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New or little known epiphyllous liverworts, XIV. The genus *Colura* (Lejeuneaceae) in São Tomé Island, with the description of *Colura thomeensis* sp. nov.

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New or little known epiphyllous liverworts, XIV. The genus *Colura* (Lejeuneaceae) in São Tomé Island, with the description of *Colura thomeensis* sp. nov.

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Abstract. Two species of the genus *Colura*, *C. digitalis* and *C. tenuicornis* were previously known from the West African island of São Tomé. *Colura calderae* known only from Bioko Island is new to São Tomé and *C. thomeensis*, a species new to science, is described and illustrated. A key to the four species now recognized on São Tomé is provided.

Keywords. *Colura*, Gulf of Guinea, island endemics, Lejeuneaceae, new species, West Africa.

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The bryological exploration of the Gulf of Guinea Islands in West Africa, among them that of São Tomé Island, have started relatively early. The first collections were made probably by Theodor Vogel in 1841 and by Gustav Mann in 1959–1863 on Bioko Island and by Moller, Newton and Quintas on São Tomé and Princípe (Wigginton, 2004) and the first records were published by Stephani (1886). After this period the interest turned to Central and East Africa and only a few authors dealt with these islands until recent times, when a series of papers was published, mostly on the liverworts (Heras & Infante 1996, 1999, 2001; Infante et al. 1997; Müller 1996, 2006; Müller & Pócs 2007, Váňa & Müller, 2003. Nevertheless, the liverwort flora of the island is still poorly known with its 82 species (Wigginton 2009) compared to its rich and variable vegetation and its size. A plant collecting expedition was organized to São Tomé and Princípe islands by the California Academy of Sciences in February 2010 (pers. comm. by J. R. Shevock, 2010) to explore the bryoflora.

São Tomé is the larger island of the Republic of São Tomé and Príncipe off the coast of West Africa, on the Equator. It is approximately 45 km long and 25 km wide for a total area of 836 km^2. It is of volcanic origin with quite rough surface, with the highest point of Pico São Tomé (2024 m). Except for the northern savanna area, the island is characterized by a typical equatorial climate with high rainfall and was originally covered by different types of tropical rain forests. It is notorious for its richness in endemic vascular plants and birdlife.

I had the opportunity to visit São Tomé Island, as the botanical expert of a TV team, filming the living world of African islands, focusing on the island biodiversity and conservation problems. During the relative short time (26–31 August 2000) I was able to collect some 150 liverwort specimens, among others 3 species of *Colura*, including an interesting form of *Colura digitalis*, *Colura calderae* previously known only from Bioko Island (Müller & Pócs 2007), and a species new to science, *Colura thomeensis*.

The Species

The following *Colura* species are known from São Tomé Island. They belong to two sections of subgenus *Colura*.

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Sect. *Colura*

1. Colura tenuicornis (A.Evans) Steph., Spec. Hepat. 5: 942, 1916.

This pantropical species is known only from historical collections on São Tomé Island. This species grows on trunks and leaves.

Specimens reported (not seen by the author): São Nicolau, Pico São Tomé, 1000–1950 m, on filmy fern leaf, *A. Moller*, 1855, Flora Africana Exsiccata, Herb. Hort. Bot. Conimbricensis (Jovet-Ast 1954); Lagoa Amelia, 1350–1380 m, *Th. Monod 11,774* (1956, PC); NW of Pico São Tomé, between Cascata and Vilela, 700–1000 m, *Th. Monod 12,201-* (1956, PC); W face of the Pico, between Monte Quinas and Quinas Altas, *Th. Monod, 12,114* (Jovet-Ast 1958).

Sect. *Harmophyllum* Grolle

2. Colura calderae Pócs, in Müller & Pócs, J. Bryol. 29: 84–85, 2007.

The occurrence of this species also on São Tomé Island suggests that it likely is endemic to the Gulf of Guinea and occurs on all the four islands (Bioko, Príncipe, São Tomé and Annobón or Pagalu). It is only known to grow on leaves in humid habitats.

Specimens known. In degraded submontane rainforest S from the Cascata Monte Café, near São Nicolau village, 850–900 m, epiphyllous, *Pócs 00147/S* (EGR). New to São Tomé Island. This species was previously known only from its type locality in Equatorial Guinea, Bioko Island, Mt. Caldera 10 km S from Luba, montane rain forest at 1200–1500 m, epiphyllous, *F. Müller B312/a* (Holotype DR, Isotype EGR).

3. Colura digitalis (Mitten) Steph., Spec. Hep. 5: 931, 1916.

This species is widespread across African tropics (Wigginton ,2009), where it occurs on both trunks and leaves.

Specimens known. Mt. Café and Pico São Tomé, on filmy fern, *A. Chevalier 14,292* (1905, PC, Jovet-Ast 1954); Lagôa Amelia, 1350–1380 m, *Th. Monod 15.8.1956* (PC, Jovet-Ast 1958); W face of the Pico São Tomé, between Monte Quinas and Quinas Altas, on fern leaves, *Th. Monod, 12,015* (PC, Jovet-Ast 1958); SE coast of the island, on coconut palm bark in a grazed plantation W of São João des Angolares, at 20 m alt. *T. Pócs 00145/A* (EGR). This is an interesting form with very broad, rounded lobule sac and broad underleaf lobes (up to 9 cells), but the construction of valve with 15–21 inner and 15–16 hyaline marginal cells is typical for this species. The leaf shape of *Colura digitalis* can be very variable. South of Pico Cão Grande, NNE of Monte Mario village, in old, partly abandoned oil palm plantation, at 60 m alt., epiphyllous, *T. Pócs 00156/D* and *K* (EGR).

4. Colura thomeensis Pócs ***sp. nov.*** **Figs. 1 & 2**

Planta epiphylla pallide-virens, surculis 6–8 mm longis et foliis 2.0–2.5 mm latis, caulibus 70–90 μm crassis, leviter ramificatis. Folium asymmetrico-ovatum, 0.6–1.2 × 0.3–0.5 mm, lobo margine arcuato, integro. Sacculus lobuli late fusiformis, acutus, terminatus cum crista lamelliformia 7–15 cellulari. Cellulae sacculi mammillis conicis ornatae. Clypeus minusculus, rotundus, 12–13 cellulis marginalibus hyalinis et solum 6–8 cellulis medianibus composita, Cellulae medianae lobi irregulariter 4–7-gonales, diametro 20–40 μm, parietibus tenuibus trigonis et 1–3 incrassationibus nodularibus. Cellulae basales moderate elongatae, ad 50 μm longae. Amphigastria asymmetrico bilobata lobis acutis base 2–5 cellulae latis. Dioica. Ramuli masculini perlongi 10–20 iugati vel intercalares. Perianthium tricarinatum, cylindricum, truncatum, bractaearum duplo longiorum, ad 400 μm longum et 150 μm latum, rostro curto. Gemmae disciformes 18–22 cellulares.

TYPE: SÃO TOMÉ ISLAND, S of Pico Cão Grande, NNE of Monte Mario village, in old, partly abandoned oil palm plantation, at 60 m alt., epiphyllous, *T. Pócs 00156/M,* 31. Aug. 2000 (holotype: EGR, isotypes: DR, G).

Diagnosis. Plants epiphyllous, pale green, shoots 6–8 mm long, slightly branching, with leaves 2.0–2.5 mm wide. Stem 70–90 μm thick, rhizoids colourless, translucent, strongly branching. Lateral leaves distant, obliquely to widely spreading, adherent to the host leaf surface, 0.6–1.2 × 0.3–0.5 mm. Shape asymmetric ovate, lobe with arcuate, entire margin, lobule sac wide spindle shaped, exceeding part about 1/3–1/2 lobe length, acute, ending in a lamellar crista consisting of 7–15 cells.

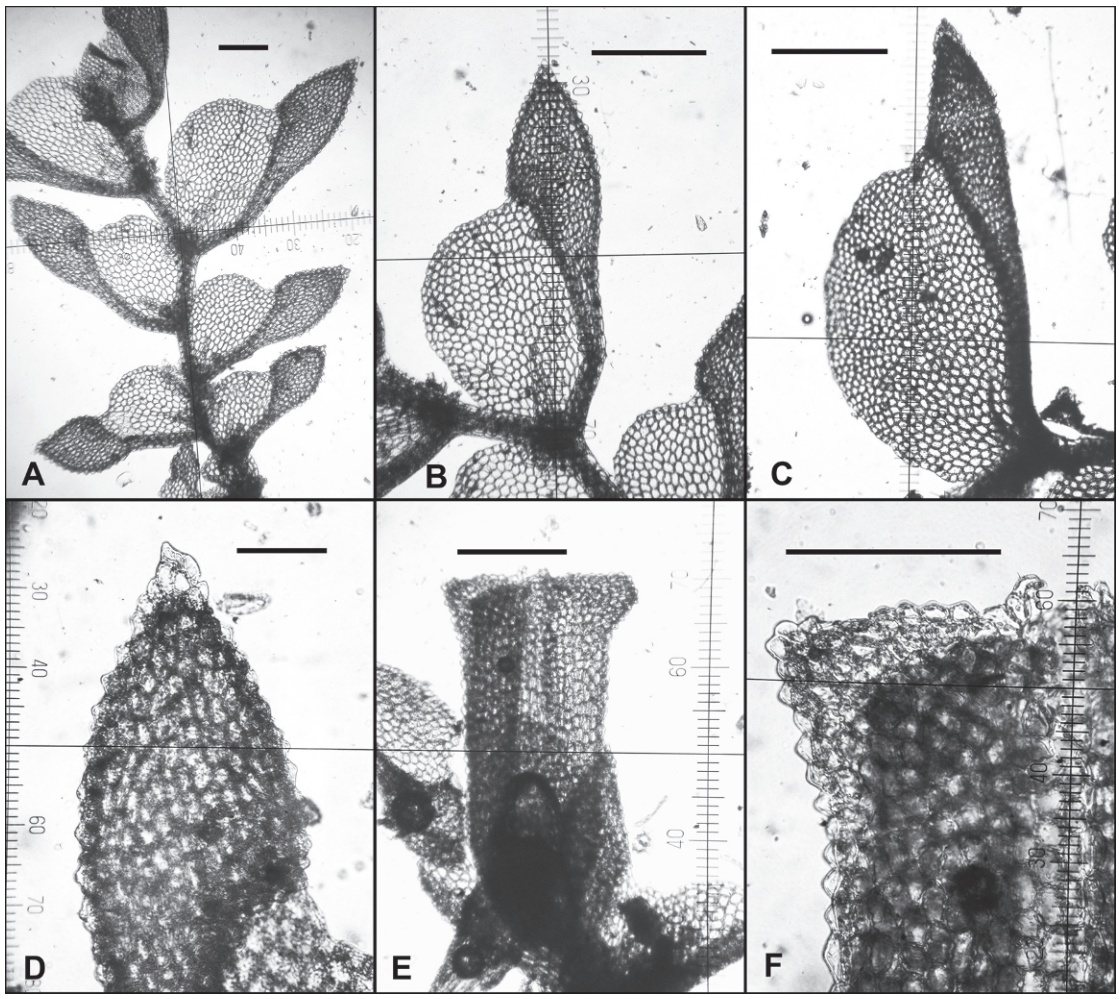

Figure 1. *Colura thomeensis* Pócs. **A**. Habit, ventral view. **B, C**. Leaves. **D**. Lobule sac **E**. perianth. **F.** Perianth wing and beak. (All from holotype). Scales: A: 200 μm; B, C, E & F: 100 μm; D: 50 μm.

Surface of lobule sac with conically mammillose cells. Median lobe cells irregular quadrangular to septangular, with 20–40 μm diameter and thin walls with small nodulose trigones and 1–3 intermediate thickenings. Basal cells slightly longer, up to 50 μm. Valve easily dehiscent, with 12–13 hyaline marginal and only with 6–8 median cells. Median basal cell single. Underleaves asymmetrically bilobed with segments 2–5 cells wide at their base. Dioecious. Androecia intercalary or on very long lateral branches with 10–20 pairs of bracts, each with 2 antheridia. The distal keel margin of bracts crenulate from mammillose cells. Bracteoles present at least on the lower part of male branch, with acute lobes 2–3 cells wide at their base. Gynoecia on short lateral branches, bracts half of perianth length, acute and their lobule is much narrower and shorter than the lobe. Perianth cylindric, tricarinate, wings slightly broadened at their upper end. Perianth surface mammillose by conically protuberant cell walls. Beak short. Ripe sporophyt unknown. Discoid gemmae abundant, 18–22 celled, with 3 adhesive cells.

Habitat. This species grows on leaves together with *Colura digitalis, Leptolejeunea maculata* (Mitt.) Schiffn., *L. epiphylla* (Mitt.) Steph., *Cololejeunea dentata* (E.W.Jones) R.M.Schust. hereby reported as new to the Gulf of Guinea Islands (*T. Pócs 00156/L,* EGR), *C. obliqua* (Nees et Mont.) Schiffn., *Cololejeunea* sp., *Drepanolejeunea* sp.

Discussion. *Colura thomeensis* is a distinct member of Subgenus *Colura*, Section *Harmophyllum.* The apical crest of the lobule sac is rare within the

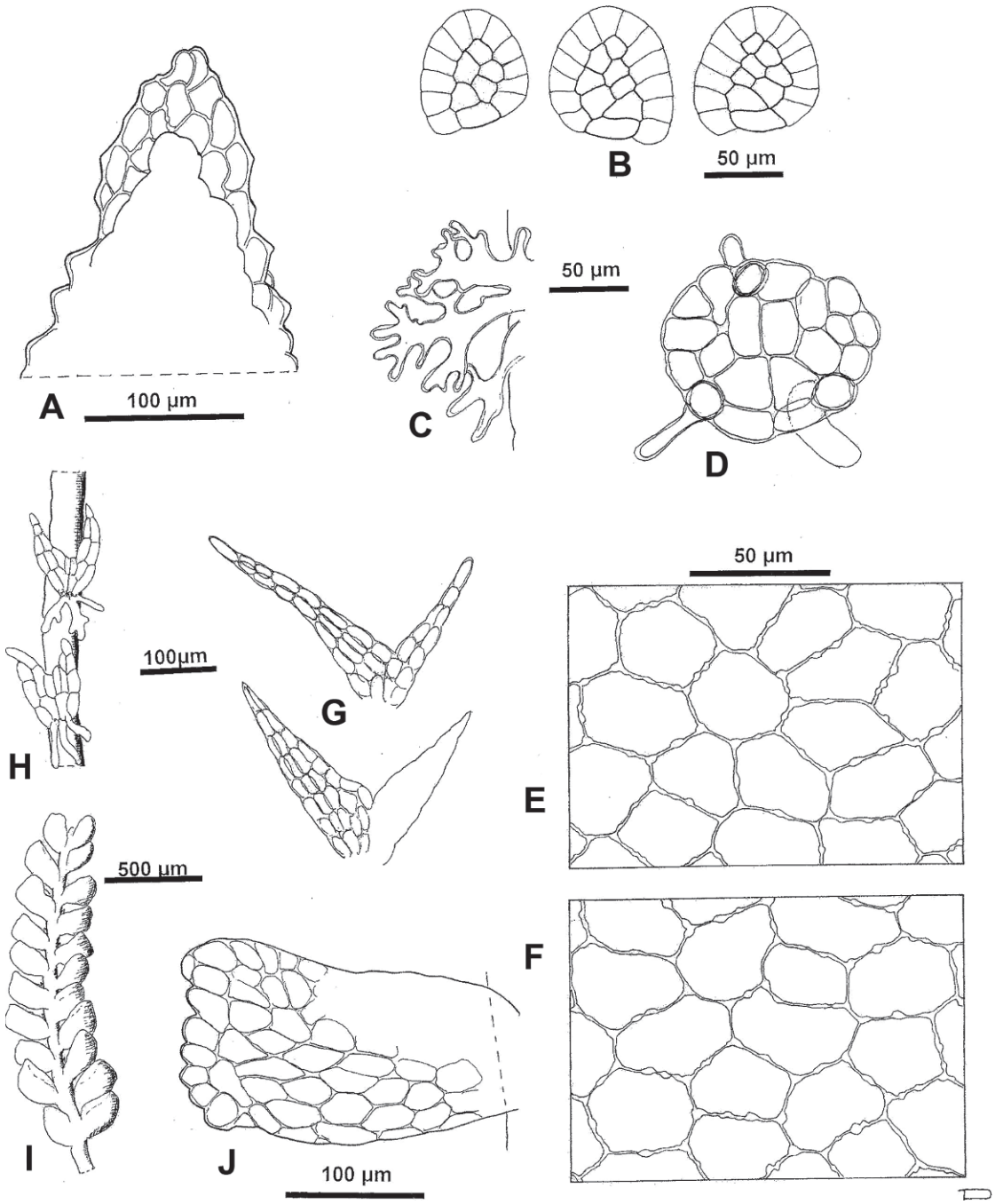

Figure 2. *Colura thomeensis* Pócs. **A.** Crest on the apex of lobule sac. **B.** Valves. **C.** Rhizoids. **D.** Discoid gemma. **E.** Median lobe cells. **F.** Basal lobe cells. **G.** Underleaves. **H.** Bracteoles. **I.** Male branch. **J.** Male bract. (All from holotype).

section, apart from our new species occurs only by the Indo-Malesian *C. conica* (Sande Lac.) K.I. Goebel and in some cases by *C. superba* (Mont.) Steph. The acutely mammillose lobule sac and perianth can be compared in Africa only with those of *C. hattoriana* Pócs (1993, but this species has no crest on the lobule sac and the number of its valve cells is higher. The very low number of median valve cells of *C. thomeensis* is unique among the African *Harmophyllum* species.

Key to the São Tomé species of Colura

1. Lobule sac ending in a long horn equaling the half of total leaf length ..... *C. tenuicornis*
1. Lobule sac shorter and broader, valve only with one median basal cell 2
   2. Valve formed at least by 30 cells. Lobe, lobule and perianth smooth, lobule sac without crest 3
   2. Valve formed only by about 20 cells of which only 6–8 are median cells. The lobule and perianth surface are acutely mammillose, apex of lobule sac with an acute, lamellate crest ..... *C. thomeensis*
3. Lobule sac generally has rounded apex, valve with 10–18 median cells, always only one median basal cell ... *C. digitalis*
3. Lobule sac acutely pointed, valve with 20–25 median cells and one or two median basal cells ..... *C. calderae*

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