

# Three mosses new to South India

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## ABSTRACT

An exploration carried out to study the bryophytes of Eastern Ghats of Tamil Nadu and Andhra Pradesh has revealed the occurrence of 3 mosses viz., *Platygyriella aurea* (Schwägr.) W. R. Buck (Hypnaceae), *Brachymenium sikkimense* Renaud & Cardot (Bryaceae) and *Dicranodontium didymodon* (Griff.) Paris (Dicranaceae) which are new additions to the moss flora of South India. A morpho-taxonomic account, illustrations of these taxa and distributional map are provided.

**Key-words:** Andhra Pradesh, *Brachymenium sikkimense*, Bryophyta, *Dicranodontium didymodon*, Eastern Ghats, *Platygyriella aurea*, Tamil Nadu

## INTRODUCTION

Eastern Ghats are discontinuous hill ranges which run along India's eastern coast, located between 11°30' and 22°00'N Latitude and 76°50' and 86°30'E Longitude in a northeast to southwest trending belt. Climatic conditions and altitude of this region favours the growth of bryophytes in pockets. Various workers from time to time have contributed to the Indian and south Indian bryoflora (Gangulee 1969-1972, 1974-1978, 1978-1980, Chopra 1975, Dabhade 1998, Lal 2005, Nair et al. 2005, 2008, 2009, 2011, Kumar & Krishnamurthy 2007, Aziz & Vohra 2008, Subramanian 2008, Daniels 2010, Dandotiya et al. 2011, Sahaya et al. 2013a, 2013b, Frahm et al. 2013, Uwe 2013, Alam et al. 2013, Daniels & Daniel 2013, Rani et al. 2014, Mishra et al. 2016, Sahu & Asthana 2016). However, these workers have provided the account of mosses mostly from the western ghats and neighbouring areas.

During the study of bryophytes of the Eastern Ghats of Tamil Nadu and Andhra Pradesh, three interesting mosses belonging to the genera: *Platygyriella*,

*Brachymenium* and *Dicranodontium* have been collected and identified as *Platygyriella aurea* (Schwägr.) W.R. Buck (Hypnaceae), *Brachymenium sikkimense* Renaud & Cardot (Bryaceae) and *Dicranodontium didymodon* (Griff.) Paris (Dicranaceae). A perusal of literature reveals that all the three mosses are new additions to the moss flora of South India showing their extended distribution in Indian subcontinent.

The genus *Platygyriella* Cardot was earlier represented by 3 species from India (Chopra 1975) as *Bryosedgwickia* Cardot & Dixon. Buck (1984) synonymized the genus *Bryosedgwickia* under *Platygyriella*. Gangulee (1978-1980) described only one species *Platygyriella aurea* (Schwägr.) Buck as *Bryosedgwickia aurea* (Schwägr.) M. Fleisch. from eastern India. Later, Lal (2005) without following Buck's synonymy, documented 4 species of *Bryosedgwickia* from India viz., *B. aurea* (Schwägr.) M. Fleisch. from eastern Himalaya, western Himalaya and Nepal, the endemic *B. kirtikarii* Card. et Dix. from South India, *B. polyantha* (Hedw.) B.S.G. from

western Himalaya and *B. densa* (Hook.) Biz. & P. Vard. from South India. *Platygyriella aurea* was earlier reported from eastern Himalaya (Darjeeling, Sikkim, Khasi Hills), western Himalaya (Dharamshala, Ranikhet), Central India (Amarkantak), Nepal and Bhutan (Gangulee 1978-1980, Gupta et al. 2016). We here report *P. aurea* from Eastern Ghats which is an addition to the moss flora already known from other regions of South India.

The genus *Brachymenium* Schwägr. is represented by 25 species (Chopra 1975) in India while Gangulee (1974-1978) described only 13 species from eastern India and adjacent regions. Later, Lal (2005) listed 14 species from India. Out of these 3 are known from eastern Himalaya, western Himalaya and South India, 2 from eastern Himalaya and South India, 1 from Central India and eastern Himalaya, 3 from eastern Himalaya and are endemic, 3 from eastern Himalaya, 1 from Central India and 1 from the Gangetic Plains. Most recently Daniels in 2010 provided a checklist of Bryophytes in which he listed 11 species of *Brachymenium* while Dandotiya et al. (2011) documented 24 species in their checklist. The species *Brachymenium sikkimense* Renaud & Cardot was earlier reported from Darjeeling and stated to be endemic to this region (Gangulee 1974-1978). This species has also been reported from Central India by Gupta et al. (2016). In the present study, we observed this species within the Eastern Ghats (South India).

The genus *Dicranodontium* Bruch & Schimp. has been reported in India by several workers in the past. Gangulee (1969-1972) described 12 species of *Dicranodontium* from eastern India and adjacent regions. Frahm (1997) recognized 7 species of *Dicranodontium*, however, earlier Chopra (1975) and Lal (2005) recognised 12 species in India. Amongst these 12 species, 1 each from eastern Himalaya, western Himalaya and South India, 3 from eastern Himalaya and western Himalaya, 1 from South India, 6 from eastern Himalaya, 1 from eastern Himalaya are considered endemic. Daniels (2010) listed 2 species of *Dicranodontium* from Tamil Nadu, while Dandotiya et al (2011) documented 14 species of *Dicranodontium*. The taxon *Dicranodontium*

*didymodon* (Griff.) Paris has also been reported earlier from the Khasi Hills, however, the present study has revealed its occurrence in South India as well, thereby increasing its geographical extent within India.

## MATERIAL AND METHODS

Plant specimens were collected from Javadi Hills, Kolli Hills, Rose Garden, Sirumalai Hills, Yercaud of Tamil Nadu and Araku Valley, Borra Caves, Katiki waterfalls, Sunkarimetta areas (Fig. 1) of Andhra Pradesh, Eastern Ghats, South India. The collected specimens are housed in Bryophyte Herbarium, National Botanical Research Institute, Lucknow (LWG), Uttar Pradesh, India.

## TAXONOMIC OBSERVATIONS

1. *Platygyriella aurea* (Schwägr.) Buck, Brittonia, 36(1): 86-88 (1984)

(Text-Figure 1: 1-25)

Plants are yellowish green, prostrate, 1 cm long, branching short-erect (about 2mm wide). Leaves erectopatent, closely arranged, concave, ovate-lanceolate, leaf apex narrow, margin entire, 1-1.6mm long and 0.30-0.80 mm broad; costa short, double; leaf cells linear, lamina cells papillate,  $\pm 38 \times 7.6\mu\text{m}$  at apex, marginal cells measuring  $38-57 \times 5.7\mu\text{m}$ ,  $49.4-53.2 \times 3.8-5.7\mu\text{m}$  at middle,  $38-91.2 \times 7.6\mu\text{m}$  at base; alar cells differentiated with rectangular cells. Perichaetial leaves oblong-ovate, margin denticulate; capsule brown coloured, ovate-cylindrical, 1.2mm long and 0.5mm broad; seta red coloured about 6mm long; peristome with 16 exostome teeth having papillosity at apex; spores yellow,  $19\mu\text{m}$  in size.

**Habitat:** Epiphytic, growing on stem bark.

**Specimens examined:** India, South India, Eastern Ghats, Tamil Nadu, Salem, 6 kms away from Yercaud, alt ca. 1177m, Epiphytic, 13.04.2014, leg. A. K. Asthana & Party, 254938A, 254945B (LWG).

**Distribution:** India: Central India (Amarkantak, Gujarat, PBR), eastern Himalaya (Darjeeling, Khasi Hills, Sikkim), South India (Salem), western Himalaya (Dharamshala, Ranikhet); Bhutan, Nepal. (Gupta et al. 2016, Gangulee 1978-1980).

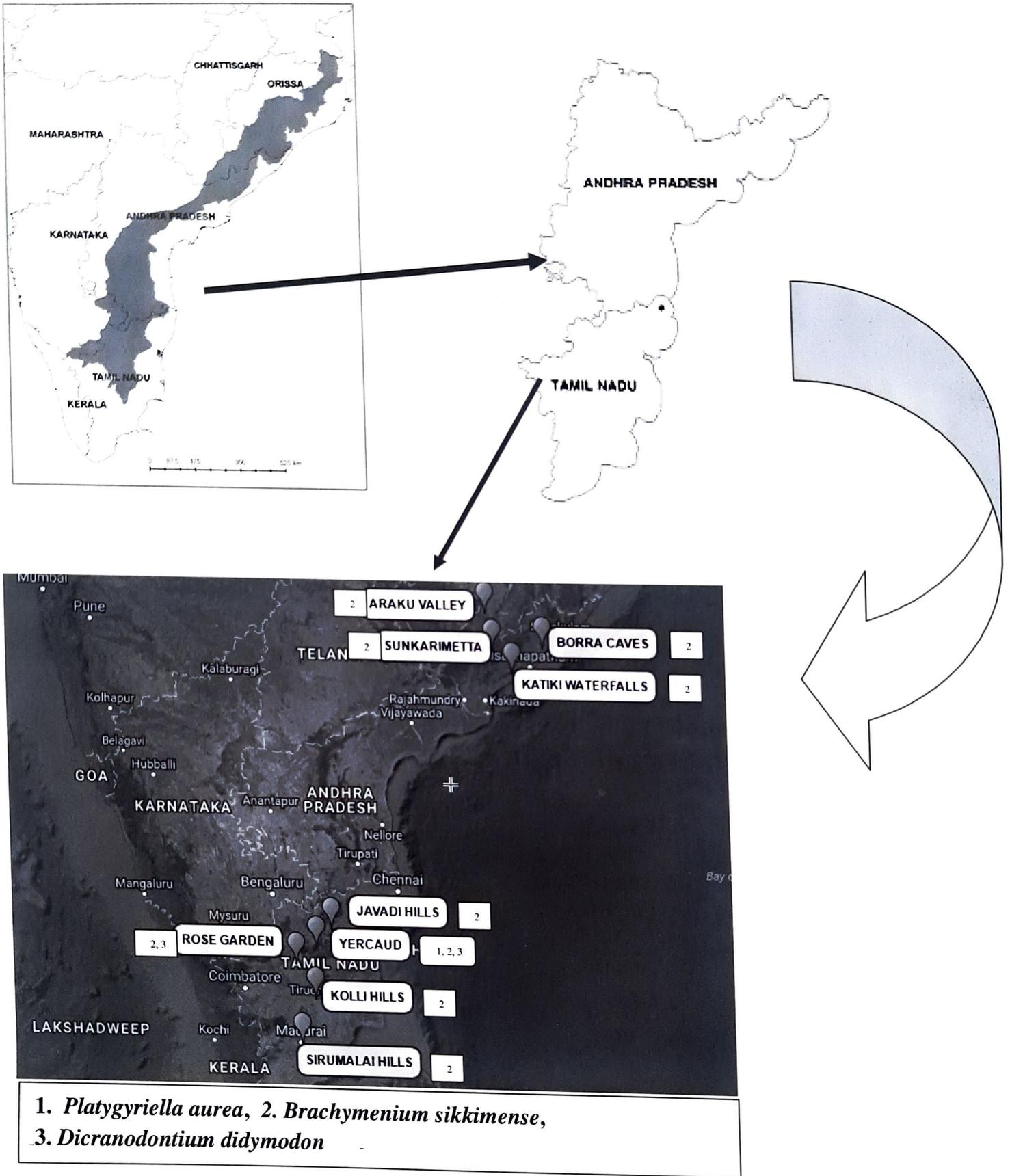
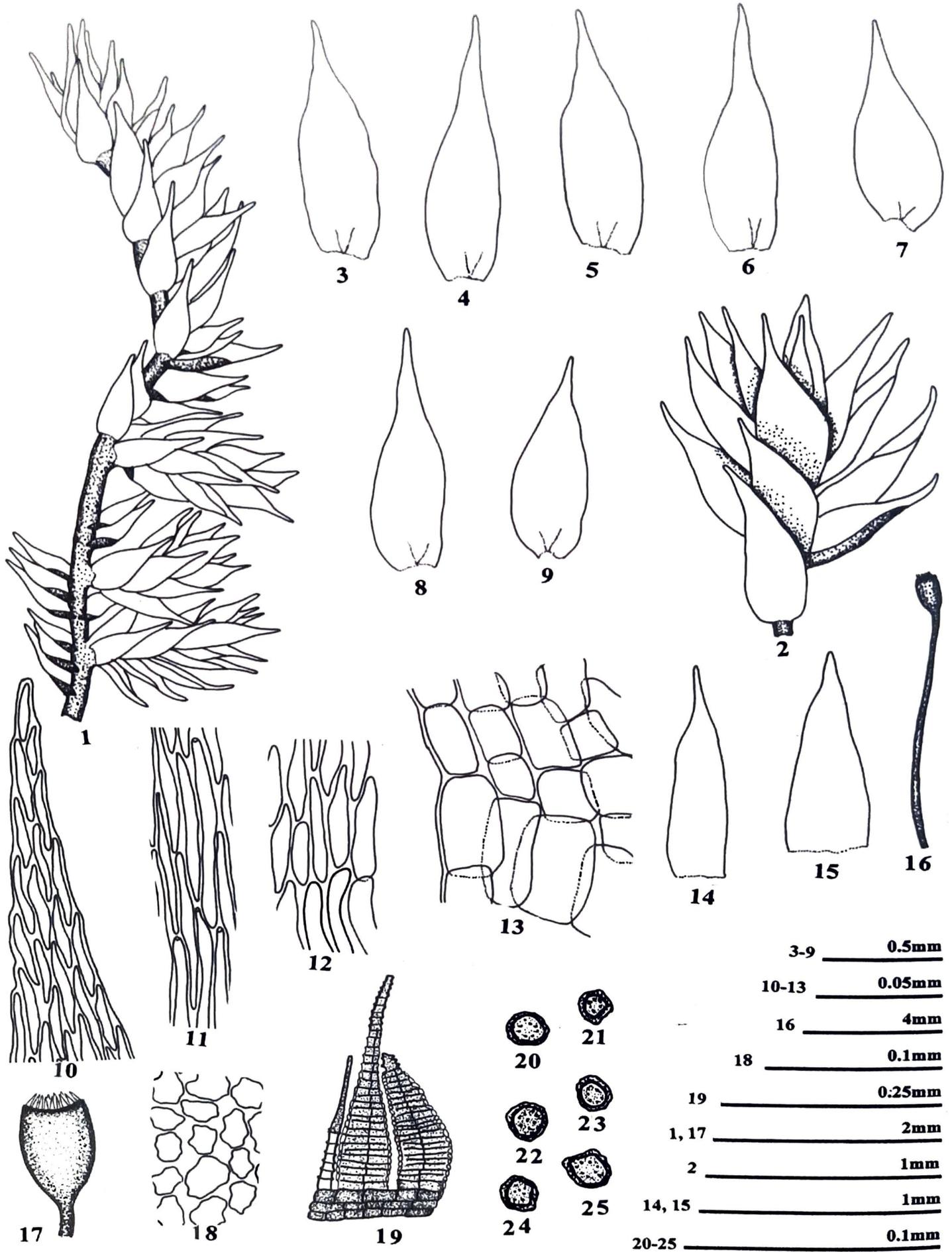
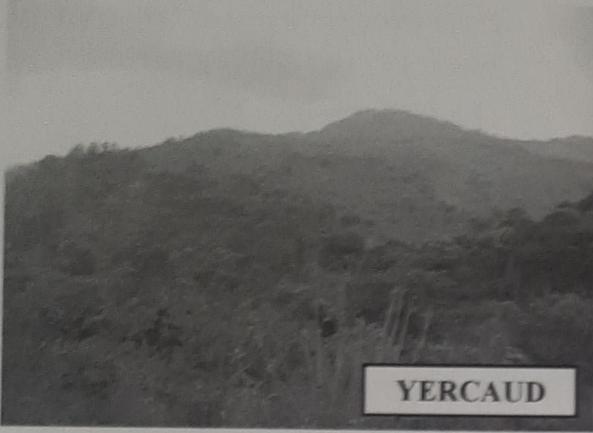


Fig. 1. Map of the Study area.



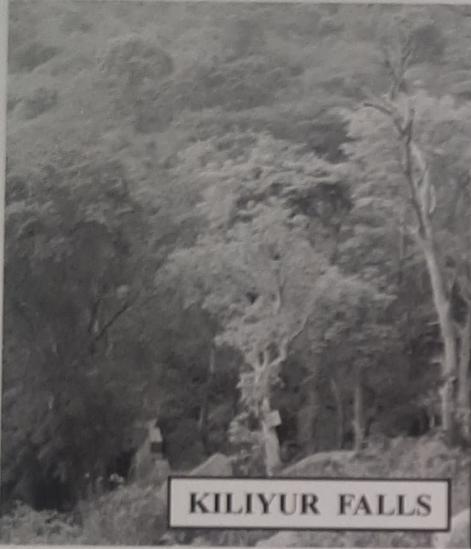
**Text-Figure 1: 1-25. *Platygryiella aurea* (Schwägr.) Buck1.** Habit of plant; 2. Arrangement of Leaves on stem; 3-9. Leaves; 10. Apical cells of leaf; 11. Median cells of leaf; 12. Basal cells of leaf; 13. Alar cells of leaf; 14,15. Perichaetial leaves; 16,17. Capsule; 18. Exothecial cells; 19. Peristome teeth; 20-25. Spores. 254938A (LWG)



YERCAUD



KILIYUR FALLS



KILIYUR FALLS



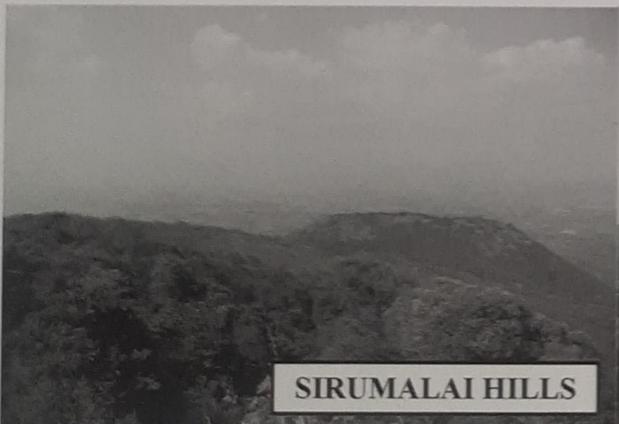
ROSE GARDEN



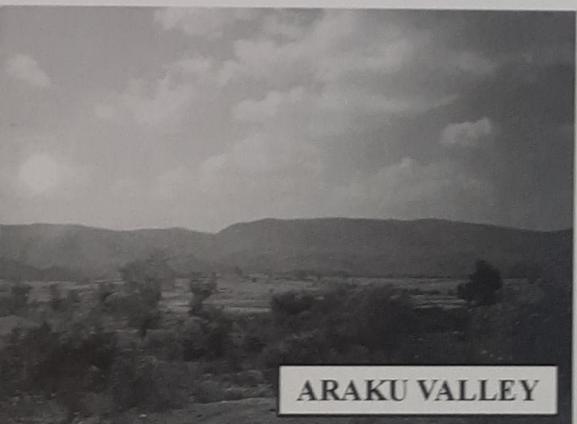
ROSE GARDEN



KOLLI HILLS



SIRUMALAI HILLS



ARAKU VALLEY

PLATE 1

View of the collection sites, Eastern Ghats, India.

2. *Brachymenium sikkimense* Renauld & Cardot, Bull. Soc. R. Bot. Belg., 38(1): 12 (1900)  
(Text-Figure 2: 1-8)

Plants sterile, brown, stem erect, 8mm long and 1mm wide with numerous rhizoids at base. Leaves in several rows, appressed, lower leaves smaller and distantly placed, ovate-lanceolate,  $\pm 1$ mm long and 0.30-0.50mm wide; leaf cells rhomboidal at apex  $30.4 \times 7.6\mu\text{m}$ , median cells rhomboidal  $38 \times 11.4\mu\text{m}$ , basal cells of leaf rectangular  $30.4 \times 19\mu\text{m}$ , one row of rectangular cells forming the border; costa prominent and excurrent in an arista of 0.10mm; numerous gemmae of clavate shaped measuring  $144.4-209 \times 83.6-152\mu\text{m}$  in leaf axils.

**Habitat:** Epiphytic, on rock, soil, soil covered rock, commonly epiphytic, rarely or sometimes on rock or soil.

**Specimens examined:** India: South India, Eastern Ghats, Tamil Nadu, Salem, 6 kms away from Yercaud, alt ca. 1177m, on soil covered rock, 13.04.2014, leg. A. K. Asthana & Party 254939B (LWG); epiphytic, 13.04.2014, leg. A. K. Asthana & Party, 254945G (LWG); Yercaud, Rose Garden, alt. ca. 1419m, epiphytic, 13.04.2014, leg. A. K. Asthana & Party, 254991C (LWG); Namakkal, Kolli Hills, alt. ca. 1205m, on rocks, 14.04.2014, leg. A. K. Asthana & Party, 256105B (LWG); Tiruvannamalai, Javadi Hills, alt ca. 921m, on soil covered rock, 17.04.2014, leg. A. K. Asthana & Party 257202B (LWG); Dindigul, Sirumalai Hills, alt ca. 1040m, on soil, 18.04.2014, leg. A. K. Asthana & Party, 257222 (LWG); Andhra Pradesh, Visakhapatnam, Araku Valley, Borra Caves, alt ca. 906m, on rocks, 16.03.2015, leg. A. K. Asthana & Party, 258389C (LWG); Sunkarimetta, alt ca. 1154m, on stony walls, 16.03.2015, leg. A. K. Asthana & Party, 258329 (LWG); Katiki waterfalls, alt ca. 887m, on rocks, 17.03.2015, leg. A.K. Asthana & Party, 300051 (LWG).

**Distribution:** India: Central India (Gujarat), eastern Himalaya (Darjeeling), South India (Dindigul, Namakkal, Salem, Tiruvannamalai, Visakhapatnam), western Himalaya (Uttarakhand). (Gupta et al. 2016, Gangulee 1974-1978).

3. *Dicranodontium didymodon* (Griff.) Paris, Index Bryol., 338 (1896)  
(Text-Figure 3: 1-8)

Plants sterile, small, 4-4.5mm long, green to reddish brown in colour with numerous rhizoids present at the base of stem. Leaves lanceolate with slightly broad base, falcate, green in colour, denticulate only at tip, 1.82-2.31mm long and 0.21mm-0.28mm broad at sheathing base; costa excurrent, covering  $\frac{1}{2}$  or more of the leaf width at base and then tapering to whole subula; border of 2 to 3 rows of narrow rectangular, linear elongated cells starts from the broader region of the leaf base, characteristic of this species; cells at the base of costa are tinted, alar cells present at base of the leaf are thin walled, lax and hyaline  $45 \times 15\mu\text{m}$ , middle cells of the leaf are linear, elongated and rectangular  $67.5-71.25 \times 11.25\mu\text{m}$ , apical cells of leaf are narrow elongated  $33.75 \times 7.5\mu\text{m}$ . Sporophyte not seen.

**Specimen examined:** India, South India, Eastern Ghats, Tamil Nadu, Salem, Yercaud, Rose Garden, alt ca. 1412m, epiphytic, 13.04.2014, leg. A. K. Asthana & Party 254988C (LWG).

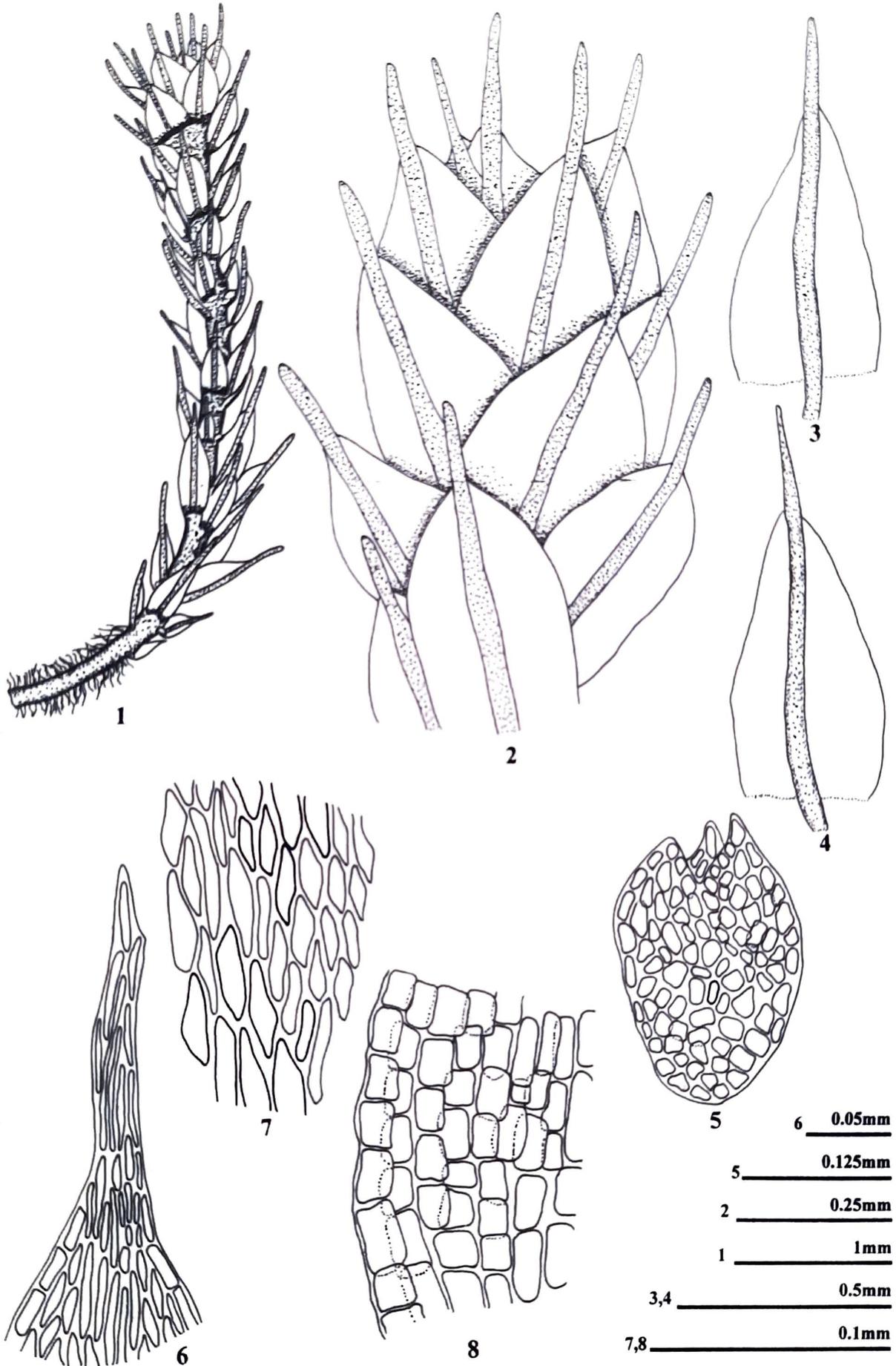
**Habitat:** Epiphytic, growing on stem bark.

**Distribution:** India: eastern Himalaya (Darjeeling, Khasi Hills, Naga Hills, Sikkim), South India (Salem); Bhutan, Burma, China (Yunnan), Nepal, Thailand, Vietnam. (Frahm 1997, Gangulee 1969-1972).

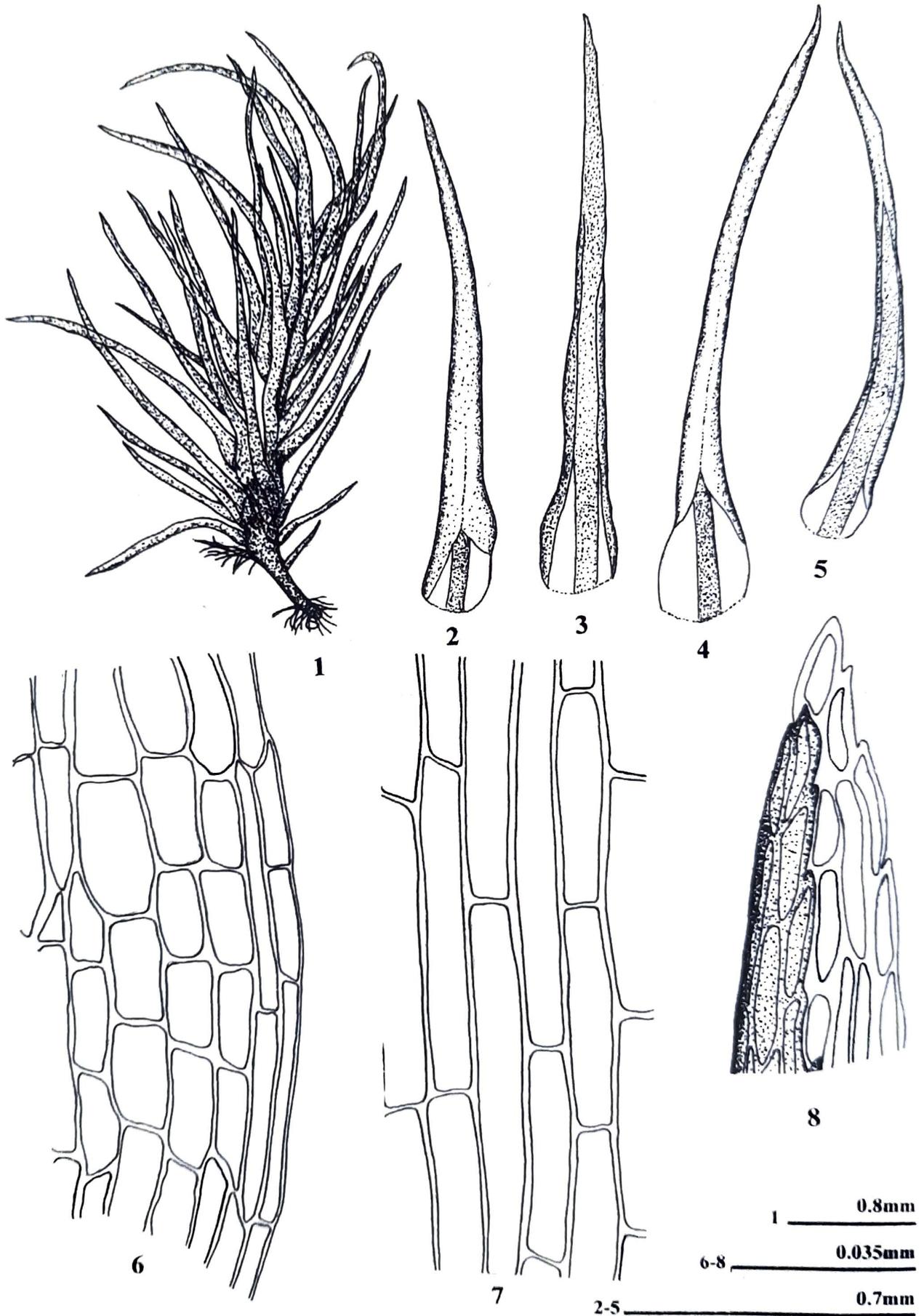
## DISCUSSION

Genus *Platygyriella* is characterized by the densely arranged leaves having laminal cells with papillate tips, margin entire, costa short double or none and alar cells conspicuously larger and distinct (Text Figure 1:3-10,13). The species is widely known and accepted as *Bryosedgwickia aurea* (Schwägr) M. Fleisch but it was suggested under older generic name *Platygyriella* by Buck (1984).

*Brachymenium sikkimense* is closely related to *B. acuminatum* (Harv.) in having smooth margin, excurrent costa, rhomboidal cells of apical region but former differs from the latter in having one row of narrow rectangular cells forming a border and presence of



**Text-Figure 2: 1-8. *Brachymenium sikkimense* Renauld & Cardot 1. Habit of plant; 2. Arrangement of Leaves; 3-4. Leaves; 5. Gemmae; 6. Apical cells of leaf; 7. Median cells of leaf; 8. Basal cells of leaf. 254939B (LWG)**



**Text-Figure 3: 1-8. *Dicranodontium didymodon* (Griff.) Paris. 1. Habit of plant; 2-5. Leaves; 6. Basal cells of leaf; 7. Median cells of leaf; 8. Apical cells of leaf. 254988C (LWG)**

clavate gemmae in their leaf axils (Text-Figure 2: 3-6) which was also illustrated by Gangulee (1974-1978).

In having denticulate tip and 2-3 rows of narrow elongated hyaline border cells arising from the basal broader region of the leaf (Text-Figure 3: 6, 8), the taxon *Dicranodontium didymodon* has been identified as *Dicranodontium decipiens* (Mitt.) Mitt. ex Broth. according to Gangulee (1969-1972). However, Frahm (1997) synonymised this species under *Dicranodontium didymodon* (Text-Figure 3: 1-8).

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