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Less known ferns and fern-allies of Manipur with ethnobotanic uses

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The ferns and fern – allies (FFAs) are the neglected group of plants as valuable resources in folk utilization by ethic groups of Manipur. A total of 20 plants belonging to 15 families were documented and categorized into food (4), medicine (5), abrasives (2), manure (3), decoration (7) and ritual ceremonies (2) based on their mode of uses. Plant information on various ethnobotanic uses was collected directly from villages, local herbal practitioners *maibas* and various anthropological literatures. The communication serves to bridge the gap that existed among the people, and also to catapult FFAs as a sustainable plant resource, and for more effective strategies for the conservation.

Keywords: Ferns, Fern-allies, Ethnobotanic uses

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Ferns and fern-allies (FFAs) or commonly known as pteridophytes, are the group of plants which are less known to many people although greatly admired by some. This group of plants attracts many plant lovers by their graceful, fascinating and beautiful foliage. Out of 10,000 species under 305 genera reported all over the world, 125 genera comprising 1,000 species exist in India. Maximum number of diversity of FFAs is observed in Himalayas, Eastern and Western Ghats[1]. Manipur lies in the extreme arm of Eastern Himalaya (23°83´N-25°68´N and 93°03´ E- 94°78´E). Although FFAs are widely distributed in the whole state including some rare plants like tree ferns (*Cyathea*) and tassel ferns (*Huperzia*, *Phlegmariurus*), their uses are not properly understood in terms of their potential value and utilization in Manipur. Due to the presence of many active components, many members of FFAs are greatly valued as medicine for treating a wide variety of diseases. They are also associated with many cultural rituals and used as manure, abrasives, ornamentals, etc. Various ethnic groups like *Meiteis*, *Nagas*, *Kukis* and *Meitei Pangals* (*Manipuri* Muslims) use FFAs differently based on the customs and *taboos* that apply in their communities. In spite of the potential of FFAs as a sustainable bioresources, this group of plants has been neglected from ages, either due to lack of awareness or due to deliberate negligence by the mass population. The FFAs also lag behind in the field of research area compared to angiospermic plants. An ample of literatures pertaining to ferns of Manipur is contributed by few authors only[2-6].

The present investigation was taken up to highlight the various aspects of FFAs in terms of their ethnobotanic uses practice by the multi-ethnic communities of Manipur. The study will also serve as a media to propagate at large the sustainability of FFAs that has been confined only to a partial section of the society. It is also one of the most urgently needed aspects of plant sciences of today, because each and every field of this flora is equally important than it was ever before with the growing importance of conservation of global floral diversity and exploitation of natural resources.

Methodology

Ethnobotanic uses of FFAs were studied and accumulated from the local people and traditional herbal healers *maibas*. Relevant information was collected through repeated interviews from different groups of people, areas and sectors. A systematic model questionnaire was used for accumulation of data on ethnobotany and local uses[7]. Plants are basically categorized into 6 groups based on their mode of uses, *viz*. food, medicine, abrasives, manure, decoration and ritual ceremonies**.** Data on the botanical name of the plant, local names, respective

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families, parts and their mode of uses were tabulated (Table 1) along with illustrations (Figs.1-12). It is also to be noted, and cannot be denied from the fact that the data accumulated from the local people and the species used in the manner described in Table 1 are most likely psychological rather than physiological. Nevertheless, such information was recorded even though it may be unreliably based on superstition, misconception, fraud or charlatanism.

Results and discussion

Plants are the foundation of all life on earth, and men have been employing them for different purposes since civilization. In the study, a total of 20 FFAs belonging to 15 families were collected and identified as an essential plant resource highly used by various communities of Manipur (Table 1). Out of these plants, as many as 8 species, *viz. Diplazium esculentum*, *Phlegmariurus phlegmaria*, *Huperzia squarrosa*, *Angiopteris evecta*, *Cyathea gigantea* and *Platycerium wallichii*, *Nephrolepis bisserata* and *N. cordifolia* are successfully marketed mainly by the womenfolk in the local bazaars known as *Nupi Keithels* Small fernery firms are also set up individually or through non-governmental organizations (NGO's) and people begin to acknowledge the ornamental value of ferns. The endemic quillwort species, *Isoetes debii* was once

Table 1 — Uses of Ferns & fern-allies practice by multi-ethnic communities of Manipur

Plant name	Local name	Family	Uses
Angiopteris evecta (Forst.) Hoffm.	*Lai-changkhrang*	Angiopteridaceae	Highly ornamental; marketable
Asplenium nidus L.	*U-nappi*	Aspleniaceae	Macerated leaves used in treatment of lice; Ornamental & marketable
Azolla pinnata R. Br.	*Kang*	Azollaceae	Used as duck feed & green manure.
Cyathea gigantea (Wall. ex Hook.) Holtt.	*U- Lai-changkhrang*	Cyatheaceae	Trunk highly recommended for orchid plantation; also ornamental; marketable
Diplazium esculentum (Retz.) Sw.	*Lai-changkhrang*	Athyriaceae	Young fronds taken as vegetable; marketable
Equisetum diffusum D. Don	*Lai-utong macha*	Equisetaceae	Macerated leaves extract mixed with the *Acacia nilotica* (L.) Del. to treat back pain; also used as abrasives.
Equisetum ramosissimum Desf. subsp. *debile* (Roxb.) Hauke	*Lai-utong achouba*	Equisetaceae	Strobili for medicines; whole plant as abrasives.
Huperzia squarrosa (Forst.) Trev.	*Leishang Khekwaiba*	Huperziaceae	Used in ritual ceremonies & worshipping of forefathers; highly ornamental; marketable
Isoetes debii Sinha	*Sorbon*	Isoetaceae	Sporophylls used to make vegetable salad; once marketed extensively
Lygodium japonicum (Tb.) Sw.	*Lai-uri*	Lygodiaceae	Decoction of fronds used to treat diabetes, wounds, ulcers, etc.
Marsilea quadrifolia L.	*Eshing yensil*	Marsileaceae	Leaves used as vegetable.
Marsilera minuta L.	*Eshing yensil*	Marsileaceae	Leaves used as vegetable.
Nephrolepis bisserata (Sw.) Schott	*U-nappi*	Nephrolepidiaceae	Ornamental; marketable
Nephrolepis cordifolia (L.) Presl.	*U-nappi*	Nephrolepidiaceae	Ornamental; marketable
Phlegmariurus phlegmaria (L.) Holub	*Leishang leiren*	Huperziaceae	An important component for marriage ceremonies in Meitei community; evergreen twigs signifies prosperity; ornamental & marketable
Platycerium wallichii Hook.	*Stag horn fern*	Platyceriaceae	Ornamental; marketable
Pteris vittata L.	*Lai- changkhrang*	Pteridaceae	Extract of fronds used in curing skin diseases.
Salvinia cucullata Roxb. ex Bory	*Kang/ Kangjoa*	Salviniaceae	Used as compost; ash used for flavouring traditional curry *ooty*.
Salvinia natans (L.) Allioni	*Sappa kang*	Salviniaceae	Used as compost; ash used for flavouring curries.
Selaginella semicordata (Wall ex. Hook. et Grev.) Spring	*Eshang*	Selaginellaceae	Whole plant grounded & applied on wounds, cuts, etc.; possess antiseptic properties.

Figs.1 -12 — (1) *Diplazium esculentum*; (2) *Isoetes debii*; (3) *Platycerium wallichii*; (4) *Lygodium japonicum*; (5) Tribals from hills selling tassel ferns; (6) *Asplenium nidus*; (7) *Huperzia squarrosa*; (8) A *Meiti* in Nupi Keithel; (9-10) Trunk of tree on sale for orchid plantation; (11) *Phlegmariurus phlegmaria*; (12) *Nephrolepis cordifolia*

marketed few years back, however this recent 2-3 yrs, not collected even a single species (Fig.2). This plant grows as a weed in paddy fields and weeded out during the traditional weeding process known as *Loupengba* held in August to October. As a result, their population has decreased over the years, and they will be almost extinct from the wild within few years. Though less in number, four plants are consumed favorably as a palatable delicacy. The common vegetable fern, *Diplazium esculentum* (Fig.1) is consumed by all the main communities of Manipur, while the consumption of *Isoetes debii*, *Marsilea quadrifolia* and *M. minuta* are restricted only to the *Meitei* community in valley region. Five ferns of high medicinal properties are used mainly by the locals in hilly areas and traditional herbal practitioners *maibas* of the *Meitei* community. They include *Lygodium japonicum* (Fig.4) for treating diabetics, *Selaginella semicordata* as antiseptic in hills, *Pteris vittata* for curing various skin diseases and both *Equisetum ramosissimum* subsp. *debile* and *E. diffusum* successfully to treat back pain and also sometimes as abrasives. Of all the FFAs ethnobotanically used in Manipur, the most commercially valued plants are tassel ferns, *Huperzia squarrosa* (Fig.7) and *Phlegmariurus phlegmaria* (Fig.11). These two species are naturally found growing only in the hill districts (Tamenglong, Senapati, Chandel, Ukhrul, Churachandpur districts). The whole plants are extracted from the wild forest by the tribal *Nagas* and *Kukis* (Fig.5), brought to the valley and marketed on large scale in the valley region only by the *Meitei* womenfolk (Fig.8). These plants are highly demanded all throughout the year as it forms an essential component in marriages and worshipping of forefathers or other related cultural offerings of the *Meitei* community in valley region. The evergreen freshly looks even after long preservation signifies the prosperity, luxury and everlasting spirit. A single whole plant may cost up to Rs 100-150 for *Huperzia squarrosa* and Rs 200-300 for *Phlegmariurus phlegmaria*. The price may become higher in lean dry seasons like November, December, January and February where the sporophytic growths are dormant. Sometimes, plants are segmented into pieces of about 1 foot and sold at the rate of Rs 10-30 per piece. In a surprising new development in recent years, the leaf tips of *Araucaria heterophylla* (Salisb.) Franco of Araucariaceae is replaced instead of *Huperzia* and *Phlegmariurus* in case they are out of stock in the market. Aquatic floating ferns like *Azolla pinnata*, *Salvinia natans* and *S. cucullata* are used as biocompost manure mainly in the valley region.

In a very scientific approach, the ashes of both the *Salvinia* species mixed together with the ashes of *Pisum sativum* L. are preferred over the use of sodium bicarbonate (Na $HCO_{3)}$ for flavoring traditional curry *ooty* and *boda*. Ashes are also kept in bathrooms to wash hands and even used as tooth paste by old folks. Many plants of this group are also appreciated all over the world for their grace and beauty. Though not much familiar with the concept of green ferneries in a backward state like Manipur, it is a fact that every fern and fern ally has its own unique charm and prosperity. It adorns the commoners garden, lawn, terrace and many a times served as an indoor plant enticing rooms and corridors. Seven ferns are highly valued as ornamentals and marketed successfully. They are *Asplenium nidus* (Fig.6), *Huperzia squarrosa*, *Angiopteris evecta*, *Cyathea gigantea*, *Nephrolepis bisserata*, *N. cordifolia* (Fig.12) and *Platycerium wallichii* (Fig.3). In rare cases, *Phlegmariurus* are planted in pots as ornamentals. The trunks of tree ferns (*Cyatheae*) are also extensively used in orchid plantation. Trunks are segmented into blocks of around 2 feet and sold in the market at Rs. 20 mainly by *Kukis* (Fig.9-10). FFAs are important component of a flora, and needed attention to bring into notice about the valuable information regarding its sustainable uses. During the survey, it was observed that most of the people were not aware about the uses of FFAs. Knowledge on their economic uses remains confined only to a section or groups of people in many cases. Like in the case of *Isoetes debii* and *Marsilea* sps., they are taken as vegetable only in valley area and people in hill districts are not even aware of its existence. Likewise, *Diplazium* is a very common vegetable in the hills, but rarely taken as food in the valley region. Why and how the local inhabitants make use of the plants around them is based on their convenience, availability of resource, ethics, beliefs and customs that apply in their communities, and thus many a time, useful old traditional knowledge thus remain isolated within the boundary of a certain community. In this process, a communication gap blooms and isolation amongst the multiethnic communities originated.

Many species mentioned above are highly endangered due to over exploitation and habitat destruction. Species under the genera *Cyathea*,

Platycerium, *Huperzia*, *Phlegmariurus* and *Angiopteris* are highly endangered in Manipur, and from global point of view. It is to be noted here that the species, *viz*. *Huperzia squarrosa*, *Phlegmariurus phlegmaria* and tree fern *Cyathea* sp. are already placed under endangered plants list by International Union for Conservation of Nature and Natural Resources (IUCN) in 1998. These 3 genera are also listed as rare and endangered species of India[8]. A floristic study on the distribution of these ferns revealed that their habitat had shrunk considerably over the few decades. Tree ferns are now confined only in Tamenglong and Chandel districts of Manipur, while *Huperzia*, *Phlegmariurus* and *Angiopteris* have vanished from the valley region and some few populations are found in hill forests only. The graceful Stag Horn Fern (*Platycerium wallichii*) is growing only in Chandel district. Main threats to biodiversity in valley is conversion of forest area into cultivable land for developmental works and other related purposes, while in hills, the main threats include jhuming, encroaching of forest area for settlement and habitat destruction as the livelihoods of many people in hills are greatly govern by their ability to exploit the flora towards economic utility. Effective culmination of conservation strategy is a must at present. The main drawback for initiating any conservation measure in Manipur is ignorance among the people. Other aspects for conservation of bioresources is to understand tribal laws or customs, mobilization on alternative source of livelihood, initiation of awareness programme, strict regulation and smooth functioning of forest legislatures. There should be call for individual participation of the mass as a whole unit in preserving the existing biodiversity, without which no conservation strategy will be effective enough to safe the diminishing bioresources. Nevertheless, it is high time for the people to understand plants around them and utilized them meticulously to his own benefit. Only then, plant resources can served as an effective source of livelihood for an economically backward state like Manipur, and at the same time preserving ancient folklore systems to develop regional resource management, conservation of biodiversity and socio-economic development for our own good sake.

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