

A Note on *Asterella khasyana* (Griff.) Pandé, K.P. Srivast. and Sultan Khan (Marchantiales, Aytoniaceae) in Thailand

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ABSTRACT.– An addition to the Bryoflora of Thailand, *Asterella khasyana* (Griff.) Pandé, K.P. Srivast. and Sultan Khan, is reported for the first time. This newly recorded species is described and illustrated. SEM images of spores are also presented.

KEY WORDS: *Asterella*, thalloid liverwort, Thailand

INTRODUCTION

Asterella is a thalloid hepatic genus belonging to the family Aytoniaceae in the order Marchantiales (Long, 2006). The genus has a surprisingly wide variability in potentially important morphological characters. For example, the position of archegoniophores and androecia on the thallus, the shape of the carpocephalum, the presence or absence of air chambers in the stalk of the carpocephalum, spore colour, spore ridging or reticulation (Long, Möller and Preston, 2000). Spore ornamentation patterns appear to be an important character for species determination (Long, 1998). So far about 48 species are found almost world-wide,

although some species have rather restricted distributions (Long, 2005, 2006). The genus was intensively studied by D.G. Long and co-workers (Long, 1998, 1999, 2005, 2006; Long, Möller and Preston, 2000). In Thailand, only one species, namely *A. blumeana* (Nees) Kachroo, has been recorded previously, from Doi Chiang Dao, Chiang Mai Province, northern Thailand (Giesy and Richards, 1959). Here, we report an additional species in Thailand, *Asterella khasyana* (Griff.) Pandé, K.P. Srivast. and Sultan Khan which was found during the surveys of bryophytes at Thong Pha Phum National Park, Kanchanaburi Province, south-western Thailand. This species also matched a specimen of chambered liverworts collected from northern Thailand: Doi Phu Kha, Nan Province; Phu Hin Rong Kla National Park, Phitsanulok

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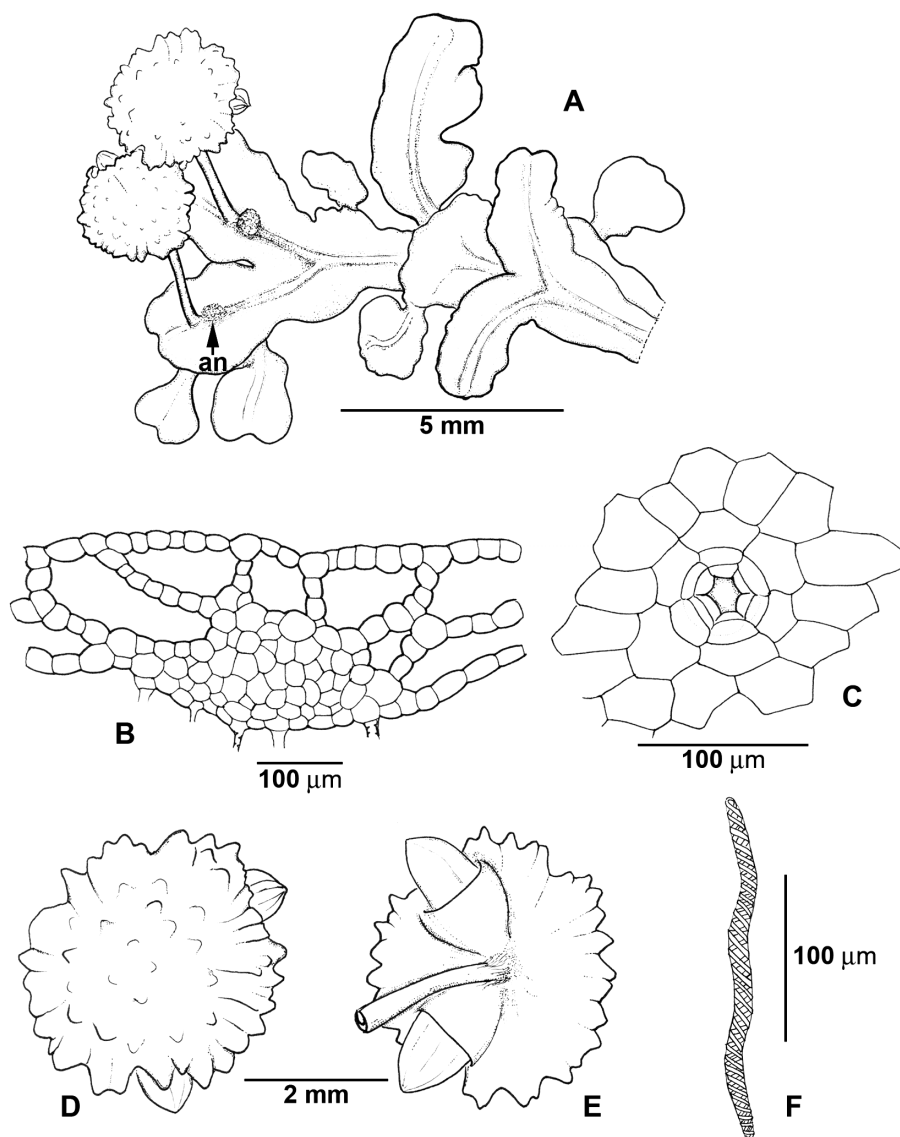


FIGURE 1. Morphological features of *Astrella khasyana* (Griff.) Pandé, K.P. Srivast. and Sultan Khan. **A.** A fertile thallus showing androecium and archegoniophore. **B.** Transverse sections of thallus. **C.** Air pore from dorsal epidermis of thallus. **D.** Dorsal view of carpocephalum. **E.** Ventral view of carpocephalum. **F.** Elater. Abbreviations: an, androecium. All line drawings were drawn from *S. Chantanaorrapint* 946.

Province; Doi Inthanon National Park and Doi Suthep-Pui National Park, Chiang Mai Province. *Asterella khasyana* was previously recorded from Nepal, India,

Bhutan, south China, Indo-China, Indonesia, Philippines, and Africa (Long and Grolle, 1990; Piippo, 1990; Kaul, Jain and Pareek, 1995; Wigginton, 2002).

MATERIALS AND METHODS

Plant materials and specimen determination

This study is based on specimens collected from Thong Pha Phum National Park, Kanchanaburi Province, south-western Thailand and Doi Phu Kha National Park, Nan Province, northern Thailand. Determinations were made with the help of a key to the species of *Asterella* in Long (2006).

Light microscopy and Scanning electron microscopy of spores

Capsules of *Asterella khasiana* were cleaned thoroughly with an ethanol series to critical-point dry. The spores were mounted on aluminium stubs using double-sided sticky tape and coated with platinum-palladium before viewing under a scanning electron microscope (SEM). Micrographs of both the proximal and distal spore surfaces were recorded and later analysed. Spore preparations were also viewed under a light microscope to record colour information and measure spore diameters.

RESULTS

The morphological characters of the collected specimens (S. Chantanaorrapint 932 and S. Chantanaorrapint 946) matched well with the key and description of *Asterella khasiana* (Griff.) Pandé, K.P. Srivast. & Sultan Khan in Long (2006) and was confirmed by the author (D.G. Long, personal communication).

Accordingly, *Asterella khasiana* is newly recorded for Thailand. The

description below is based on the Thai materials.

Asterella khasiana (Griff.) Pandé, K.P. Srivast. and Sultan Khan, J. Hattori Bot. Lab. 11: 7. 1954; D.G. Long, Bryophyt. Biblioth. 63: 167. 2006.—*Octokepos khasianus* Griff., Not. Pl. Asiat.: 343. 1849. (Fig. 1, 2)

Thallus bright or yellowish green, medium-sized, ca. 2 mm in diameter; dorsal surface of thallus reticulate and with simple pores; epidermal cells without trigones; under surface with small scales; thallus margin delicate. *Air chambers* usually 1 layer, without photosynthesis filaments. *Monoicous*. *Androecia* on main thallus just behind base of carpocephalum stalk. *Carpocephalum* flattened, 3-4 mm in diameter, strongly papillose above, slightly lobed at margin, with a small group of archegonia underneath, surrounded by a cup-shaped involucre. *Sporophyte* with a very short seta; capsule ovoid, ca. 0.5 mm long; pseudoperianth lanceolate. *Spore* yellowish-brown, 75-90 μm in diameter; dorsal face regularly areolate, muri pitted; proximal face differs from distal side, irregularly reticulate, triradiate mark strongly distinct. *Elaters* dark-brown, bispiral thickening, 200-230 μm in length.

Thailand- NORTHERN: Chiang Mai [Doi Suthep-Pui, *R. Pollawatn* 293 (BCU); Doi Inthanon National Park, *Frahm* 2006404, *Frahm* 2006405 (BONN)], Phitsanulok [Phu Hin Rong Kla National Park, *R. Pollawatn* 254 (BCU)], Nan [Doi Phu Kha National Park, *S. Chantanaorrapint* 932 (PSU)]; SOUTHWESTERN: Kanchanaburi [Thong Pha Phum National Park, *S. Chantanaorrapint* 946 (PSU)].

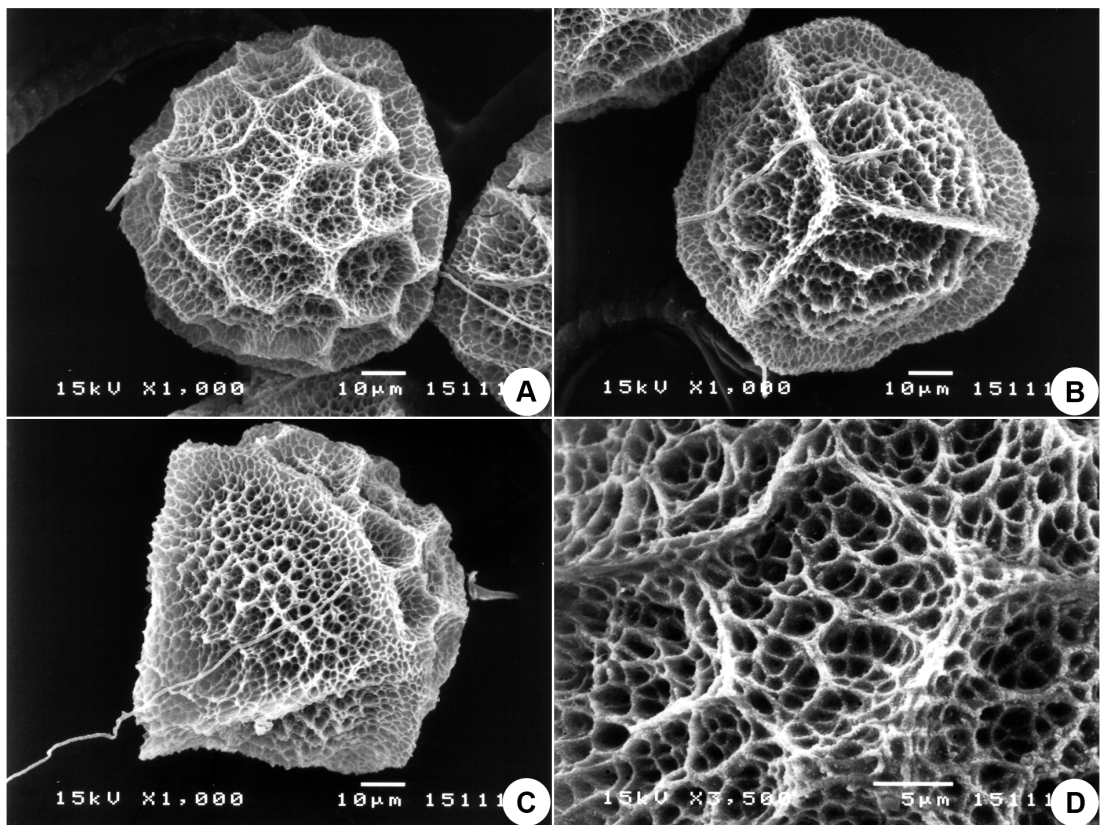


FIGURE 2. SEM photographs of spores in *Asterella khasyana* (Griff.) Pandé, K.P. Srivast. and Sultan Khan. A. Distal view. B. Proximal view. C. Side view. D. Distal surface, showing boreticulate wall structure.

Distribution- Nepal, India, Bhutan, China, Indo-China, Indonesia, Philippines and Africa.

Habitat- On moist sandy soil slopes or on rocks, in exposed areas of the lower montane forests, altitudes 670-1,635 m.

DISCUSSION

Asterella khasyana has affinity to *A. wallichiana* (Lehm. and Lindenb.) Grolle in size and shape of thallus (Long, 2006). However, the former differs from the latter species in having a very thin and delicate thallus, with short branches; par-autoicous

with androecia on the main thalli, just behind base of archegoniophore; female receptacle is flat; spores complicate and areolate, yellow. In contrast the latter species usually has quite leathery thalli, with long branches; dioicous with androecia and receptacles on separate plants; receptacles hemispheric; spores are ridged to almost smooth, and brown.

In all, the diagnostic characters of *Asterella khasyana* are: 1) Thallus is very thin and delicate, with short branches; 2) par-autoicous with androecia on main thallus just behind base of archegoniophore; 3) female receptacle is flat; 4) spores with

complicate areoles, yellow. Long (1998) divides spore sculpturing in *Asterella* into 8 types, i.e. spores may be ridged (Type I, II, III); irregularly and incompletely areolate (Type IV, VIII); regularly and completely areolate (Type V, VI, VII). *Asterella khasiana* clearly fits spore Type VII.

The occurrences of *Asterella khasiana* at Thong Pha Phum National Park, Kanchanaburi Province, south-western Thailand and the other provinces of northern Thailand are in agreement with the present distribution of this species in peninsular India (Kaul, Jain and Pareek, 1995), Indonesia and south China (Piippo, 1990), respectively, and suggest further studies in other S.E. Asian countries are warranted to ascertain the true distribution pattern.

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