

ASSESSMENT ON ENDANGERED PLANT BIODIVERSITY OF SHIRUI NATIONAL PARK, UKHRUL, MANIPUR

ABSTRACT

The study deals with the biodiversity and ethnobotany of Shirui National Park, Ukhrul, Manipur that was carried out in 5 different sites. A total of 9 plant species belonging to 6 families with 1607 individual were found. Quadrates sizes 10m x 10m of plant were used. In term of IVI Site 4 Showed the maximum parameter for IVI value of Plant Species which was represent by *Bidens pilosa* with the value of 130.7.

The Family *Passifloraceae*, *Phyllathaceae*, *Amaranthaceae*, *Anacardiaceae*, *Ranunculaceae*, *Taxaceae*, *Apiaceae*, *Plantaginaceae*, *Oxalidaceae* and *Elaeocarpaceae* were represented by only one species each and *Asteraceae* was found to be dominant with 2 species.

Keywords: Conservation, endangered, biodiversity, Ukhrul.

1. Introduction

Biological diversity refers to the variety and variability among living organisms and the ecological complexes in which they occur (Pullaiah *et al.*, 2015). The extinction and species introduction are two major biodiversity crises of the current millennium. A species may become endangered and eventually extinct when death rate exceeds birth for a prolonged duration. Anthropogenic activities are now-a-days prominent and causing extinction of many plant species of ecological and economic significance (Choudhury and Khan, 2010).

Understanding of the dynamics of plant resources is important for their sustainable management, utilization and biodiversity conservation (Sarkar and Devi, 2014). Remote sensing data provides a perspective on how ecosystems and species are being affected by the multiple disturbances. Progress achieved for understanding essential biodiversity variables with reference to species populations, species traits, community composition, ecosystem function and ecosystem structure have been reviewed (Reddy *et al.*, 2017).

Forest plants are gathered for food, herbal medicine, spices, fuel, etc, which have built up their socio economic and cultural life (Wangcha and Konyak, 2021). Tribals are the oldest ethnological groups which live far away from the civilized world. They prefer to live in forested areas, follow primitive customs and occupations, profess primitive religions, have common language and social culture, are economically dependent on each other. (Sharma and Kumar, 2013).

Majority of population in the developing countries like India depends on the traditional systems of medicine like Ayurveda for their primary healthcare needs. Increasing demand of medicinal plants leads to irrational cutting deforestation leading to depletion of the wild resources (Kadam and Pawar, 2020). The Use of medicinal plants by ancient people and inheritance of this

Comment [A1]: Abstract section is poorly written.

Comment [A2]: Introduction is poorly written and not in proper order with missing references and not justify the title of this paper.

Comment [A3]: Reference missing

Comment [A4]: Reference missing

information from one generation to next have led to the study of relationship between humans and plants (Thakur *et al.*, 2020).

Manipur (India) is a land of Blue Hills and green valley. It is in the extreme northeastern border of India. According to 2011 census the total population is 28,55,794 lakhs. Different communities having their own language and culture are residing in the state. But the main language in the state is Meitei language. Shirui lily is the state flower of Manipur and this flower is found only in Ukhrul district. The Government of Manipur organized a festival in the name of this state flower called “Shirui festival” as a state function from 2017 onwards. The main theme of the festival is to conserve the flower as well as unite together all the communities through cultural exchange programmed and enhances the tourism industry in the state. (Devi *et al.*, 2021).

Comment [A5]: Reference missing

The forests are the main repository of biodiversity and play an important role in maintaining the ecological balance of nature. The status of species diversity reflects the health of the ecosystem. (Waponungsanget *et al.*, 2021)

2. Materials and methods

Shirui National Park, Ukhrul, Manipur within 24°13'51.0"N 94°13'51.0"E longitude and latitude at an elevation of 2,835 meters above sea level. Ukhrul district is sub-tropical monsoon type. The climate of the district is of temperate nature with minimum and maximum degrees of 3°C to 33°C. The average annual rainfall is 1,763.7mm.

Comment [A6]: Incorrect

Comment [A7]: Font changed

For the study of the plant species, quadrat methods were used. The plants were measured and recorded by random sampling with 10 quadrats of 10m ×10m in each study site.

Comment [A8]: Author did not describe the study sites and rational behind these sites.

The objective of the study is to analyse the community structure for species richness, density and frequency. Important community parameters such as frequency, density, basal area and Importance Value Index (IVI) were calculated using standard methods given by Misra (1968) and Muller-Dombois and Ellenberg (1974).

Comment [A9]: Reference missing

Comment [A10]: Materials and methods section is poorly written.

2.3 Map location of the study area

Comment [A11]: From the google image of map, it can be seen that study site 4 & 5 looks like devoid of vegetation. These sites not seems to be ideal for laying down quadrats.



Fig 1:- Map of Ukhrul District and Shirui National Park

3. Results and discussion.

Table 1. Quantitative analysis (Site 1):-

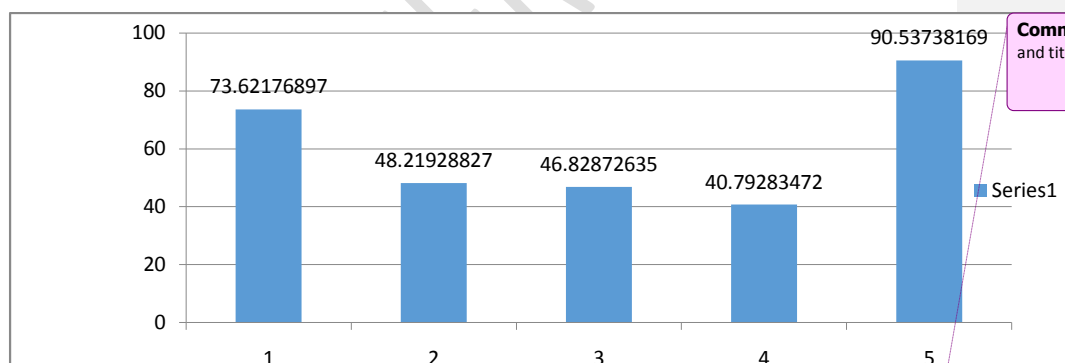
Sl no.	Species	BA(cm ²)	F	D	A	RF	RD	RDo	IVI
1	<i>Curcuma rubescens</i>	0.04	85	4.5	5.3	22	26.7	24.7	73.6
2	<i>Dendrobium densiflorum</i>	0.15	70	2.4	3.5	18.1	13.9	15.8	48.2
3	<i>Dendrobium nobile</i>	0.16	70	2.3	3.5	17.1	13.6	16.3	46.8
4	<i>Rhododendron arboretum</i>	0.27	70	1.8	2.5	18.1	10.7	11.8	40.7
5	<i>LiliumMackliniae</i>	0.02	90	6.1	6.4	23.3	35.5	31.2	90.53738169

Comment [A12]: Title of this table?

Comment [A13]: Data of this column is wrong.

Comment [A14]: Proper units are missing.

Comment [A15]: Calculation is incorrect.



Comment [A16]: Repetition of data, no legends and titles were added in the graphs for x and y axis.

Fig 2. IVI Index(site 1)

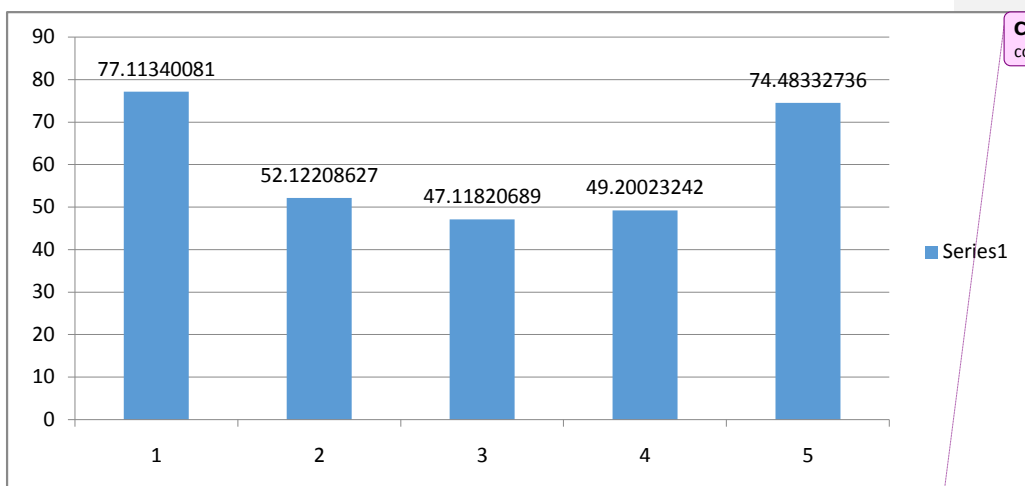
Table 2. Quantitative analysis (Site 2):-

Sl no.	Species	BA(cm ²)	F	D	A	RF	RD	RDo	IVI
1	<i>Curcuma rubescens</i>	0.04	90	5.1	5.6	22.2	28.7	26	77.1
2	<i>Dendrobium densiflorum</i>	0.16	70	2.8	4.0	17.2	16.10	18.7	52.1

Comment [A17]: Title missing

Comment [A18]: BA calculation and unit used is incorrect.

3	<i>Dendrobium nobile</i>	0.23	80	2.4	3.0	19.7	13.4	13.8	47.1
4	<i>Rhododendron arboretum</i>	0.50	85	2.5	3.0	20.9	14.0	13.8	49.2
5	<i>LiliumMackliniae</i>	0.03	80	4.8	6	19.7	27.0	27.6	74.4



Comment [A19]: Repetition and same correction required as mentioned in A18.

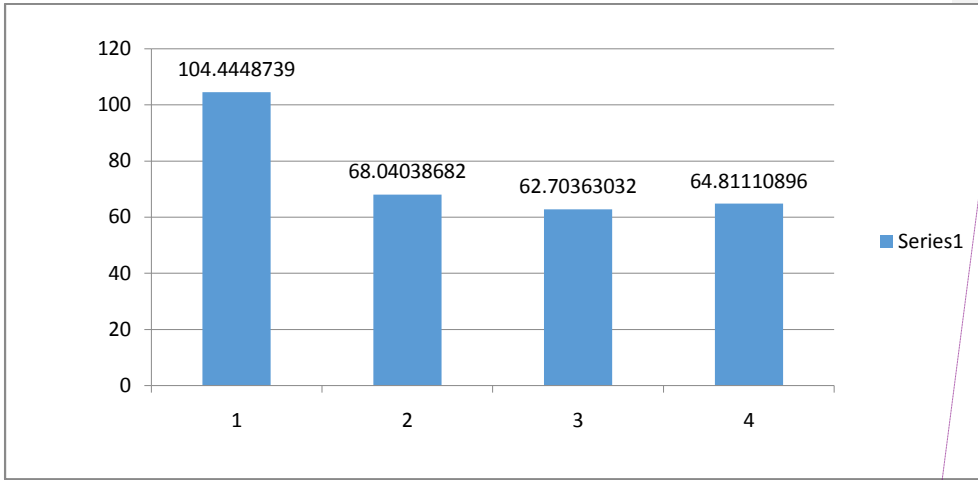
Fig 3. IVI Index(site 2)

Table 3. Quantitative analysis (Site 3):-

Comment [A20]: Same correction required.

Sl no.	Species	BA(cm ²)	F	D	A	RF	RD	RDo	IV
1	<i>Bidenspilosa</i>	0.001	100	7.9	7.9	28.9	40.0	35.3	104
2	<i>Plantago major</i>	0.005	85	4.2	5	24.6	21.0	22	68.04
3	<i>LiliumMackliniae</i>	0.006	80	3.7	4.6	23.1	18.7	20.7	62.7
	<i>Plantagoerosa</i>	0.005	80	3.9	4.9	23.1	19.7	21.8	64.8

Comment [A21]: Wrong.



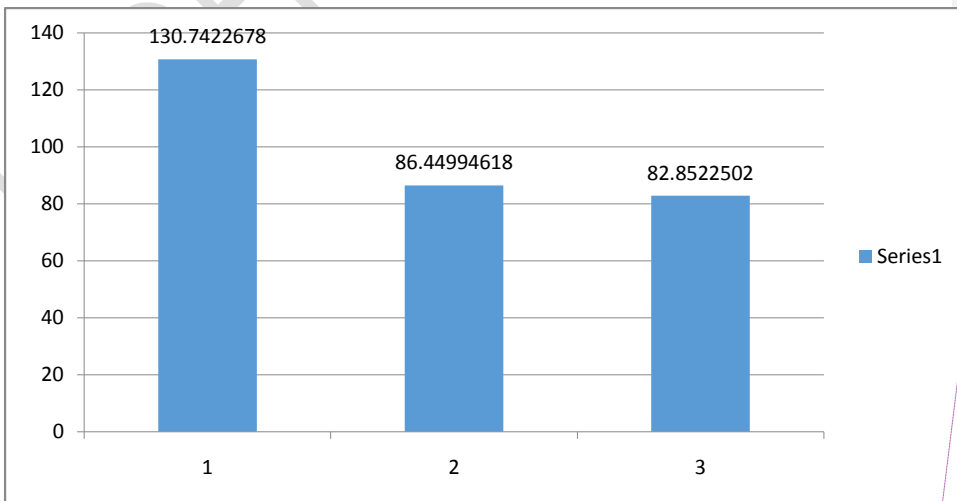
Comment [A22]: Repetition again.

Fig 4. IVI Index(site 3)

Table 4. Quantitative analysis (Site 4) :-

Comment [A23]: Same correction required.

Sl no.	Species	BA(cm ²)	F	D	A	RF	RD	RDo	IVI
1	<i>Bidenspilosa</i>	0.001	150	4.6	5.1	51.7	48.9	42.66	130.7
2	<i>Plantago major</i>	0.006	75	2.5	3.3	25.8	26.5	27.5	86.44
3	<i>Liliummackliniae</i>	0.005	65	2.3	3.6	22.4	24.4	29.8	82.85



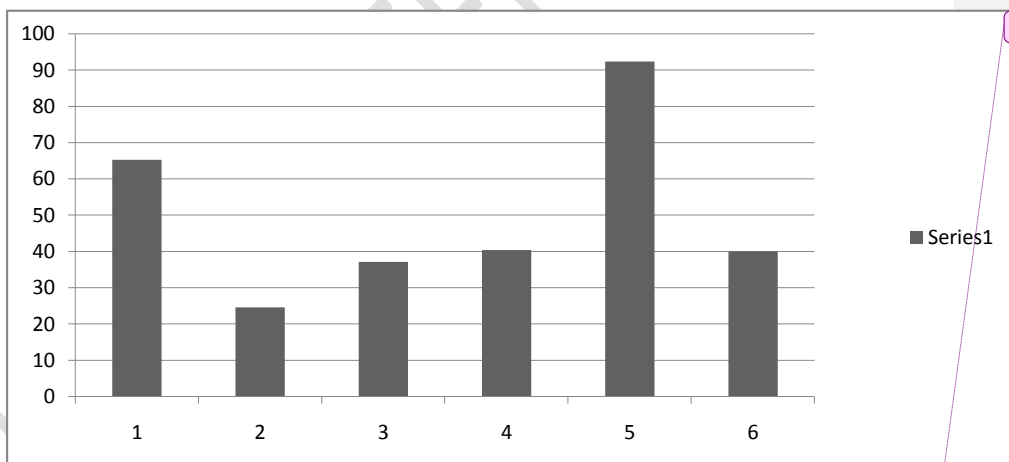
Comment [A24]: Repetition of data presentation.

Fig 5. IVI Index(site 4)

Table 5. Quantitative analysis (Site 5):-

Comment [A25]: Same problem.

Sl no.	Species	BA(cm ²)	F	D	A	RF	RD	RDo	IVI
1	<i>Eupatorium Adenophorim</i>	0.01	90	3.8	4.2	18.5	23.8	22.8	65.34
2	<i>LiliumMackliniae</i>	0.03	45	0.8	1.8	9.2	5.0	10.06	24.6
3	<i>Plantago Major</i>	0.50	80	1.6	2.0	16.5	9.9	10.66	37.12
4	<i>Bidens Pilosa</i>	0.19	90	1.8	2.0	18.5	11	10.66	40.43
5	<i>Artemisia Nilagirica</i>	0.63	95	6.1	6.4	19.5	38	34.5	92.4
6	<i>Rhododendron Arboretum</i>	0.23	85	1.8	2.1	17.5	11	11	40.03



Comment [A26]: Same comment A18.

Fig 6. IVI Index(site 5)

The Shirui National park is sub-alpine region blessed with high diversity of flora, the National park is divided into two core; outer core and the inner core. The outer core area is a dense forest cover area whereas the main or inner core area are mostly of grassland, where the *LiliumMackliniae* which grow during the month of March to June, the state flower of Manipur is endemic to Shirui National Park, Ukhrul, Manipur. Annually, during the month of January the villagers torch the main core area of grassland in order to get minimize the other competitive species of *LiliumMackliniae*, and help in conserving the species in a traditional way. On the other hand many species were lossed.

The site was selected from the five different area of inner core area, For **site 1** based on the IVI value of table the most dominant plant species was found out to be *Liliummackliniae*(90.5). For **site 2** based on the IVI value the most dominant plant species was out found to be *Curcuma rubescens*(77.1), For **site 3** based on the IVI value the most dominant plant species was out found to be *Bidenspilosa* (104). For **site 4** Based on the IVI value the most dominant plant species was out found to be *Plantago Major*(130.7). For **site 5** based on the IVI value the most dominant plant species was found out to be *Artemisia Nilagirica*(92.4) .

Comment [A27]: Result section is poorly written and discussion part is completely missing.

Conclusion

From the present research work it can be conclude the plant species in **Site 4** of Shirui National park showed the maximum parameter for IVI value of Plant Species which was represent by *Bidenspilosa* with the value of **130.7**, whereas **Site 5** Showed the minimum parameter for IVI value of Plant Species which was represent by *LiliumMackliniae* with the value of **24**, which indicates the declining population status of the species which is only endemic to Shirui National Park, Ukhrul, Manipur.

Comment [A28]: This paper is not suitable for publication. As language is concern plenty of typing and grammatical errors in this paper.

References

Comment [A29]: Some of the cited references are missing.

Choudhury, B., and Khan, M. (2010) Conservation and Management of Endangered Plant Species: A case study of Northeast India, *Global Science Books*, 4 (Special Issue 1) 47 – 53.

Devi, N. (2021) Remembering Shirui lily festival in Manipur, *An International Journal of Creative Research Thoughts (IJCRT)*, Volume 9, Issue 3 March 2021 | ISSN: 2320-2882.

Nandy, S., and Das, AK. (2012) Comparing tree diversity and population structure between a traditional agro forestry system and natural forests of Barak valley, Northeast India, *International Journal of Biodiversity Science, Ecosystem Services and Management*, Volume 9, 2013- Issue 2.

Pullaiah, T. Bahadur, B., and Krishnamurthy, KV. (2015) Plant Biodiversity, Volume I: Plant Diversity, Organization, Function and Improvement, DOI 10.1007/978-81-322-2286-6_6

Reddy, C.S., Diwakar, P.G., and Murthy, Y.V.N.K. (2017) Sustainable Biodiversity Management in India: Remote Sensing Perspective, *Proceedings of the National Academy of Sciences, India Section A: Physical Sciences*, 617–627 (2017)

Sarkar, M., and Devi, A. (2014) Assessment of diversity, population structure and regeneration status of tree species in Hollongapar Gibbon Wildlife Sanctuary, Assam, Northeast India, *Tropical Plant Research an International journal*, ISSN (E): 2349 – 1183, ISSN (P): 2349 – 9265.

Thakur, M., Kholsa, P. Radha., and Puri, S. (2020) ethnobotanical study of wild medicinal plants used by local people of Tirthan valley in district Kullu of Himachal Pradesh, India, *Plant Archives*, Vol. 20, Special Issue (AIAAS-2020), 2020 pp. 129-132.

Wangcha, A., and Konyak, W. (2021) Survey of ethnomedicinal plants and its uses by the konyak tribe in Mon district, Nagaland, India, *International Journal of Ecology and Environmental Science*, Volume 3; Issue 1.

Wapongnungsang, Ovung, E., and Tripathy, SK. (2021) Assessment of tree diversity in tropical moist deciduous forest of Mizoram University, Northeast India, Journal of Applied and Natural Science, ISSN : 0974-9411.

UNDER PEER REVIEW