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STUDY OF FLORAL DIVERSITY IN ERAPPIN KOOTTAM WATERFALL, VAPPALA IN VELIYAM PANCHAYATH, KOLLAM, KERALA

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Abstract

The present work deals with the floral studies of Erappin Koottam, Vappala in Veliyam panchayath, Kollam, Kerala. This study was conducted for a period of 3 months from January 2023 to March 2023. During this study a total of 44 plants belonging to 24 families including herbs, shrubs and trees were studied. The area is filled with a wide variety of plants such as *Andrographis paniculata, Ficus arnottiana, Mitracarpus hirtus, Smilax zeylanica* etc. Plants were utilized as food, fodder and medicines. The study may provide valuable information for the sustainable management of this fragile ecosystem.

Keywords: Erappin Koottam, Floral Diversity, Medicinal plants, Sustainable management

Introduction

Floral diversity indicates the diversity of plants occur in a particular region. Plants play a major role in balancing ecosystem, protect watershed moderate climate etc. Green plants give out a substantial proportion of world's molecular oxygen and they are the basis of most of the earth's ecosystem. Up to 80 % of population in developing countries are totally depends on plants for their primary health care needs (Vines *et al.*, 2004). Plants with medicinal properties were used by primitive for meeting their health care needs (Jain and

Saklani, 1994). Vast ethnobotanical and ethnopharmacological knowledge exist in India from ancient times onwards. Different countries have their own indigenous systems including Sidha, Ayurveda, Unani and Allopathy. Usage of herbal medicine throughout the world has been rising from the past few years (Mazzari and Prieto, 2014). India has tremendous biodiversity. It has over 7% of world's biodiversity in the 2.5% of earth surface. This diversity can be attributed to the vast variety of landforms and climates. resulting in habitats ranging from alpine to desert. The number of plant species in India is estimated over 45,523 representing about 11.8 % of world's flora. Of these, 17,500 flowering plants of which 4,950 species are endemic to the country (Tracy and Benjamin, 2000). Plant diversity provides essential goods for human welfare like food and fibre. Many useful materials for humans are provided by plant diversity and many other ecosystems. Plant diversity is under threat due to human activities, habitat loss, fragmentation, degradation, overgrazing, increased pollution, increased population growth, invasive alien species and environmental degradation. Other important threats to biodiversity are overharvesting of selected species, toxic discharges, habitat alteration, narrow geographical area, parasites, natural disasters, deforestation, soil erosion *etc.* Plant diversity loss has direct and indirect negative effects on living organisms. The stress on floral diversity induces increased temperature, shift of climatic zones, melting of snow and ice, rise in sea level and extreme weather conditions. Nature has constantly been reliant on flora which is a valuable natural blessing. Flora is a compiled checklist of plant species developing in any graphic region. List of floras by different plant taxonomists gives out information about plants. Geological and ecological varieties zones of the world support various types of floristic composition (Masroor,2011). The immediate human uses change the overall land spread through horticulture, pasture area forest *etc.* These methods diminish the normal habitat of species. Humans are utilizing plant assets brutally in some parts of the globe. The natural forest loss

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clearly demonstrates a decrease in the quantity of species and hereditary variation in population (Ibrar, 2003). Flora is the simplest list of plants occurring within a given region and they are living organisms which lack the power of locomotion (Ramachandran, 1988). The local plants act as the wealth of plant species. Most of the species have high medicinal value and it can be analyzed rough phytosociological studies. Recently, a part of medicinal plants in traditional health care has diverted the attention of researchers toward ethnomedicines (Qureshi, 2008).

Floristic catalogue is the source of botanical details for a particular field and also it serves as a useful point for numerous detailed learning. The listing of species is easy and comparatively less time consuming. It provides public outreach and fundamental information to use in addressing the biodiversity crisis (Funk *et al.,* 2007). Climatic conditions and soil type also have a good influence in the properties of different medicinal plant species. Hence by learning analyzing an area, we can detect medicinal properties of certain plants. It is a fact that almost all plants have some medicinal properties and also they have different uses in human life. This shows the importance of need for conserving the flora. The present work on the documentation of flora in Erappin Koottam Waterfall in Vappala of Veliyam Panchayath was undertaken on this concept. There were not any previous studies conducted on the floral diversity of Erappin Koottam waterfall.

Materials and Methods

The present floral study was conducted at Erappin Koottam Waterfall in Vappala of Veliyam Panchayath in Kollam district of Kerala, India (figure 1) and the study was conducted for a period of 3 months from January 2023 to March 2023. Field trip was conducted to collect herbarium specimens and raw materials. Identification of plants were done by using various floras including flora of Thiruvananthapuram, flora of Pathanamthitta *etc*. Few plants which were not mentioned in the floras were identified with the help of taxonomic experts. Photographs have been provided for all the species. About 44 species of plants collected for the project (Table 1). The specimens collected were prepared as herbarium.

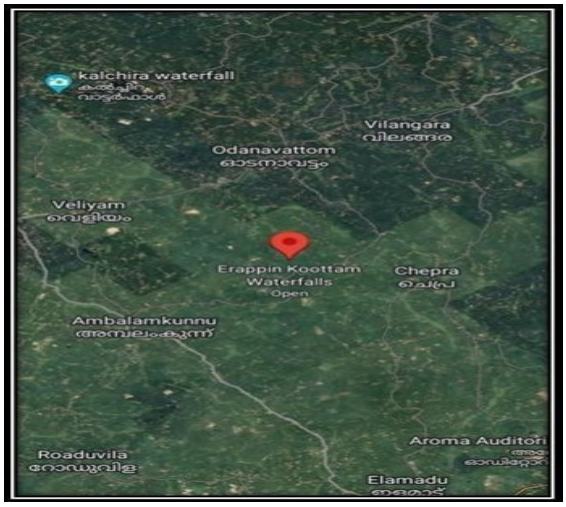

Figure 1 Map showing Erappin Koottam

Figure 2

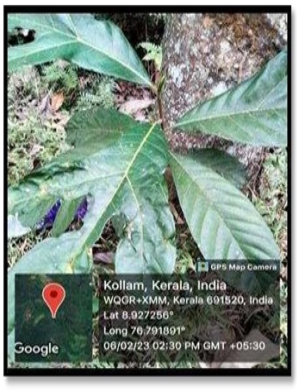

Figure 3

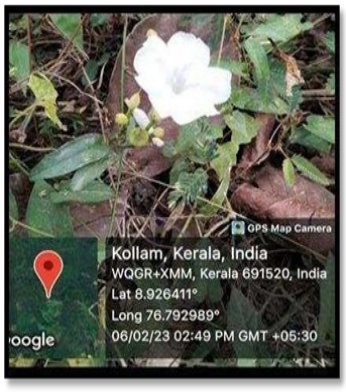

Figure 4

Figure 5

Figures of selected plants growing in the study area Figure 2. *Alternanthera brasiliana* Figure 3. *Artocarpus hirsutus* Figure 4 *Camonea umbellate* Figure 5. *Lepidagathis incurva*

Sl. Number	Local name	Scientific name	Family	Uses
1	Precatory bean,	*Abrus precatorius L*	Fabaceae	Valued in native jewelry for their bright coloration.
2	Fringed pod toothache plant	*Acmella ciliata*	Asteraceae	The flower heads are used to treat toothache and throat and gum infections. The leaves used to treat bacterial and fungal skin diseases.
3	Brazilian joyweed	*Alternanthera brasiliana*	Amaranthaceae	The plant is used against inflammation, cough, and diarrhea
4	Bitterweed	*Andrographis paniculata*	Acanthaceae	Treatment of common cold, diarrhea, fever due to several infective cause, jaundice, as a health tonic for the liver and cardiovascular health, and as an antioxidant.
5	Custard apple	*Annona reticulata*	Annonaceae	Source of medicine, used as an anthelmintic, analgesic, anti-inflammatory activity, a good source of food, an ornamental plant
6	Anjili	*Artocarpus hirsutus*	Moraceae	Fruits and seeds are edible, timber was used in the construction of ceilings, door frames and furniture.
7		*Asystasia crispata*	Acanthaceae	Fruits and seeds are edible, its bark cures diabetes, anemia, tapeworm infection, asthma, dermatitis, diarrhea, malarial fever, pimples and ulcers.
8	Chinese violet	*Asystasia gangetica*	Acanthaceae	The leaves are eaten as a vegetable in Africa, the leaves are used in many parts for the management of asthma, used as an ornamental plant
9	Common bamboo	*Bambusa vulgaris*	Poaceae	Used for construction of houses, huts, boats, and fences, raw material for paper pulp, shoots are rarely used as a vegetable, rarely used as livestock fodder
10	Star Gooseberry	*Breynia androgyna*	Phyllanthaceae	The leaves are a good source of protein and are very nutritious, ripe fruits can be made into sweetmeats a green dye, obtained from the leaves, is used for food dyeing, the leaves are used as a medicine for coughs and to soothe the lungs, as a tonic.
11	Hogvine	*Camonea umbellata*	Convolvulaceae	useful in rheumatism, neuralgia, headache, used as ear drops in case of auricular ulcers. In epilepsy, the powder of the leaves is sniff up. The leaves are used in the Moluccas as an emollient for abscesses and ulcers.
12	Hairy fountain grass	*Cenchrus pedicellatus*	Poaceae	It is an aggressive weed, used for treatment of wounds, pain related condition, eye and parasitic infections among the traditional healers
13	Chromolaena	*Chromolaena odorata*	Asteraceae	It is a pain reliever, prevent cervical cancer, prevent diabetes, maintain the hearts health, ulcer medicine.

14	Bhat or hill glory bower	*Clerodendrum inflortunatum*	Lamiaceae	The leaves and root are used as anti-dandruff, ascariecide, antipyretic and anti diabetic, treatment of skin disease, treat-ment of internal infection and kidney disfunction, widely used as antihyperglycemic
15	Smooth crotalaria	*Crotalaria pallida*	Fabaceae	Used to treat urinary problems and fever.
16		*Cyanthillium cinereum*	Asteraceae	Has therapeutic potentials against asthma, cancer, cholera, colic pain, cough, diarrhea, dysentery, impotency and night- blindness.
17	Moonseed	*Cyclea peltata*	Menispermaceae	Digestive, anti-inflammatory, diuretic and to treat jaundice, digestive disorders, *etc.*
18		*Desmodium hirtum*	Fabaceae	Used as fodder, prescribed to treat malaria, as cover crop to protect the soil against steep erosion.
19	Flax lily	*Dianella ensifolia*	Asphodelaceae	Leaves are applied to wounds, juice from the berries is a source of a pale blue dye, the aromatic rhizomes and roots are ingredients in cosmetics and perfume.
20	Elephant's foot	*Elephantopus scaber*	Asteraceae	Used to treat conditions such as asthma, coughs and pulmonary diseases; dyspepsia, diarrhea and dysentery; oedema; urethral discharges and venereal diseases.
21	Indian rock fig	*Ficus arnottiana*	Moraceae	Leaf decoction used as tea and sterilizer, leaves and bark used in medical applications for cuts, wounds etc.
22	Wild hibiscus	*Hibiscus hispidissimus*	Malvaceae	Lowers blood pressure, lowers cholesterol, promotes weight loss, fights bacteria, Supports liver health.
23	China rose	*Hibiscu srosasinesis*	Malvaceae	Consumed in teas made from its flowers, leaves, and roots, used as an herbal medicine to treat hypertension, cholesterol production, treatment of diabetes and cancer progression
24	Jungle geranium	*Ixora coccinea*	Rubiaceae	Used in skin diseases and diabetes, juice leaves and the fruit is used to care for dysentery, ulcers and Gonorrhea.
25	Arabian jasmine	*Jasminum sambae*	Oleaceae	Used for perfumes, oils, and herbal teas besides curing ailments
26	Willow-leaved justicia,	*Justicia gendarussa*	Acanthaceae	Food -Herb and Spice, Plant is traditionally used to treat chronic rheumatism, headache, earache, fever, cough, bronchitis, inflammation, bruises,
27	Curved lepid agathis	*Lepidagathis incurva*	Acanthaceae.	The leaves are chewed to cure coughs.
28	Shield-leaf tree	*Macaranga peltata*	Euphorbiaceae	Leaves are used to wrap jaggery and other sweetmeats, making wooden pencils and in the plywood industry.

29	Cassava	*Manihot esculenta*	Euphorbiaceae	Roots are used as food, leaves are used fodder
30	Malabar goose berry	*Melastoma malabathricum*	Melastomataceae	Used to treat diarrhea, dysentery, hemorrhoids, wounds, anti-inflammatory activity, platelet activating factor inhibitory activity, ant venom activity, wound healing activity.
31	Pignut	*Mesosphaerum suaveolens*	Lamiaceae	Used to treat diseases related to the gastrointestinal and respiratory tracts, against cancer cells, used for traditionally in the treatment of aliments such as stomach pain, cough, liver disease.
32	Girdle pod	*Mitracarpushirtus*	Rubiaceae	Used in the treatment of toothache, headache, dyspepsia, amenorrhea, venereal diseases, liver diseases, leprosy, wounds, burns, cuts, boils, eczema, mycosis, scabies, sore throat, respiratory diseases, and hepatitis.
33	Tropical kudzu	*Neustanthusphaseoloides*	Fabaceae	It is grown as a cover crop in oil palm, rubber and coconut, used as forage crop and as green manure in crop rotations, used to prevent soil erosion on sloppy soils.
34	Running mountain grass	*Oplismenus compositus*	Poaceae	Used as animal food, medicine, used in antifungal and antiradical activities of some grasses.
35	Cardinal's guard	*Pachystachyss picata*	Acanthaceae	The whole plant is a bitter stomachic that stimulates digestion, a maceration of the leaf has been used to aid in childbirth
36	Stinking passion flower	*Passiflora foetida*	Passifloraceae	Used to treat asthma, leaf paste is applied to the head for headache and giddiness young leaves and plant tips are edible.
37	Mashitandu	*Peperomia pellucida*	Piperaceae	Used as a food item as well as a medicinal herb, the plant mostly grown for its ornamental foliage.
38	Climbing aroid	*Pothos scandens*	Araceae	It is an edible plant, used for the treatment of bone fracture, diarrhea, ulcer.
39	Guava	*Psidium guajava*	Myrtaceae	Used as food but also as a folk medicine, used for inflammation, diabetes, hypertension, wounds, pain relief, fever, diarrhea, rheumatism, lung diseases and ulcers
40	Ceylon Smilax	*Smilax zeylanica*	Smilacaceae	Used for the treatment of ulcers
41	Yellow creeping daisy	*Sphagneticola trilobata*	Asteraceae	The leaves are used in dyeing grey hair and in promoting the growth of hair. They are considered tonic, alternative, and useful in coughs, cephalalgia, skin diseases, and alopecia.
42	Cinderella weed	*Synedrella nodiflora(L)*	Asteraceae	Used for the treatment of inflammatory diseases, including liver disease, asthma, rheumatism and earache.
43	Nag kuda	*Tabernaemontana alternifolia*	Apocynaceae	Used to cure toothache, wounds, root is traditionally used as an antidote for snakebites
44	Caesarweed	*Urena lobata*	Malvaceae	Treatment of diabetes, gonorrhea, malaria, dysentery, abdominal colic, nausea, rheumatism, and edema in folk medicines

Results and Discussion

The present study recorded 44 plant species belonging to 25 families, indicating considerable plant diversity in the study area. The species included herbs, shrubs, climbers, grasses, and trees. Among the families identified, Asteraceae, Fabaceae, Acanthaceae, Malvaceae, and Poaceae were the most dominant. The family Asteraceae showed the highest representation with species such as *Acmella ciliata*, *Chromolaena odorata*, *Elephantopus scaber*, and *Synedrella nodiflora*. Similarly, species belonging to Fabaceae, including *Abrus precatorius*, *Crotalaria pallida*, and *Desmodium hirtum*, were also recorded. The dominance of these families may be due to their wide distribution and adaptability to tropical environments. (figure 1 to 4). Most of the recorded plants were found to have medicinal importance, being traditionally used to treat various ailments such as fever, cough, digestive disorders, skin diseases, and wounds. For example, *Andrographis paniculata* is used for fever and liver disorders, while *Acmella ciliata* is used to treat toothache and throat infections. Plants such as *Melastoma malabathricum* and *Passiflora foetida* are also used for wound healing and respiratory problems. These uses indicate the continued dependence of local communities on plant-based remedies for primary healthcare. Several species also serve as food sources, including *Manihot esculenta* (cassava), *Psidium guajava* (guava), and *Artocarpus hirsutus*. In addition, some plants have economic and ornamental value. For example, *Bambusa vulgaris* is used for construction and household materials, while plants such as *Ixora coccinea* and *Hibiscus rosa-sinensis* are commonly cultivated as ornamental plants. Some species like *Neustanthus phaseoloides* also contribute to agricultural sustainability by improving soil fertility and preventing soil erosion. Overall, the study highlights the ethnobotanical importance of these plants and emphasizes the need for their conservation and sustainable use.

Summary and Conclusion

The rapid loss in floristic diversity and changing pattern of vegetation due to various biotic and abiotic factors has necessitated the qualitative and quantitative assessment of vegetation. Floristic diversity refers to the variety of plants and their variation. It is a well-organized complex association having a typical composition (floristic aspect) and structure (morphological aspect), which results from the interaction through time. It can be measured in different levels with just a number of species in a given area to a complex association with prevailing ecosystem. Floristic investigations and taxonomic studies provide reliable information about the nomenclature, distribution, ecology and utility of various plant species with special reference to ecologically sensitive areas. Understanding the floristic diversity of an area is a prerequisite for proper conservation efforts. Species need to be conserved along with the habitat for which proper understanding the diversity of the species and their association is very essential.

Floral diversity of any place is one of the most important blessings of nature. If we have a detailed knowledge about plants, we can use them in a number of ways for welfare of mankind as well as other organisms. An attempt was made to study the floral diversity available in Erappin Koottam during 2022-2023. During this study a total of 44 plants belonging to 24 families including Herbs, Shrubs and Trees were studied for their morphological characters and uses, especially medicinal ones. All the plants in this study were recorded by visiting the area. This study could play an important role for the conservation of valuable phyto- diversity, use of this phyto-diversity for the welfare of all other organisms, better ecological balance in future and sustainable development of the area.

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