



Sacred forests of South Travancore of South India

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Abstract

During the study period we inventoried 201 miniature sacred groves covering an area of 13.1 ha. Among these, 10 sacred forests are present in Agastheeswaram, 11 in Thovalai, 72 in Kalkulam, and 108 in Vilavancode taluk. The floristic richness of the sacred groves in South Travancore (presently known as Kanyakumari district) was analysed. A total of 329 species belonging to 251 genera of 100 families were enumerated from the miniature sacred forests of Kanyakumari district. Of these, 42 species were endemic, 40 very rare, 47 rare, and 16 endangered. Since there is minimal exploitation of these groves, they are considered a home to certain rare, endangered, and endemic plants and are rich in biodiversity. These sacred groves are closely related to the social and cultural life of a people and a number of cultural rites and religious rituals have perpetuated the status of a sacred grove, which has ensured the protection of the sacred grove vegetation in pristine condition.

Key words: Medicinal plants, Plant diversity, Religious beliefs, Sacred grove, India

1. Introduction

Due to widespread deforestation and land use, large scale changes have taken place in the plant wealth all over the world (Yesilyurt et al., 2008; Alao, 2009; Tel, 2009; Ocakverd et al., 2009; Prasad and Jeeva, 2009; Akçin et al., 2010; Yildirim and Kilinc, 2010; Yildiztugay and Kucukoduk, 2010). However, preponderance of small patches of South Travancore is still preserved as sacred groves. This is due to strong religious beliefs of the indigenous people of the region (Jeeva et al., 2006; 2007). These groves are locally known as *Koil kadu*, *Kavu*, *Iyarkaikovil* (nature temples), etc. The sacred trees are very good examples of *in situ* conservation where a single plant is conserved and worshipped as sacred trees (sthalavriksham or thalamaram) by the residents of the neighborhood (King et al., 1997). Such trees are both ethnobotanically or culturally important and ecological representative of the region. Under a chosen tree there is a place for sanctification of the idols or deity of the grove. The deity is mostly erected by a carved stone or clay, in some cases tying a red color cotton thread or fiber in the sacred tree and worshipped. The inhabitants of this area are conserving the sacred groves as a part of tradition and culture and possess vast ethnobotanical knowledge to utilize the precious plant wealth sustainably (Sukumaran and Jeeva, 2008; Sukumaran et al., 2008).

2. Materials and methods

The present study was conducted in South Travancore (presently known as Kanyakumari district) of Tamil Nadu, Southern Peninsular India (77° 15' – 77° 30' E, 8° 30' – 8° 15' N), located in the part of southern Western Ghats. It occupies an area of about 1684 sq. km, which is 1.29 percent of the total geographical area of the state. This district is comprised of four taluks namely, Agastheeshwaram, Thovalai, Kalkulam and Vilavancode (Figure 1).

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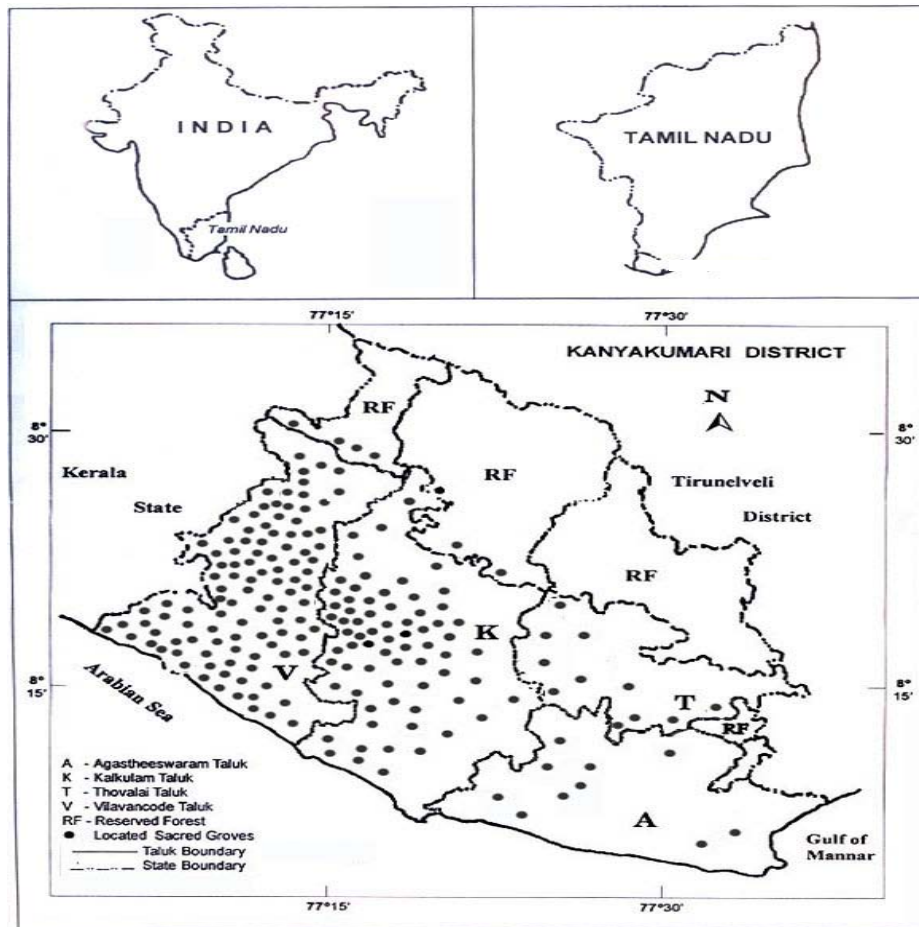


Figure 1. Map showing the location of scared groves studied

3. Results

During the field visits 201 miniature sacred groves covering an area of 13.1 hectare were surveyed (Figure 2) and information was gathered on sacred trees, taboos, deities, festivals, priests and cultural aspects through personal contacts, questionnaires and also interviewing villagers, temple authorities and various social organizations. The male deity associated with the majority of the sacred forest is 'Nagaraja' and the female deity is 'Mariamman'. Of 201 sacred groves surveyed so far, 10 groves are in Agastheeswaram, 11 in Thovalai, 72 in Kalkulam and 108 in Vilavancode taluk. From the detailed scrutiny the sacred groves has been classified into Thanikaavu (belongs to the particular person), Kudumbakavu (family grove), Oorkavu (village grove), Pothukavu (community grove) and Amaithikavu (burial ground) based on the deity, rites, rituals and worships associated with them.

Taxonomically, a total of 329 plant species belonging to 251 genera and 100 families were recorded in 40 sacred forest patches of the study area. Among these, 139 (42.25%) were trees, 95 (28.88%) shrubs, 79 (24.01%) herbs and 16 (4.86%) climbers including lianas. Of 100 families, 98 families were angiospermic and 2 gymnospermic families such as Cycadaceae and Gnetaceae. Fabaceae was the dominant family with 14 genera and 18 species, and it was followed by Euphorbiaceae and Moraceae (15 species each), Acanthaceae and Rubiaceae (12 species each), Apocynaceae, Mimosaceae and Verbenaceae (10 species each), Arecaceae, Caesalpiniaceae and Combretaceae (8 species each).

In angiosperms, among the dicotyledons, 134 plant species (40.73%) come under Polypetalae, among them 70 were trees, 38 shrubs, 23 herbs and 3 climbers. Gamopetalae had 109 plant species (33.13%), of these 29 were trees, 42 shrubs, 28 herbs and 10 climbers. Out of 47 species (14.28%) of Monochlamydeae, 25 were trees, 9 shrubs, 12 herbaceous species and one climber. Thirty-nine species (11.25%) of monocotyledons from 17 families were identified, among them 12 were trees, 8 shrubs, 16 herbs and one climber. Two species namely *Cycas circinalis* L. and *Gnetum ula* Brongn. belonged to the gymnosperms.

The angiospermic species *Petiveria alliacea* L. of family Phytolaccaceae has been newly reported from one of the groves of Kalkulam taluk as an addition to the flora of Tamil Nadu. An important pteridophyte *Tectaria zeilanica* (Houtt.) Sledge. (Dryopteridaceae) has been rediscovered after Beddome – 1864 (Figure 3) (Sukumaran et al., 2007).

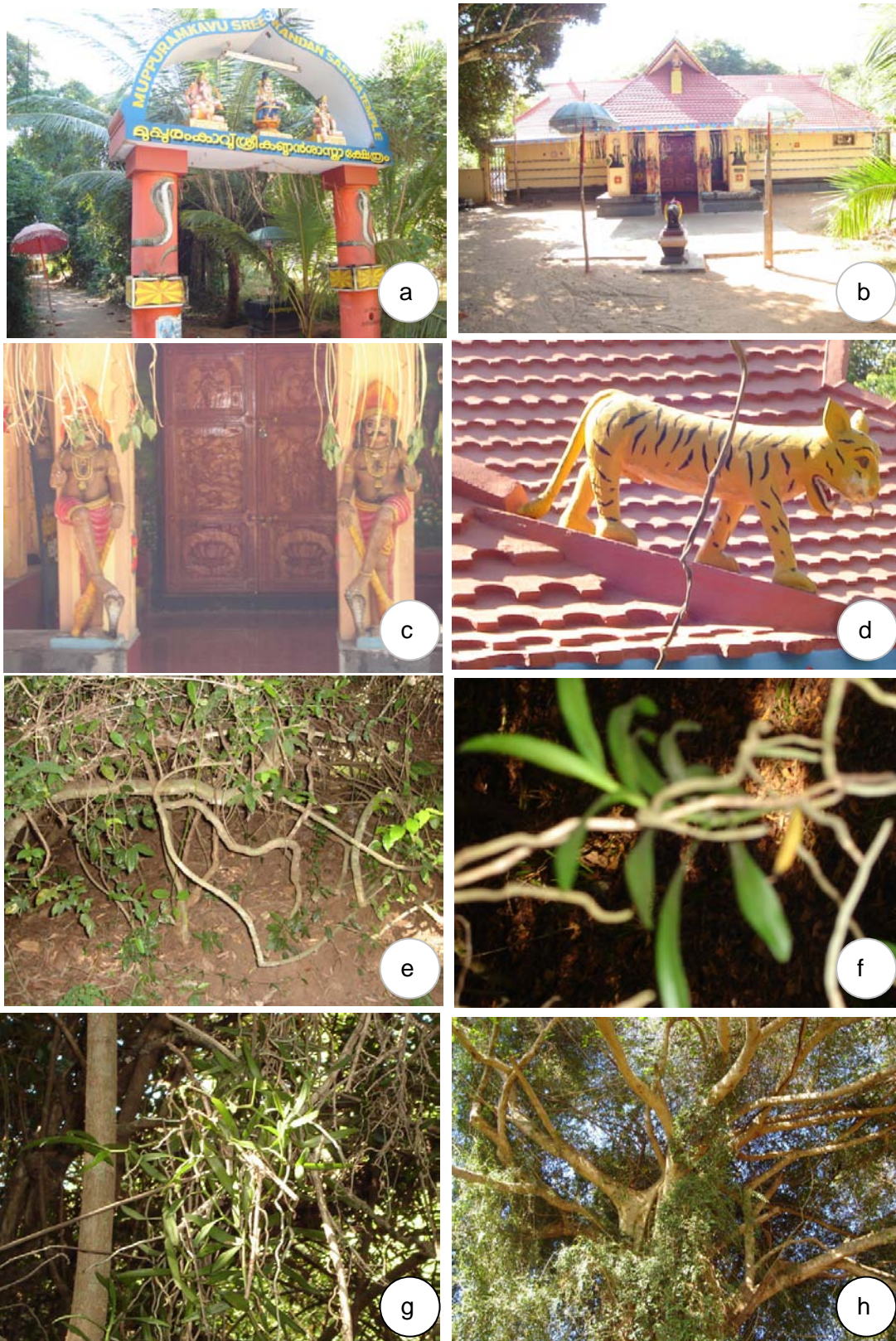


Figure 2 a-h. An overview of the studied sacred forest – a): Entrance of Temple associated with sacred forest b) Temple, c) Security guards at the entrance d) Tiger e) *Strychnos* sp. associated with the flora of sacred forest f) and g) Orchids h) *Ficus* tree

The endemics were about 8% of the total species content of all the sacred groves inventoried during the present study. Out of 329 species studied, 41 species belonging to 34 genera and 23 families were endemic, and 103 species belonging to 83 genera and 55 families were rare and endangered.

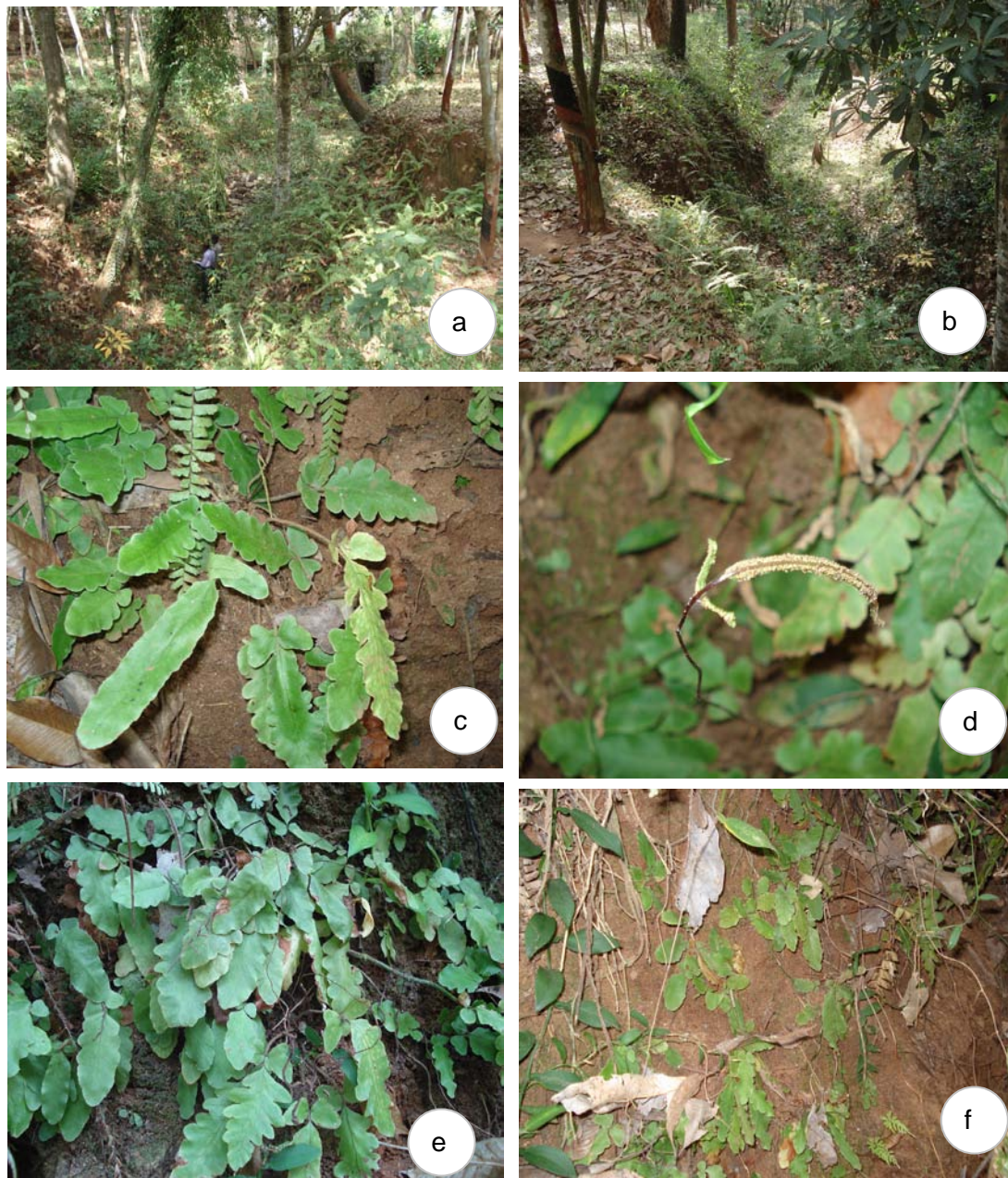


Figure 3 a-f. *Tectaria zeilanica* (Houtt.) Sledge. (Dryopteridaceae) – a rare pteridophytic species rediscovered from the studied sacred forest after Beddome – 1864 a and b. Sacred forest showing understory flora c. *Tectaria zeilanica* d. Frond with reproductive organ, e and f) Near life cycle completion.

Among the 41 endemic plant taxa, 2 species are endangered, 10 species are rare and 25 very rare. Of them 30 were tree species, 8 shrubs, 2 herbs and one climber. Ebenaceae and Moraceae had the highest number of endemic species (5 species each), followed by Clusiaceae (4 species), Caesalpiniaceae, Dipterocarpaceae, Flacourtiaceae, Melastomaceae, Meliaceae and Rubiaceae (2 species each) whereas, 15 families having single species. The endemic species such as, *Artocarpus hirsutus* Lam., *Asteriastigma macrocarpa* Bedd., *Atlantia monophylla* (L.) Correa., *Caesalpinia mimosoides* Lam., *Diospyros ebenum* Koen., *Hydnocarpus laurifolia* (Dennst.) Sle., *Naregamia alata* Wight & Arn., *Persea macrantha* (Nees.) Kosterm. and *Tetracera akara* (Burm.F.) Merr. are widely distributed throughout the study area and their presence in different types of vegetation covers reflects their wide adaptability.

The groves also harbour 103 rare and endangered plant species, among them 64 were trees, 20 shrubs, 16 herbs and 3 climbers. Moraceae was dominating in terms of species composition and it had 11 species, followed by Fabaceae (7 species), Ebenaceae (5 species), Clusiaceae, Combretaceae and Euphorbiaceae (4 species each), Meliaceae, Rubiaceae and Rutaceae (3 species each), 13 families were represented by 2 species, whereas, 33 families were monospecific.

The phytogeographic elements of these groves showed predominance of Asiatic elements (89 species- 27.1%), followed by pantropical elements having 46 species (14%) as the dominant one and the species endemic to western

Ghats possess 41 species (12.5%) which occupy the codominant group, the remaining elements are drawn from the neighbouring phytogeographic domain such as Afro-Asian, Indo-Srilankan sharing the rest of the species.

It is interesting to see that some of the *keystone* and *flagship* species are recorded from these groves. *Keystone species* refers to a species, which is critical for the survival of several other species in the community, whereas, *Flagship species* are the dominant species of the community, which serve as markers. *Ficus benghalensis* L., *Ficus religiosa* L., *Artocarpus heterophyllus* Lam. and *Artocarpus hirsutus* Lam. were keystone species recorded from the sacred groves. The flagship species found in the groves were *Antiaris toxicaria* (Pers.) Lesch., *Diospyros ebenum* Koen., *Mesua ferrea* L. and *Vateria indica* L.

Most of the plants recorded from sacred groves of Kanyakumari district are economically important. The medicinal plants comprise of 194 species, 34 species having timber value and 19 species were regarded for minor forest produce. Many multipurpose species have also been reported from groves. Of these, 23 species are used as timber and medicine, 34 species as medicine and minor forest produce, 18 species as minor forest products and timber, and 10 species as timber, medicine and minor forest produce.

In addition to this, pteridophytes (24 sp.), bryophytes (4 sp.), lichens (5 sp.), fungi (7 sp.), and 30 species of microalgae (from the water resources associated with the groves) were reported from these groves. It is interesting to note that these patches are also rich in faunal wealth with 21 species of mammals, 20 reptiles, 34 birds, and 48 insects.

However, in recent days needs and greeds of people have resulted in weakening of religious beliefs, leading to fragmentation of habitat. This study revealed that a number of valuable plant species are found in the sacred groves. If conservation measures are not introduced in near future, there may be great loss of plant diversity. Strengthening researches and pooling data from such investigations could be helpful in developing suitable measures to develop appropriate technology by involving the indigenous communities towards reorientation of traditional psyche through environmental consciousness by nature lovers, environmental practitioners and researchers will be an effective approach for conserving biological wealth.

References

- Akçin, T.A., Akçin, T.A., Kutbay, H.G. 2010. A study on flora of Çakmak Dam and its surroundings (Çarsamba, Samsun/Turkey). *Biological diversity and Conservation*, 3/1, 28-44.
- Alao, J.S. 2009. Need for biodiversity conservation in Nasarawa State, Nigeria. *Biological Diversity and Conservation*, 2/1, 14-20.
- Cansaran, A., Bingol, M.U., Geven, G., Guney, K., Erdogan, N., Kaya, O.F. 2010. Contribution to the Flora of Sakarat Mountain (Amasya/Turkey). *Biological diversity and Conservation*, 3/1, 103-120.
- Jeeva, S., Kingston, C., Kiruba, S., Kannan, D., Jasmine T Sawian, Venugopal, N. 2006. Sacred forests – treasure trove of medicinal plants: a case study from Trivandrum district of southern Western Ghats. In: National Seminar on Medicinal, Aromatic and Spices Plants: Perspective and Potential. Organized by Indira Gandhi Krishi Vishwavidyalaya, TCB College of Agriculture and Research Station, Bilaspur, Chattisgarh.
- Jeeva, S., Kingston, C., Kiruba, S., Kannan, S., and Jasmine T Sawian, 2007. Medicinal plants in the sacred forests of Southern Western Ghats. In: National Conference on Recent Trends on Medicinal Plants Research (NCRTMPR – 2007). Organized by Centre for Advanced Studies in Botany, University of Madras, Guindy Campus, Chennai – 600 025.
- King, E.D.I.O., Viji, C., Narasimhan, D. 1997. Sacred groves: traditional ecological heritage. *International Journal of Ecology and Environmental Sciences*, 23: 463-470.
- Ocakverd, H., Vural, M., Adiguzel, N. 2009. Vegetation of Kısır Dağı (Kars-Ardahan / Turkey). *Biological Diversity and Conservation*, 2/2, 1-37.
- Prasad, M.N.V., Jeeva, S. 2009. Coal mining and its leachate are potential threats to *Nepenthes khasiana* Hook. f. (Nepenthaceae) that preys on insects - an endemic plant in North Eastern India. *Biological Diversity and Conservation*, 2/3, 29-33.
- Sukumaran, S., Jeeva, S. 2008. A floristic study on miniature sacred forests at Agastheeshwaram, southern peninsular India. *EurAsian Journal of Biosciences*, 2/8: 66-72.
- Sukumaran, S., Jeeva, S., Raj, A.D.S., Kannan, D. 2008. Floristic diversity, conservation status and economic value of miniature sacred groves in Kanyakumari district, Tamil Nadu, Southern Peninsular India. *Turkish Journal of Botany*, 32/2: 185-199.
- Sukumaran, S., Jeeva, S., Raj, A.D.S., Laloo, R.C. 2007. Rediscovery of *Tectaria zeilanica* (Tectarioideae) – an endemic rare fern from the sacred grove of Vilavancode, Southern Western Ghats. *Indian Journal of Forestry*, 2007, 30/3, 331-332.
- Tel, A.Z. 2009. Contributions to the flora of Nemrut Mountain (Adiyaman/Turkey). *Biological Diversity and Conservation*, 2/1, 36-60.
- Yesilyurt, E.B., Kurt, L., Akaydin, G. 2008. A Study on Flora of Hacıkadın Valley (Ankara/Turkey). *Biological Diversity and Conservation*, 1/2, 25-52.
- Yildirim, C., Kiliç, M. 2010. The Flora of the İnegöl Mountain Gümüşhacıköy /Amasya, Turkey). *Biological Diversity and Conservation*, 3/2, 49-67.
- Yildiztugay, E., Kucukoduk, M. 2010. The flora of Kas Plateau and its surroundings (Anamur – Mersin/Turkey). *Biological diversity and Conservation*, 3/2, 170-184.

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