

Perspicacity of Fern Biodiversity of Tamil Nadu: A Fountain of Economy Elevation

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ABSTRACT

Man has been using the vegetation as a source of food, fodder, drugs and many other necessities of existence from ancient times. Even these days the primitive tribal societies rely only on the plant existence in their surroundings. Though, there had been investigations of the match for human consumption, monetary values of the higher plants, especially the ferns and angiosperms had been unfortunately ignored. The ferns were used in Homeopathic, Ayurvedic, and Unani pills and offered food, insecticides and ornamentation. The present investigation is about the uses of ferns as food, fodder and ethno-medicine. So, a deep view about some fern species of Tamil Nadu hills had been taken underneath consideration for economic, and monetary elevation of the area.

Key words : Ayurvedic, Economy, Ferns, Homeopathic, Perspicacity

Introduction

Natural environment comprises of biotic and abiotic components. Of the biotic components, plant life plays an important position on earth's surface, besides which other living things cannot survive. About 250, million years ago fern and fern allies have been the dominant plant groups on this planet. However, they are now changed via seed bearing plants; however still grow luxuriantly in moist tropical and temperate forests (Dixit, 2000). There are about 13,600 species of ferns and their allies worldwide (Moran, 2006). India as a mega diversity country has a massive and rich diversity of Fern and their allies represented by 1157 species (Fraser-Jenkins *et al.*, 2016). Kolli hills area, a part of eastern Ghats in Tamil Nadu, India supports large growth of diverse ferns (Vijayakanth *et al.*, 2017), Vijayakanth, (2018). About four hundred species of pteridophytes occur in south India of which ferns are a part (Singh and Upadhyay, 2010). South Indian ferns were deter-

mined in Palani hills (Myers, 2003), Western Ghats (Sumesh *et al.*, 2012), Nilgiri hills etc. (Abraham *et al.*, 2012). The tribal communities are highly dependent on the herbal resources obtained from the surrounding woodland areas for therapy of a number of ailments and diseases. The most frequent ailments dealt with are skin problem, burns, wounds and cuts etc. Other illnesses alleviated via herbal medicines consist of respiratory infections, cough, fever, cold, stomach pain etc. (Ignacimuthu *et al.*, 2006). The present report is about economic, monetary and financial elevation of Tamil Nadu.

Perspicacity of Fern biodiversity

Ferns are the second largest group of vascular plants, consist of about 10,000 dwelling species. Ferns attained remarkable levels of variety and abundance from the carboniferous period to the Jurassic period (3000 – 150 million years ago) (Skog, 2001). There are about 34 families, 144 genera and more than 1100 species of ferns with about 235 en-

demic species from India (Chandra Shubhash, 2000). Ferns and Fern allies are the natural group of vegetation in an essential division of plant kingdom known as the pteridophytes. They are distributed all over the world. Ferns develop vigorously in moist, shady, tropical and temperate forests. According to the report of Arisdason and Lakshminarasimhan, (2014), in Tamil Nadu, the pteridophytes are represented by way of about 275 species in 44 families, of which 33 are endemic to the state and about 80 are known as threatened taxa (Manickman, 2007). Terrestrial species were about 46 per cent whereas lithophytes constitute 19 per cent. Besides there are semi aquatic ferns and fern allies and only five true aquatic ferns, such as *Azolla pinnata*, *Ceratopteris thalictroides* and *Salvinia molesta* located in Tamil Nadu. Other primary ferns species of Tamil Nadu include *Asplenium bipinatum*, *Cheilanthes viridis*, *Huperzia phlegmaria*, *Selaginella Ciliaris*, *Adiantum lunulatum*, *Cyatheanilgerensis*, *Deparia petersenii*, *Diplazium esculentum*, *Doodia dives*, *Dryopteris concolor*, *Osmunda huegaliana*, *Ophioglossum reticulatum*, *Pteris argyrea* etc. Amongst these ferns, the species of *Cyathea nilgerensis* generally known as tree fern found in the region of Nilgiri hills Ooty area that is endemic to south India and needs conservation.

Medicine and Ferns

The Ferns had been recognised for their medicinal and therapeutical utility. In historic period these species had been prescribed as herbal extract for the cure of several diseases. However, Shushruta and Charak in their contribution on the medicinal characters of ferns have cited the utility of *Marsilea*, *Adiantum* etc. First historical effort was made by Caius in 1935 to describe the medicinal utility of ferns in India. These plants are having glycosides, flavonoids, terpenoids and many primary as well as secondary metabolites which are prescribed for making ready of expectorant. However, certain species are used for the therapy of diuretic, ulcer as well as Stomuch pain. *Angiopteris evecta* is used for the treatment of skin diseases and dysentery observed by local people in Kolli hills, *Botrychium lanuginosum* is stated to have anti-dysenteric and antibacterial activity. *Ceratopteris thalictroides* used for the remedy of skin and skin related diseases. *Cheilanthes tenuifolia* is used as a tonic. *Hemionitis artifolia* is used to treat cuts, wounds and menstrual disorders. *Adiantum* species confirmed antibacterial attributes. (Johnson

et al, 2017). The people of Valaparai hills (Western Ghats of Tamil Nadu) used the fern species for the treatment of diseases like diabetics, cough, cold, fever etc. of families *Adiantaceae*, *Marsileaceae*, *Ophioglossaceae* etc. (Kumar *et al.*, 2014)

Fern and Organic Fertilizer

Azolla, *Salvinia* and *Marsilea* in the paddy field have accelerated the agricultural productivity. *Azolla* can be utilized as a bio-fertilizer because, it possess special features of rapid decomposition and environment friendly availability of nitrogen fixation to the crops in soil for better yield (Jaja *et al.*, 2012). The bacteria found in the apical meristem and the leaves of the *Azolla* are *Acromonas*, *Agrobacterium* *Pseudomonas* etc. were considered as nitrogen fixing microorganisms enhancing soil fertility (Pereira, 2017). So, it is used as an alternative fertilizer of organic origin.

Fern and Food, Fodder

The remotely inhabiting humans in the region of tropical forests across the globe are depending up on plant resources for food and fodder. The lower plants like pteridophytes, ferns and bryophytes had been of utmost significance for such cause in these areas. The tribes had been using newly arising foliar buds, crosiers, rhizomes of many fern species viz., *Diplazium esculantum*, *Nephrolepsis*, *Cyathea*, *Marsilea* etc as dietary supplements. Few of the species of pteridophytes viz *Microlepis*, *Acrostichum aureum*, *Diplazium* with stripes and foliar compositions have been used as cattle fodder in the Asiatic and American countries. However, dried Pteridophytic leaves have been sprayed in the cattle shed as supplementary fodders.

Removal of Contaminants by Ferns

Fern species gets rid of a variety of inorganic and organic contaminants from the environment. Organic contaminants such as volatile compounds, dyes, explosives and hydrocarbons have been removed by fern species like *Azolla*. It indicates biofiltration capability due to the fact that it can alter pH and eliminates dissolved oxygen, Biochemical oxygen demand etc. Aquatic fern species such as *Salvinia minima* possesses capacity to deal with high energy synthetic organic waste water (HSWW). They exhibit viable for putting off inorganic nutrients such as ammonium and nitrate. *Azolla* were used as biofilter. The arsenic has been most important problem in the place of high water fed paddy

fields. Thus, these extraordinary physiological attributes of *Pteris vittata* can be utilized for the management of environment related problems.

Genetic resources and Ferns

Environmental adjustment to diverse habitats has indulged the ferns to exhibit wonderful genetic traits. Many of the taxa cooped with the desiccation, cold and rains have been very peculiar to synthesize the proteins of specific composition. These proteins enabled the ferns to withstand these drastic conditions, species such as *Selaginella*, *Bryopteris*, *Cheilanthes*, *Azolla*, and *Salvinia* etc. possessing such peculiarities can be used as genetic resource for research work and development of transgenic plants of high economic value.

Aesthetic and Ornamental Ferns

Massive range of ferns of Tamil Nadu were used as ornamental and aesthetic purposes (Abraham *et al.*, 2012). These Ferns include *Actinopteris radiata*, *Adiantum lunulatum*, *Asplenium nidus*, *Cyathea nilgirensis*, *Cheilanthes swartzii*, *Diplazium petersenii*, *Odontosoria chinensis*, *Ophioglossum reticulatum* etc and many others had been used for ornamental and beautification purposes.

Integral role of Ferns in economy upliftment

Ferns having aesthetic enchantment and one of the possible beautifying characters are recently in practice for ornamental purposes. The Fern market has reached in million dollars involving many human beings of outreach areas globally taking part in a pivotal position in alleviating poverties. The medicinal application of these plants particularly in Homeopathy and Ayurvedic system of drug treatments are making billion bucks turn over globally. The raw substances of these medicines are excessively collected from the forests by using tribes. But the enforcement of the CBD (Convention on Biological Diversity) regulation has described certain criterion for the utilization of organic diversity. Therefore, it has grown to be prime necessity to sustainably utilize our bio-resources and equitably share its benefits. Thus, to meet out their requirement in the market, the vast step-up of fernery and nursery of these flowers at small or giant scale might also help to uplift the economy of common people.

Conclusion

The Ferns having great capability can be exploited

for the improvement of many allopathic drug treatments of positive lethal diseases. Some taxa used in Homeopathic and Ayurvedic system of medicine are to be produced at massive scale involving the frequent use of tribal people to meet out its requirements globally. It is well known that herbal drugs have no side effects, so these plants can be prescribed as herbal formulations to treatment numerous illnesses letting tremendous scope of economic earn. Though, uses of Ferns in drugs are mentioned through tribal people however, it requires suitable screening, testing and validation of actual compounds having their therapeutical values. Also, the aesthetic ferns in demand of international markets are to be cultivated for cottage as nicely as giant scale industrial setup attractive tribes to preserve their better livelihood.

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