

## BRYODIVERSITY OF DISTRICT BUDGAM (JAMMU AND KASHMIR) HEPATICAEE IV

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Received: December 12, 2018

Accepted: January 12, 2019

**ABSTRACT:** The present survey of the unexplored area till date has revealed the occurrence of 73 bryophyte species in various habitats. These species fall in 32 genera in 10 orders and 18 families. Among these, there are three species of hepaticae. The present study provides a working base to an Ecologist, Cytologist, Chemist, Physiologist and Pharmacist to evaluate potential of these tiny plants in their relevant field of study.

**Key Words:**

***Marchantia polymorpha* L., Sp. pl.:1137. (1753).**

**Plate 71**

*Marchantiapolyomorpha* L., Sp. pl.:1137. 1753; Mitt in J. Proc. Linn. Soc., Bot. 5: 125. 1861; Kashyap, Liverw. W. Himal. 1: 32. 1929; V.B. Singh in Bull. Lucknow Natl. Bot. Gard. 156: 20. 1966; Bischl. Bryophyt. Biblioth. 38: 74. 1989. sub species polymorpha.

Dioecious. Thallus deep-green, 8cm long and 4cm wide, dichotomously branched; lobed, margins wavy, apex emarginated; dorsal surface slightly concave, dark median streak; epidermal cells angled; angles not thickened, pores small, oval, slightly elevated, 5-7 superimposed concentric rings of 4-6 cells each, 2-4 rings of projecting below in the air chamber; cells quadrate-cruciate,  $\pm 42 \times 35 \mu\text{m}$ , papillate, air chambers single layered with 2-5 cells high chlorophyllose filaments; storage tissue parenchymatous; ventral scales in six rows (three on either side of midrib), large, appendiculate, margin entire with one celled mucilage hairs, appendages sub-rotund, laminar scales nearly half way of the thallus from the midrib region, ligulate; Gemma cups common near growing points,  $\pm 4.5$  cm high and to  $\pm 1$  cm in diameter, each has a slender stalk, with 9 narrow, terete rays, with diameter 0.7 mm, On the under side of the head between the rays are 8 receptacles.

Male receptacle stalked; green or brown stalk, stalks smaller than that of female receptacle,  $\pm 2$  cm high and a flat-topped head, up to  $\pm 1$  cm in diameter, receptacle stalked; stalk with two rhizoidal furrows, disc circular, receptacle stalked, 8 lobed, green in colour except for a broad, colourless margin.

Most frequently found on very wet soil and along water falls and water springs.

**Specimen examined**

**Budgam:** Budgam, Khansahib, Beerwah; Growing near water spring and soil; Mar 2014, **PAN 6173.**

**Distribution:** A cosmopolitan species.

**Chromosome number:** 9

***Dumortierahirsuta* (Sw.) Nees in Reinw. et al., Nova Acta Phys.-Med. Acad. Caes. Leop. Carol. Nat. cur. 12: 410 (1824).**

**Plate 72**

*Dumortierahirsuta* (Sw.) Nees in Reinw. et al., Nova Acta Phys.-Med. Acad. Caes. Leop. Carol. Nat. cur. 12: 410 1824; Kashyap, Liverw. W. Himal. 1: 42. 1929.

*Marchantiahirsuta* Sw., :Prodr.: 145. 1788.

Monoecious or dioecious. Thallus green-dark, hygrophilous,  $\pm 8$ cm long and  $\pm 1$ cm wide, semi-translucent, large, dichotomously branched; lobes flat, apex notched, margins undulate; dorsal surface with faint network, papillate cells; bulging midrib, apex emarginate, sparsely hirsute, hairs  $\pm 250.0 \mu\text{m}$  long and  $\pm 12.5 \mu\text{m}$  wide at base.

Epidermis, pores and air chambers absent; dorsal cells from above hexagonal,  $\pm 45 \times 32 \mu\text{m}$ , containing chloroplasts; marginal cells thin-walled, longer, short-rectangular,  $\pm 52 \times 18$ ; midrib with  $\pm 18$  rows of cells, oil bodies rare, yellow-brown; rhizoids below midrib numerous, mostly smooth,  $\pm 17 \mu$  wide, occasionally tuberculate,  $\pm 5 \mu$  wide, ventral scales hyaline. Antheridiophores sessile, disciform,  $\pm 2 \times 0.6$  mm thick in centre, antheridia,  $\pm 470 \times 250 \mu\text{m}$ , ovate, acropetally arranged,  $\pm 1$  mm diameter, bifurrowed stalk, rhizoids lining furrows; hyaline, filiform scales on ventral face of disc, the latter encircled by dense outer fringe of  $\pm 700 \mu\text{m}$  long and  $\pm 25 \mu\text{m}$  wide. Archegoniophore disciform, 3 mm in diameter; dorsal face grooved by sinuses; ventral face 6-8-lobed star-shaped, bristled; archegonia in groups of 8-16, enclosed in

green, fleshy involucre, long archegonial necks protruding through narrow slit-like apical openings; receptacle  $\pm 40$  mm long and  $\pm 925$   $\mu\text{m}$  wide, cortical cells  $\pm 15.0 \times 12.5$   $\mu\text{m}$ . Seta protruding from membranous calyptra, pseudoperianth lacking; capsule wall unistratose with annular or semi-annular thickenings. Spores brown, ornamented with numerous nodules,  $\pm 20$   $\mu\text{m}$  in diameter.

Plants are large and robust and are found mostly near water spring often flooded with water. Archegoniophore and antheridiophore were clearly visible.

#### Specimen examined

**Budgam:** Budgam, Khansahib; Growing near water spring and soil; Mar 2014, PAN 6174.

**Distribution:** A Cosmopolitan species.

**Chromosome number:**  $n=9$

*Porella obtusata* (Taylor) Trevis var *macroloba* (Steph.) S. Hatt & Zhang, J. Jap. Bot. 60: 325 (1985).

#### Plate 73

*Porella obtusata* (Taylor) Trevis

Deep green-brown, bipinnately branched. Stem creeping, green-brown,  $\pm 4.5$  cm long. Leaves incubous, imbricate, patent, horizontal, ovate, leaf lobe  $\pm 0.7$  mm long and  $\pm 0.67$  mm wide, closely imbricate, recurved at apex, margins entire, rounded apex, slightly decurrent at base; marginal laminal cells towards apex quadrate-subquadrate,  $\pm 25 \times 20$   $\mu\text{m}$ , median leaf cells hexagonal-polygonal,  $\pm 25 \times 20$   $\mu\text{m}$ , basal laminal cells elongated, polygonal,  $\pm 28 \times 40$   $\mu\text{m}$ ; trigones triradiate-subnodulose; laminal lobes large, broadly ovate, entire at margins, rounded at apex, entire base, appendage decurrent, appendages at inner base; underleaves ovate-suborbicular, inserted by a broad base, long-decurrent on both sides, incurved at margins.

Plants are green to brown in color. They were attached to tree trunks. They were trailing on them.

#### Specimen examined

**Budgam:** Chadoora, Khansahib; Growing on tree trunk; Mar 2014, PAN 6175.

**Distribution:** India, Asia, North Africa and Europe.

**Chromosome number:** Not known so far.

#### Discussion

This wide discrepancy in the occurrence/distribution of the two major groups of bryophytes seems to be related to the difference in the inherent potential of tolerance/adaptation to environmental conditions prevailing in the area. The endohydric and actively ectohydric habit of mosses is another contributory factor for their relatively successful colonization as compared to liverworts which lack endohydric absorption and also have relatively lesser and slower ectohydric property of water absorption. It seems likely that the difference in the ectohydric absorption in the two groups may be due to the difference in the nature of their cell wall materials. The wall materials may be more of hydrophilic colloids in mosses as compared to those of liverworts.

Unfortunately, limited study or lack of it does not permit the writer to draw any final conclusion about this relationship. Nevertheless, it appears desirable to undertake studies on the nature of the wall material in the two groups so as to test the validity/invalidity of the present suggestion.

Presently, this study however, does suggest that the explored area does not provide hospitable conditions for the larger colonization of liverworts.



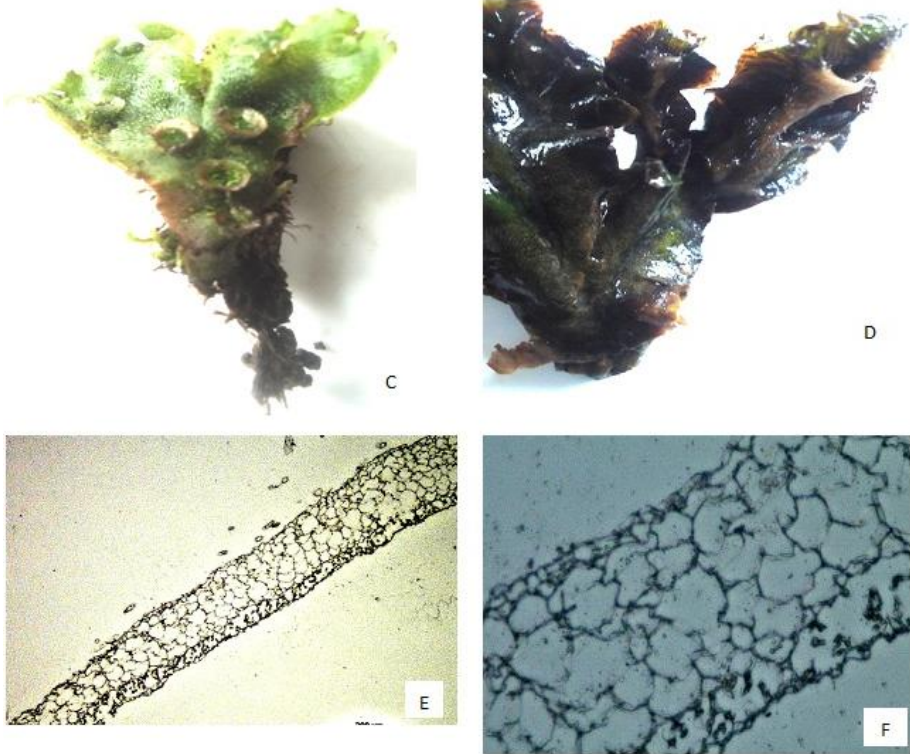


Plate 71: *Marchantiapolyomorpha* L., Sp. pl.:1137. (1753); A. Plant in field (1X), B. Patch of plant (2X), C. Dorsal view (3X), D. Ventral view (3X), E. Cross sectional view (75X), F. Magnified Cross sectional view (290X).

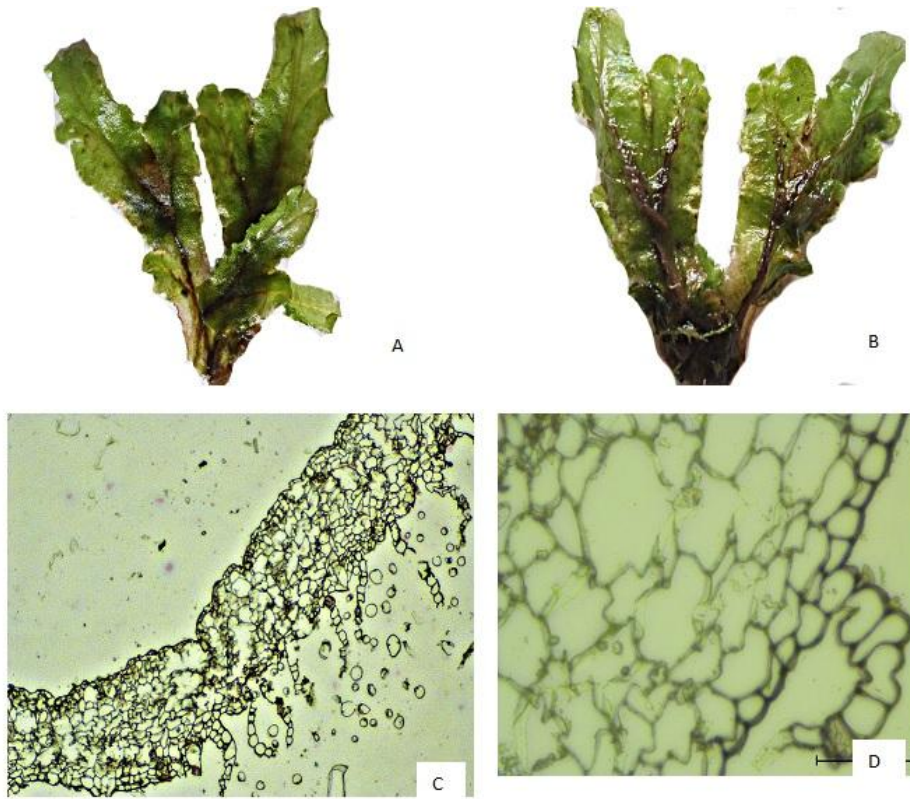


Plate 72: *Dumortierahirsuta* (Sw.) Nees & Reinw. et al., Nova Acta Phys.-Med. Acad. Caes. Leop. Carol. Nat. cur. 12: 410 (1824); A. Dorsal view (3X), B. Ventral view (3X), C. Cross sectional view (75X), D. Magnified Cross sectional view (290X).



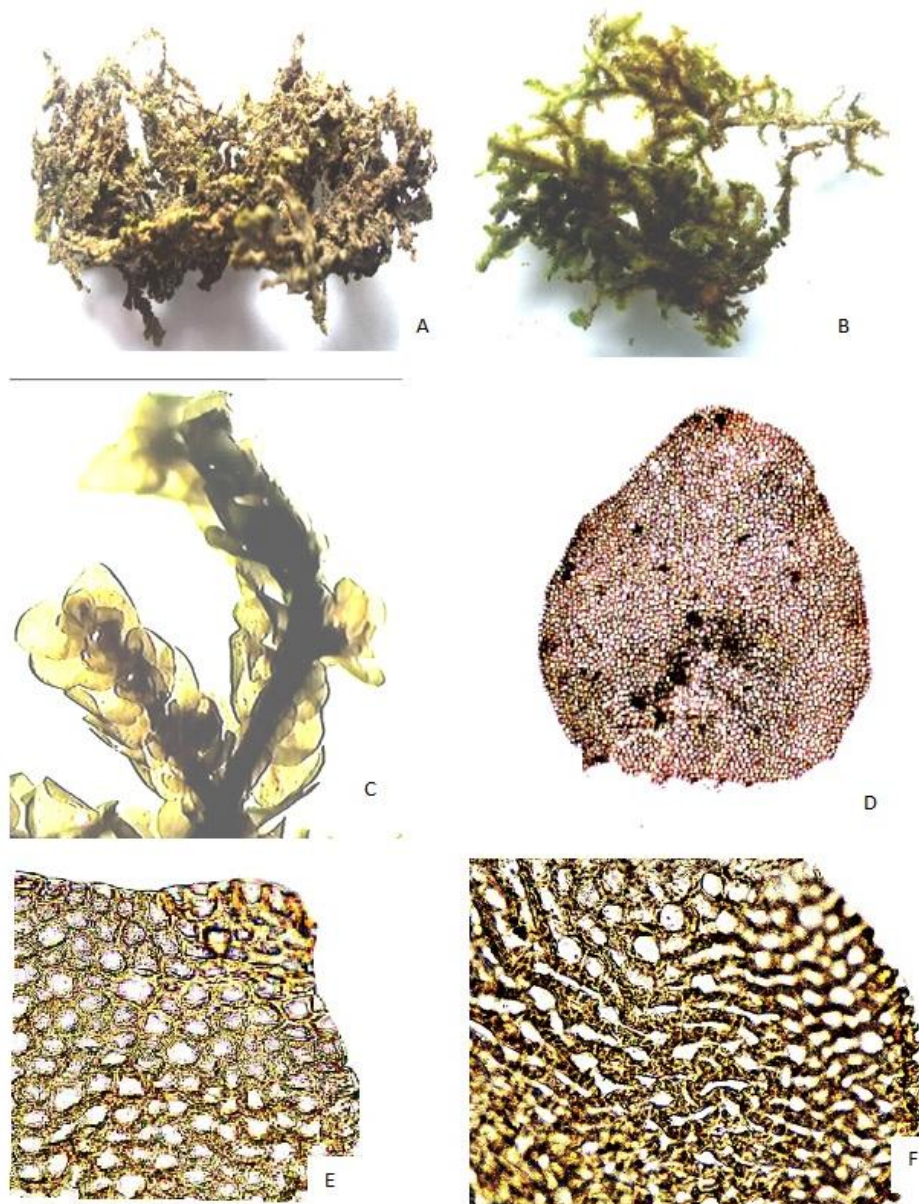


Plate 73: *Porella obtusata* (Taylor) *Trevisvarmacroloba* (Steph.) S. Hatt & Zhang in J. Jap. Bot. 60: 325 (1985); A. Dry plant (3X), B. Wet plant (3X), C. Plant (10X), D. Apical laminal cells (75X), E. Middle laminal cells (290X), F. Basal laminal cells (290X).