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Phytosociological studies of the selected sacred grove in Kannur district, Kerala

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Abstract
Sacred groves are the relic forest patches protected by strong and supplemented mystic folklores in reverence of a deity. It act as a treasure trove for many medicinal and economic species. After the dawn of modern civilization, by the anthropogenic activities and over exploitation of natural resources, the sources of biodiversity is depleting day by day. Therefore, a holistic understanding of the current status, structure and function of sacred grove is essential for assessing their ecological role and formulating strategies for their conservation. This paper briefly reviews the floristic composition, ecological status and conservation priorities of the selected sacred grove.

Keywords: Phytosociological, modern civilization, selected sacred grove in Kannur district, Kerala

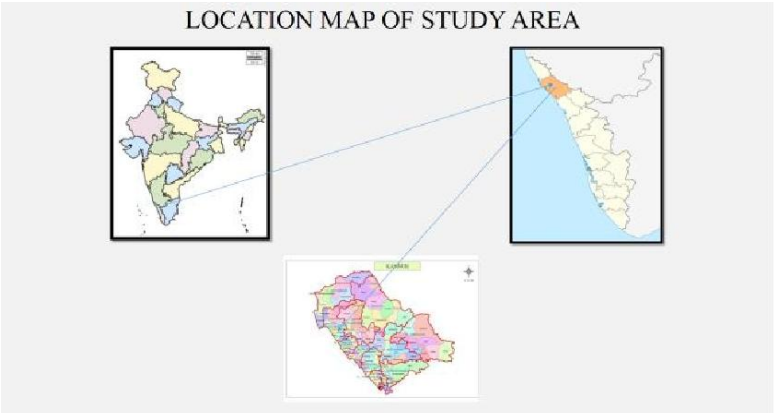
Introduction
Sacred groves are characterized by rare species conserved by local communities. It is potential for its richness of biodiversity and ecological role it plays. Along the qualitative surveys, a quantitative approach to the species composition and their biodiversity induces play an important role in assessing the ecological status of sacred grove in conserving the natural resources.

Sacred groves are characterized by rare species preserved on isolated land with social and religious beliefs of people (Kulkarni and Shindikar, 2005) [10]. The way of conserving natural biodiversity through preservation plots in forest areas or sacred groves is a unique feature in Indian culture (Khullar, 1992) [9]. These sacred groves are more or less pockets of climax vegetation preserved on religious grounds. These forests are the true indicators of the type of vegetation that once existed here before the dawn of modern civilization. Their existence is mostly due to certain taboos, strong beliefs and supplemented mystic folklores (Gadgil and Vartak, 1975) [6]. It is well known that the sacred trees such as Banyan, Peepal and other species of ficus support a variety of life forms. In India sacred groves are known by several names such as Kavu, Nagakavu orSarpakavu in Kerala, Deorais or Deoban in Maharashtra, Orans or Kenri in Rajasthan, Devarakadu, Pavithavana or Sindhravana in Karnataka and Sarana in Bihar (Induchoodan, 1996) [7].

In Kerala, there are about 2000 sacred groves (Malhotra *et al.*, 1998) [5] of which 352 are in Kannur district (Jayarajan, 2004). Sacred groves in Kerala are widely distributed from the West Cost to the Eastern high lands. Generally, local communities call these natural islands of vegetation-'Kavus'. These Kavus are still preserved by mythological beliefs. Kavu represent the locally deep-rooted tradition of worshiping plants, animals and local deities. They are known by various other names like Sarpakavu (when snakes are worshiped), Mundya, Vallikkettu, etc. (Bhandari and Chandrashekhar, 2003) [3].

The present study of sacred grove focuses on analyzing floristic composition, medicinal properties and red listed species in the selected area.

Materials and Methods
Study area
The study area, Vaneeswaram Kavu is concentrated in Kannur district, which is located in the northern part of Kerala (Figure 1). The sacred grove is located in Morazha central, which is about 14 kilometers long from Kannur town. The temple lies between 11.987' N latitude and 75.349'E longitude. Here, the climate is very hot and humid with maximum and minimum temperature ranging from 27ºC to 31^{0}C. The average annual rainfall is 3614 mm. The study area of sacred grove spread out in one and half acres. Here is the worship of "Nagam" (snake).



Vaneeshwaram Kavu, Morazha

Fig 1: Location of Study Area-Vaneeshwaram Kavu

Floristic composition

First-hand information about exact location, extent and presiding deity of the sacred grove is collected by the personal contact with village men, temple authorities, etc. A brief floristic survey of the sacred groves in the region has been carried out. Plants were identified with the help of Madras Presidency (Gamble 1915-1936) [2], Flora of Cannanore (Ramachandran and Nair, 1988) and also by using available field keys and taxonomic bulletins. The identification was further confirmed with the help of taxonomic experts in Botany.

Ethnobotanical studies and Phytosociological analysis

During the field visits, the various uses of plants were gathered. In addition to various literatures, personal interviews have also been carried out know the commercial utilization of plants. 70 species were recorded by adopting Quadrat method of sampling. The biodiversity induces like frequency, density, abundance, basal cover and important value index and their synthetic attributes like relative frequency, relative density, relative dominance, and relative value of importance were calculated.

Results

Species Composition in Vaneeshwaram Kavu

A total of 70 vascular plants falling under 63 genera and 39 families were documented. Out of which, the Angiosperms dominate with 65 members, while 3 were Pteridophytes and *Gnetum ula,* the lone Gymnosperm. With respect to their habit, there are 18 trees, 20 herbs, 17 climbers and 15 shrubs. Among 66 Angiosperms, dicot comprises 32 families, 62 genera and 69 species. The dominant families are Rubiaceae, Asteraceae, Vitaceae, Malvaceae, Euphorbiaceae, oleaceae and Menispermaceae having 5, 4, 4, 4, 3, 3 and 3 species respectively.

Medicinal Uses of Various Plants Reported From the Sacred Grove

The medicinal uses of all plants recorded are documented. Of the total of 70 species in the study area, 51 species (73%) harbor various medicinal uses. Majority of plants species have the medicinal uses for antimicrobial, antidiabetic, antioxidant, anticancer and anti-inflammatory uses. A few species can be used to control high blood pressure.

Biodiversity Induces of Various Plants in Vaneesharam Kavu

- **Frequency (%)**: Highest in *Abrus pulchellus* (40) and lowest frequency (10) was reported by 58 species.
- **Abundance (individuals/m^2):** Highest in *Adiantum lunulatum* (14) and lowest in 52 species, which are reported to have an abundance value of 1.
- **Density (individuals/m^2):** *Adiantum lunulatum* secured the highest density of 1.4. The lowest density, 1 was shown by 49 species.
- **Basal cover (m^2/m):** *Gnetum ula* attains the higher basal cover of 85.22 m^2/m. *Desmodium triquetrum* is the species having lowest basal cover of 35.4945 m^2/m.

Red Listed Plants Reported From Vaneeshwaram Kavu

15 red listed species were identified (Plate 1) (IUCN, 2015), among which the least concerned species were 3 in number and they are *Aglaia alaeagnoidea, Holigarna arnottiana* and *Nothopegia racemosa.* The plants in endangered category includes 5 species, which are *Connarus paniculatus, Euodia lunu-ankenda, Gnetum ula, Syzygium caryophyllatum* and *Naregamia alata. Canskora cossiflora* and *Cissus heyneana* are the only two species belong to nearly endemic category. Threatened species present in the study area are 4 in number, which are *Alseodaphne semicarpifolia, Antidesma montana, Blumia oxyodonta* and *Hemidesmos indicus.* Only one vulnerable species present in the grove is *Dioscoria wallichiana.*

Alseodaphne semicarpifolia Nees. Var., *Hemidesmos indicus* (L.) R.Br. and *Holigarna arnottiana* J.Hk. are anticancerous plants. *Canskora cossiflora*. Dalz. can be used to control high blood pressure. *Syzygium caryophyllatum* (L.) Alston. is antidiabetic in activity. For skin various skin diseases, the plants used are *Hemidesmos indicus* (L.) R.Br., *Holigarna arnottiana* J.Hk., *Naregamia alata* Wight &Arn. and *Syzygium caryophyllatum* (L.) Alston.

As new diseases out break day by day, and the established medicines and treatment systems fail to treat them, it is important to conserve the medicinal plants as they meet an infinity in their nutritional values and biological actions. As sacred groves act as treasure trove for various such vegetation, it is also important to protect them too.

Aglaia elaeagnoidea

Alseodaphne semicarpifolia

Antidesma montana

Blumia oxyodonta

Canskora cossiflora

Cissus heyneana

Connarus paniculatus

Dioscoria wallichiana

Euodia lunu-ankenda

Hemidesmos indicus

Holigarna arnottiana

Gnetum ula

Syzygium caryophyllatum

Naregamia alata

Nothopegia racemosa

Plate 1: Red Listed Plants Reported From the Sacred Grove

Summary

For the current study of Phytosociological analysis of sacred groves, Vaneeshwaram Kavu, Morazha, Kannur was selected. The main objectives of the study includes analysis of the floristic composition, various medicinal uses of documented species, listing out of red listed species, and the conservative strategies for the protection of sacred groves. Of the total of 70 species, about 51 species (73%) harbor various medicinal uses. Out of the total species, about 15 red listed species were reported and the important thing is that, all this plants harbor potential medicinal properties. So that, the need to conserve this sacred grove is important for its vital role in the society.

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