dr. Hooker (NY original material of Leptoscyphus decipiens Mitt.); id, (NY with C. magellanicus Steph.). Rennell I., matorral costero, Eskuche 70-26 (CTEFN); id, Bahía Tekenika, C. Skottsberg ser.III, n° 33 [S-PA as Leitoscyphus horizontalis (Hook.) Stepph.]. ARGENTINA. Tierra del Fuego, Paso Garibaldi, G.H.M. e I. Gamundi 1477. Destacamento Lago Cami, C.A. y G.H.M. 907. Lago Escondido, Solari 11 (BA 22212c); id G.H.M. 3550. Valle Carbajal, G.H.M. 2438; id 3269. Lapataia, G.H.M. 2482. Bahía San Valentín, G.H.M. 3809 (c. per. c. caps.). Bahía Slogget, Spegazzini (c. per.) (VER). Península Mitre, Cerro Arriola, Hyvönen 3095 (BA). Isla de los Estados (Estado I.) Bahía Crossley, G.H.M. 3866; id 3885 (masc.); id 3880 (c. per. c. caps.). Bahía Flinders, G.H.M. 4563 (c. per. c. caps.); id 4611 (c. per). Pto. Cook, G.H.M. 3018 (masc.); id Spegazzini 14(a) (VER as Lophocolea pallidouirensis); id 38 (1) (VER as Chiloscyphus grandifolius); id 40 (VER as Leitoscyphus chiloscyphoides). Pto. Rocca, Castellanos (BA 1414); id G.H.M. 4003 (c. per.). Mte. Conegliano, Spegazzini 43 (VER as Chiloscyphus grandifolius). Monte Italia, Spegazzini 110 (VER as Chiloscyphus grandifolius). Pto. San Juan, G.H.M. 4132, id 4204; id Castellanos (BA 1398), id (BA 1413). Pto. Vancouver G.H.M. 3107; id 4315 (c. per). Observatorio I., G.H.M. 3923; id 3931. Goffre I., G.H.M. 3955. Barbagallo, (masc. c. per.) (BA 15266). Malvinas I. Charcot Expedition (M); Pto. Stanley, Skottsberg (S as Lophocolea pallidouirensis).

Ecology and distribution


Chiloscyphus durus turns out to be very widely distributed in the evergreen forest zone reaching from Chiloé I. in the north, as far as to the eastern tip of southern South America, the Isla de los Estados; where it has been found with perianths and sporophytes. A detailed observation even of sterile specimens, allows identification of the taxon, nevertheless it was in the past overlooked and confused with other taxa (see list of specimens examined). It grows loosely in the hepatic carpet that covers the ground, also on stream banks under Gunnera sp., on rotten logs and in the coastal shrub fringe, with Gackstroemia magellanica (Lam.) Trev., Blepharidophyllum densifolium (Hook.) Angstr., Telaranea plumulosa (Lehm. & Lindenh.) Fulf., Chiloscyphus obvolutes (Hook.f. & Taylor) Hässel, C. pallidouirensis (Hook.f. & Taylor) Taylor, C. magellanicus Steph. and other common hepatics.


≡Chiloscyphus lobatus Steph., Spec. Hesp. 3: 256, 1908; syn. nov.
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Description

Plants dioicous, creeping horizontally amongst other bryophytes, brown colored, in the dry condition shiny, profusely branched, leafy shoots 1,5-4 mm wide; branches lateral intercalary, diverging mostly at right angles from the main stem. Stem cylindric to prismatic, in t.s. 0,2-0,3 mm wide and high, (6)-12-14 cells wide, (7)-9-16 cells high, cortical cells 23-35 \( \mu \)m in diam., cell walls brown, thin; medullary cells from much recurved, teeth uncommon, when present, mate, asymmetric ovate, isolated, acute presence of large cells in dry condition shiny, profusely branched, leafy shoots amongst other bryophytes, brown colored, in the ventral border plane except limb mainly flat, dorsal border slightly recurved, closely imbricate, subopposite, dorsally approximated arch, initially elevating from stem by the smooth. Oil bodies unknown. Amphigastria with pronounced inverted U-shaped insertion, united decurrent lamina, underleaf lamina cuneiform, the biseriate base 4 cells long, uniseriate tip 4 cells long, additional teeth or trigones with growth continuing as a vegetative shoot, on each side, biseriate portion 2 at distal portion of main stem, successive with intervals of normal growth with vegetative leaves continuing. Here it is shown, (see fig. 2.1), that the androecia are intercalary on main shoots, a detail present in the syntype of Chiloscyphus magellanicus Steph. from Smyth Channel (at G), and that when androecia originate on branches close to the stem, normal growth with vegetative leaves continues.

This species can be distinguished from C. durus because of its shiny brown appearance, the large cells, the narrow dorsal furrow between the subopposite leaves and the amphigastria connate on both sides to the leaves.

C. lobatus Steph., here considered a synonym of the present taxon, was placed by Grolle (1962:61) as synonym of "Leptoscyphus expansus ".

Specimens examined

Fig. 2. *Chiloscyphus magellanicus* Steph. 1. Dorsal view of male plant with intercalary androecia, and androecium at branch base. 2. Perigonial bracts. 3. Ventral view of shoot. 4. Amphigastria. 5. Detail of amphigastrium. 1-5. Chile, Virtudes I., G.H.M. TBPA-B 1905

**Distribution and ecology**

*Chiloscyphus magellanicus* Steph. is known to be present in Chile, from Chiloé, the channel islands, the Brunswick Peninsula, as far as the most southern islands of the Magellanic archipelago. In Argentina it inhabits the east southern area of Tierra del Fuego and the Isla de los Estados. It occurs in the thick bryophyte carpet that covers the ground in the *Nothofagus betuloides* forests, rocks, stream banks and sometimes it is submerged in bog pools of that area.

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