

Full Length Research Paper

Ethno-botany and Utilization of Fern and Fern-allies as Non Timber Forest Product in Darjiling Hills.

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Abstract

This paper deals with the ethno-medicinal use and utilization of ferns and fern allies of Darjiling hills, an alienated group in terms of study compared to angiosperms. Darjiling hills is inhabited by multiethnic race in remote region, in accessible by modern transport in 21st century. Due to lack of facility they are directly dependent on forest resources for day to day purposes. An attempt has been made to record the uses of 39 species, which falls under different category as ethno-medicine, food, fodder –cattle bed and ornamentals.

Keywords: Darjiling, ethno-medicine, ethno-botany.

Introduction

The District of Darjiling, West Bengal lies between 26°31' and 27° 13' N latitude and between 87°59' and 88°53' E longitude (O'Malley 1907). The hill of Darjiling is a segment of Eastern Himalaya and is spreading over around 2436.55 km² or 77 % area of the Darjiling District. The altitudinal variation ranges from 150 m (at Sukna) to 3660 m (at Sandakphu-Phalut) which presents diverse topographical condition and offer suitable habitat for the occurrence of wide range of plants (Das 1995, 2004; Acharya & Acharya 2001). The ethnobotany of the region has been studied by different worker like Bhujel (1996), Bhujel *et al.* (1984), Yonzon *et al.* (1981), Yonzon *et al.* (1984, 1985, 1996), Lama (1989), Rai *et al.* (1998) and Rai & Bhujel (1997, 1999, 2002), Chettri *et al.* (2003) on identification and enlisting such plants in the past. But they mostly concentrated upon the angiosperms and alienated the entire group of Fern and Fern allies.

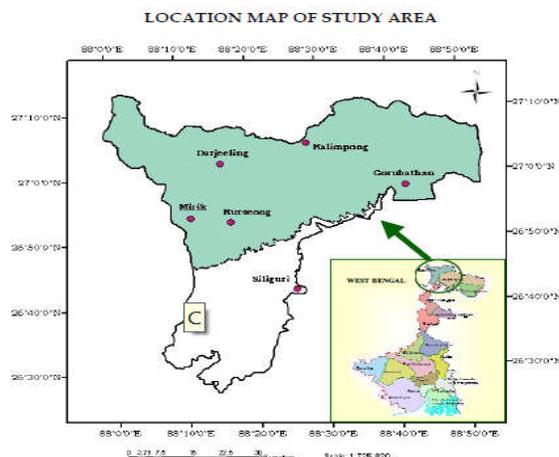


Fig 1. Location of Darjiling Hills in west Bengal

Materials and Methods

Regular field trips were made during April 2011 to July 2014 for documentation of ethnobotanical information of fern and fern allies in remote forest villages of Darjiling hills. The information were collected through interviews to local healer, herbal practitioner, Phedangba, Mata, Jhankri, Bijuwa village Head. Local market were surveyed throughout the year and plants were collected, photographed and documented. The collected specimens were processed into mounted herbarium-sheets following conventional techniques (Jain & Rao 1977). Specimen were identified by matching with the pre-identified specimens in the Herbarium of the

Llyod's Botanical Garden, Darjiling as well as consulting published literature including Mehra & Bir (1964); Hara (1966); Mathew (1971); Chowdhury(1973); Ghosh *et al* (2004) and Fraser-jenkins (2008).

Data Collection and Analysis

The survey was conducted in different forest village; local market as well as questionnaires was made for general people for documenting a raw data. This raw data served as a primary source while data mining and the information from herbalist served as a secondary source (Rai & Bhujel,1999; Rai *et al*,1998; Chettri *et al*,2003; Yonzon *et al* 2011). The available raw data was verified in term of triplicate from different forest village and accepted for documentation.

Results

The study revealed rich traditional knowledge of ethnic people of Darjiling hills, natural resources from the surrounding area was utilized for day to day purposes. In this survey it was found that 39 species of fern and fern allies are used by people for different purposes, where 12 species were used as medicine. Young croizer of Fourteen species of the genus *Diplazium*, *Deparia* and *Cyathea* were utilized as vegetables. Five species of ferns were utilized as cattle bed (Sottar) for domesticated animals and ten species of fern were used for ornamental purposes. *Pteridium revolutum* fronds were used to cover the sowed zinger rhizome in order to insulate the heat loss for speedy germination and to safe guard from domesticated animals.

Table 1:Cattle bed ferns

Sl.No.	Scientific Name	Local Name	Family	Uses
1.	<i>Pteridium revolutum</i>	Sottarey uniyo	Dennstaedtiaceae	Cattle bed ferns
2.	<i>Glechiema giganteum</i>	Sottar	Gleicheniaceae	Used to cover the sowed zinger rhizome and used as cattle bed ferns too.
3.	<i>Dicranopteris taiwanseis</i>	Sottar	Gleicheniaceae	Cattle bed ferns
4.	<i>Dicranopteris lanigera</i>		Gleicheniaceae	Cattle bed ferns.

Table 2: Edible fern

Sl. no	Scientific name	Local name	Family	Uses
1	<i>Diplazium dilatatum</i>	Lekh Chipley ningro	Woodsiaceae	Young fronds edible
2	<i>Diplazium esculentum</i>	Auley Chipley ningro	Woodsiaceae	Young fronds edible
3	<i>Diplazium kawakamii</i>	Jire ningro	Woodsiaceae	Young fronds edible
4	<i>Diplazium forrestii</i>	Lekh chipley ningro	Woodsiaceae	Young fronds edible
5	<i>Diplazium himalayensis</i>	Danthey ningro	Woodsiaceae	Young fronds edible
6	<i>Diplazium succulentum</i>	Lekh Chipley ningro	Woodsiaceae	Young fronds edible
7	<i>Diplazium maximum</i>	Sawney ningro	Woodsiaceae	Young fronds edible
8	<i>Diplazium spectabile</i>	Kalo ningro	Woodsiaceae	Young fronds edible
9	<i>Diplazium sikkimensis</i>	Sawaney ningro	Woodsiaceae	Young fronds edible
10	<i>Diplazium javanicum</i>	Sano Chipley ningro	Woodsiaceae	Young fronds edible
11	<i>Deparia boryana</i>	Ghew ningro	Woodsiaceae	Young fronds edible
12	<i>Tectaria fuscipes</i>	Rato lekh ningro	Dryopterideaceae	Young fronds edible
13	<i>Angiopteris indiaca</i>	Gaikhurey uniyo	Maratiaceae	Rhizomes edible
14	<i>Cytha chinensis</i>	Rukh uniyew	Cyatheaceae	Young croizer edible

Discussion

The remote area where modern medical facilities couldn't be available by people had their faith on traditional herb for healing of wounds, Pneumonia, chest congestion etc. This traditional knowledge tends to be a blessing in disguise as it facilitated to be the source of income for down turn people. The young croizer of edible ferns were utilized as vegetable, collected from the forest area and were taken to local market to earn a living. In the survey we could find some fern allies which were taken by Flower shop as ornamentals. The point of concern is the over exploitation of some species like *Nephrolepis cordifolia* whose foliage is used for decoration purposes and its tubers are used for ethno-medicine purposes which has led to a steady decline in the population of this species. Furthermore, the humus content and the water holding capacity of the soil have depleted making it dry and inhospitable for its growth and development.

Table 3: Medicinal Fern's

Sl.no.	Scientific name	Local name	Family	Medicinal uses
1	<i>Adiantum capillus-veneris</i>	Simsary uniyo	Adiantaceae	Foliage used against pneumonia
2.	<i>Adiantum philippense</i>	Simsary uniyo	Adiantaceae	Paste used in cut and wounds
3	<i>Adiantum venustum</i>	Rani sinka	Adiantaceae	Stipe used as antibiotic and antiseptic sticks in pierced nose and ear.
4	<i>Aleuritopteris bicolor</i>	Rani sinka	Pterideaceae	Stipe used as antibiotic and antiseptic sticks in pierced nose and ear.
5	<i>Equisetum diffusum</i>	Salli-bisalli	Equisetaceae	Used against dog bites
6	<i>Lygodium japonicum</i>	Parayo-Anri	lygodiaceae	Used against fever and cough.
7	<i>Nephrolepis cordifolia</i>	Pani amala	Oleandraceae	It is used against chest congestion.
8	<i>Pteris biurata</i>	Thara uniyo	Pterideaceae	Used as antibiotic against pneumonia
9	<i>Pteris spinescens</i>	Thara uniyow	Pterideaceae	Used as antiseptic as well as for blood coagulation
10	<i>Tectaria codunata</i>	Aula kalo ningro	Dryopterideaceae	Rhizome used in diarrhea and pneumonia
11	<i>Thelypteris cana</i>	Pirey sottar	Thelypteridaceae	To eradicate bed bugs and lice of fowl
12	<i>Thelypteris procera</i>	Pirey sottar	Thelypterideaceae	Leaves used for preparation of yeast cake.

Table 4:Ornamental ferns

Sl.no	Scientific Name	Local Name	Family	Uses
1.	<i>Davillia fejisensis</i>	Rabit foot	Daviallaceae	Ornamental
2.	<i>Nephrolepis cordifolia</i>	Pani amala	Oleandraceae	Ornamental, used for decoration.
3.	<i>Selaginella pulvinata</i>	Kur kura jhar	Selaginaceae	Used for decoration purposes.
4.	<i>Huperzia pulchermia</i>	Lycopodiaceae	Ornamental.
5.	<i>Huperzia squarrosa</i>	lycopodiaceae	Ornamental
6.	<i>Cyathea spinulosa</i>	Rukh uniyew	Cyatheaceae	Ornamnetal & its trunk are used for orchid cultivation.
7.	<i>Cyathea brunoniana</i>	Rukh uniyew	Cyatheaceae	Pot made up of the trunk for orchid cultivation.
8.	<i>Lycopodium japonicum</i>	nakbeli	Lycopodiaceae	Utilized in decoration of Pandals as well in religious ceremony specially Saraswati puja.
9.	<i>Lycopodiella cernua</i>	nagbeli	lycopodiaceae	Used for Decoration.



Plate I: A. *Cyathea spinulosa* croizer; B. *Deparia boryana* croizer; C. *Tectaria fuscipes*; D. *Huperzia squarosa*; E. *Davallia fijiensis*; F. *Cyathea brunoniana* trunks utilized for making pot; G. *Huperzia pulchermia*; H. *Pteridium revolutum*; I. *Thelypteris procera*.

The study revealed only two species of *Cyathea* but past literature survey points out that there was five species of *Cyathea*. Similarly the disappearance of *Huperzia phlegmeria* from the study area makes it clear that some conservational strategy should be formulated to safeguard this alienated, neglected group of lower vascular plant.

Conclusion

The present study revealed rich traditional practices of ethnic communities of Darjiling hill. The people in far flung and remote area utilized fern and fern-allies for different purposes. However management practices should be adopted in order to prevent over exploitation of species like *Nephrolepis cordifolia* whose demand is high in terms of foliage as well tuber. The intervention of Government and Forest department is necessary in order to educate the people regarding the ill effect of loss of species from the habitat.

Ethics

All the authors read and approved the manuscript and no ethical issues involved.

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