Bryophytes of Chinnar Wildlife Sanctuary (South India) - A preliminary account

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The bryophytic flora of the Chinnar Wildlife Sanctuary is explored for the first time. 60 taxa are listed including 40 mosses, 19 liverworts and 1 hornwort. Among these one is new to the mainland of India, seven are new records to peninsular India and 18 are new records to Kerala.

Key-words—Bryophytes, Chinnar Wildlife Sanctuary, South India

CHINNAR Wildlife Sanctuary with an area of 90.442 km^2 is located in the eastern part of the high ranges in the southern Western Ghats (Map). The area is highly undulating, ranging from 450 m at Chambakkad to 2,372 m at Nandalamala, bordered by Indira Gandhi Wildlife Sanctuary of Tamil Nadu in the north-west and Eravikulam National Park of Kerala in the south-west. It comes under the administrative control of Munnar Wildlife division and is situated in the Devikulam taluk of Idukki district.

The area, being located in the rain shadow region of Western Ghats, sharply differs from the general climatic and vegetational features of Kerala and is characterized by high temperature (average maximum is 36° C and the average minimum is 12° C) and the annual precipitation is 500-800 mm, far lower than the state average of 3000 mm. The major share of the precipitation is due to the withdrawal of monsoon during September-November.

Owing to the climatic extremes the vegetation shows high variations from dry deciduous to montane wet temperate forests (Sholas). The dominant vegetation is dry deciduous forest, which occupies nearly 30% of the total area. Scrub forest is the second largest land cover category occupying about 21% of the area. Other vegetation types include moist deciduous forests (7.5%), Riparian forests (1.2%), Shola forests (8.2%) and grasslands (0.8%). Barren lands and exposed rocks are also present in some parts of the Sanctuary.

Concerted efforts to document the plant diversity of the area resulted in recording of about 965 species of angiosperms (Sasidharan, 1999) and some ferns (Kumar & Madhusoodanan, 1998). The sanctuary is one of the richest in terms of plant diversity with 114 peninsular Indian endemics. The area is reported to be a 'treasure house' of medicinal plants with 335 species (Sasidharan, 1999).

The present paper is the result of a rapid biodiversity assessment conducted during January-February, 2003 in and around 11 tribal settlements within the sanctuary, of which 7 belong to Muduvans and the rest to Hill Pulayas, located at various altitudinal levels and vegetation types. Chambakkad, Thayannamkudy, Alampatty, Karimutty and Pudukkudy settlements located at low altitude (600-900 m), are with dry type of vegetation and with lesser number of bryophytes. Ollavayal and Palapatty settlements are at 850-1000 m altitudinal range. Mangappara, Vellakkalkudy and Olikkudy settlements located at high altitutde regions (1000-2372 m), are surrounded by wet evergreen forests and sholas, which support a very high floral diversity including bryophytes.

MATERIAL

The mosses are taxonomically arranged following Gangulee (1969) and liverworts following Stotler and Stotler (2000). For each taxon, locality, collection number, altitudinal range, habitat, distribution and

previous reports from Kerala/India, if any, are provided. Identification of the specimens was done by referring the pertinent literature (Gangulee, 1969, 1971, 1972; Srinivasan, 1974; Chopra, 1975; Asthana & Srivastava, 1991; Bapna & Kachroo, 1999a, b; So, 2001; So & Grolle, 2001; Easa, 2003). The specimens collected from the area are deposited in the Calicut University Herbarium (CALI).

CHECKLIST OF THE BRYOPHYTES OF CHINNAR WILDLIFE SANCTUARY

LIVERWORTS

Aytoniaceae

Asterella nepalensis Taylor; Pudukkudi, *MCN 87665, 87671;* 650-800 m; On soil cuttings and on rocks; it is distributed in North-west Himalaya and Nepal; the present collection is a new record to peninsular India.

Marchantiaceae

Dumortiera hirsuta (Swartz) Nees; Common throughout the area, *MCN 87685, 87687, 120026, 120091;* 800-1845m; mostly seen along riverine area on wet rocks, soil and on roots of higher plants; it is widely distributed in the high altitude area, it has wider distribution in North India (Simla, Mussoorie, Kumaon, Pachmarhi), South India (Chennai, Kotagiri, Kerala), Nepal, Japan, North America, South America, Europe, New Zealand, Hawaii and Africa.

Ricciaceae

Riccia fluitans L.; Pudukkudy, Way to Olikkudy, *MCN 87669;* 760-1,700 m; in marshy areas and on river sides; it has wide distribution in North-east India (Assam, Himalayas, Garhwal, Kashmir, Kumaon, Pachmarhi), South India (Chennai, Nilgiris), Central India (Mt. Abu), Borneo, Bangladesh, China, Japan, Java, Korea, Malaysia, Nepal, Taiwan, Siberia, New Zealand, South America, North America, Europe, West Indies and Britain.

Fossombroniaceae

Fossombronia cristula Austin; Olikkudy shola, *MCN 120062;* 1700 m; on soil cuttings; it is distributed in South India (Kodaikanal, Palni hills, Ooty, Kerala), China, Japan, Korea, New York, New Jersey, North America and West Virginia, the first report of this species from Indian territory was by Udar and Srivatava (1969) from Kodaikanal.

Aneuraceae

Aneura pelloides (Horik.) Inoue; way to Olikkudy, *MCN 87686;* 1,250 m; on rocks and on roots of higher plants near riverine area; it is distributed in North India (Darjeeling) and South India (Ooty, Coonoor, Palni hills). It was first reported from India in 1975 by Srivastava and Udar; the present collection is a new record to Kerala.

Riccardia tenuicostata Schiffn.; Olikkudy shola, *MCN 120061a;* 1,672 m; On basal portion of tree trunks and on rocky patch near streams along with *Lejeunea* sp. and other mosses; it is distributed in North India (Western Himalayas), South India (Palni hills), Singapore and Java; this collection is a new record to Kerala.

Metzgeriaceae

Metzgeria furcata (L.) Dumort.; Olikkudy shola, *MCN 120043*, Koyman shola, *MCN 120068*; 1,000-1,650 m; mostly as epiphytic along with other mosses, sometimes as epiphyllose; it is distributed in Northan-East India (Western Himalayas, Sikkim), South India (Palni hills), China, Japan, Java, Taiwan, Sumatra, Australia, America, Africa and Europe; the present collection is a new record to Kerala.

Geocalycaceae

Heteroscyphus argutus (Reinw. et. al.) Shciffn; Way to Olikkudy, *MCN & KPR 87690*; 1670 m; on soil cuttings; it is a widely distributed species in South Asia, it is distributed in North India (Darjeeling, West Himalaya, Pachmarhi), South India (Palni hills, Karnataka), East India (Assam, Sikkim, Manipur, Meghalaya), Borneo, Brazil, China, Java, Japan, Myanmar, New Guinea, New Zealand, Philippines, Sumatra and Taiwan; the present collection is the first record from Kerala.

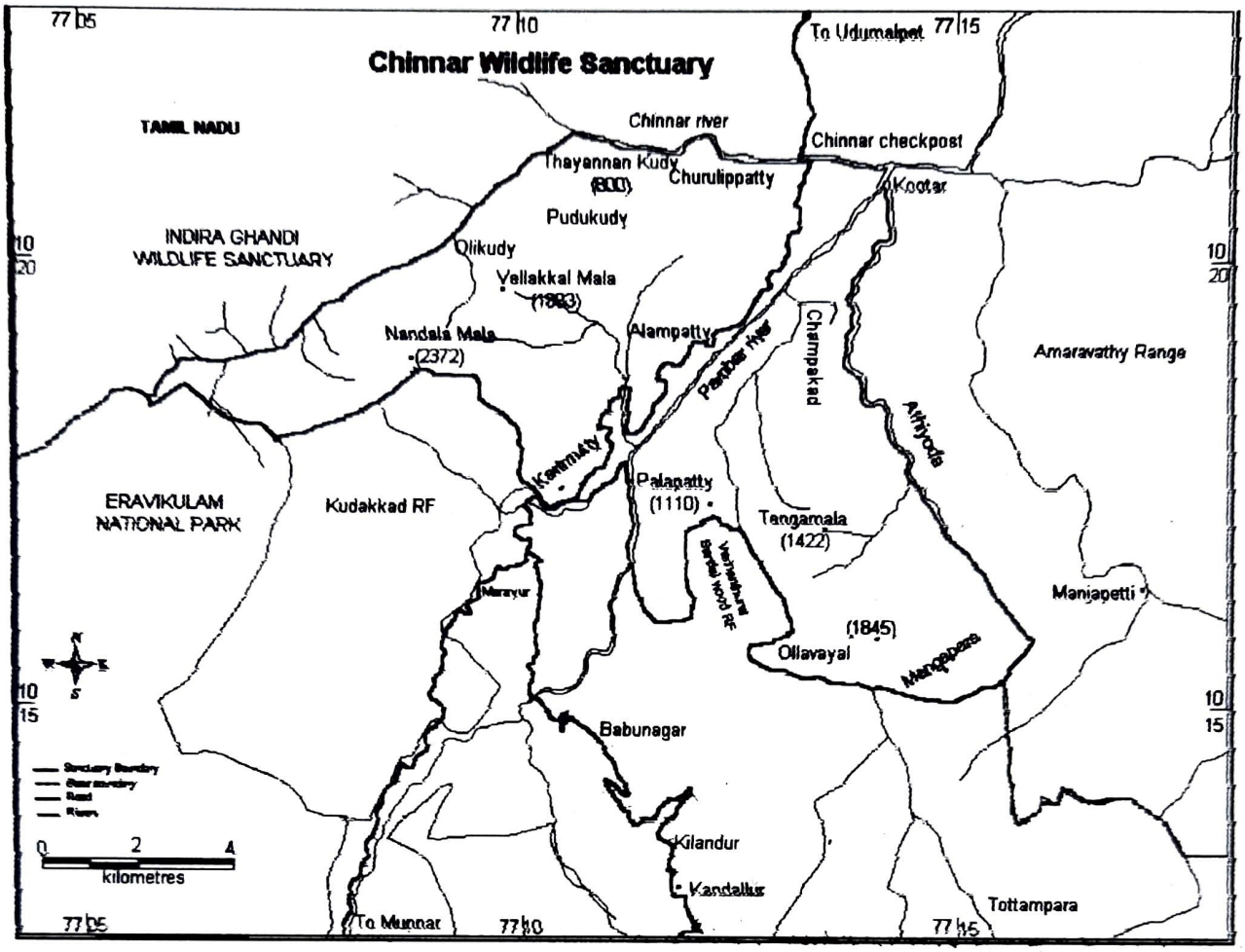

Fig. 1. Map of Chinnar Wildlife Sanctuary

Plagiochilaceae

Plagiochila elegans Mitt.; Koyman shola, *MCN 120083*; 990 m; epiphytic on Shola trees; it is distributed in North-east India (West Bengal Sikkim), South India (Madura), Bhutan, China, Japan and Nepal; this was originally reported by Mitten (1860) from Sikkim; the present collection is a new record to Kerala.

Calypogiaceae

Calypogeia arguta Montin & Nees; Pudukkudy, *MCN 87673*; 720 m; on loose soil along with *Fossombronia cristula;* it is a widely distributed species in the tropical regions, it has wide distribution in North and South India.

Lipidoziaceae

Bazzania tridens (Reinw. *et al.*) Trev.; Olikkudy shola, *MCN 87698*; 1,670 m; epiphytic on shola trees; widely distributed in tropical to temperate regions of south eastern Asia, it is distributed in East India (Assam, Sikkim) and South India (Nilgiri hills, Thirunelveli, Agasthyamala).

Cephaloziellaceae

Cephalozia pandei Udar & Kumar, Olikkudy shola, *MCN 120034*; 1600 m; on soil cuttings along with other mosses; it is an Indian endemic species first reported from Darjeeling; the present collection is a new record to peninsular India.

Porellaceae

Porella campylophylla (Lehm. & Lindenb) Trev.; Koyman shola, *MCN 20070*; 1,000 m; epiphytic on shola trees; this is one among the commonest members of Asiatic *Porella*. It is distributed from India through Myanmar and Thailand to North Vietnam; Nair and Madhusoodanan (in press) reported this species from Vellarimala forests in the Western Ghats of Kozhikode district of Kerala as a new record for South India.

Porella acutifolia (Lehm. & Lindenb.) Trev.; Olikkudy shola, *MCN 120051*; 1,670 m; epiphytic on

shola trees; this species is known from South India only (Madras, Nilgiri hills, Anamalai hills, Kerala), the species extends to Malay Archipelago including New Guinea, and tropical areas of Continental Asia, northward to Ryukyu Islands of Japan.

Porella pinnata (Dick.) Lindb.; Mangappara, *MCN 87433c*; 1,820 m; epiphytic on Shola trees; it is distributed in South India (Kotagiri), America and Europe; the present collection is a new record to Kerala.

Jubulaceae

Frullania muscicola Steph.; Olikkudy shola, *MCN 120048, 120054*; 1,670 m; epiphytic along with microlichens; this species has a wide distribution in Central India, North India (Mussoorie, Garhwal), South India (Kerala), China, Japan, Korea, Manchuria, Mangolia and Nepal.

Frullania tamarisci (L.) Dumort.; Kariveppin shola, *MCN 87410b*; 1,600 m; corticolous as well as on small branches of shola trees; it is distributed throughout the tropical Asia.

Lejeuneaceae

Lopholejeunea subfusca (Nees) Steph.; Olikkudy shola, *MCN 120031*; 1,670 m; epiphytic on shola trees; it is distributed in South India (Karnataka, Tamil Nadu, Kerala), North-east India (West Bengal, Meghalaya, Sikkim), Andaman Islands, Sri Lanka, Borneo, Carolina Islands, China, Japan, Java, Madagascar, Malaya, New Guinea, New Caledonia, the Philippines, Sumatra, Taiwan, Tahiti and Thailand.

Radulaceae

Radula japonica Gottsche & Steph.; Mangappara, *MCN 87444*; 1820 m; corticolous on Shola trees; it is distributed in South India (Kerala), China, Japan and Korea.

HORNWORT

Anthocerotaceae

Anthoceros crispulus (Montin) Douin; Pudukkudy, *MCN 87668*, Way to Olikkudy, *87689*; 1200-1500 m; on soil cuttings along with *Trematodon longicollis*; in India this was first reported by Pande and Ahmad (1944) from Lucknow. Srivastava and Asthana (1987) commented that this species has vanished from that site due to anthropogenic activities. However, in recent years it has also been known from North India (Western Himalayas, Eastern Himalayas, Lucknow), South India (Khandala, Kodiakanal, Shembaganur, Perumalmalai, Ooty, Kerala). It also occurs in Europe and America.

MOSSES

Polytrichaceae

Pogonatum aloides (Hedw.) P. Beauv.; Way to Olikkudy, *MCN 87406*, Ollavayal, *MCN 87679*; 1650-1850 m; on soil cuttings; distributed in North-east India (Sikkim, Bhutan, Darjeeling, Western Himalaya), South India (Coorg, Nilgiri, Palni hills), Sri Lanka, East Nepal, Thailand and Java; this collection is a new record to Kerala.

Dicranaceae

Trematodon longicollis Michx.; Pudukkudy, *MCN 87674*; 650-800 m; on trees and soil cuttings; this is distributed in North-east India (Western Himalaya, North Bengal, Assam, Manipur, Sikkim, Tripura), South India (Coorg, Palni hills), Sri Lanka, China, Japan, Korea, Argentina, Myanmar, the Philippines, New Guinea, Siberia, Hawaii, Ryukyu Islands, Taiwan, South Africa, Europe, Cuba, Eastern United States, Mexico to South America and New Zealand; this collection is a new record for Kerala.

Campylopodium khasianum (Griff.) Par.; Way to Olikkudy, *MCN 87680a*; 1,785 m; terrestrial along with *Campylopodium griffithii* and *Bryum argenteum*; an Indo-Sri Lankan species distributed in North-east India (Darjeeling, Khasia hills), South India (Palni hills), Nepal and Sri Lanka; this collection is a new record to Kerala.

Campylopodium griffithii (Mitt.) Broth.; Way to Olikkudy, *MCN 87680b*; 1,785 m; on soil cuttings; it is distributed in North-east (Darjeeling, Khasia hills), South India (Palni hills) and Nepal; this collection is a new record to Kerala.

Leucoloma amoene-virens Mitt.; Koyman shola, *MCN 120090*; 1,620 m; basal part of the tree trunks;

an Indo-Sri Lankan species distributed in East India, South India (Kerala, Palni hills) and Sri Lanka.

Leucobryaceae

Leucobryum bowringii Mitt.; Olikkudy shola, *MCN 120049*; 1750 m; on the base of tree trunks; it is distributed in East India (Khasia hills), South India (Palni hills, Kerala), Sri Lanka, Borneo, China, Japan, Taiwan, New Guinea, the Philippines and Vietnam.

Fissidentaceae

Fissidens asperisetus Sande-Lac. var. ***andamanensis*** Gangulee; Koyman shola, *MCN 120080*; 1630 m; epiphytic along with leafy liverworts; this variety has been described by Gangulee in 1969 from the Andaman Islands; the present collection is a new record to the mainland of India.

Fissidens virens Thwait. & Mitt.; Way to Olikkudy, *MCN 87688a*; 1,780 m; on rocky patches near riverine area; a South-east Asiatic mainland species distributed in North-east India (Assam, West Bengal), Nepal and Vietnam; the present collection is a new record to peninsular India.

Pottiaceae

Hyophila involuta (Hook.) A. Jaeger; Mangappara, *MCN 87677*; 1765 m; on soil and small rocks along with *Brachymenium exile*; a cosmopolitan species found everywhere in tropical and subtropical regions of the world.

Hyophila nymaniana (Fleisch.) Menzel; Way to Olikkudy, *MCN 87676, MCN 120069*; 1650 m; on rocks; an Indo-Pacific species distributed in North-east India (Orissa, Western Himalaya), peninsular India (Gujarat, Palni hills, Kerala) and the Philippines.

Funariaceae

Funaria hygrometrica Hedw.; Palapatty, *MCN 87296*; 1,000 m; on soil and brick walls along with *Hyophila involuta*; a cosmopolitan species distributed in North-east India (Himalayas, Kashmir, Manipur, Naga hills, Orissa), South India (Nilgiri, Palni hills, Kerala), Sri Lanka, China, Japan, Korea, Myanmar, Siberia, Taiwan, Thailand, Tibet, Europe, North and South America, Africa, Australia, New Zealand and Oceania.

Bryaceae

Anomobryum auratum (Mitt.) A. Jaeger; Way to Olikkudy; *MCN 87684a*; 1,650 m; on muddy soil along with *Cladonia* sp.; the species is distributed in North-east India (Darjeeling, Kashmir, Western Himalayas, Mahabaleswar, Sikkim, Meghalaya, Naga hills), South India (Tamil Nadu), Bhutan and Nepal; the present collection is a new record to Kerala.

Brachymenium exile (Dozy & Molk.) Bosch & Lac.; Way to Olikkudy, *MCN 87678*; 1,785 m; terrestrial as well as lithophytic; a South and East Asiatic species distributed in northern and southern parts of India.

Bryum argenteum Hedw.; Way to Olikkudy, *MCN 87680c*; 1,785 m; terrestrial; a cosmopolitan species common in the area.

Mniaceae

Mnium restratum Schrad.; Olikkudy shola, *MCN 1200013*, 120014; 1750 m; on rocks near streams along with *Homaliodendron flabellatum, Hypopterigium tenellum* and *Lopidium struthiopteris*; distributed in North-east India (Himalaya, Arunachal Pradesh, Meghalaya, Assam, Manipur, Nagaland), South India (Kerala), Sri Lanka, China, Java, Korea, Japan, Myanmar, Nepal, New Guinea, Pakistan, the Philippines, Taiwan, Tibet, Europe, Africa, North and South America, Australia and New Zealand.

Rhizogoniaceae

Pyrrhobryum spiniforme (Hedw.) Mitt.; Olikkudy shola, *MCN 120029*, Koyman shola, *MCN 120089*; 980-1620 m; on bark and soil where leaf litter is more; it is distributed in North-east India (Darjeeling, Khasia hills, Assam, Arunachal Pradesh), South India (Palni hills), Borneo, Celebes, China, Java, Japan, Korea, New Guinea, the Philippines, Taiwan, Madagascar, Central and South Africa, Australia, Tasmania, New Caledonia, Hawai, Tahiti; the present collection is a new record to Kerala.

Bartramiaceae

Philonotis fontana (Hedw.) Brid.; Way to Olikkudy, *MCN 87675*; 1420 m; on soil cuttings; distributed in

North-east India (Himalaya, Kangra, Kedar Nath, Sikkim), Western Tibet, the Philippines, North and Central Asia, Europe and North Africa; Nair and Madhusoodanan (in press) recorded this species from the Vellarimala forests in the Western Ghats as a new record for Kerala.

Philonotis falcata (Hook.) Mitt.; Ichampatty, *MCN 87280, 87284*; 1400 m; on soil cuttings; it is distributed in North and East India (Darjeeling, Western Himalayas, Kashmir, Khasia hills), South India (Nilgiri hills), China, Japan, Java, Korea, the Philippines, Tonkin, South Africa, Europe and North America; the present collection is a new record to Kerala.

Orthotrichaceae

Macromitrium sulcatum (Hook.) Brid.; Koyman shola, *MCN 120079*; 1,010 m; on fallen branches; it is distributed in South India (Kerala, Tamil Nadu), Sri Lanka, Borneo, Kampuchea, Malaysia, Malay Peninsula, Madagascar, Myanmar, Nepal, the Philippines, Thailand and Vietnam.

Racopilaceae

Racopilum orthocarpum Wils. & Mitt.; Olikkudy shola, *MCN 87496*, Mangappara, *MCN 120046*; 1,800-1910 m; on bark of trees; it is distributed in Eastern India (Sikkim, Khasia hills), South India (Kodaikanal, Kerala), Nepal and Myanmar.

Trachypodaceae

Trachypodopsis serrulata (P. Beauv.) M. Fleisch.; Olikkudy shola, *MCN 120044a*; 1560 m; epiphytic; widely distributed in North-east India (Simla, Mussoorie, Sikkim, West Bengal), South India (Palni hills), Andaman Islands, Nepal and Bhutan; Nair and Madhusoodanan (in press) recorded this species from the Vellarimala forests in the Western Ghats as a new record to Kerala.

Pterobryaceae

Garowaglia plicata (Brid.) Bosch. & Sande-Lac.; Olikkudy shola, *MCN 120037*; 1,780 m; epiphytic along with *Homaliodendron flabellatum* and *Lejeunea* sp.; distributed in India (Sikkim), Sumatra, Indonesia, Cera and the philippines; this collection is a new record to Peninsular India.

Pterobryopsis crassicaulis (C.Muell.) M.Fleisch.; Koyman shola, *MCN 120075*; 1,250 m; epiphytic along with *Barbella cubensis* and *Cryptopapillaria fuscescens*; distributed in Sri Lanka, Indonesia and the Philippines; Chopra (1975) mentioned that this species could be occuring in South India; the present collection is the first confirmed record from the peninsular India.

Meteoriaceae

Cryptopapilldria fuscescens (Hook.) A. Jaeger; Koyman shola, *MCN 87433d*, Mangappara, *MCN 120076, MCN 120088*; 1,650-1850 m; epiphytic along with *Barbella cubensis* and *Pterobryopsis crassicaulis*; this is distributed in India (Karnataka, Kerala, Tamil Nadu, Meghalaya, Sikkim), Sri Lanka, Bhutan, Indonesia, Indian Archipelago, Myanmar, Nepal, the Philippines, Thailand, Tonkin and Yunnan.

Meteoriopsis reclinata (C. Muell.) M. Fleisch.; Mangappara, *MCN 87003*; 1,850 m; hanging from small branches of trees and shrubs; it is distributed in North-east India (Darjeeling, Manipur, Naga hills, Khasia hills, Assam, Arunachal Pradesh), Bhutan and Nepal; the present collection is a new record for peninsular India.

Neckeraceae

Homaliodendron exiguum (Bosch. & Sande-Lac.) M. Fleisch.; Olikkudy shola, *MCN & KPR 87433b*, Koyman shola, *MCN & KPR 120024*, Mangappara, *MCN & KPR 120071*; 1000-1845 m; epiphytic along with other mosses and leafy liverworts; widely distributed in the tropics and subtropics; Nair and Madhusoodanan (in press) has earlier recorded this species from the Vellarimala forest in the Western Ghats of Kerala.

Homaliodendron flabellatum (Sm.) M. Fleisch.; Olikkudy shola, *MCN 87424a*, Koyman shola, *MCN 120030*, Kariveppin shola, *MCN 120087a*; 950-1845 m; on rocky patches near streams and also as epiphyte along with *Homaliodendron exiguum*, *Mnium rostratum*, *Hypopterigium tenellum* and *Lejeunea* sp.; it is a common species distributed in India, Sri Lanka, Thailand, Sumatra, Australia and Pacific Ocean Islands.

Hypopterigiaceae

Hypopterigium aristatum Bosche & Sande-Lac.; Olikkudy shola, *MCN 120016*; 1720 m; lithophytic along with *Mnium rostratum*; distributed in North India (Himalayas), South India (Thirunelveli hills, Kerala), China Indo-Malayan region, Java and New Guinea; Nair and Madhusoodanan (in press) recorded this species from the Vellarimala forests in the Western Ghats as a new record to Kerala.

Hypopterigium tenellum C. Muell.; Kariveppin shola, *MCN 87424b*; 1560 m; on rocky patches near streams; it is distributed in South India (Palni hills, Kerala); Sri Lanka, Borneo, Java, Malaya, Sumatra, the Philippines, New Guinea, Pacific Islands, Central Africa and Madagascar; it is a pantropical species, extending to the south temperate regions of Africa and Australasia; Nair and Madhusoodanan (in press) has recorded this species from the Vellarimala forest in the Western Ghats as a new record for Kerala.

Lopidium struthiopteris (Bridel) M. Fleisch.; Koyman shola, *MCN 87433a*, Mangappara, *MCN 120001, 120087b*; Olikkudy shola, *MCN 120009*; 1720-1850 m; epiphytic as well as on rocks near streams along with *Homaliodendron flabellatum* and *Plagiochila* sp.; it is distributed in South India (Nilgiri), Sri Lanka, Malaysia, Thailand, Sumatra, Java, the Philippines, New Guinea and New Caledonia; the present collection is a new record to Kerala.

Fabroniaceae

Fabronia minuta Mitt.; Olikkudy shola, *MCN 120050*; 1790 m; epiphytic along with *Metzgeria furcata*; in India it is earlier known from Western Himalayas; the present collection is a new record to peninsular India.

Thuidiaceae

Claopodium nervosum (Harv.) M. Fleisch.; Kariveppin shola, *MCN 87424c*; 1450 m; it is distributed in North-east India (Darjeeling, Ranikhet, Sikkim, Khasia hills, Assam), South India (Palni hills), Sri Lanka, China, Indonesia, Japan, Korea, Nepal and Taiwan; the present collection is a new record to Kerala.

Thuidium tamariscellum (C. Muell.) Bosch. & Sande-Lac.; Olikkudy shola, *MCN 87443, 120027b*; 1600-1650 m; seen in a wide variety of habitats such as rock, black soil, roots of higher plants, mostly seen near riverine areas along with *Mnium rostratum, Homaliodendron flabellatum and Lopidium struthiopteris*; it is distributed in North India (Himalaya), South India (Kerala, Tamil Nadu), China, Japan, Malaya and the Philippines.

Brachytheciaceae

Erythrodontium julaceum (Schwaegr.) Par.; Olikkudy shola, *MCN 120060*; 1760 m; epiphytic; distributed in North and East India (Dehra dun, Mussoorie, Ranikhet, Dwarahat, Sikkim, Khasia hills, Assam), South India (Palni hills, Coorg, Kerala), Nepal, Sri Lanka, Myanmar, Sumatra, Java, Celebes, the Philippines, Yunnan, Tonkin and Central Africa.

Eurhynchium riparioides (Hedw.) Jennings; Koyman shola, *MCN 120078*; 1650 m; on soil cuttings near river sides; distributed in North-east India (Simla, Kumaon, Sikkim), South India (Palni hills), Argentina, China, Japan, Nepal, Western Tibet, Siberia, Caucasus, Europe, North America, North Africa and Mexico; this collection is a new record to Kerala.

Entodontaceae

Entodon rubicundus (Hook.) A. Jaeger & Sauerb.; Kariveppin shola, *MCN 87421*; 1850 m; basal part of tree trunks; widely distributed in the tropics and subtropics.

Sematophyllaceae

Sematophyllum subhumile (C. Muell) M. Fleish.; Palapatty, *MCN 87297*; 1450 m; epiphytic; it is distributed in East India (Assam), South India (Nilgiri, Palni hills), Indo-Malayan region, Pacific Ocean Islands and Sino-Japanese region; this collection is a new record to Kerala.

Hypnaceae

Hypnum cupressiforme L. & Hedw.; Olikkudy shola, *MCN 12006*; 1750 m; on soil, leaf litter, humus and on rocks; widespread in the neotropics and

tropics; reported from North-east India (West Himalaya, Kashmir, Sikkim, Khasia hills), South India (Palni hills, Madras, Kerala), Canada, China, Chile, Colombia, Japan, Mexico, Ecuador and Peru.

Taxiphyllum taxirameum (Mitt.) M. Fleisch.; Pudukkudy, *MCN 87672*; 750 m; on soil in loose tufts; widely distributed in the tropics including North-east India (Mussoorie, Simla, Nainital, Ranikhet, Almora, Sikkim, Abor, Assam, Khasia hills), South India (Palni hills), Sri Lanka, Nepal, Bhutan, Indonesia, Japan, Myanmar, New Guina, the Philippines, Sumatra, Taiwan and Tonkin; the present collection is a new record to Kerala.

DISCUSSION

The Kerala State still remains bryologically underexplored (Nair & Madhusoodanan, 2002). Out of 12 wildlife sanctuaries and 3 national parks, Silent Valley National Park and Ervikulam National Park are the two protected areas, which had been explored bryologically to some extent (Vohra *et al.*, 1982; Nair & Madhusoodanan, 2001; Madhusoodanan *et al.*, in press). The present paper enumerates 40 mosses, 19 liverworts and one hornwort. Among these, one taxon viz., *Fissidens asperisetus* Sande-Lac. var. *andamanensis* Gangulee is a new record to the mainland of India. Seven species viz., *Asterella nepalensis* Taylor, *Cephalozia pandei* Udar & Kumar, *Meteoriopsis reclinata* (C. Muell.) M. Fleisch., *Fabronia minuta* Mitt., *Fissidens virens* Thwait. & Mitt., *Garowaglia plicata* (Brid.) & Sande-Lac., *Pterobryopsis crassicaulis* (C. Meull.) M. Fleisch. are new records to peninsular India. Eighteen species viz., *Aneura pelloides* (Horik.) Inoue, *Riccardia tenuicostata* Schiffn., *Metzgeria furcata* (L.) Dumort., *Heteroscyphus argutus* (Reinw. *et al.*) Schiffn., *Plagiochila elegans* Mitt., *Porella acutifolia* (Lehm. & Lindenb.) Trev. *Anomobryum auratum* (Mitt.) A. Jaeger, *Campylopodium khasianum* (Griff.) Par., *Campylopodium griffithii* (Mitt.) Broth., *Trematodon longicollis* Michx., *Eurhynchium riparioides* (Hedw.) Jennings, *Taxiphyllum taxirameum* (Mitt.) M. Fleisch., *Lopidium struthiopteris* (Bridel) M. Fleisch., *Philonotis falcata* (Hook.) Mitt., *Pogonatum aloides* (Hedw.) P. Beauv., *Pyrrhobryum spiniforme* (Hedw.) Mitt., *Sematophyllum subhumile* (C. Muell) M. Fleish., *Claopodium nervosum* (Harv.) M. Fleisch., are new records for Kerala. The species such as *Dumortiera hirsuta* (Swartz) Nees, *Riccia fluitans* L., *Hyophila involuta* (Hook.) A. Jaeger, *Bryum argenteum* Hedw. and *Philonotis falcata* (Hook.) Mitt. are common in all the settlements. *Bazzania tridens* (Reinw. *et al.*) Trev., *Porella pinnata* (Dick.) Lindb., *Metzgeria furcata* (L.) Dumort., *Lopidium struthiopteris* (Bridel) M. Fleisch., *Garowaglia plicata* (Brid.) Bosch. & Sande-Lac. and *Claopodium nervosum* (Hary.) M. Fleisch. were found confined to the Shola forests of high altitudes. *Claopodium nervosum* (Harv.) M. Fleisch., *Eurhynchium riparioides* (Hedw.) Jennings and *Fabronia minuta* Mitt. are rare in the area. Some specimens collected from the Chambakkad, Thayannamkudy, Vellakkalkudy and Karimutty settlements, require further study to fix the identity, which are not included here. This preliminary survey shows the high bryophyte diversity of the area and the importance of detailed bryophyte documentation of this phytogeographically unique area.

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