Ethno medicinal Survey of Indigenous Flora among some rural Communities of District Anantnag Jammu and Kashmir

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***Abstract*- In This paper we present Ethnomedicinal Survey of Indigenous Flora among some rural Communities of District ANANTNAG JAMMU and KASHMIR. The medicinal properties of plant species have made an outstanding contribution in the origin and evolution of many traditional herbal therapies. Keeping this thing in view, an ethno medicinal survey was carried out to study traditionally used plants by the rural communities of District ANANTNAG JAMMU and KASHMIR. An ethnobotanical survey was conducted in the field during 2016–2018. Ethnobotanical data were gathered from 182 informants through oral interviews and semi-structured questionnaires. The distribution of plants was explored using both descriptive and graphical methods. Further, a Multinomial Logit Specification was applied to find out the probability of the occurrence of diverse utilization of plants in multipurpose domains.**

***Index Terms*- Flora, Distt., Rural, Indigenous, Survey etc.**

I. INTRODUCTION

The demand of medicinal plants has seen a significant growth all over the world because of popularity of alternative systems of medicine. Both the Regional Research Laboratory, Jammu and Field Research Laboratory, Anantnag have done some commendable work on medicinal plants. In view of the exponential growth in demand for medicinal plants, private capital and enterprise need to be attracted in this sector. The state government needs to formulate a special package to attract investment in the sector. The financial incentive in such a package should be related to the employment potential of the units. Jammu and Kashmir provides a favourable climate for cattle breeding. In other parts of the country one has to create an artificial climate for cattle breeding and the success rate is low. The state government should emphasize the use of biotechnology to introduce new and improved breeds. The state of Jammu and Kashmir is divided into three geo-climatic zones, viz., subtropical, temperate and cold arid zone. Each zone has its specific needs. Most of the research in biotechnology has taken place in the temperate zones of the country. Technical innovations can't simply be borrowed from other states. There is a need to develop indigenous technology for productivity enhancement and developing new varieties of crops, keeping in mind the local conditions and demands. The ecological environment of Jammu and Kashmir is fragile and therefore not conducive for large-scale industrial development in the conventional sense. The agriculture sector, on the other hand, continues to be important sector in the state economy as large sections of the population depend on it for employment as well as consumption. In this study recorded 136 species of medicinal plants belonging to 45 families with Asteraceae (14 species) as the dominant family of the area. Decoction (26 species), juice and powder (24 species each) were most common methods of preparation. Spearman's correlation analysis showed that age and gender had the significant effect on both numbers of mentioned species and different uses. A number of known medicinal plants and the number of different uses (H: 38.51; $p < 0.001$) differ significantly as indicated by Kruskal-Wallis tests. These results showed that the knowledge about the plant varies among different age groups, which were the first hypothesis of the present study. The highest use values (UVs) were reported for *Berberis lyceum* and *Ajuga bracteosa* (1.13 each) followed by *Abies pindrow* (1.03). Highest informant

consensus factor (ICF) values were recorded for digestive system diseases (ICF = 0.90) and muscular and skeletal system diseases (ICF = 0.89). The value of Jaccarad index ranged from 6.11 to 32.97 with an average value of 19.84, percentage of similarity was highest between study area and Pir Lasura National Park (34.62%).

The variables known to affect medicinal plant knowledge include education, occupation, age, gender and psychosocial variables [6–10]. Age and gender are generally the factors most examined for their influence on knowledge about plants. One of the most studied resources is medicinal plant knowledge because it is a structural component of local medical systems [11]; it is the focus of this study. Much of this knowledge is traditional, that is, learned long ago and passed on with varying degrees of faithfulness for at least two or three generations. However, ethnobiological knowledge can change rapidly. Every tradition had a beginning cf., and was itself a new creation in its time. Ecosystems change, new plants and animals arrive, and people learn new ways of thinking; ethnobiological systems change accordingly, and are typically flexible and dynamic. Field-workers have observed new knowledge being incorporated into systems around the world.

Divergences in knowledge and practice between two cultural groups that live within the same ecosystem are intriguing as they can provide insight into how the lens of culture can not only alter human viewpoints of the environment but even guide human interactions with resources embedded in the ecosystem. To explore the question of what role culture plays in shaping the human–nature interface, we conducted field research in Pearl Vellay in Rawalakot that hosts an incredibly rich repertoire of cultural, linguistic and biological diversity. We hypothesize that two distinct cultural groups living in the same ecosystem will share a similar pattern of use of wild flora for daily subsistence and medical practices, and that distinctions will arise only for those taxa that play a key role in culture-specific ritual, food or health practices.

II. MATERIALS AND METHODS

The study has been carried out in District ANANTNAG JAMMU and KASHMIR also known as Pearl Valley, located in the core of District ANANTNAG JAMMU and KASHMIR (Latitude 33°51'32.18"N, Longitude 73° 45'34.93"E). It is a saucer-shaped valley with an altitude of 1615 m a.s.l. The climate can be classified as subtropical highland (Cwa) under the Köppen climate classification due to high altitude. The average annual temperature is 15.3°C ranging from 38°C during the mid-summer months to– 3°C during the winter months. The annual rainfall is very variable year by year and ranges from 500 to 2000 mm, most of which is irregular and falls as intense storms during the monsoon season stretching from July to September. Woodlands, dominated by conifers such as Abies pindrow, Cedrus deodara, Pinus roxburghii, and Pinus wallichiana, and open grasslands, mainly cover the area.

The ethnic composition of the region is quite diverse and complex: Gujjars, Sudhans, Rajputs and Jats are considered to be the major ethnic groups living in the area. Gujjars are the largest group; Rajputs who are spread across the region and Sudhans, mostly settled in Rawalakot, are regarded as the influential ethnic groups in Azad Kashmir. Almost all of them are Muslims. According to the last census in 2014 there are 4,980 households in Rawalakot and each household comprises an average of 7.6 members. This high demographic density can be explained by the higher work opportunities in Rawalakot where most dwellers are engaged, directly or indirectly, with the tourism sector. In contrast, the rural population largely depends on subsidence agriculture, livestock, forestry and formal employment. Agriculture is based on rain-fed cropping system and the main crop of the region is maize.

III. ETHNOBOTANICAL DATA COLLECTION

Fieldwork was carried out from August 2016 to July 2018. Before initiating of our survey Ethical approval for the study was obtained from the COMSATS Institute of Information Technology ethics Committee. Legal permission was taken from representatives of the municipality for conducting the interview. All respondents were asked to sign a prior informed- consent form after the objectives and possible consequences of the study had been explained. The prior informed consent (PIC) form was translated into the local Pothwari language. Ethnobotanical information was collected from native

inhabitants of the valley by using semi-structured questionnaires. This method allows a large number of participants to be interviewed in a relatively short period of time by asking the same questions within a flexible framework. All the interviews were carried out in the local dialect, Pothohari. A total of 64 informants, ranging in age from 35 to 70 years, were selected by convenience sampling (i.e., a sampling method in which units are selected based on easy access or availability).

Interviews were carried out complying with the ethics guidelines commonly followed in ethnobotanical studies, and the informants' written consent was obtained prior to the interviews. In order to ensure that the information was as unbiased as possible, we tried to avoid the presence of other people during the interviews. Participant observation was also used in order to better interpret and analyze the data reported by informants. The information collected concerned both diseases (the most frequent ones, ways of classifying and diagnosing them, etc.) and medicinal plants (local names, indications of use, plant parts used, places/methods/rituals of gathering, utilization and administration).

Voucher specimens were gathered using the informants' indications, prepared according to standard taxonomic methods, and conserved in our lab for future reference. For plant identification, we consulted the Flora of Pakistan (www.eflora.com). Botanical nomenclature is presented in accordance with the International Plant Name Index (IPNI) (www.ipni.org).

Table 1: Medicinal Flora of District ANANTNAG JAMMU and KASHMIR

Scientific Name and voucher number	Local name and habit	Family	Part Used	Method of preparation/property	Mode of application	Disease treated	FC	RFC	UV	
1	*Abies pindrow* Royle (HF-99)	Partal, Paluder silver fir, Tree	Pinaceae	Leaf	paste	External	Swelling	48	0.75	1.03
					Juice	Internal	Antypiretic			
				Bark	Powder	Internal	Cough chronic asthma.			
				Bark	Tea	Internal	Rheumatism			
				Resin	Resin	External	Wounds.			
						1				
				Root	Decoction	Internal	Cough, bronchitis			
2	*Achillea millefolium* L. (HF-77)	Yarrow, Herb	Asteraceae	Flower	Extract	Internal	Refrigerante	24	0.38	0.33
				Leaves	Powder	External	Toothache			
3	*Achyranthes aspera* var. *perphyristachya* Hook. F. (HF-128)	Puthkanda, Herb	Amaranthaceae	Root	Decoction	Internal	Inflammation	21	0.33	0.38
				Leaves			Pain			
4	*Adhatoda zeylanica* L. (HF-139)	Bahkar, Herb	Acanthaceae	Bark	Powder	Internal	Stomachache	35	0.55	0.59
				Leaves			Constipation			
				Root			Asthma			
							Cough			
5	*Adiantum capillus-veneris* L. (HF-101)	Hansraj, Srajfern	Adiantaceae	Leaves	Decoction	Internal	Cough	57	0.89	0.97
							Boils			
							Asthma			
							Jaundice			
							Fever			
							Diabetes			
							Eczema			
							Measles			
							Chest pain			
6	*Adiantum incisum* Foressk (HF-	Sumbul, Hansraj, Fern		Leaves	Juice	Internal	Scabies	44	0.69	0.64
							Cough			
							Antypiretic			
							Bodyache			

Scientific Name and voucher number	Local name and habit	Family	Part Used	Method of preparation/property	Mode of application	Disease treated	FC	RFC	UV	
	120)									

IV. ETHNOBOTANICAL DATA ANALYSIS

To determine whether a statistically significant correlation exists between the numbers of plants mentioned and the informant's age, we used the Spearmann test. The Mann-Whiney U and Kruskal-Wallis tests were used to find significant differences between two and among 5 groups related groups, respectively, all set at 0.5 alpha level of significance.
Some quantitative indices commonly adopted in ethnobotanical studies were used to analyze the data collected through the interviews. Relative frequency of citations (RFC) and use value (UV) was used to access relative importance of plant species cited by informants. Frequency of citations was estimated as RFC=FC/N here FC is the number of informants reporting the use of a particular species and N is the total number of informants. Use value was estimated as **UV**=$\sum$***Ui/N*** Where Ui is the number of uses mentioned by each informant for a given species and N is the total number of informants.
Informant consensus factor (ICF)
Informant consensus factor was used to identify the most trusted healing plants for those disease categories that were claimed to be most common in the area following the approach of by using the following formula:
ICF=(Nur−Nt)/(Nur−1)
Where Nur is the number of use-reports in each disease category and Nt is number of species used.
Jaccard index (JI)
JI was calculated in order to compare data reported in our study with previously published data collected from neighboring regions by using the following formula
JI=c/(a+b−c)×100
Where
a = number of species found only in area A
b = number of species found only in area B
c = number of species common to both areas

V.PLANT COLLECTION AND IDENTIFICATION

The plant species were collected in triplicate during sampling, carefully dried and mounted on herbarium sheets. The Flora of Jammu and Kashmir (www.eflora.com) was followed for taxonomic identification, whereas to obtain the correct botanical names the International Plant Name Index (IPNI) and Tropicos was used. The fully determined vouchers were deposited in the herbarium of the Department of Botany, Arid Agriculture University Jammu and Kashmir.

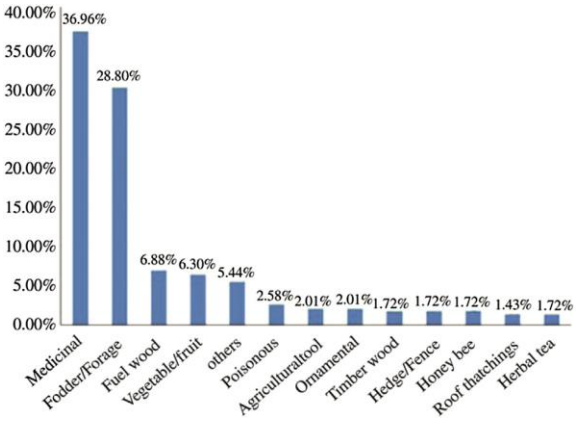

Figure 1. Ethnobotanical uses of flora of Anantnag District, J&K.

VI. RESULT AND DISSCUSION

The state of Jammu & Kashmir constitutes the Northern most extremity of India and is situated between 320.17D and 360.58D N latitude and between 370.26D and 800.30D E longitude. Anantang is one of the 22 districts in J&K state , situated at an average height of 1581m above mean sea level (AMSL) and is spread over an area of 4191 sq.kms. The district lies between 320-58/ to 350-50/ North latitude and 730-45/ to 750-20/ East longitude (Fig. 2). Line of control lies in its West. The climate of the Anantnag district is of Mediterranean type with four distinct seasons viz. Spring (March- May), Summer (June – August), Autumn (September-November) and Winter (December- February). The monthly mean temperature ranges from -0.030C in January to 30.10 C in July. Average annual rainfall in district has been recorded as 1270 mm. Forests are one of the most important resources of Anantnag district, spreading over an area of 2963 sq. kms and the district has 71% area under forests (Raina,2002).

Geologically the mountain enclosing the area are comprised of complex crystalline rocks such as granite, genesis and sedimentary rocks as slates, phyllites and schist's with embedded limestone. The rural communities like Gujjars, Bakarwals and Paharis inhabiting in district constitute a significant proportion of the district.

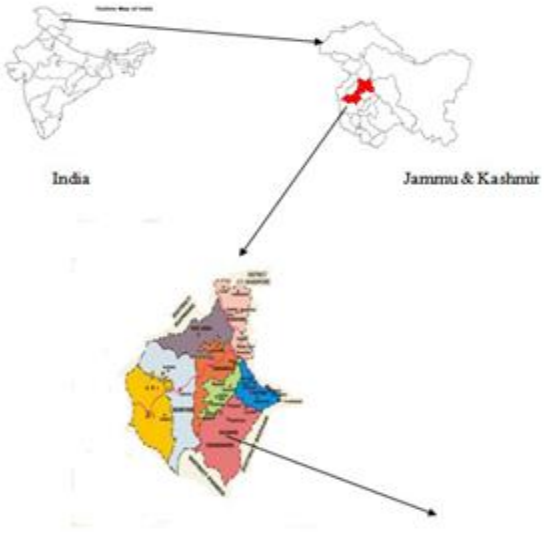

Figure 2. Study area

In the present study, a total of 32 plant species belonging to 22 families that were traditionally used by rural communities of Anantnag district in their day to day life to cure various ailments have been documented along with their uses. In the plant families, Lamaiacea represented maximum number of species (7 species) followed by Asteraceae, Papilionaceae, Polygonaceae, Rosaceeae and Solanaceae (2 species each). Out of the reported plants, 24 were herbs, 4 shrubs, 3 trees and 1 species climber (Fig. 2). Considering the habit of the medicinal plants, herbs were more prevalent than trees, shrubs and climber. The high usage of herbs in the study region could be an indication of their abundance as it has been witnessed during visits to the study sites. The study found that many different parts of the medicinal plant species were used as medicine (namely whole plant, leaves, roots, seeds, flowers, bark, stem, fruits) but the most commonly used plant part was leaf (15 species) followed by root (7 species), whole plant (5 species), flower (3species), fruit (2 species), bark (2 species), seed (2 species), and stem (2 species) Medicines were administered in different forms including powder, paste, decoction (liquid obtained by boiling of the medicinal plants in the solvent) and infusion (plant powder/paste mixed with the solvent). The present study revealed that ethno-medicinal plants are being used to treat the diseases like headache, fever, urinary disorder, toothache, cough, rheumatism, jaundice, boils, eye disease etc. by the people of Anantnag district. Largest number of diseases treated by different plant parts are cough (12 species) followed by fever (06 species), wounds (05 species), rheumatism (02 species), urinary disorders (02 species) and diarrhoea (02 species) It seems to be in agreement with the present study. Another study carried out by Kumar et al. (2009) , Jammu and Kashmir is in conformity with the present study as most of the documented plant species were found to be having traditional use in their study. The rural communities of Anantnag district have been using these plant species for therapeutic purpose since time immemorial. Due to more demand of traditionally used plants, people of study area have been motivated for conservation of these plant species.

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