

Plagiomnium cuspidatum (Hedw.) T. Kop. (moss) from Kumaon Hills, Uttarakhand, India

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ABSTRACT

Saxena D. K., Saxena S. & Kumar S. 2011. *Plagiomnium cuspidatum* (Hedw.) T. Kop. (moss) from Kumaon Hills, Uttarakhand, India. *Geophytology* 40(1-2): 55-59.

The moss *Plagiomnium cuspidatum* (Hedw.) T. Kop is widely distributed and grows luxuriantly in almost all the bryogeographical regions in India. The present study describes the GPS-based distribution followed by taxonomy and ecology of *Plagiomnium cuspidatum* collected from Kumaon Hills during the years 2007–2008.

Key-words: *Plagiomnium cuspidatum*, moss, taxonomy, distribution, ecology, Kumaon Hills, Uttarakhand, India

INTRODUCTION

Kumaon Hills (Lat. 28°44'–30°49' N; Long. 78°45'–80°01' E) are essentially a region of great physical diversity exhibiting vast range of altitude coupled with complex, varying mountainous topography, giving rise to variety of climate and vegetation. The region is situated at the tri-junction of Nepal, Tibet and India and is spread over 21035 km². The topography of the area is irregular due to valleys and plateaus of various dimensions (Singh et al. 2004). Study of the moss *Plagiomnium cuspidatum* was made from this region during three seasons of 2007–2008 at the following sites: Mukteshwar, Ranikhet, Chaubatia, Almora Jageshwar, Artola, Pithoragarh and Nainital. Koponen (1968) divided the genus *Mnium* into three genera, viz. *Mnium*, *Plagiomnium* and *Rhizomnium*, which more or less correspond to the biserrate, serrate and integerrima of Limpricht (1895–1904). The genus is widely distributed in India (Chopra 1975) but no record is available on its distribution from this region, compelling us to take up the present systematic and distributional study based on GPS data.

MATERIAL AND METHOD

Collections were made in winter, summer and rainy seasons during 2007–2008 from Kumaon Hills, Uttarakhand. Samples were identified with the help of available literature (Gangulee 1969, Chopra 1975, Smith 1978, Dabhade 1988). Line diagrams were made with the help of Camera Lucida. A reference specimen was borrowed for comparison from Cryptogamic Herbarium, Department of Biology, Duke University, Durham, North Carolina, U.S.A.

Voucher specimens were prepared for *Plagiomnium cuspidatum* Hedw. collected from Kumaon Hills, India and were deposited in the 'Bryophyte Experimental Bank' of Botany Department, Bareilly College, Bareilly, India [Specimen nos. 0065082007(a) – 0065082007(d), 0065032008(a)–0065032008(d) and 0065072008(a) – 0065072008(d)].

PLAGIOMNIUM CUSPIDATUM (HEDW.) T. KOP.

Plagiomnium cuspidatum (Hedw.) T. Kop.,

Ann. Bot. Fenn. 5, 1968.

Figure 1, Text-figure 1

Etymology: Plagios (Greek) = “oblique, transverse, slanting; also the side flanks”; mnion = “moss”; cuspidatum (Latin) = cuspidatus meaning “with a cusp,” a sharp and rigid point

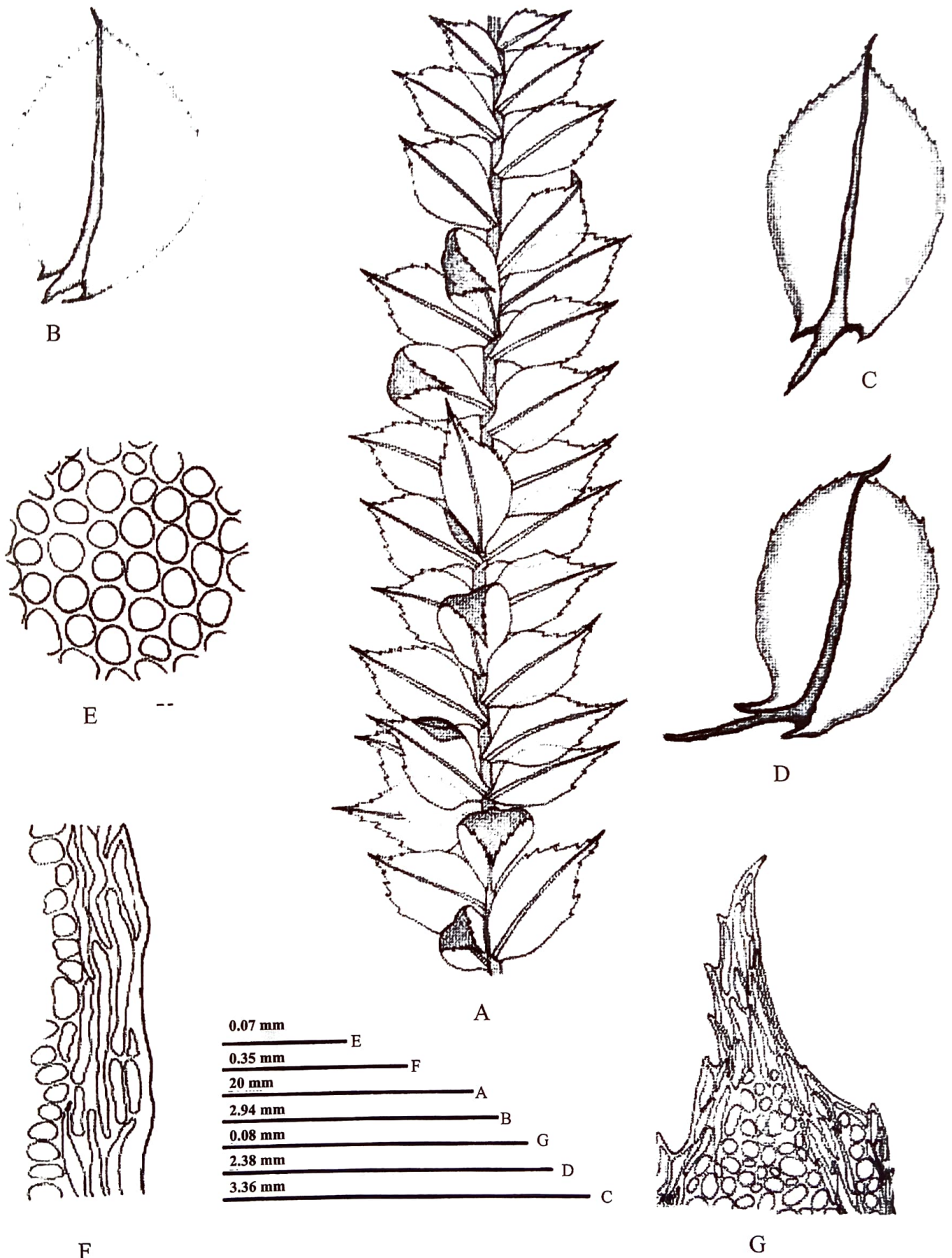
Description: Synoecious. Moss light to dark green, growing in dense tufts or patches with paler young growth on damp soil, walls, rocks and tree boles in humid, moist and shaded habitats (Figure 1). Plants approximately 0.2 to 8 cm in length. Stems erect with prostrate branches having whip like flagella with rhizoids at tips. Sterile stems arcuate or erect and brownish in colour. Leaves crisped ovate to broadly ovate. Lower leaves distant, small in size, measuring up to 2 mm long and 1 mm wide; upper leaves more crowded, ranging in size from 4 to 5 mm long and 1.5 to 2.5 mm wide. Leaf base decurrent and apex sharply pointed. Leaf

margins with unistratose yellowish borders 2–4 cells wide and cells rectangular. Margins sharply toothed from top (about half) and teeth relatively small. Nerve prominent and single, ending below apex and brownish in colour. Mid leaf cells parenchymatous, not arranged in divergent rows, and all cells of nearly same size, rounded and approximately 70 μm in diameter (Text-figure 1).

Habitat and ecology: The moss was found to grow luxuriantly in the altitude range of 700 to 3500 metres. Its wide range of habitats could be due to wide tolerance potentials. Its altitudinal variations to varying climates (Tewari et al. 1994) signify its acclimatization in varied habitats, including temperature, as evidenced by wide temperature ranges (minimum 10.5°C in Artola and maximum 21.5°C in Pithoragarh during winter



Figure 1. *Plagiomnium cuspidatum* from Linguard House of Mukteshwar Reserve Forest (2286 m), Kumaon Hills, Uttarakhand.



Text-figure 1. *Plagiomnium cuspidatum* (Hedw.) T. Kop. A. Whole plant. B-C. Leaves. D. Leaf of borrowed specimen. E. Mid leaf cells. F. Marginal cells. G. Leaf apex.

Table 1. Meteorological data of native samples of moss *P. cuspidatum* collected during different seasons (summer, rains and winter) of 2007-2008.

Stations/ Location	Latitude N	Longitude E	Elevation	Habitat	Meteorological data		
					Soil pH	Av. Temp.	Humidity %
Mukteshwar							
Summer	29°28.333'	079°37.165'	2252 m	On soil covered by dead <i>Pinus</i> needles	7.0	25°C	83
Rains	29°28.236'	079°39.163'	2173 m	On wall	7.1	14°C	78
Winter	29°28.288'	079°39.161'	2167 m	On humus	7.1	12.5°C	69
Ranikhet							
Summer	29°37.151'	079°27.676'	1931 m	On moist soil	6.9	24°C	70
Rains	29°37.129'	079°27.571'	2009 m	On humus	6.8	17.5°C	65
Winter	29°37.115'	079°27.667'	2017 m	On damp soil	6.9	20°C	73
Artola							
Summer	29°37.547'	079°49.869'	1875 m	Along the road	7.0	21°C	60
Rains	29°37.497'	079°49.920'	1857 m	On rock surface	6.8	15.5°C	72
Winter	29°37.501'	079°49.924'	1862 m	On damp soil	7.0	10.5°C	65
Jageshwar							
Summer	29°37.562'	079°50.190'	1783 m	On stone surface	6.9	22.5°C	70
Rains	29°37.659'	079°50.294'	1825 m	On the wall	7.0	18.5°C	75
Winter	29°37.677'	079°50.313'	1860 m	On the tree trunk	7.0	18°C	62
Nainital							
Summer	29°27.800'	079°39.803'	2196 m	On rock surface	6.9	25°C	79
Rains	29°27.222'	079°39.234'	2136 m	On wall	6.9	22.5°C	70
Winter	29°27.263'	079°39.236'	2235 m	On tree trunk	6.8	16.5°C	86
Pithoragarh							
Summer	29°34.720'	080°12.620'	1505 m	On moist soil	7.0	30°C	67
Rains	29°34.552'	080°12.656'	1500 m	On soil along roadside	7.1	18°C	72
Winter	29°34.684'	080°12.720'	1507 m	On humus	7.0	21.5°C	69

season). In summer, minimum temperature was recorded up to 21°C in Artola while maximum was 30°C in Pithoragarh. The genus was found to grow on slightly acidic or neutral soil (pH 6.7–7.1). It prefers damp, acidic, raw humus soil, along roadsides, in areas covered by pine needles, as well as on stone surfaces. The humidity in the area was high, with the minimum of 60% recorded in Artola and maximum 86% in Nainital. GPS positioning in the various districts are shown in Table 1.

Specimen examined: *Plagiomnium cuspidatum*, Acc. No. of the borrowed specimen: 0133179, Collected by: R. S. Chopra, Locality: Himachal Pradesh (Shimla), Uttarakhand (Kumaon Himalaya), India. Altitude: 2400 m, Year of collection: 1934.

Distribution of *Plagiomnium* in India: *Plagiomnium* is a cosmopolitan genus and its 20 species were described by Chopra (1975), out of 34 species reported from the world (Juutinen 2006). The geographical distribution of the species has been published by Gangulee (1969), Chopra (1975), Smith (1978), and Dabhade (1988).

Remarks: The present findings are based on the first extensive survey using GPS data on distribution of a species from this region, followed by taxonomic description. Both frequency and density were maximum at Mukteshwar (2286 m), followed by Ranikhet (1829 m), Chaubatia (1869 m), Almora (1656 m), Artola (1400 m), Jageshwar (1870 m), Pithoragarh (1851 m) and Nainital (1851 m). Its scattered distribution in Nainital could be due to the highly inhabited area and man-made constructions.

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