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SHORT COMMUNICATION

Trachycarpidium echinatum (*Pottiaceae*, *Bryophyta*): a new genus and species record for Thailand

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Abstract. *Trachycarpidium echinatum* (*Pottiaceae*) is here reported as a new genus and species for Thailand, where it occurs on soil in deciduous dipterocarp-oak hardwood seasonal forest in a protected area of the Hariphunchai Education Centre of Chiang Mai University, Lamphun Province, northern Thailand. A description, line drawings, photographs and SEM micrographs based on Thai material are provided, and the ecology and distribution of this species are described and discussed.

Key words: bryoflora, deciduous forest, Lamphun Province, northern Thailand, pygmy-durian moss

Introduction

Trachycarpidium (Brotherus 1901) (*Pottiaceae*) is a small genus of acrocarpous mosses which has only four recognized species: *T. brisbanicum* (Stone 1975), *T. echinatum* (Dixon 1942), *T. tisserantii* (Potier de la Varde 1928) and *T. verrucosum* (Brotherus 1901) (see also Zander 1993; Inoue & Tsubota 2017). All of them are always found on soil in arid microhabitats and are distributed mainly in the Southern Hemisphere, including Australia (Queensland), New Caledonia, Papua New Guinea, Nigeria, South Africa and Brazil (e.g., Dixon 1942; Stone 1975; Norris & Koponen 1989; Eddy 1990; Zander 1993; Tan et al. 2003; Peralta et al. 2008). Members of the genus are easily separated from other genera of mosses by their minute size and their immersed, tuberculose and cleistocarpous capsules.

The first report of *Trachycarpidium* in the Indochinese region was published by Tan et al. (2003), who reported *Trachycarpidium echinatum* from Yokdon National Park, southern Vietnam. The Vietnamese collections were the first record of the genus from north of the Equator. Biogeographically, their discovery in Vietnam and Thailand represents a significant expansion of the distribution range from Papua New Guinea to Indochina. This paper presents the first record of a *Trachycarpidium* species, reported as part of a floristic treatment of the bryophyte flora for Thailand.

Materials and methods

This study is based on a fresh specimen collected from a protected area at the Hariphunchai Education Centre of Chiang Mai University, Lamphun Province, northern Thailand, during 18–19 August 2018. The herbarium specimen is deposited in the Herbarium of the Biology Department of Chiang Mai University (CMUB). Morphological and anatomical details were studied using Olympus stereo (SZ-30) and Nikon compound (Eclipse E-200) microscopes. The distinctive characters of the species were illustrated with the use of a Nikon camera (D7000) and a Nikon camera lucida drawing tube. Mature gametophytes and sporophytes were mounted on double-stick cellophane adhesive tape affixed to stubs and examined with a scanning electron microscope (LV-SEM: JEOL JSM-5910LV). Distribution and ecological data were compiled from the literature.

Results and discussion

Trachycarpidium echinatum Dixon, J. Bot. 80: 6. 1942. (Figs 1–2)

Description. Plants ca 3 mm high, with immersed capsules. Rhizoids numerous, multicellular; walls oblique. Stems simple, unbranched, erect; central strand not differentiated. Leaves slightly contorted when dry, erect-spreading when moist. Dioicous. Leaves linear-lanceolate, (1.0–)1.5–2.3(–2.5) mm long and (0.1–)0.15–0.25(–0.35) mm wide at base, tapering to acuminate apex from broad oblong base; margins incurved in lower part

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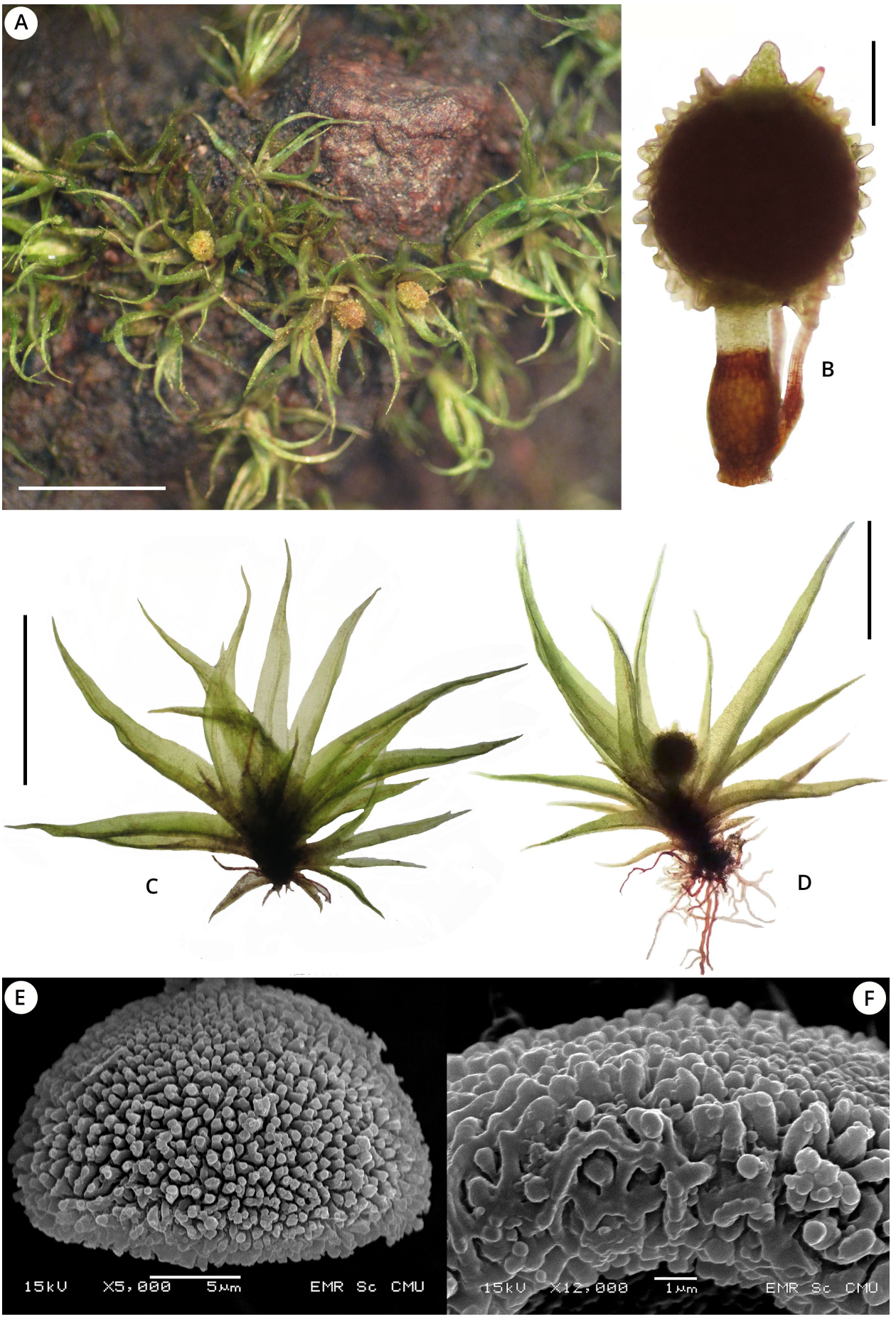

Figure 1. *Trachycarpidium echinatum* (Changsalak & Printarakul 17): A – habit; B – sporophyte; C – isolated plant; D – plant with immersed sporophyte; E, F – spore, SEM micrographs. Scales: A = 3 mm; B = 100 µm; C, D = 1 mm.

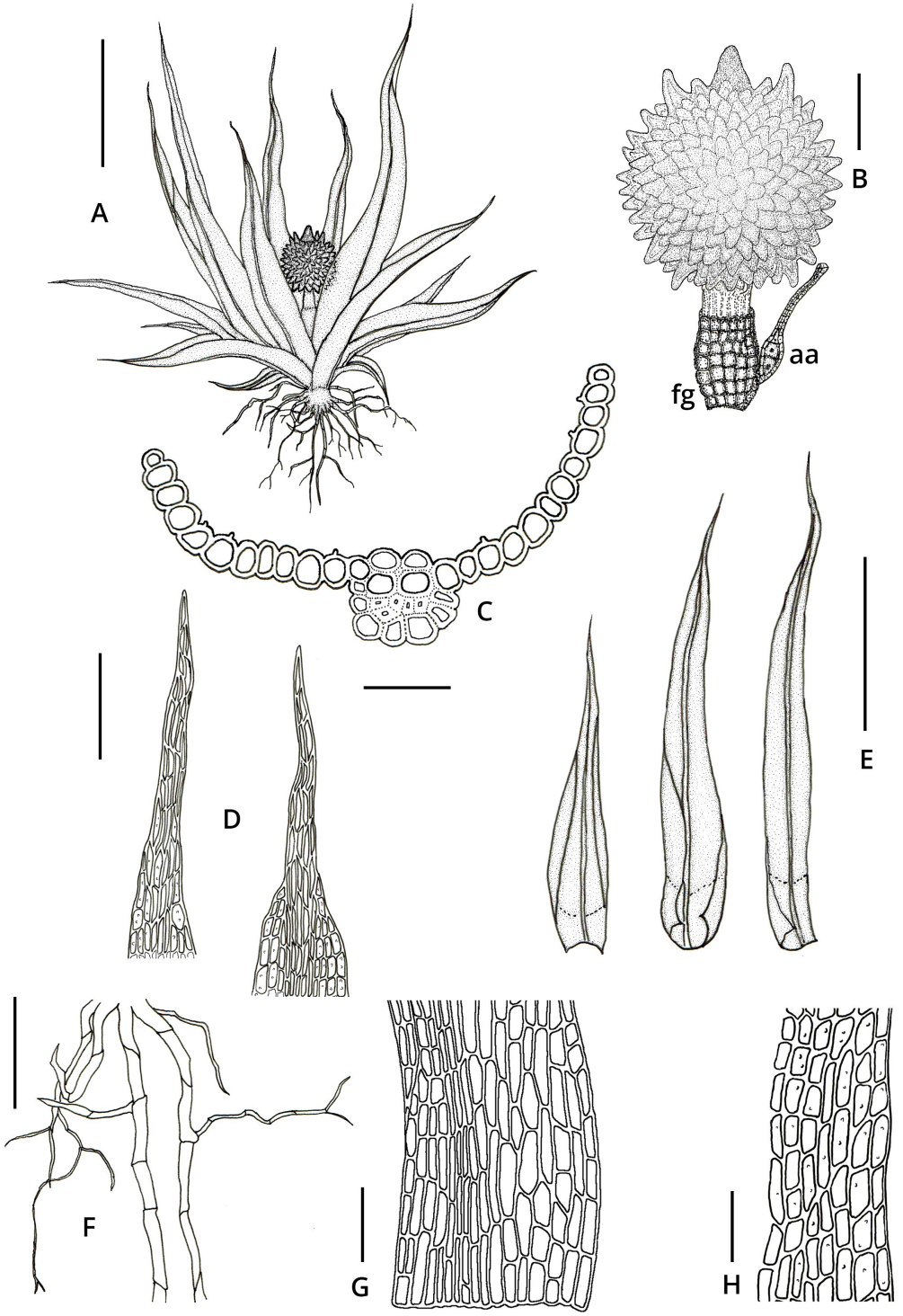

Figure 2. *Trachycarpidium echinatum* (Changsalak & Printarakul 17). A – plant with immersed sporophyte; B – sporophyte attached on female gametophyte (fg) with aborted archegonium (aa); C – cross section of leaf; D – apical leaf cells; E – leaves; F – multicellular rhizoids with oblique walls; G – basal leaf cells; H – median leaf cells. Scales bar: A, E = 1 mm; B, D, F = 100 µm; C = 30 µm; G = 50 µm; H = 25 µm.

at about 1/3 the leaf length near insertion, entire and smooth; costae stout, narrowly excurrent into subulate hair point, 100–250 µm long, slightly papillose on adaxial and abaxial surfaces, rarely smooth; in cross section with 2–4 guide cells in a single row, compressed on both sides by 0–1-stratose adaxial and 2–3-stratose abaxial stereid bands; upper laminal cells sub-quadrangular to short rectangular, (8.75–)10–15(–25) µm long and (5–)6.25–7.5(–9) µm wide, slightly papillose on both surfaces with (2–)3–4(–5) papillae; basal laminal cells enlarged, rectangular, (45–)50–75(–80) µm long and (10–)12.5–15(–17.5) µm wide. Asexual reproduction absent. Perichaetial leaves linear-lanceolate, smaller and narrower than normal leaves, (0.8–)1.0–1.5(–1.7) mm long and (0.1–)0.15–0.25(–0.30) mm wide, widest at base, apex tapering to subula acumen. Calyptrae cucullate, 0.5–0.7 mm long. Spores (20–)25–27.5(–30) µm diameter, densely papillose.

Setae very short, 60–80 µm long; capsules cleistocarpous, immersed, sub-ovoid to sub-orbicular, echinate,

(150–)200–300(–350) µm diameter; exothecial cells quadrangular to sub-quadrangular, thick-walled, mamillose to spiculose; spines (30–)45–50(–55) µm long. Opercula differentiated, conic with short beak, 35–50 µm long.

Ecology. In Thailand, *Trachycarpidium echinatum* was found on open-dry soils in deciduous dipterocarp-oak hardwood seasonal forest on granite bedrock at 370 m a.s.l.

Total range of distribution. Papua New Guinea (type locality) (Dixon 1942; Norris & Koponen 1989; Eddy 1990), Vietnam (Tan et al. 2003), and from northern Thailand.

Notes. This species is very similar to *Weissia platystegia* in having minute plants with immersed capsules, and we found these two species in the same habitat, on open-dry soils in deciduous forest. It is sometimes difficult to observe in the field even with a magnifying lens, but *Trachycarpidium echinatum* can be identified under a microscope by its cleistocarpous, mamillose-spiculose capsules and longer excurrent leaf costae, versus the stegocarpous (macrostomous), smooth capsules and shortly excurrent costae of *W. platystegia*.

Specimen examined. THAILAND. Lamphun Province in a protected area at the Hariphunchai Education Centre of Chiang Mai University, on soil, 18°32′10″N, 99°07′50″E, 18 Aug. 2018, Changsalak & Printarakul 17 (CMUB).

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