



Research article

Pogonatum perichaetiale subsp. *thomsonii* (Mitt.) Hyvönen - An uncommon species from western Himalaya

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Abstract: The present study deals with the investigation of *Pogonatum perichaetiale* subsp. *thomsonii* from Watan Village, Pithoragarh. The important characteristics of this species are plants simple, leaves stiff, tufted and forming a bud like structure when dry, margin sharply toothed in upper part of the leaves, costa ends in a sharp awn like point. Leaf base 1/4 to 1/5 of the total leaf length, lamellae 5–6 cells high, end cells of lamellae thick walled, smooth rectangular. The present study recognizes *Pogonatum perichaetiale* subsp. *thomsonii* a rare species from Uttarakhand which is a new addition to west Himalayan bryoflora of India.

Keywords: Polytrichaceae - Awn like point - Lamellae - End cells - India.

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INTRODUCTION

Genus *Pogonatum* belongs to family polytrichaceae. This genus is easily recognized by its thick, rough textured leaves and hairy calyptra. In India this genus is represented by 18 species (Gangulee 1969, Hyvönen 1989, Asthana & Sahu 2012, Sahu & Asthana 2013). Gangulee (1969) described 4 species within section *Cephalotrichum* (C. Muell.) Broth. from eastern India (*P. perichaetiale* (Mont.) A. Jaeger, *P. thomsonii* (Mitt.) A. Jaeger, *P. tortipes* (Mitt.) A. Jaeger and *P. muticum* Broth.). Hyvönen (1989) synonymized *P. thomsonii* (Mitt.) Jaeg. and *P. tortipes* (Mitt.) A. Jaeger under *P. perichaetiale* subsp. *thomsonii* and *P. muticum* into *P. neesii* (Müll. Hal.) Dozy. Only two valid species were reported in the section *Cephalotrichum* from India at present. *P. perichaetiale* subsp. *thomsonii* can easily be distinguished from *P. perichaetiale* subsp. *perichaetiale* with serrated leaf margin and aristate leaves. The key characters of this taxon are: leaves aristate, margin serrulate at top, forming a bud like structure when dry and end cells of lamellae thick walled, quadrate to short rectangular. Chopra & Kumar (1981) described 6 species from western Himalaya and adjacent plains (*P. perichaetiale*, *P. thomsonii*, *P. himalayanum* Mitt., *P. microstomum* (R. Br. ex Schwägr.) Brid., *P. neesii*, *P. urnigerum* (Hedw.) P. Beauv.), out of which 4 taxa are valid. The present study has revealed *Pogonatum perichaetiale* subsp. *thomsonii* as a new addition to Uttarakhand, west Himalayan bryoflora.

MATERIAL AND METHODS

Plant specimens were collected from Watan Village, Pithoragarh district of Uttarakhand, western Himalaya, India. Plants were air dried and transferred to brown packets. For morphological and anatomical study plant samples were soaked and washed in tap water and were mounted on glass microslide in 30 % glycerine to investigate under microscope. Sections were cut free hand with a razor blade. Observations were made under Olympus compound microscope. The measurements were taken with the help of oculometer. The voucher specimens were deposited in Bryophyte Herbarium, National Botanical Research Institute, Lucknow (LWG).

TAXONOMIC DESCRIPTION

Pogonatum Palisot de Beauvois in Mag. Enc., 5: 329 (1804).

Plants usually dioicous, stiff, robust, erect, simple. Leaves curled to crispate when dry and erectopate when moist. Leaves lanceolate from a sheathing bases, margin not bordered, usually serrate at upper portion and numerous longitudinal lamellae on ventral surface. Leaf costa percurrent to excurrent. Seta long, capsule erect to inclined, subcylindrical, stomata absent. Peristome teeth 32, sometimes 16, calyptra hairy, cucullate.

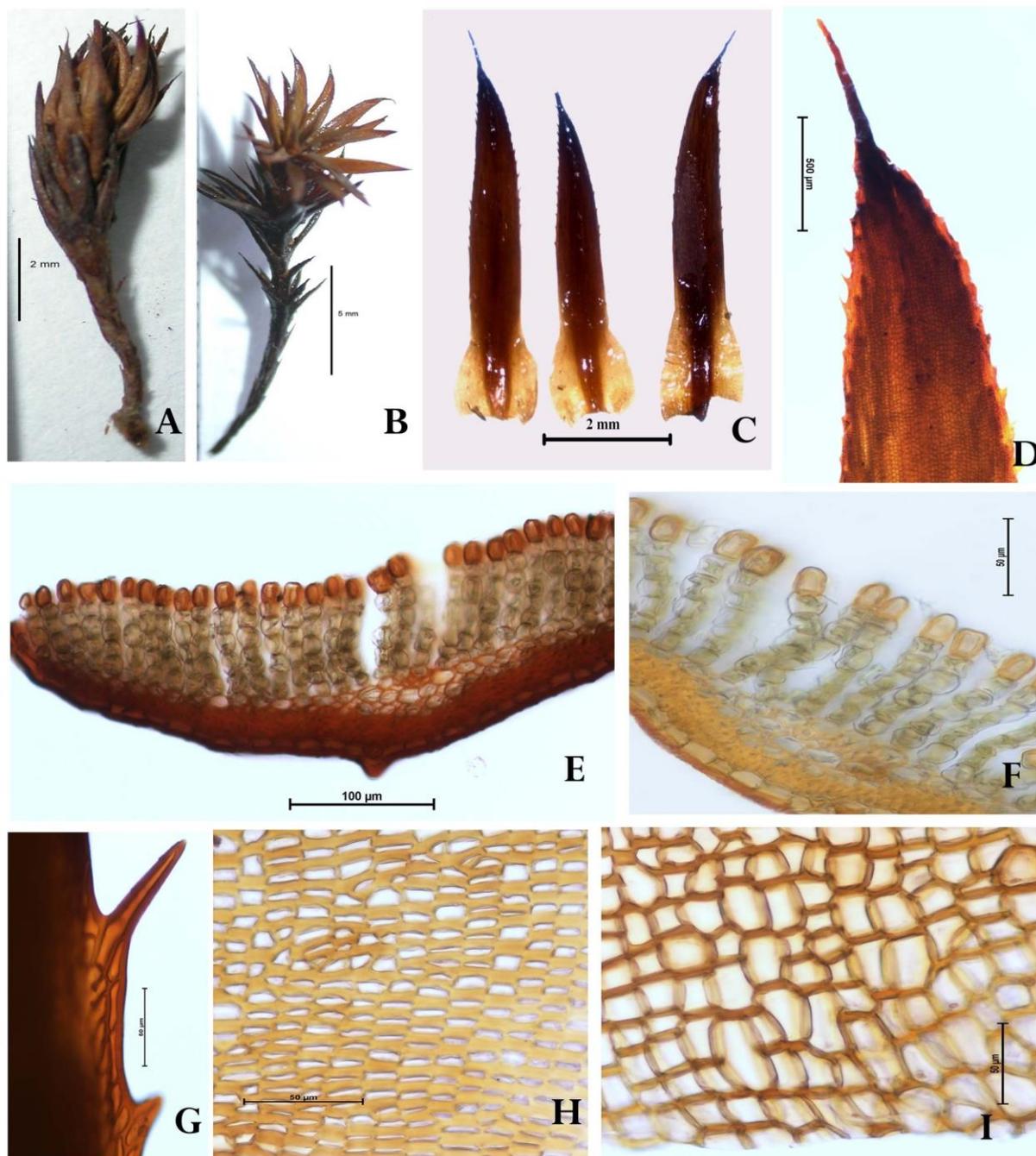


Figure 1. *Pogonatum perichaetiale* subsp. *thomsonii*: **A**, Plant in dry condition; **B**, Plant in wet condition; **C**, Leaves; **D**, Apical margin of Leaf; **E & F**, Cross sections of leaves showing Lamellae; **G**, Apical cells of leaf; **H**, median cells of leaf; **I**, basal cells of leaf.

P. perichaetiale subsp. *thomsonii* comes under the section *Cephalotrichum*. The important characteristics of this section are that plants are small, stiff, leaves tufted at top. Leaf margin dentate at apex or entire, costa excurrent in a sharp point or ending at the tip into a long awn like point. Lamellae 4–5 cells high (sometimes up to 7), end cells bigger quadrate to rectangular, thick walled, smooth and 16 Peristome teeth each having a bifurcated axial pillar.

Pogonatum perichaetiale subsp. *thomsonii* (Mitt.) Hyvönen, in a synopsis of genus *Pogonatum* (Polytrichaceae, Musci). *Acta Bot. Fennica* 138: 1–87 (1989). (**Fig. 1**).

Polytrichum thomsonii Mitt., *J. Linn. Soc. Bot. Suppl.* 1:155 (1859).

Pogonatum thomsonii (Mitt.) A. Jaeger. *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1873–74: 257 (1875);

Pogonatum tortipes (Mitt.) A. Jaeger. *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1873–74: 257 (1875);

Pogonatum thomsonii var. *tibetanum* Chen, *Sci. Exped. Qomolongma Reg.* 235.14 (1962).

Plants dark brown, erect, simple, 12–15 mm long. Leaves stiff, tufted and forming a bud like structure when dry, Lower leaves small. Leaves erectopate, lanceolate from a wider transparent sheathing base, 4–5 mm long and 0.96–1.12 mm wide, margin sharply toothed in upper part of the leaves. Leaf costa ends in a sharp awn like point. Leaf base 1/4 to 1/5 of the total leaf length. In cross section of leaf, lamellae covering almost the entire ventral leaf surface, lamellae 5–6 cells high, end cells of lamellae thick walled, smooth reddish brown, rectangular with top cell flat or rounded. Apical cells of leaf 12–16 μm long and 8–12 μm wide, short quadrate. Basal cells of leaf 20–40 μm long and 12–20 μm wide, quadrate to rectangular. Leaf costa 140–160 μm wide at base. Sporophyte not seen.

Specimens examined: INDIA, Western Himalaya, Uttarakhand, Pithoragarh, Near Watan Village, 27.09.1990, V. Nath 205087A (LWG).

Habitat: ca. 3500 m, on soil.

Distribution: India (Simla, Sikkim), Bhutan, South eastern Tibet, Nepal, China.

Hyvönen (1989) synonymized *Pogonatum thomsonii* and *P. tortipes* under *P. perichaetiale* subsp. *thomsonii*. In the case of *P. tortipes* end cells of lamellae are smooth, thick walled, 4–5 cells high, elongated rectangular with top cells flat and leaf basal part 1/3 of total leaf length, basal cells rectangular up to 145 μm long and 24 μm wide while in *P. thomsonii* end cells of lamellae cup shaped with depressed top, lamellae 5–7 cells high, basal leaf cells up to 60 μm long and 17 μm wide (Gangulee 1969). Characteristic end cells of lamellae and basal leaf portion might be the reason for making *P. perichaetiale* subsp. *thomsonii* as separate subspecies. In our specimens end cells of lamellae are 5–6 cells high, thick walled, smooth, elongated rectangular, with top cells flat or rounded and basal portion of leaf 1/4 to 1/5 of the total leaf length. *P. tortipes* was collected by Hooker in Japanese Expeditions in 1960–63 from Sikkim and it is known in India from that collection only. Chopra & Kumar (1981) examined the specimen no. 6202 (BM) of *P. thomsonii* but in that specimen date of collection and altitude was not mentioned. *Pogonatum perichaetiale* subsp. *thomsonii* is very rare and it has been collected from Pithoragarh, western Himalaya after 30 years. It is still untraced despite several collections in the area in past few decades. After Hyvönen treatment of this taxon, the plants have been identified and described from Pithoragarh region of western Himalaya for the first time.

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