SHORT COMMUNICATION

Diversity of Pteridophytes in Nipani Taluk, Karnataka, India

Doris Singh,[1]* Omkar Koshti,[1] Nilesh Madhav,[2] Aditya Magdum,[3] Sushant Amate,[4] Pandit Shirgave[4]

DOI: 10.18811/ijpen.v7i01.12

Abstract

Considering diverse ecological and topographical conditions, Nipani Taluk is close to the Eastern ranges of Western Ghats. Adi Hill and Stavanidhi Ranges are the extended branches of the Western Ghats. An attempt was undertaken to enumerate the ferns from Nipani Taluk to fill the gap of a valid document of the ferns from the study area. During the study, 14 species from 9 different genera of 6 different families were recorded. The distribution of some species is found to be unique from Adi Hill and Stavanidhi Ranges. The study revealed that the number of species from family Pteridaceae was the highest, common to both the ranges followed by family Ophioglossaceae, Marsileaceae, Lomariopsidaceae, Salviniaceae and Polypodiaceae. *Adiantum philippense* L. was dominantly found in both the studied areas, while *Adiantum incisum* Forssk. and *Actiniopteris radiata* (Sw.) Link are less dominant. Whereas *Microsorum membranaceum* (D. Don) Ching is least populated and found very rarely at both the study area.

Keywords: Adi Hill, Diversity, Ferns, Nipani Taluk, Stavanidhi Ranges.

International Journal of Plant and Environment (2021); **ISSN:** 2454-1117 (Print), 2455-202X (Online)

Introduction

Pteridophytes (ferns and fern-allies) are the most primitive vascular plants that appeared on the Earth, in the mid-Paleozoic era during the Silurian period which began 438 million years ago. They are the earliest of the plants ever evolved on the earth heralding the presence of a well developed vascular system, and hence, are referred as 'vascular cryptogams'. India has a rich and varied pteridophytic flora due to its Gondwanaland origin, its drift from south of the Equator towards Eurasia far north, carrying the progenitors of today's pteridophytes from Australia, Africa, Madagascar etc. as well as probable endemics of its own. Moreover India's strategic geographical position would have facilitated migration of species, including several pteridophytes from Eurasia and South-East Asia and vice-versa, a notable factor that would have reduced endemism among the fern community. Today, among the vascular plants, pteridophytes form a major part next only to the angiosperms in India. The major centers for pteridophytes diversity are Eastern and Western Himalayas, Western Ghats, Eastern Ghats, Central India and Andaman and Nicobar Islands (Dudani, *et al.,* 2014).

The presence of perennial streams and rivers, evergreen forests, grasslands and high altitude sholas and many other habitats of this mountain chain harbor almost 320 species of ferns and fern-allies. The pteridophytes tend to increase in number in the north-south direction of Western Ghats, obviously due to the more number of rainy months and higher altitudes with cooler climates. Maharashtra has 64 species of Pteridophytes, most of them confined to northern Western Ghats (Manickam, *et al.,* 2003).There have been some notable studies on the pteridophytes of central Western Ghats in Karnataka with the earliest record of 75 ferns species from North Canara district (Matchperson, 1986). Blatter and d' Almeida (1922) included 90 species of ferns from North Canara district in their work 'Ferns of Bombay'. Karnataka has about 174 species of pteridophytes, mostly growing in central Western Ghats (Rajagopal and Gopalkrishna Bhat 1998).

[1]Department of Botany, Karnatak Science College, Dharwad, Karnataka, India

[2]Department of Botany, HPT Arts and RYK Science College, Nashik, Maharashtra, India

[3]Department of Botany, Shivaji University, Kolhapur, Maharashtra, India

[4]Department of Botany, Devchand College, Arjunnagar, Kolhapur, Maharashtra, India

***Corresponding author:** Doris Singh, Department of Botany, Karnatak Science College, Dharwad, Karnataka, India, Email: dorissingh@gmail.com and koshtiomkar@gmail.com

How to cite this article: Singh, D., Koshti, O., Madhav, N., Magdum, A., Amate, S., Shirgave, P. (2021). Diversity of Pteridophytes in Nipani Taluk, Karnataka, India. International Journal of Plant and Environment. 7(1), 96-99.

Conflict of interest: None

Submitted: 27/02/2021 **Accepted:** 30/03/2021 **Published:** 15/04/2021

Materials and Methods

Study Area

Nipani Taluk of Belgaum district in the state of Karnataka is the third largest city. Since Nipani is close to the branches of the Western Ghats, it enjoys a good rainy season (150 to 250 cm) and temperature ranges between 16 to 40 °C. Nipani is located between latitude 16°23' 56.40" N and longitude 74°22' 58.26" E. The survey of study area was carried out in the year July 2018 to July 2019 and the locations such as Adi Hill (ADH), Stavanidhi Ranges (STR), and plains of Nipani Taluk were surveyed (Plate 1).

Methods of identification and classification of ferns

The specimens of Pteridophytes were collected and Specimen were deposited at Herbarium of Department of Botany, Devchand College, Arjunnagar and identified with the help of different floras, journals, monographs and revisions such as

Table 1: Occurrence, Habitat and the Distribution of the Ferns in the Nipani Taluk.

Sr. No.	*Name of the Species*	*Family*	*Habitat*	*Category*	*ADH*	*STR*
1	*Adiantum philippense* L.	Pteridaceae	Terrestrial	Very Common	++++	++++
2	*Adiantum incisum* Forssk.	Pteridaceae	Terrestrial	Common	+++	+++
3	*Marsilea minuta* L.	Marsileaceae	Aquatic	Occasional		++
4	*Marsilea quadrifolia* L.	Marsileaceae	Aquatic	Occasional		++
5	*Nephrolepis exaltata* (L.) Schott	Lomariopsidaceae	Terrestrial	Occasional	+	++
6	*Nephrolepis falcata* (Cav.) C. Chr.	Lomariopsidaceae	Terrestrial	Occasional	+	++
7	*Pteris vittata* L.	Pteridaceae	Terrestrial	Very Common	++++	++++
8	*Azolla pinnata* R. Br.	Salviniaceae	Aquatic	Occasional		++
9	*Ophioglossum costatum* R.Br.	Ophioglossaceae	Terrestrial	Rare		+
10	*Ophioglossum parvifolium* Grev. & Hook.	Ophioglossaceae	Terrestrial	Rare		+
11	*Ophioglossum gramineum* Willd.	Ophioglossaceae	Terrestrial	Rare		+
12	*Salvinia molesta* D.S. Mitch.	Salviniaceae	Aquatic	Occasional		++
13	*Actiniopteris radiata* (Sw.) Link	Pteridaceae	Terrestrial	Occasional	++	++
14	*Microsorum membranaceum* (D. Don) Ching	Polypodiaceae	Epiphytic	Rare	+	+

Total Number of Species: 14
Abundance/Frequency: ++++ Very Common +++ Common ++ Occasional +Rare

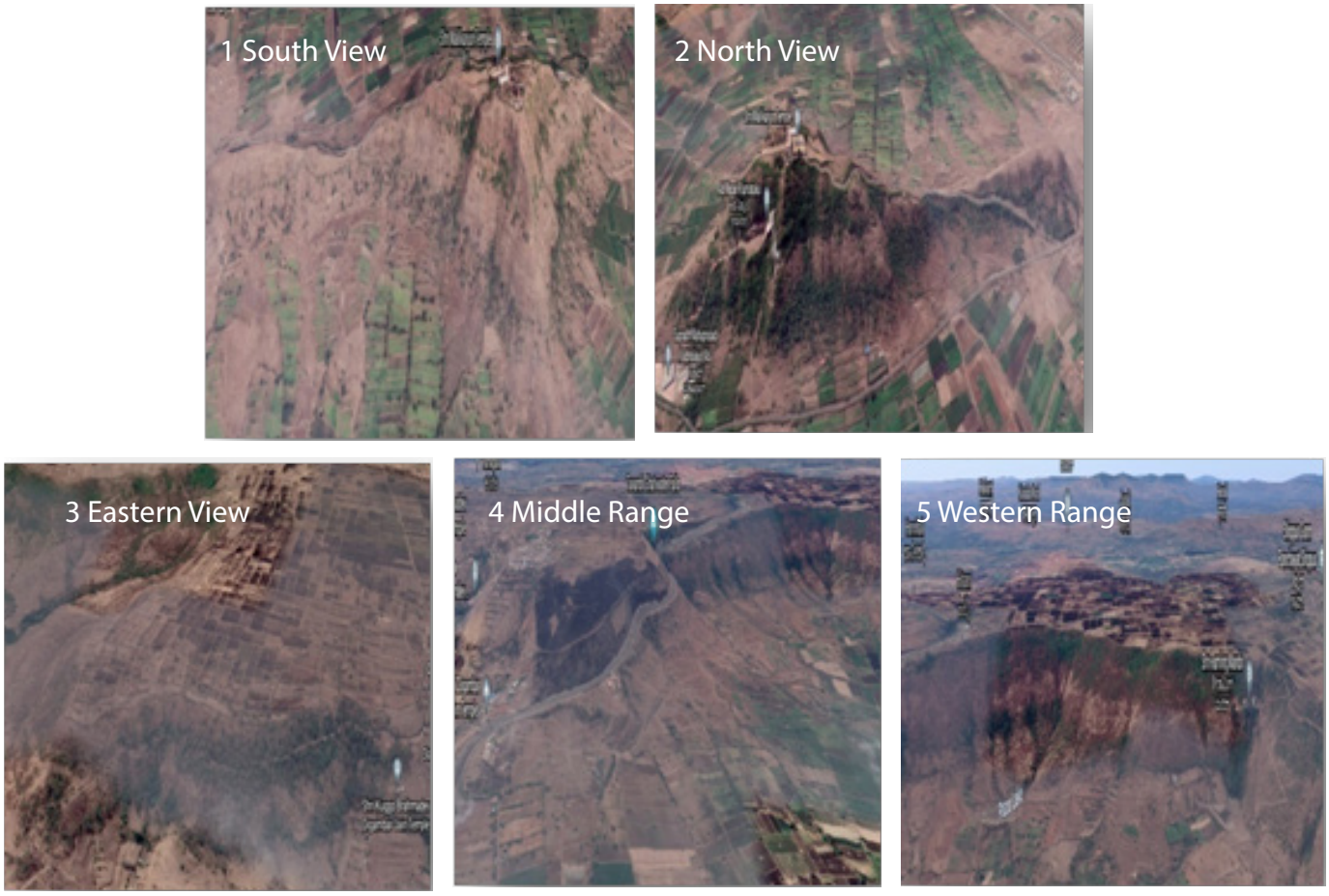


Plate 1: Google Earth Images of Adi Hill (1-2) and Stavanidhi Ranges (3-5)

1. ***Ophioglossum costatum*** **R.Br.**

2. ***Ophioglossum parvifolium*** **Grev. & Hook.**

3. ***Ophioglossum gramineum*** **Willd.**

4. ***Microsorum membranaceum*** **(D. Don) Ching**

Plate 2: Rarely observed Ferns from Nipani Taluk

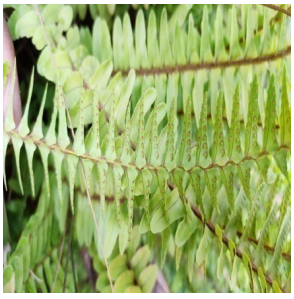
1. *Pteris vittata* **L.**

2. *Actiniopteris radiata* **(Sw.) Link**

3. *Marsilea minuta* **L**

4. Marsilea quadrifolia **L.**

5. *Nephrolepis exaltata* **(L.) Schott**



6. *Adiantum philippense* **L.**

Plate 3: Commonly observed Ferns from Nipani Taluk

Blatter and d'Almeida, 1922; Rajagopal and GopalkrishnaBhat 1998; Manickam and Irudayaraj 1992; Fraser-Jenkins 2008; Beddome 1883. The rarity of ferns was determined based on the occurrence of a species at different localities of hills and hillocks In The Studied Area (Patil, *et al.,*2012).

Results

Adi Hill and Stavanidhi ranges are situated in the Eastern Slopes and are extended branches of the Western Ghats. On enumeration of the Pteridophytes 14 species from 9 different genera of 6 different families were recorded. Four species were documented from family Pteridaceae, three species from Ophioglossaceae, while from Marsileaceae, Lomariopsidaceae and Salviniaceae two species were recorded and only one Polypodiaceae member was found, among which eight are terrestrial, four are aquatic and only one epiphytic was recorded. Out of fourteen species, *Adiantum philippense* L. and *Pteris vittata* L. are most commonly found in the Plains, Adi Hill and Stavanidhi Ranges. Based on occurance studies *Adiantum incisum* Forssk. is a common species occurring in large numbers and *Microsorum membranaceum* (D. Don) Ching an epiphyte is recorded in very few numbers therefore categorized as rare in the study area. *Ophioglossum costatum* R.Br., *Ophioglossum parvifolium* Grev. & Hook. and *Ophioglossum gramineum* Willd. are also rare and found at the slopes of Stavanidhi ranges only, because at Adi Hill the aquatic species are not recorded due to its high altitude slopes and xerophytic condition (Plate 1: Adi Hill 1-2). Remaining seven species are occasionally found, as depicted in Table 1. Comparing both the sites the distribution of the species is found to be unique.

Conclusion

Documentation on the pteridophytes of Nipani has not been recorded so far, hence an attempt on documenting the pteridophytes from Nipani Taluk has been accomplished. The environmental conditions are being altered due to anthropogenic activities as noticed in the Stavanidhi Ranges which are being destroyed for state development. These species may have totally vanished from the study sites. Pteridophytes are an important class of vascular plants and therefore their numbers should be documented as they are the wealth of our planet.

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