International Journal on Science and Technology (IJSAT)
E-ISSN: 2229-7677 ● Website: www.ijsat.org ● Email: editor@ijsat.org

The Ecological and Taxonomic Studies On the Pteridophytes of Agali Gram Panchayath- A Case Study

Jelly Louis C[1], Riya chinaraj[2], Aswathy S[3]

[1,2,3]Mercy College

ABSTRACT

The present study is the first attempt to explore the pteridophytes of Agali gram panchayath. The primary level perspective of the study implies to the exploration and documentation of the diversity of pteridophytes, and from the conservation point of view, the present study is significant to formulate proper planning of conservation at local level. The study recorded the presence of 21 genera with 31 species belongs to 14 families (1 species from lycophytes and 30 species from ferns). Adiantaceae and Pteridaceae families were dominant. The Adiantaceae with 5 species of 2 genera and the Pteridaceae with 5 species of 3 genera. Adiantum is the largest genus, which represented by 4 species, and it is followed by pteris with 3 species. Thelypteridaceae, dennstedtiaceae, polypodiaceae are the next largest families with 3 species present in these areas.

KEY WORDS: Pteridophytes, Horsetails, Ferns.

1. INTRODUCTION

Pteridophytes are vascular plants, non-flowering, and spore bearing plants and have leaves (known as fronds), roots and sometimes true stems, and tree ferns have full trunks. Like reptiles they are considered as the first true land plants that evolved after bryophytes. Hence pteridophytes are sometimes called as “snakes of plant kingdom”. Fronds in the largest species of ferns can reach some six meters in length. They grow luxuriantly in moist tropical and temperate forests and their occurrence in different eco-geographically threatened regions from sea level to the highest mountain are much interest (Dixit, 2000).

The world flora consists of approximately 12,000 species of pteridophytes of which around 1000 species distributed in 70 families and 192 genera are likely to occur in India, because of its various climatic conditions and geography. The ferns are found rich in the Himalayas and Western Ghats, as these places are the two hotspots of biodiversity in India. Regarding the number of species Pteridophytes are next to angiosperms. Pteridophytes are an important component of the flora of India. There are about 1200 fern species have been reported from India (Manickam and Irudayaraj 1992, Manickam and Rajkumar 1999, Chandra 2000). Kerala is one of the floristically rich areas of South India, facing fast devastation of natural vegetation. The tropical humid climate favors the growth of ferns and fern allies. 238 species of pteridophytes have been reported from this area, which include many new taxa.

Pteridophytes are seedless, vascular cryptogams and they procreate through spores. They don’t have conducting tissues for transportation of water and minerals. Instead, the water and minerals flow from the

surface of the plant- cell to cell in the plant's body. They show true alternation of generations**:** The sporophyte generation and the gametophyte generation are observed in Pteridophytes. Sporophyte has true roots, stem and leaves. Spores developed in sporangia are homosporous or heterosporous**:** Sporangia are the structures in which spores are formed. They are usually homosporous (meaning: one type of spore is produced) and are also heterosporous, (meaning: two kinds of spores are produced.) Sporangia are produced in groups on sporophylls: Leaves that bear the sporangia are termed as sporophylls. Young leaves of sporophyte show circinate vernation**:** The tip of the leaves tend to curl inwards to protect the vulnerable growing parts. Sex organs multicellular and jacketed**:** The male sex organs are called antheridia while the female sex organs are called archegonia. they may be Protandrous (The antheridium matures before the archegonia.) or Protogynous (the archegonia mature before the antheridia)

2. MATERIALS AND METHODS

The study of pteridophyte diversity of Agali gram panchayath ,palakkad district, kerala was conducted from 2018 december to may 2019. The study consist of following.

Literature survey

An extensive survey of literature was done as to update available information in the field of study and to interpret and analyze the data collected from the area. The details were collected from different sources are libraries of institutions, and information retrieval systems. Electronic sources like internet were utilized.

Floristic survey and specimen collection

Several field trips were conducted to various parts of agali gram panchayath, during different seasons. During each trip focused on plant collection.

Plant collection

Repeated collections in the same locality were made to get all essential parts of the plant and all seasonal plants. A total of about 31 collections were made from December 2018 to may 2019. Photographs of plants, sori etc were taken and all the field observations such as habit habitat, morphology of leaves were recorded in the field book.

Identification

The specimens were identified by using Pteridophyte flora of the Western Ghats-South India

3. STUDY AREA

Agali is a gram panchayath in Palakkad district, state of kerala, India. It is a local government organisation that serves the villages of Agali, Kallamala, Padavayal. Agali gram panchayath contains Agali, Nellippathy, Jellippara, Karara, Thavalam, Kallamala, Mukkali ect. Agali located in foots of Nilgiris hills of Western Ghats.

4. RESULT

The exploration and collection of lycophytes and ferns from Agali grama panchayath showed the presence of 22 genera with 31 Species belonging to14 Families. The results are summarized below.

Table 1. Materials collected from Agali panchayath, Palakkad district

Sl no	binomial	locality	Family
1	Hemionitis cordata	Goolikkadavu	Adiantaceae
2	Selaginella delicatula	Mukkali	Lycopodiaceae
3	Pteris confusa	Goolikkadavu	Pteridaceae
4	Ceratopteris thalictroides	Mukkali	Pteridaceae
5	Pteris vittata	Agali	Pteridaceae
6	Doryopteris concolor	Kallamala	Sinopteridaceae
7	Blechnum occidentale	Kallamala	Blechnaceae
8	Blechnum orientale	Mukkali	Blechnaceae
9	Tectaria wightii	Mukkali	Dryopteridaceae
10	Adiantum caudatum	Kallamala	Adiantaceae
11	Angiopteris evecta	Mukkali	Marratiaceae
12	Lygodium flexuosum	Jellippara	Lygodiaceae

13	Adiantum raddianum	Agali	Adiantaceae
14	Hypolepis glandulifera	Jellippara	Dennstaedtiaceae
15	Pteridium aquilinum	Jellippara	Dennsteadtiaceae
16	Dicranopteris linearis	Jellippara	Gleicheniaceae
17	Nephrolepis biserrata	Goolikkadavu	Oleandraceae
18	Diplazium esculentum	Goolikkadavu	Athiriaceae
19	Nephrolepis cordifolia	Agali	Oleandraceae
20	Marselia minuta	Agali	Marseliaceae
21	Christella dentata	Nellippathy	Thelypteridaceae
22	Cyclosorus interruptus	Nellippathy	Thelypteridaceae
23	Christella parasitica	Nellippathy	Thelypteridaceae
24	Pityrogramma calomelans	Goolikkadavu	Pteridaceae
25	Microlepia strigossa	Mukkali	Dennstaedtiaceae
26	Actiniopteris radiata	Agali	Actiniopteridaceae
27	Tectaria coadunate	Mukkali	Pteridaceae
28	Pteris pellucida	Mukkali	Pteridaceae
29	Adiantum latifolium	Mukkali	adiantaceae
30	Drynaria quercifolia	Karara	Polypodiaceae
31	Adiantum lunulatum	Goolikkadavu	Adiantaceae

5. DISCUSSION AND CONCLUSION

The present study is a regional level documentation of pteridophytes in Agali gram panchayath. The study recorded the presence of 22 genera with 31 species belongs to 14 families (1 species from lycophytes and 30 species from ferns). In the present study, Adiantaceae and Pteridaceae families were dominant. The

Adiantaceae with 5 species of 2 genera and the Pteridaceae with 5 species of 3 genera. Adiantum is the largest genus, which represented by 4 species, and it is followed by pteris with 3 species. Thelypteridaceae, dennstedtiaceae, polypodiaceae are the next largest families with 3 species present in these areas.

Graph 1 showing the diversity of pteridophytes in Agali gram panchayath

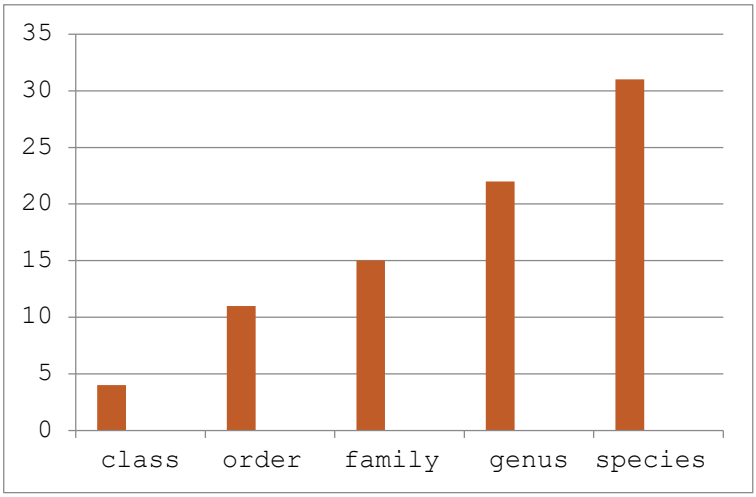


Table 2- Systematic position of genera collected

Classification of pteridophytes by pichi-sermolli			
Class	**Order**	**Family**	**Genus**
Lycopsida	Lycopodiales	Lycopodiaceae	Selaginella
Marattidae	Marattiales	Marattiaceae	Angiopteris
Filicidae	Gleicheniales	Gleicheniaceae	Dicranopteris
	Schizeales	Schizeaceae	Lygodium
	Polipodiales	Polipodiaceae	Drynaria
			Tectaria
	Dicksoniales	Dennstaedtiaceae	Pteridium
			Microlepia
			Hypolepis
	Pteridales	Pteridaceae	Pteris
			Ceratopteris
			Pityrogramma
		Sinopteridaceae	Doryopteris

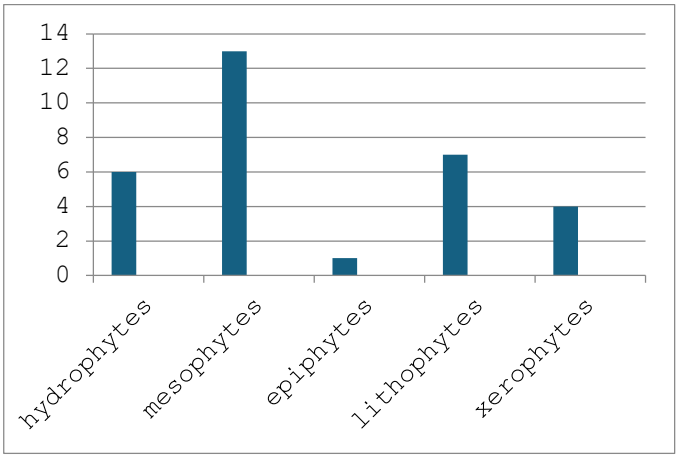
		Actiniopteridaceae	Actiniopteris
		Adiantaceae	Adiantum
			Hemionitis
	Davalliales	Oleandraceae	Nephrolepis
	Aspidiales	Thelypteridaceae	Christella
			Cyclosorus
		Athyriaceae	Diplazium
	Blechnales	Blechnaceae	Blechnum
Marseleidae	Marseliales	Marseliaceae	Marselia

Due to availability of favorable climatic conditions and suitable habitats for their growth, the pteridophytes are widely distributed in Agali panchayath, even microclimatic condition for their survival and any disturbance in these conditions may lead to their extinction. Each fern species has its own preferences for temperature, humidity, soil type, moisture etc. The pteridophytes grow in different habitats like moist or dry rocks, and boulders, on tree trunks, as hydrophytes in lake ponds etc, on forest floors and edges, along perennial streams and deep ravines, grass lands, tea and coffee estates etc. Ecologically various members of fern and fern allies inhabiting a region can be classified in to different categories depending up on their growth habits and various habitats they occupy.

Some pteridophytes grow as epiphytes on the stem and branches of the trees in moist and shady evergreen forests. The bark or branches covered with moss and humus form ideal base for their growth. Drynaria quercifolia is one of the examples for epiphytic pteridophytes. At high altitudes, the stems and branches of trees are usually covered with moist mossy surface and leafy liverworts which provide an ideal condition for growth of pteridophytes.

Majority of ferns and fern allies are terrestrial growing and differing in growth and habitat they occupy. Some major terrestrial growing pteridophyte genera are Pteris, Dicranopteris, Diplazium, Cyclosorus etc. some terrestrial ferns like Dicranopteris grow abundantly and form thickets in the forests. Species like pteris vitata, Diplazium esculentum grow in moist and shady places.

Graph 2 – ecology of ferns



The fern genera Lygodium are climbing ferns with underground serpentine rhizomes. For securing favorable light conditions, the plants grow up the adjacent shrubs and branches of nearby trees with the help of rachis. Some ferns are lithophytes, and are found in rock crevices and among rock boulders along water channels. Examples for lithophytic pteridophytes are Adiantum spc. Pityrogramma, Hemionitis etc.

The present study is the first attempt to explore the pteridophytes of the study area. The primary level perspective of the study implies to the exploration and documentation of the diversity of pteridophytes, and from the conservation point of view, the present study is significant to formulate proper planning of conservation at local level.

Selaginella delicatula

Angiopteris evecta

Dicranopteris linearis

Lygodium flexuosum

Tectaria wightii

Tectaria coadunate

Drynaria quercifolia

Pteridium aquilinum

Hypolepis glandulifera

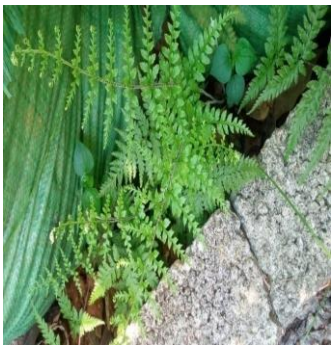
Microlepia strigossa

Pteris vitata

Pteris pellusida

Pteris confuse

Ceratopteris thalictroides



Pityrogramma calomelans

Doryopteris concolor

Actiniopteris radiata

Adiantum caudatum

Adiantum lunulatum

Adiantum radianum

Adiantum latifolium

Hemionitis cordata

Nephrolepis cordata

Nephrolepis biserrate

Christella dentata

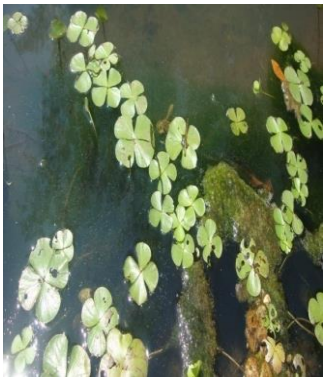
Christella parasitica

Cyclosorus interruptus

Diplazium esculentum

Blechnum occidentale

Blechnum orientale



Marselia minuta

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