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Ethnobotanical and Phytosociological Studies of Tehsil Gujar Khan District Rawalpindi

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Abstract: Tehsil Gujar Khan is a typical example of Potohar region characterized by the natural beauty and specific cultural heritage. Only one family represented Pteridophytes, Gymnosperms by three families and Angiosperms by 66 families (10 monocots and 56 dicots). About 271 plants were enlisted from the study area in which 206 species of plants (76.01%) are herbs, 45 species are trees (16.60%) and about 20 species are shrubs (07.38%). As for as conservation status of plants species is concerned 8.12% are abundant, 44.65% common, 22.14% uncommon, 17.71 rare and 7.38% of species are very rare. The results of utilization of plants showed that some plants have multiple uses. Based on utility, there were 197 medicinal plants (72.69%), whereas 76 species (28.04%) served as fodder and forage for animals, 42 species (15.49%) were used as fuel wood, 47 species (17.34%) served for attracting honey bees, 32 species (11.81%) were used as vegetables and pot herbs, 35 species (12.91%) used for thatching, sheltering and roofing, 31 species (11.43%) were planted as ornamental, 27 species (9.96%) used for making various agricultural appliances and ropes, 21 species (07.74%) were timber yielding, 20 species (7.38%) were used for fencing and hedges whereas 22 species (08.11%) each were serving for the Category of fruit yielding plants. Lastly 7 species (02.58%) were serving as a source of spices and condiments. The species within a stand were arranged on the basis of importance values and named after the three leading species with the highest importance value as dominant; the closely approaching species were considered as co-dominant and followed by associated and rare species on the basis of I.V. So following four communities were found namely, *Acacia-Aristida -Gnaphalium* community, *Poa-Acacia-Cymbopogon* Community, *Imula-Tamarix-Chenopodium* community and *Acacia-Prosopis-Imperata* Community.

Key words: Ethnobotany, indigenous plants, economic importance, Rawalpindi

INTRODUCTION

Ethnobotany: A discussion of human history on this planet will never be completed without a look at the role of plants. A complete record of the many thousands of plant species used by human beings during past shows their importance in health, economy, shelter, clothing and food. For last few decades people were more interested in surgery and allopathic medicines as compared to old traditional use of plants for the treatment of different diseases. But in recent years, however, there has been a reawakened scientific interest in the fundamental role of plants, which they play in many cultures, including medicinal purposes.

Ethnobotany is the study of how the people of a particular culture and region make the use of indigenous plants, while the Ethnobotanists explore how plants can be used as food shelter, medicine, clothing, hunting and religious ceremonies. It is the science, which studies the relationship between a given society and its environment

and in particular the plant world. According to Pie (1995), It is the study of direct interaction between human and plant population through its culture.

In 1895, at a lecture in Philadelphia, Dr. John Harshburger used the term Ethnobotany to describe his field of inquiry, which he defined as the study of "plants used by primitive people. In 1896, Harshburger published the term and suggested Ethnobotany is a field, which elucidates the cultural position of the tribes who used the plants for food, shelter or clothing (Harshburger, 1896). The term quickly began to be used and a new field was opened. Later on Pei (1995), redefined Ethnobotany as, The study of direct interaction between human and plant population through its culture. The modern concept of Ethnobotany was given by Aumeeruddy (1996). According to him, It is the science which studies the relationship between given society and its environment and in particular, the plant world. So we can say that Ethnobotany is a multi-disciplinary science of Botany, Ecology and Anthropology. In 1994, Long and Wang,

introduced a research on social and cultural values of Ethnobotany. Ethics and intelligent property right of Ethnobotany are treated as social values. Cultural phenomenon such as plant ceremony, flower eating culture and herb culture are described.

Meza and Villagran (1991) studied the Ethnobotany of Alxo Island, Chile and concluded that the level of knowledge was greater for the native flora than the introduced flora. Six principles categories of use were defined:

- Magic and medical
- Forage and animal medicine
- Art craft and building
- Combustible
- Food
- Stain

Ethnobotany is the most appropriate approach to study natural resource management of indigenous peoples. There is no provision any where for the protection of knowledge rights of native peoples (Martin, 1995).

Throughout the world, wild, naturalized or non-cultivated plants provide a green Awan *et al.* (1987) studied the spring flora of Rawal lake area in relation to geology, soil, climate, hydrology and biotic factors. Certain drastic changes occurred in environmental conditions due to the construction of Dam. About 142 species belonging to 125 genera and 68 families were recorded on the northern side. The floristic composition showed abundance of herbs followed by shrubs and trees.

Khan (1991) conducted phytosociological studies in Suleiman Mountain, in Baluchistan and identified two communities i.e., *Olea-Pistacia* community at the lower elevation and *Pinus-Ephedra-Cotoneaster* community at higher elevation. Importance of the habitat is suggested in favor of protection of Markhor against biotic interference.

This study is carried under following objectives:

- To enlist the plants of the area.
- To collect information about local names and distribution.
- To estimate the use of plants by local communities.
- To have knowledge of plants for particular disease.
- To estimate the abundance of different species in the area.
- To open new avenues for improvement of traditional phytomedicine.
- To study different plant communities in the area.

The significance of present study is as follows

- Indigenous knowledge of medicinal plants is fast diminishing because as more plants are lost, so is the knowledge of their value to humanity. This study is an effort to save this precious heritage.
- This will also help to estimate the belief of people about the use of medicinal plants.
- Future research can be done to know the chemical nature of a particular plant with respect to a specific disease.

MATERIALS AND METHODS

Ethnobotanical study was conducted during the whole year 2004 in the region of Tehsil Gujjar Khan. Moreover the area has its own cultural heritage and therefore they have their own indigenous knowledge about the plants of the area, cultivation practices and their management. Several study trips were made to the study area.

Equipment used during research: All the necessary equipments like compass, altimeter, note book, pencil, polythene bags, scissor, blotting papers, rough news papers, khurpa, white papers and camera for photography were carried to the sites. The conveyance mostly used was motorcycle but occasionally local transport was also used.

Collection of ethnobotanical data: For the collection of Ethnobotanical data from the local inhabitants, many villages of the area were randomly visited. For the collection of data questionnaires were developed and the researcher personally collected informations from the respondents. During field trips a general collection of plants was made. Blotting papers, old newspapers and plant pressers were used for the preservation of specimens. The fully dried plants were poisoned and then mounted on the herbarium sheets. The plants were identified with the help of available literature (Nasir and Ali, 1972-2004). Confirmation of plants was done by comparing with the already identified plant specimens of the herbarium of Quaid-i-Azam University, Islamabad. In the last plants were given voucher numbers and deposited to the herbarium for future references. About 100 people (75 males and 25 females) of the area were interviewed and priority was given to local elderly peoples and hakims. The survey of local markets was also included where plants and plant products were sold.

Cover: This is defined as the proportion of the ground occupied by perpendicular projection on to it of the aerial parts of individuals of the species under consideration. Cover percentage of a species in sampling plot was determined by visual estimation.

The value of cover per unit area for each species, which is known as coverage or canopy cover was calculated for the total canopy cover by using the following formula.

$$\text{Canopy cover} = \frac{\text{Total canopy cover of a species}}{\text{No. of quadrats} \times \text{quadrat size}}$$

For trees dbh. was recorded and changed into area

$$\begin{aligned} \text{Circumference} &= \pi D, D = \frac{C}{\pi} \\ \text{Area} &= \frac{\pi D^2}{4} \\ A &= \frac{C \times C}{\pi \times 4} \end{aligned}$$

Relative canopy cover: The relative canopy cover was calculated from the cover value of a species as a proportion of the total cover values for all species.

Relative

$$\text{canopy cover} = \frac{\text{Canopy cover value of a species} \times 100}{\text{Total canopy cover of all species}}$$

$$\text{Importance value} = \frac{\text{Relative density} + \text{Relative frequency} + \text{Relative canopy cover}}{3}$$

RESULTS

Ethnobotanical results: Out of 271 plants, 206 species of plants (76.01%) are herbs, 45 species are trees (16.60%) and about 20 species are shrubs (07.38%). As for as conservation status of plants species is concerned 8.12% are abundant, 44.65% common, 22.14% uncommon, 17.71% rare and 7.38% of species are very rare. Medicinal plants comprised 72.69% of the total plants studied. Seventy six species served as fodder and forage, which comprised of 28.04% of the total species. Local inhabitants use 42 species as fuel wood. (15.49%). Almost 47 different species (17.34%) were recorded that served for attracting honeybees. Almost all kinds of vegetables were grown in the investigated area and 32 different species recorded that were cultivated as vegetables and potherbs. They comprised of 11.81% of the total species recorded. Thirty one species (11.43%) were classified as

ornamental species. Among the ornamental species recorded, 22 different species (8.11%) were recorded as fruit yielding for the local community. Seven different species served as spices and condiment in the investigated area that comprised of 2.58% of the total plants recorded.

Phytosociological results: The species within a stand were arranged on the basis of importance values and named after the three leading species with the highest importance value as dominant; the closely approaching species were considered as co-dominant and followed by associated and rare species on the basis of I.V.

$$\text{Importance value} = \frac{\text{Relative density} + \text{Relative frequency} + \text{Relative canopy cover}}{3}$$

So following four communities were found namely,

- *Acacia-Aristida -Gnaphalium* community
- *Poa-Acacia-Cymbopogon* Community
- *Inula-Tamarix-Chenopodium* community
- *Acacia-Prosopis-Imperata* Community

The present study provides information about some therapeutic uses of 271 plant species belonging to 70 families. Among them 197 plant species were recorded as medicinal plants which were either used singly or in the form of mixture with other plants or sugar, salt ghee or honey. It has been observed that different plants have the potential of curing the same disease or several diseases at a time.

Raimondo and Lentini (1990) studied the plants of the local flora in the folk tradition of the Madonie Mountains, Italy. They collected 210 ethnobotanically important plants. In several cases the same plant has multiple applications. The most interesting taxonomic component is restricted to the *Asteraceae*, *Apiaceae*, *Lamiaceae* and *Leguminosae*.

Ethnobotanically most of the species reported here has multiple uses e.g., *Acacia modesta* Wall. Wood is used as fuel and construction purposes. The gum obtained from the bark is used as tonic and stimulant. Branches of the tree are used as toothbrush (Miswak) against toothache. Similarly bruised leaves of *Acacia nilotica* (L.f.) Delile applied to eyesores in children soaked in cow's milk. Leaves dried in shade are ground and mixed with sugar are given in sexual impotency. The pods and leaves are used as astringent in diarrhoea and bark as an astringent lotion. The bark is also used to cure asthma. The decoction of boiled thorns is taken against pains in the joints and against heavy sweating. Wood is

also used as furniture and construction purposes and also as fuel. *Calotropis procera* (Willd.) R. Br. plant is bitter in taste and used as tonic, expectorant, anthelmintic, laxative purgative, anti-inflammatory, diaphoretic, antiperiodic, stomachic, poisonous and diuretic. It is used for the treatment of asthma, cough, piles, fevers, headache, pains of muscles, joints, chest, inflammatory swelling, wounds, toothache, leprosy, malaria fever, abdominal pain, dressing on paralyzed parts and gonorrhoea. The milky juice of plant is irritant and applied as a cure against thorn prickling. The latex when allowed to fall on sand is taken as a cure against snakebite. Fruit fibers are stuffed into cushions.

Ripened fruits and seeds of *Melia azedarach* L. are used against diabetes. Decoction of leaves is applied in hysteria. Seeds are used in blood pressure. Wood is used in furniture making. Mature roasted fruit are crushed into powder and mixed in antimony (Surma) locally, which gives cooling sensation to eyes. Leaves serve as excellent fodder for goats.

RECOMMENDATIONS

Usage: To obtain increasingly successful results when treating a person with an illness, the full potential and actions of each medicinal plant, together with the benefits gained by combining plants, needs to be known and understood. With the increase in knowledge of the uses of particular species, treatment will be more effective and larger variety of medical complaints could be addressed.

Processing: Processing should be allowed for principal constituents to be present in preparation that can be stored. Sun drying result in a loss of the medicinally active volatile oils that many plants contain.

Storage: Storage needs to be out of direct sunlight to prevent oxidation of an extract, which would reduce effectiveness of that preparation, should be stored in an airtight container and a relatively cool environment.

Marketing: Awareness for the proper marketing of medicinal plants and other useful plants critical on an international and domestic level, it is essential to identify marketable species with their current valuable and demand.

Community awareness: Education is vital. By educating people about the usage, collection, processing, storage and marketing and marketing of medicinal and other useful plants, they can begin to comprehend what an advantageous venture they could embark upon. By

improving these steps, a superior quality plant with increased efficacy would be obtained, thus providing both economic and domestic health and other benefits. From an environmental aspect, awareness should be created amongst the community on the local numbers of medicinal species growing in their area. This would decrease the risk of depleting the number of locally known medicinal plants.

Medicinal plants nurseries: Implementation of projects for establishment of nurseries of medicinal plants and demonstration plots in the farmers' fields for popularization.

Training courses: Short training courses to the collectors, farmers and traders on proper identification, collection and cultivation of medicinal plants and to improve processing and post harvest treatment of crude drugs.

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