

Full Length Research Paper

An overview of human-plant interaction in Nikyal rangeland district Kotli Azad Jammu and Kashmir

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The aim of this study was to document the local uses of important plant species of Nikyal valley particularly medicinal, fodder, fuel, timber, fruit, vegetable, tanning, dying and furniture uses. A total of 111 species belonging from 51 families were found to have a variety of uses by the local people for the accomplishment of their basic needs. These species includes 9 tree 20 shrubs and 82 herbs. The major bulk of 52 plant species (35%) were used as fodder/forage. Fifty species (34%) has medicinal uses, 15 species (10%) were used as a fuel wood and 5 (3%) for timber. Eight species (5%) were used as vegetable or edible fruit, three species (2%) each were used for preparation of furniture and tanning or dying, only 2 species (1.5%) were used for resin and three species (1.5%) were used for the preparation of furniture. *Pinus roxburghii*, *Punica granatum*, *Quercus dlatata*, *Olea ferruginea*, etc. have multiple uses such as fodder, timber wood, fuel wood and medicine. These plants are used in individual form or in combination with other species or other edible items. The study revealed that most of the plants are used for medicinal and fodder purposes. The major utility of this ecosystem is for pasture; therefore efforts should be directed to improve the area as a rangeland.

Key words: Nikyal hills, ethnobotany, human plant interaction, conservation.

INTRODUCTION

Ethnobotany focuses on the uses of plants which is established by a particular community over generations. It plays an important role in understanding the dynamic relationships between biological diversity and social and cultural systems (Husain et al., 2008; Mahmood et al., 2011a). It is a multidisciplinary science that studies "the relationship between a given society and its environment and in particular the plant world". People understand and collect the knowledge of valuable plants by the use of anthropological methods (Ajaib et al., 2010). Human interactions with plants vary due to their uses, relative importance and varying social, cultural and ethnic factors (Pahnwar and Abro, 2007). Man have always been dependent on plants for food, shelter, health fragrance, cosmetics, dyeing agent, soap and body care since the pre-historic times. Human being and plant populations have

direct interaction through culture, belief, dependence, economy and commerce (Dashora, 2006).

Nikyal Hills are situated in District Kotli, Azad Jammu and Kashmir at an altitude of 1500-1900 m. They are located 30 km away from Kotli towards North. The investigated area lies within longitude 74° 04' to 10' east and latitude 33° 26' to 29' north. It is surrounded by Kotli on the south, on western side by Tatapani, on Northern side by Mender and on the east by Pir-Panjal (Amjad et al., 2011). The climate of Nikyal valley is of sub tropical humid type with average annual rainfall of 95.60 mm. The maximum rainfall occurs during July amounting to 251.52 mm, while least rainfall occurs during November amounting to 14.44 mm. The hottest months of the year are June and July, with mean daily maximum temperature of

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37.69 and 34.82°C, respectively and minimum temperature of 23.61 and 23.62°C, respectively, while the coldest months of year were December and January with mean maximum temperature of 19.99 and 18.09°C, respectively and minimum temperature of 5.49 and 4.41°C, respectively. The average maximum and minimum relative humidity of the area is 79.64 and 30.82%, respectively (Anonymous, 2006). Plants used as fuel and timber and other uses were extremely studied (Kappelle et al., 2000; Gutkowska et al., 2002; Ibrar et al. 2007; Ishtiaq et al., 2007; Ahmad et al., 2006; Durrani and Manzoor, 2006; Okello and Segawa, 2007; Gilani et al., 2003; Hussain et al., 2006; Zabihullah et al., 2006; Wazir et al., 2004; Khan and Khatoon 2007; Khan and Khatoon, 2008). No such studies are however available on plants of Nikyal valley. The present study reports on the ethnobotanical important resources from the Nikyal Valley, AJK, Pakistan and analyzes the indigenous traditional knowledge on the utilization of the most commonly used plants.

METHODOLOGY

The research was conducted in 12 villages which were selected after general survey and preliminary discussion. For data collection, 60 informers which are native to the area, mainly farmers, shepherds and housewives were interviewed. They were randomly selected during 2012-2013. The informants were aware of the aims and the end use of informations they provided. They also cooperated in collecting and recognizing plants. Moreover, they also indicated where plants were easily available. The plants species collected during sampling were carefully dried and mounted on herbarium sheets. All the available literature was used for identification of species. Nomenclature of Nasir and Ali (1971-1994) and Ali and Qaisar (1995-2006) were followed.

RESULTS

A total of 111 plant species were recorded from Nikyal valley. There were 34% (50 spp.) medicinal plants, 35% (52 spp.) fodder species, 10% (15 spp.) fuel wood species, 3% (5 spp.) timber wood species, 8% (12 spp.) vegetable/edible fruit species, 5% (7 spp.) poisonous plants, 2% (3 spp.) tanning/dying species, 1% (2 spp.) resin yielding species. Only 2% (3 spp.) were used for furniture making (Table 1 and Figure 1). The data shows that the area is suitable for rangeland and medicinal plants.

DISCUSSION

Interaction between plant and humans is very strong and can never be separated as the dependence is obligate. The plant resources lead to the economical wealth of an area. The utility and use of plants create the importance of plant in that area. In the same context when the plant of Nikyal valley were analyzed, it was observed that all 111 species had different local uses as such medicinal, fuel, fodder and construction purposes. The majority of plant species, that is, 54 (40%) was used as fodder. They had different palatability value. This indicates that area is

well suited for rangeland. Poor vegetation and moist and cold weather conditions cannot support agriculture. Most of the species reported in the present study have also been reported as fodder species by some other worker (Hussain et al., 2004, 2006; Badshah et al., 2006; Kappelle et al., 2000; Tordio et al., 2006; Arenas and Scarpa, 2007; Maoe et al., 2009; Ajaib et al., 2010; Bano et al., 2013).

The next major utility of 63 (47%) was for medicinal purpose. Exploitation of medicinal plants by local folk, collectors and herbal drug dealers was increasing with increasing demand of pharmaceutical industry and non awareness of local inhabitants. This caused drastic decrease in the occurrences and products of medicinal plants. Grazing, browsing, deforestation and soil erosion were mainly responsible for reduction in the medicinal flora. It is therefore essential to have conservation strategies for these medicinal plants. Therefore, the preferred medicinal plants grow at high elevation where man and grazing animal could not reach easily. The increasing population has pressurized the medicinal plant which has dramatically decreased the species and population of medicinal plants (Ajaib et al., 2010). The nomads collect the medicinal plants for their earning. They uproot and collect each part of the medicinal plants in non scientific way. Prior to this study, no reference exist on the medicinal plant of this area. Most species in the present study have also been reported as medicinal by some other worker like Gilani et al. (2003), Wazir et al. (2004), Jabar et al. (2006), Ishtiaq et al. (2007), Hussain et al. (2008), Sardar and Khan (2009), Tareen et al. (2010) and Bano et al. (2013).

Deforestation, overgrazing and soil erosion were the main factor responsible for the reduction of medicinal plant in this area. The local live stocks grazed most of the medicinal plant. It is therefore essential to have conservation strategies for these medicinal plants. The collection of plant must be correlated with the phenological cycle. The plants are abrupt to graze and collected for medicinal or fuel wood purpose. Similarly, the plants grazed or collected for root, rhizome, bulb and flower become more threatened. The shoots fail to develop seed and flowers while the rhizomatous plants are destructively collected. This will reduce the chance of their regeneration.

In the investigated area, most people are poor and lack the basic facilities. They depend upon the forest for fuel wood. There are 15 (10%) species used for fuel wood. These include the *Quercus dlatata*, *Punica granatum*, *Pinus roxburghii*, *Plectranthus rugosus* and *Zanthoxylum alatum*. The use of plants as fuel wood from adjoining areas has been reported by other workers (Sardar and Khan, 2009; Ajaib et al., 2010; Qasim et al., 2010). The furniture wood consisting of *P. roxburghii* is also valuable source of earning to meet their demands. Some of these plants with similar uses have been reported by Qureshi et al. (2007), Hussain et al. (2004) and Shah and Hussain (2008).

Table 1. Economic use classification of flora of Nikyal valley.

Name of species	M	F	TW	FW	V/E	P	TD	RT	Ft
Tree layer									
<i>Astragalus floridus</i> L.	+	+	-	-	-	-	-	-	-
<i>Ficus palmata</i> Forrsk	+	+	+	+	-	-	-	-	-
<i>Grewia villosa</i> Willd	+	+	-	+	-	-	-	-	-
<i>Pinus roxburghii</i> Sargent	+	-	+	+	-	-	-	+	+
<i>Prunus persica</i> (L.)Batsch	+	-	-	-	+	-	-	-	-
<i>Punica granatum</i> L.	+	-	-	+	+	-	-	-	-
<i>Qurecus dlatata</i> Lind	-	-	+	+	-	-	-	-	+
<i>Olea ferruginea</i> Royle	+	+	-	+	-	-	-	-	+
<i>Ziziphus jujuba</i> Mill	+	-	-	-	+	-	-	-	-
Shrub Layer									
<i>Berberis lycium</i> Royle	+	-	-	+	+	-	-	-	-
<i>Colebrookia oppositifolia</i> Sm.	-	-	-	+	-	-	-	-	-
<i>Contoneaster acuminatus</i> I Linley	-	-	+	-	-	-	-	-	-
<i>Debregeasia salicifolia</i> (D.Don) Rendle	-	+	-	+	-	-	-	-	-
<i>Dodonaea viscosa</i> L. Jack	+	-	-	+	-	-	-	-	-
<i>Elaeagnus parvifolia</i> Wall. ex Royle	+	-	-	-	-	-	-	-	-
<i>Indigofera heterantha</i> Wall.	+	+	-	-	-	-	-	-	-
<i>Loranthus pulverulentus</i> Wall. in Roxb	+	-	-	-	-	-	-	-	-
<i>Nerium indicum</i> Mill	+	-	-	-	-	+	-	-	-
<i>Otostegia limbata</i> (Bth) Boiss	-	-	-	+	-	-	-	-	-
<i>Plectranthus rugosus</i> Wall.	-	+	-	-	-	-	-	-	-
<i>Rabdopsia rugosa</i> (Wall. ex Benth.) H.Hara	+	-	-	-	-	-	-	-	-
<i>Rhus cotinus</i> L.	-	+	-	+	-	-	-	-	-
<i>Rhynchosia hirta</i>	+	+	-	-	-	-	-	-	-
<i>Rubus fruticosus</i> Wallich.	+	-	-	-	+	-	-	-	-
<i>Rubus niveus</i> Wallich	-	-	-	-	-	-	-	-	-
<i>Sarcococca saligna</i> (D.Don) Muel	+	-	-	-	-	-	-	-	-
<i>Viburnum grandiflorum</i> Wallich ex DC	+	-	-	+	+	-	-	-	-
<i>Woodfordia</i>	+	-	-	-	-	-	-	-	-
<i>Zanthoxylum alatum</i> Roxb	+	-	-	+	-	-	-	-	-
Herb Layer									
<i>Achillea millefolium</i> L.	+	+	-	-	-	-	-	-	-
<i>Achyranthes aspera</i> Wall	+	-	-	-	-	-	-	-	-
<i>Adiantum venustum</i> D.Don	+	+	-	-	-	-	-	-	-
<i>Agrostis canina</i> auct	-	+	-	-	-	-	-	-	-
<i>Ajuga bracteosa</i> Wallich	+	+	-	-	-	-	-	-	-
<i>Anaphalis margaritacea</i> (L.) Bth.	-	-	-	-	-	-	-	-	-
<i>Andropogon gerardii</i> Vitman	-	+	-	-	-	-	-	-	-
<i>Androsace rotundifolia</i> Hardw	-	+	-	-	-	-	-	-	-
<i>Arisaema jacquemontii</i> Blume	+	-	-	-	-	+	-	-	-
<i>Aristida adscensionis</i> L.	-	+	-	-	-	-	-	-	-
<i>Bergenia ligulata</i> (Str) Hot	+	+	-	-	-	-	-	-	-
<i>Biden biterata</i> (Lour.) Merr and Sherf	-	+	-	-	-	-	-	-	-
<i>Brachiaria eruciformis</i> (J.E Smith) Griseb	-	+	-	-	-	-	-	-	-
<i>Brachiaria repans</i> (L.) Gardner and Hubbard	-	+	-	-	-	-	-	-	-
<i>Bryophyllum pinnatm</i> Kurz	+	-	-	-	-	-	-	-	-

Table 1. Contd.

<i>Bupleurum falacatum</i> L.	-	-	-	-	-	-	-	-	-
<i>Chrysopogon aucheri</i> (Boiss) Stapf	-	+	-	-	-	-	-	-	-
<i>Commelina benghaliensis</i> Linn.,sp. Pl.	+	+	-	-	+	+	-	-	-
<i>Conyza ambigua</i> Hook. Arn	+	-	-	-	-	-	-	-	-
<i>Conyza canadensis</i> L.	+	-	-	-	-	-	-	-	-
<i>Cymbopogon jwarancusa</i> (Jones) Schult.	+	+	-	-	-	-	-	-	-
<i>Cynodon dactylon</i> (L.) Pers	-	+	-	-	-	-	-	-	-
<i>Cynoglossum lanceolatum</i> Forssk	-	+	-	-	-	-	-	-	-
<i>Poa inferna</i> H.Bk.	-	+	-	-	-	-	-	-	-
<i>Cyperus globosus</i> Forssk.	+	+	-	-	-	-	-	-	-
<i>Cyperus niveus</i> Retz	+	+	-	-	-	-	-	-	-
<i>Cyperus rotundus</i> L.	+	+	-	-	-	-	-	-	-
<i>Cyprus difformis</i> L.	+	+	-	-	-	-	-	-	-
<i>Dichanthium annulatum</i> (Forssk).Stapf	-	+	-	-	-	-	-	-	-
<i>Dicliptera roxburghiana</i> Nees	-	+	-	-	-	-	-	-	-
<i>Dryopteris stewartii</i> Fress	-	+	-	-	-	-	-	-	-
<i>Eragrostis japonica</i> Thunb. Trin.	-	+	-	-	-	-	-	-	-
<i>Eriophorum comosum</i> Wall	-	-	-	-	-	-	-	-	-
<i>Euphorbia helioscopia</i> L.	+	-	-	-	-	+	-	-	-
<i>Euphorbia prostrata</i> Ait	-	-	-	-	-	+	-	-	-
<i>Euphorbia wallichii</i> HK..f	-	-	-	-	-	+	-	-	-
<i>Fragaria nubicola</i> Landle ex Lacaita	+	+	-	-	+	-	-	-	-
<i>Galium elegan</i> Wall.	-	+	-	-	-	-	-	-	-
<i>Geranium rotundifolium</i> L.	+	-	-	-	-	-	-	-	-
<i>Gerbera gossypina</i> Royle	-	+	-	-	-	-	-	-	-
<i>Hedra nepalensis</i> K. Koch	-	+	-	-	-	-	-	-	-
<i>Heteropogon contortus</i> (L.)	-	+	-	-	-	-	-	-	-
<i>Hypericum perforatum</i> L.	+	-	-	-	-	-	-	-	-
<i>Ipomea purpurea</i>	+	-	-	-	-	-	-	-	-
<i>Impatiens edgeworthii</i> H.K.f	-	+	-	-	-	-	-	-	-
<i>Imperata cylindrica</i> (L.)	-	+	-	-	-	-	-	-	-
<i>Ipomea cordata</i>	+	-	-	-	-	-	-	-	-
<i>Juncus serotinus</i> Clarke	-	-	-	-	-	-	-	-	-
<i>Justica paploroides</i>	+	+	-	-	-	-	-	-	-
<i>Lespedeza sericea</i> (Thunb) Miq	-	-	-	-	-	-	-	-	-
<i>Malva parviflora</i> L.	-	+	-	-	+	-	-	-	-
<i>Malvestrum coromendelianum</i> L.	-	+	-	-	-	-	-	-	-
<i>Medicago denticulata</i> Willd	+	-	-	-	-	-	-	-	-
<i>Melilotus indica</i> (L) All	+	-	-	-	-	-	-	-	-
<i>Micromeria biflora</i> (Ham) Bth	+	-	-	-	-	-	-	-	-
<i>Myrsine africana</i> L.	-	+	+	+	-	-	-	-	-
<i>Oenothera rosea</i> (L). Her	+	-	-	-	-	-	-	-	-
<i>Origanum vulgare</i> L.	+	-	-	-	-	-	-	-	-
<i>Oxalis corniculata</i> L.	-	-	-	-	+	+	-	-	-
<i>Phalaris arundinacea</i>	-	+	-	-	-	-	-	-	-
<i>Poa annua</i> L.	-	+	-	-	-	-	-	-	-
<i>Polygonum aviculare</i>	+	+	-	-	-	-	+	-	-
<i>Prunella vulgaris</i> L.	+	+	-	-	-	-	-	-	-
<i>Pteris cretica</i> L.	-	+	-	-	-	-	-	-	-

Table 1. Contd.

<i>Ranunculus muricatus</i> L.	+	-	-	-	-	-	-	+	-
<i>Rubia tinctorum</i> L.	+	+	-	-	-	-	+	-	-
<i>Rumex hastatus</i> D.Don	+	-	-	-	-	-	-	-	-
<i>Rumex nepalensis</i> D.Don	+	+	-	-	-	-	+	-	-
<i>Saccharum spontaneum</i> L.	-	-	-	-	-	-	-	-	-
<i>Scutellaria linearis</i> Benth	-	-	-	-	-	-	-	-	-
<i>Seteria viridis</i>	-	+	-	-	-	-	-	-	-
<i>Solanum nigrum</i> L.	+	-	-	-	+	-	-	-	-
<i>Solanum surattense</i> Burm. f.	+	-	-	-	-	-	-	-	-
<i>Sonchus arvensis</i> L.	+	-	-	-	-	-	-	-	-
<i>Sonchus asper</i> Hill	+	-	-	-	-	-	-	-	-
<i>Sorghum halepense</i> (L.)Pers	-	+	-	-	-	-	-	-	-
<i>Taraxacum officinale</i> Weber	+	-	-	-	+	-	-	-	-
<i>Themeda anathera</i> (Hack)	-	+	-	-	-	-	-	-	-
<i>Trifolium repens</i> L.	+	+	-	-	-	-	-	-	-
<i>Tussilago farfara</i> L.	+	-	-	-	-	-	-	-	-
<i>Valeriana jatamansi</i> Jones	+	-	-	-	-	-	-	-	-
<i>Viola odorata</i> L.	+	-	-	-	-	-	-	-	-

M = Medicinal, F = fodder, TW = timber wood, FW = fuel wood, V = vegetable, E = edible fruits, TD = tanning/dying, P = posinous, RT = roof thatching, FT = furniture.

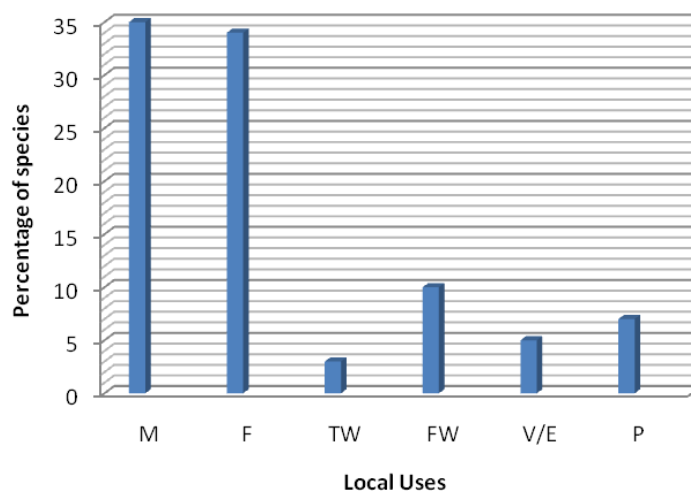


Figure 1. Economic use classification of flora of Nikyal valley.

Timber wood harvest from forest resources has become one of the major ecological problems. In recent times, there is pressure on species for burning and construction material. This has lead to creation of barren areas. Plants such as *Contoneaster acuminatus*, *Ficus palmata* and *P. roxburghii* and *Q. dlatata* are highly valuable as timber wood with high selling and buying prices.

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