

Taxonomical Studies of Genus *Mnium* From District Budgam (J&K) India

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Abstract: The genus *Mnium* Hedw., was reported for the first time from the Southern hemisphere. Plants of this genus are medium sized with fertile erect stem and prostrate sterile stem. In present investigation five species of genus *Mnium* namely, *Mnium confertidens* (Lindb. Arn.) Kindb. Bryin. Exot. :107 (1891), *Mnium cuspidatum* Hedw. Musc. : 192(1801), *Mnium integrum* Bosch & Sande Lac. Bryol. Jav., 1: 153(1861), *Mnium rostratum* schrad. Regensburg, 1: 79(1802) and *Mnium succulentum* Mitt. Musci Ind. Or. : 143 (1859) have been reported from the district Budgam for the first time.

Keywords: Budgam, *Mnium* and Taxonomy

1. Introduction

The genus *Mnium* Hedw. was reported for the first time from the Southern Hemisphere (Koponen and Norris, 1983). First species of the genus *Mnium* was named by Dillenius as *M. androgynum*, now known as *Aulacomnium* (Grout, 1902). *Mnium* Hedwig is proposed for conservation over *Mnium* L., which is technically the name of a genus of liverworts (Proskauer, 1963). Koponen's (1968) separated genus *Mnium*, with more than 70 species (Wyatt and Odrzykoski, 2012). The plants of this genus grow in moist and shady places, forming dense mats. They are medium to robust in size. Fertile stem is usually erect with upper leaves larger and often rosette-like, prostrate stem are usually sterile. Leaves are densely clustered, ovate to elliptic-ovate, apex acute or rounded and shortly mucronate. On drying, leaves become curled. The costa or midrib is strong and may or may not be toothed on the back. Sporophytes may occur singly or clustered at the tips of stems.

Antibiotic activities are present in genus *Mnium* (Castaldo-Cobianchi *et al.*, 1988). North American Indians used *Polytrichum juniperinum*, *Bryum*, *Mnium* and *Philonotis* mosses to heal burns, bruises and wounds (Ilhan *et al.*, 2006). In Utah, the Gasuite Indians used *Bryum*, *Mnium*, *Philonotis*, by crushing them into a paste and applying the poultice to reduce the pain of burns (Flowers, 1957). *Mnium rostratum* is used for flavouring food (Meenu Krishnan *et al.*, 2014). *Mnium cuspidatum* is used for treating hematostasis and nosebleed (Asakawa *et al.*, 2013). Due to trample-resistant structure and regenerative ability it prevents soil erosion (Khanam *et al.*, 2011).

District Budgam; (Figure 1) Kashmir Valley of the State of Jammu and Kashmir is situated between 33° 15' and 34° 30' N latitude and 74° and 75° 13'E longitude. It is bounded on South by the Pir Panjal range and on the North by the main or central Himalayan ranges. District Budgam is one of the districts of Kashmir, located in the northern part of India between 34° 42'-34° 50' N and 74° 24' -74° 54' E. In North it is surrounded by Baramulla and Srinagar districts. District Pulwama is present in South and Poonch border occurs in South West. Pir Panjal and Karewas as foothills, which are present from South-West to North-East separate it from the Chenab valley and the Jammu region (Najar and Khan,

2011; Lone and Romshoo, 2011). *Brachythecium kamounense* (Harv.) A. Jaeg., *B. plumosum* (Hedw.) Schimp., *B. rutabulum* (Hedw.) Schimp., *Cratoneuron commutatum* (Hedw.) G. Roth., *Drepanocladus aduncus* (Hedw.) Warnst., *Haplocladium microphyllum* (Hedw.) Broth., *Hypnum cupressiforme* Hedw. and *Philonotis falcata* (Hook.) Mitt., have been studied and recorded from Doodhpathri (Budgam) (Kour *et al.* 2015).

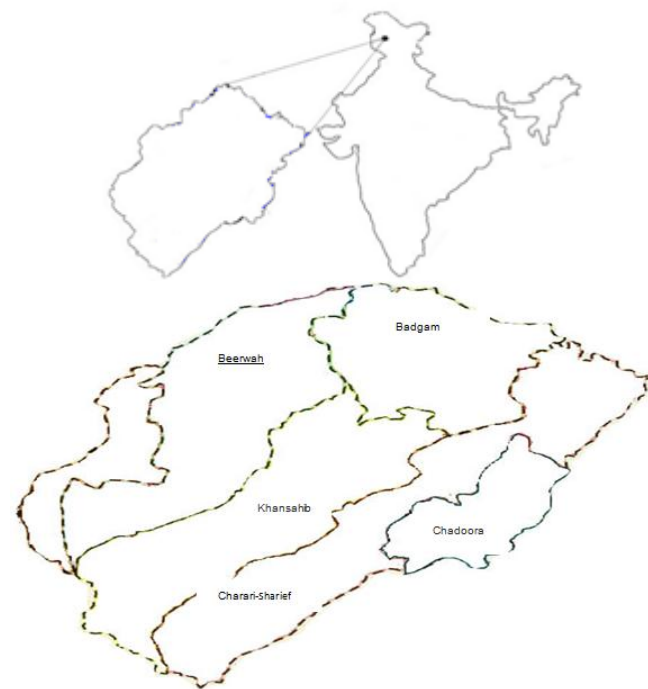


Figure 1: Map of District Budgam (J&K) showing different tehsils

2. Materials and Methods

The materials were collected during the month of October, 2013 from different places of district Budgam (J&K). The field data were recorded on the spot. The materials collected in polythene bags were air-dried and then kept in paper bags. To study the collected taxa, materials were soaked in boiling water for about 5-10 minutes to regain turgidity. The leaves were dissected under binocular microscope and mounted in Gum Chloral. Gum Chloral constitutes gum arabic, chloral hydrate, glycerine and distilled water with proportion of

40gms, 50gms, 20ml and 100 ml respectively. Later these slides were observed under microscope and studied. Studied materials were also photographed.

3. Result and Discussion

Mnium confertidens (Lindb. Arn.) Kindb. Bryin. Exot. :107 (1891)

It is an Asiatic species (Koponen, 1981a). Some scientists have reported it from Mongolia and Turkey (Tsegmed, 2001; Kürschner & Erdağ, 2005). Koponen (1980) reported it from Europe. Plants yellow-green above, reddish-brown at base, erect, branched, stolons not prominent; leaves crispate when dry, spreading when moist, smaller, ovate-elliptical to narrowed at top and base, median leaves rounded, decurrent at base, mucronate at apex; more or less transversely undulate, margin dentate; costa yellow brown, excurrent; leaf cells thick walled, irregularly rounded quadrate at top, basal cells near costa elongated sub-rectangular, median laminal cells rounded-hexagonal, sporophyte not found.

Mnium cuspidatum Hedw. Musc. :192(1801)

It is commonly distributed in Europe and North America (Andrews, 1959). Koponen in (1981b) reported it from tropical and southern Africa. It is also reported from different Ohio countries (Claassen, 1919). Plants green, robust; sterile sub erect side shoots, lower leaves smaller and placed wide apart, upper leaves crowded forming comal tufts ovate, leaves acuminate, base narrowed, decurrent, crumpled, crispate when dry; margin dentate only in the upper half, bordered leaves on sterile side shoots more distant at top and base but more or less crowded in the middle; leaf cells thick walled, irregularly rounded quadrate, marginal border; costa strong, reddish; perichaetial leaves longer and narrower with more pointed tips; seta erect, arcuate at tip, capsule pendulous, ovate-oblong, operculum conical obtuse, peristome normal.

Mnium integrum Bosch & Sande Lac. Bryol. Jav. 1:153(1861)

It is Asiatic species (Koponen, 1972). In India it is reported from Western Ghats (Verma *et al.* 2011). Plants green, robust, sterile shoots suberect, branched in the upper regions, tomentose at base; leaves large, ovate-oblong, narrowed at base, apex obtuse, vegetative shoots sub-erect, branched in the upper regions, tomentose, margin entire; costa percurrent in older leaves; leaf cells usually thin walled quadrate to hexagonal, leaf cells indistinctly bordered, perichaetial leaves longer and narrower, seta erect, arcuate at tip, capsule pendulous, ovate-oblong, operculum conical obtuse, peristome double.

Mnium rostratum schrad. Regensburg, 1:79(1802)

It was reported from New Zealand, Pennsylvania and Europe (Craw, 1976; Barbour, 1902; Koponen,1980).

Choyal and Sharma (2011) reported it from Dharmshala (H.P). *Mnium rostratum* Schrad. is reported from Western Himalayas, India (Alam *et al.*, 2013). Pradhan in 2013 documented *Mnium rostratum* Schrad. from Nepal .

Plants yellow green to dark green, forming loose or compact creeping mats; main stem erect, lateral sterile branches arise from the comal regions, fertile erect shoot more crowded at apex, spreading, curled and crumpled when dry, simple or branched; leaves on the prostrate stem complanate, large usually oblong, notched at tip, undulate, margin strongly bordered with teeth almost to base; leaf bases not decurrent; costa red, strong; leaf cells thick walled to collenchymatous, irregularly quadrate hexagonal at top and middle, rectangular or sub-rectangular at extreme base, a row of larger longer rectangular guide cells are usually present on both sides of costa; perichaetial leaves largest, seta red, erect; capsule horizontal to pendulous, yellow to light brown, operculum long rostrate, straight or curved; beak red; peristome normal.

Mnium succulentum Mitt. Musci Ind. Or. :143 (1859)

It is reported from Western Himalayas, India (Alam, 2013). Higuchi *et al.*, (2010) reported it from Tiwan. It is also reported from Britian (Watson, 1968). Huan *et al.*, (2002) reported it from China. Plants large, stout, green with brown tomenta below, creeping, branched sterile shoots; stem leaves obovate-oblong, rounded-obtuse, apiculate, base narrower, wide at middle, margins slightly dentate in oldest leaves, costa percurrent; leaf cells collenchymatous, rounded to hexagonal; costa inconspicuous, ending just below the apiculus; each perichaetium, flexuose when dry; capsules cernuous, oblong; opercula shortly rostrate, exostome teeth yellowish-brown; cilia of endostome 2-3; calyptrae cucullate, with a long beak; perichaetial leaves longer and narrower, flexuose when dry; seta long; capsules cernuous, oblong; opercula shortly rostrate, exostome teeth yellowish-brown; calyptrae cucullate, with a long beak. Relevant data of the investigated plant species is given in the Table 1.

4. Conclusion

Total five species of genus *Mnium* namely *Mnium confertidens* (Lindb. Arn.)Kindb. Bryin. Exot. :107 (1891), *Mnium cuspidatum* Hedw. Musc. : 192(1801), *Mnium integrum* Bosch & Sande Lac. Bryol. Jav., 1:153(1861), *Mnium rostratum* schrad. Regensburg, 1:79(1802) and *Mnium succulentum* Mitt. Musci Ind. Or. :143 (1859) have been studied and recorded from district Budgam for the first time.

5. Acknowledgement

I would like to thank UGC BSR for giving me fellowship.

Table 1: List of the Studied Taxa Along with Related Data

Name of The Taxon	Substratum	Herbarium Reference Number (PAN)	Figur Number
ORDER: BRYALES FAMILY: MNIACEAE <i>Mnium confertidens</i> (Lindb. Arn.) Kindb. Bryin. Exot. : 107 (1891) <i>Mnium cuspidatum</i> Hedw. Musc. : 192 (1801) <i>Mnium integrum</i> Bosch & Sande Lac. Bryol. Jav., 1: 153 (1861), <i>Mnium rostratum</i> Schrad. Regensburg, 1: 79 (1802) <i>Mnium succulentum</i> Mitt. Musci Ind. Or. : 143 (1859)	Soil, Rocks, Logs	6111a	2
	Sand	6112 a	3
	Sandy soil	6113 a	4
	Soil	6114 a	5
	Soil	6115 a	6

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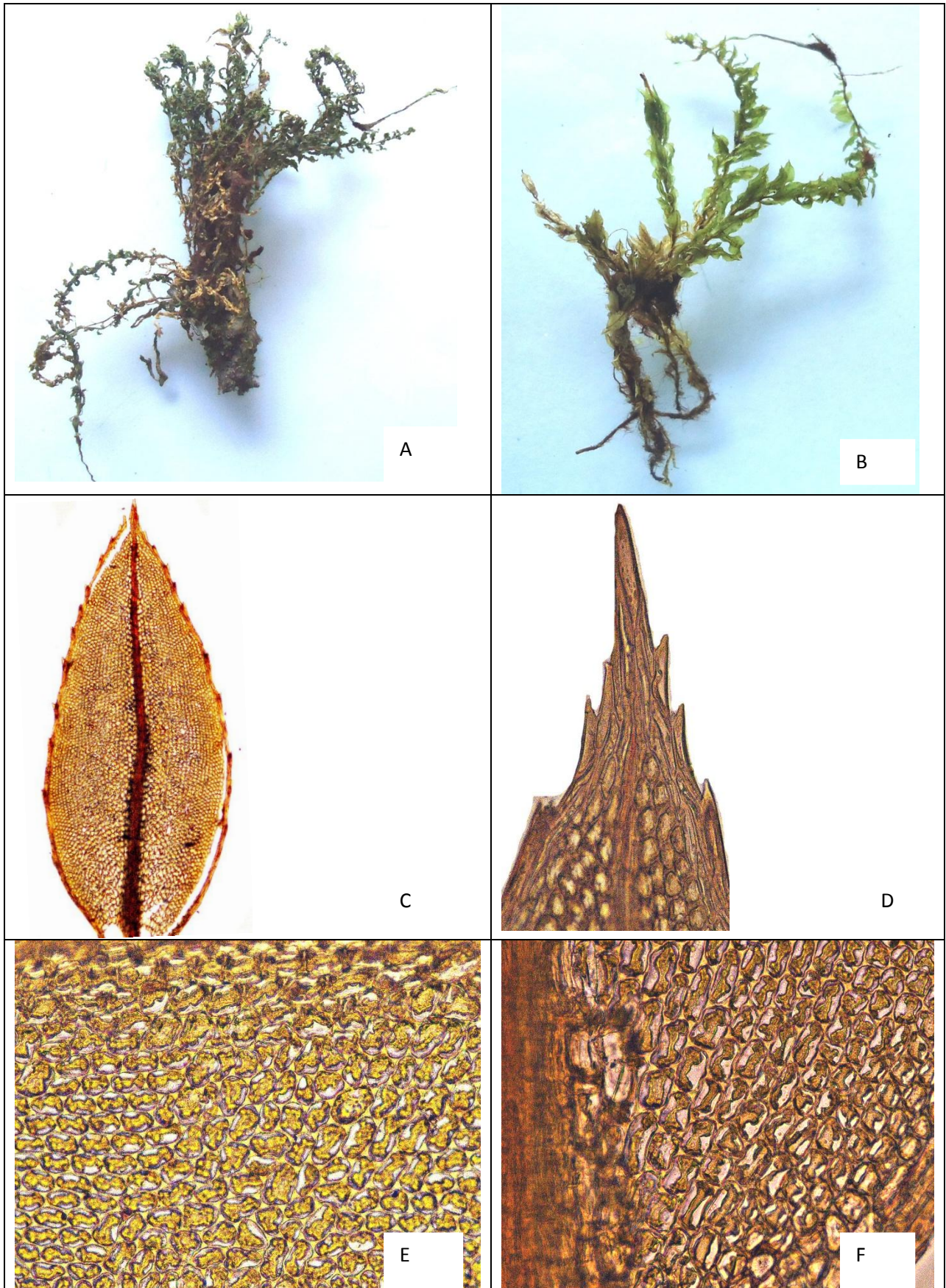


Figure 2: *Mnium confertidens* (Lindb. & Arnell) Kindb. A Dry plant, B Wet plant, C Leaf, D Apical cells, E Middle cells and F Basal cells

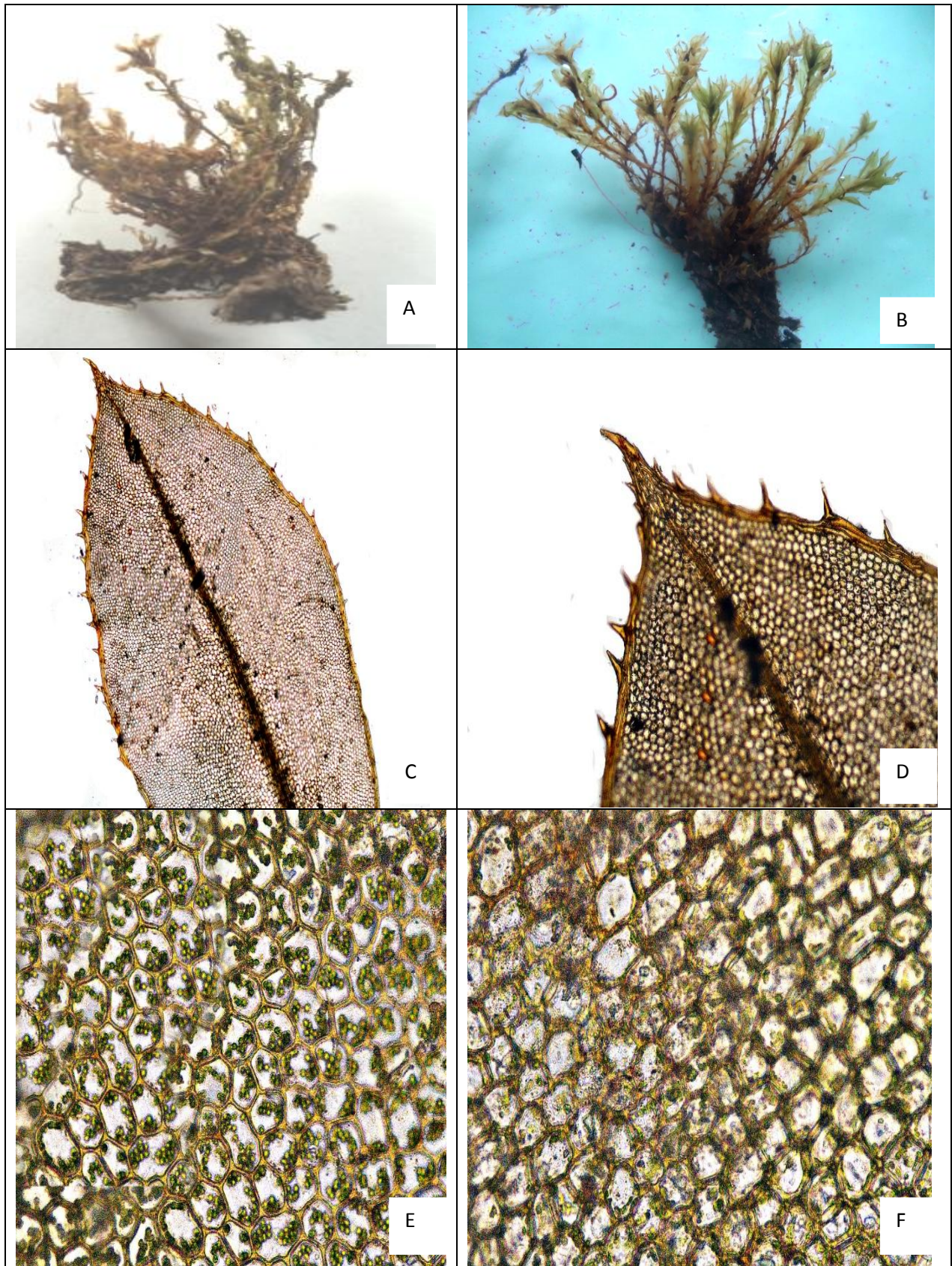


Figure 3: *Mnium cuspidatum* (L.) Leys., A Dry plant, B Wet plant, C Leaf, D Apical cells, E Middle cells and F Basal cells

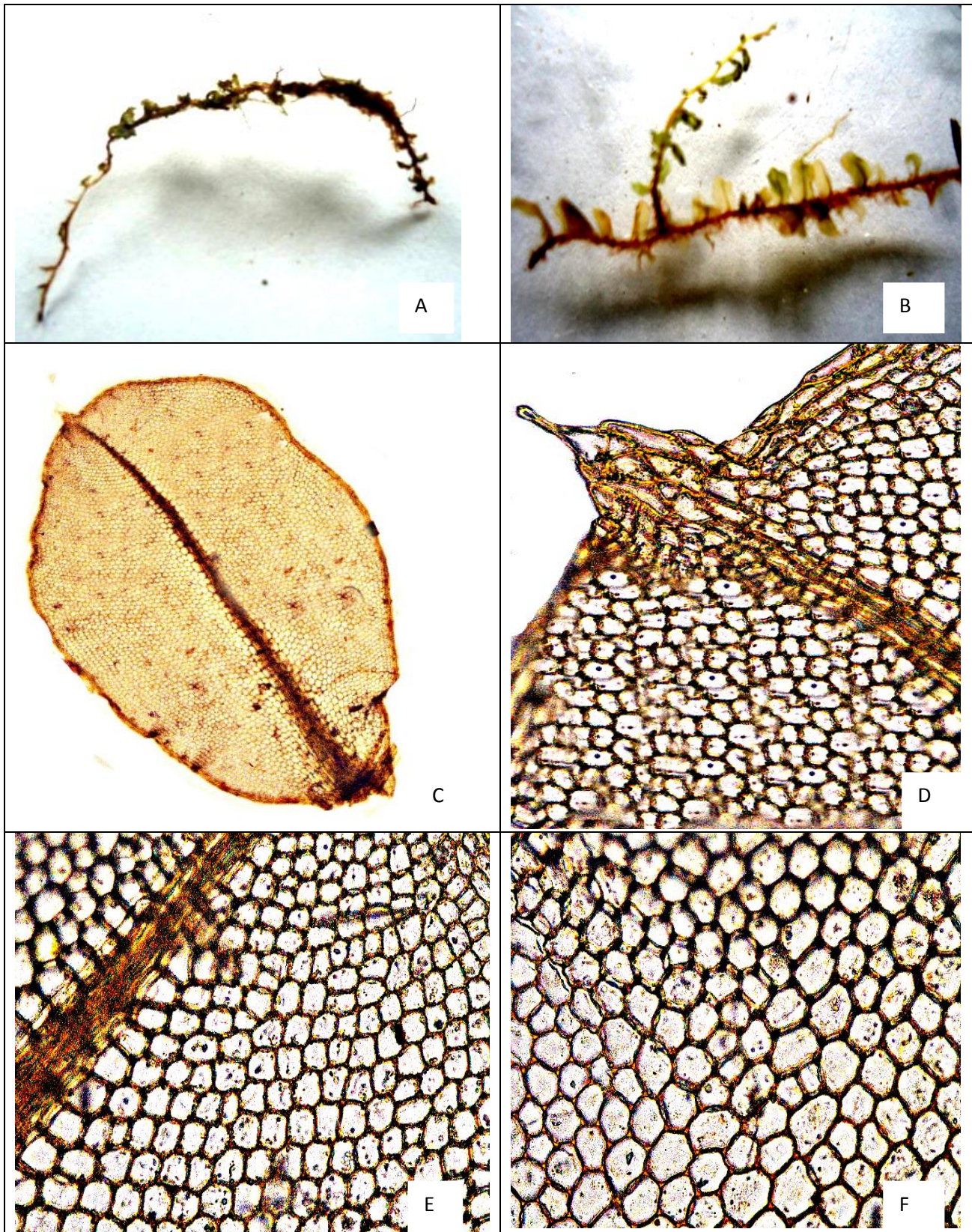


Figure 4: *Mnium integrum* Bosch & Sande Lac.,. A Dry plant, B Wet plant, C Leaf, D Apical cells, E Middle cells and F Basal cells

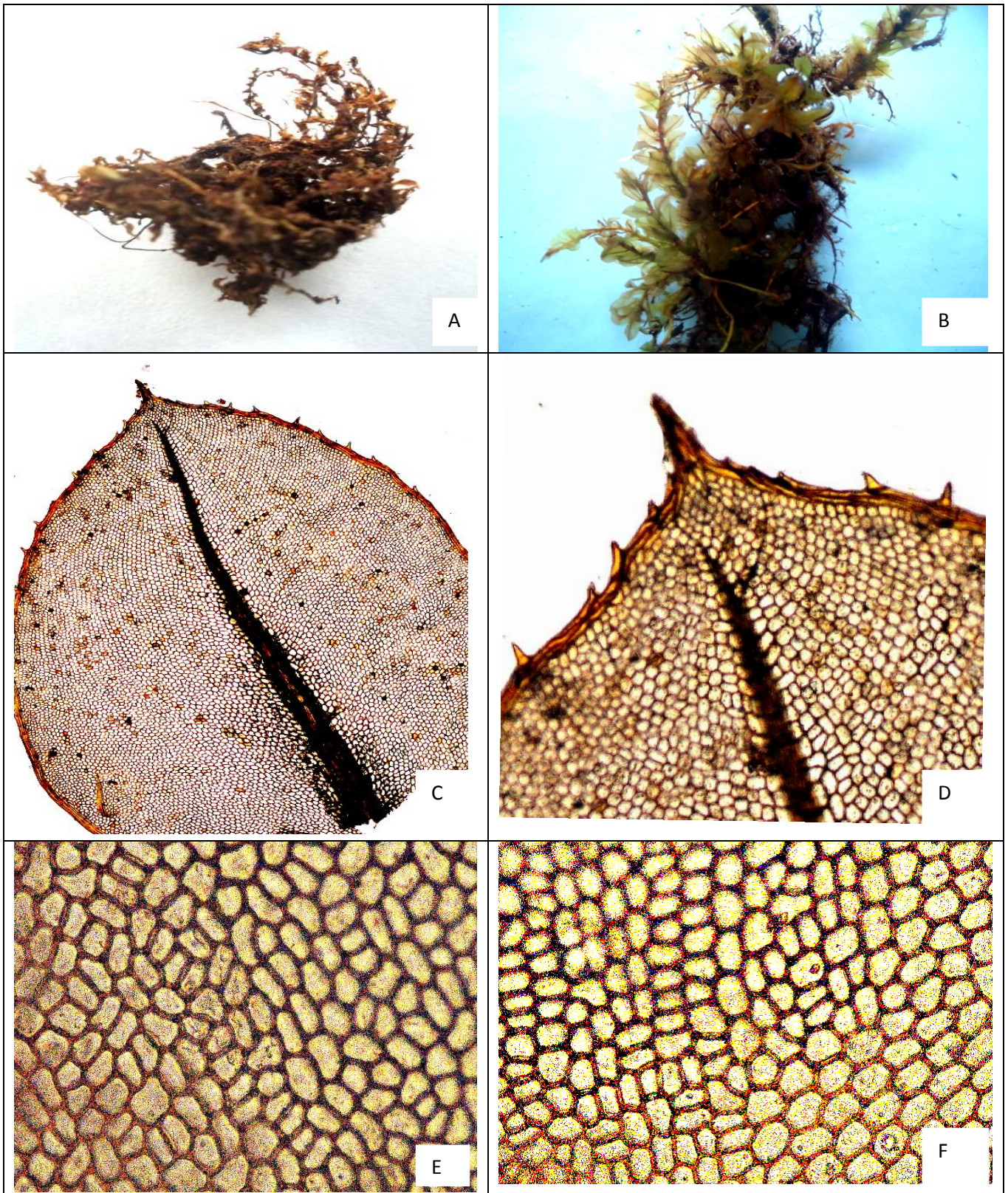


Figure 5: *Mnium rostratum* schrad., A Dry plant, B Wet plant, C Leaf, D Apical cells, E Middle cells and F Basal cells

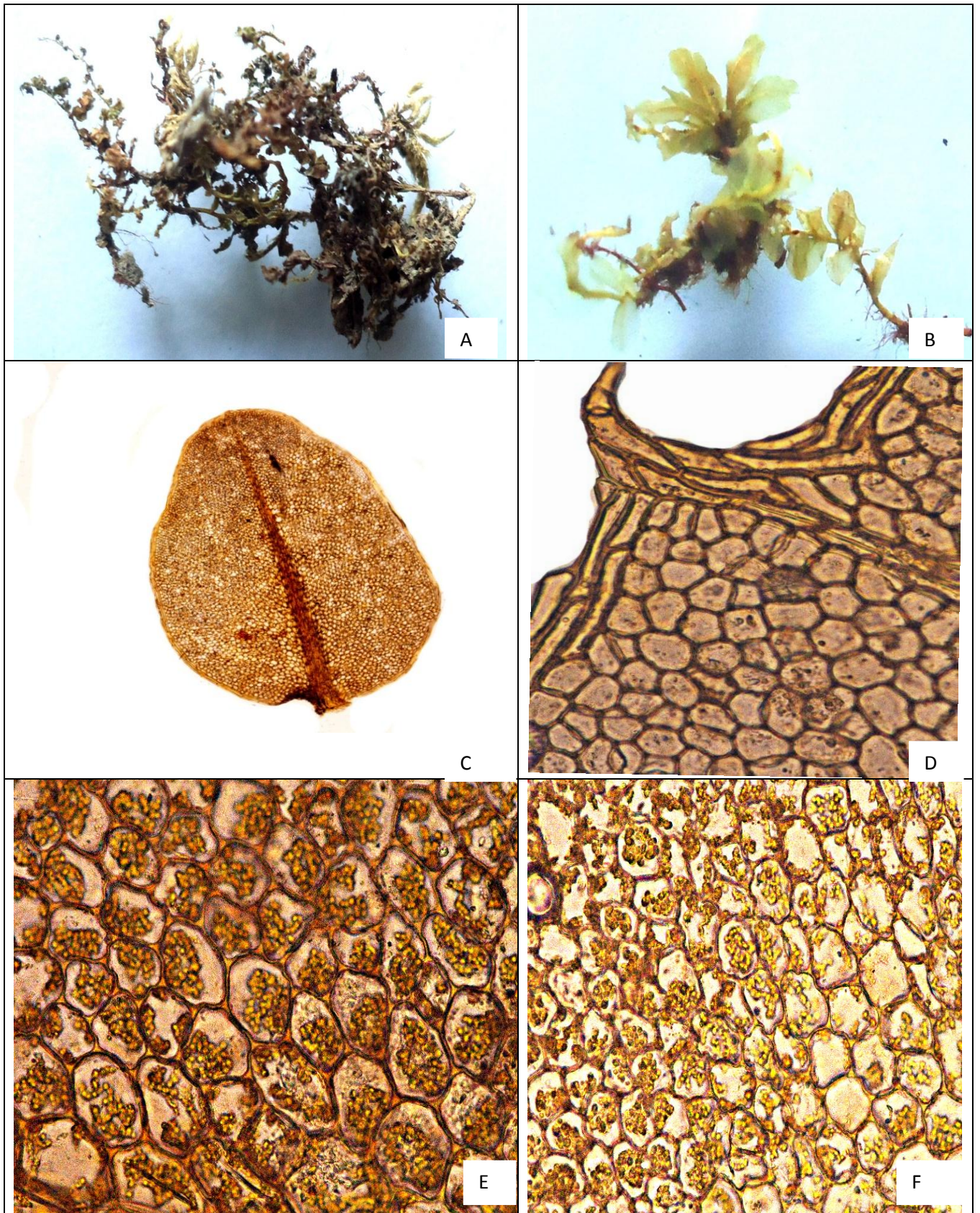


Figure 6: *succulentum* Mitt., A Dry plant, B Wet plant, C Leaf, D Apical cells, E Middle cells and F Basal cells