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# Ethnobatanical studies on non-medicinal plants of Shinaki Valley Hunza, Gilgit-Baltistan

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**Abstract**

Present investigation explores folk modes, means, ways, approaches and practices-in-use of indigenous floral, fungal and lichens wealth usages in the Hunza. Out of a total 108 species identified 35.45% were medicinal, 30.9% fuel wood, 38.2% used for food, 94.5% fodder and forage, 21.8% cash crops, 17.2% timber wood, 6.36% oil producing, 9% condiments and 24.01% are least used for miscellaneous purposes. All these floro-fungal and lichen species belong to 84 genera and 37 families. Comparative utilization scores show that *Juglans regia L.* (CUS=8) is the most versatile plant species used followed by *Morus alba L., Morus nigra* and *Prunus armeniaca* (CUS=7) which are more common and possess diverse uses. *Elaeagnus angustifolia, Linum usitatissimum, Ficus carica L., Punica granatum, Prunus avium (L.) L., Prunus amygdalus, Prunus persica, Pyrus communis* and *Malus pumila* showed 3rd major plant species for their wide and important utilization having 6 CUS. Folk medication practices have eroded in the area and at present only 1.4% population relies on indigenous treatment and medication. Several adverse causes have left many floro-fungal species under severe pressure. Conservation of threatened species is needed to avoid loss and extinction of several endemic species.

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## Introduction

Shinaki Valley derives its name from its lingo-racial population 'Shien' inhabiting the area and speaking 'Shina' dialect. Study was carried out during 2011-2012 in five major villages including Nasirabad, Khanabad, Mayoon, Hussainabad and Khizirabad. Shinaki stretches over 43 sq. kms comprising upon a total population of 7500 (GOP, 1999). Karakoram Highway (KKH) passes through Nasirabad only and remaining four villages are jeepably linked to KKH.

Human settlement history is unknown however, Rono tribes are considered to be the oldest dwellers that were completely decimated in 16th century. Human settlement and agro-pastoral area falls in between 36° 15' N to 36° 17'N (latitude) and 74° 22' to 74° 36' E (longitude) at an elevation of 4000-14700 feet from mean sea level (see map). Climatically and geographically area falls within the dry temperature zone in the lower limits and ascends to alpine zone in the upper reaches (Ahmad *et al.*, 2009) and is part of Karakoram range. Mild summer alternates with chilling winter (Hussain and Mustafa, 1995). Rampant commercialization in the area has increased pressure on natural resources particularly medicinal plants (Hamayauon 2005).

In 1987 Pie and Manandhar reported that Karakorum-Himalayan mountain ranges are niche for at least 70% of the medicinal plants and wild animals upon which 70-80% population depends for health care. Likewise Gilgit, Astor and other parts of Gilgit-Baltistan, Shinaki area is also rich in plant and cultural diversity but has not been explored in detail (Qureshi *et al.*, 2001, 2006). Local communities use floral wealth for various purposes i.e. timber, firewood, medicine, food, grazing, agriculture, dining utensils and even musical instruments to pass leisure time (Khan and Khatoon, 2007).

Folk wisdom in the area has sharply declined and about extinction. At present only 1.4% people practice ethnomedication (Khan *et al.* 2013) as compared to 80% dependency in 1950s (Hocking 1958) and 70% in 1987 (Pie and Manandhar 1987). An ethnophobic behavior dominated in the area has consumed folk-wisdom. Agricultural commercialization in the study area has rampantly replaced indigenous and endemic flora with several exotic species. Therefore, it is urgent to document ethnobotanical knowledge from the area before it becomes part of a forgotten past.

Keeping in view the bitter fact articulated above, present study was aimed at exploring various plant species and their traditional uses which were further grouped into nine (9) categories i.e. medicinal, food, fodder, fire wood, timber, cash crops, condiments, oil extraction and others.

## Materials and methods

*Specimen collection*

Study was carried out during 2011-2012 in valleys of lower Hunza known as Shinaki. Taxonomically important plant speciemans were collected during flowering and fruiting seasons i.e. early March and early September. Collection was made from the plains only and not from the forest and pasture area. Repeated visits were made into the field for collection, interview, verification and re-verification of specimen and data etc.


Map: Study area: Shinaki, Hunza

*Specimen Identification*

Identification was made by comparing with herbarium specimen and with the help of the Flora of Pakistan (Nasir 1971, 1972, 1975; Stewart 1972, 1982; Jafri 1973, 1975, 1983; Ali 1977, 2001; Grohmann 1974; Siddiqi 1977; Hedge 1990; Nasir and Nasir 1987; Akhter 1986). Specimens followed by proper mounting were deposited at Herbarium, Deparment

of Biological Sciences, Quid-e-Azam University, Islamabad for record.

*Data Collection*

A structured instrument was used to collect data along with some in-depth semi-structured interviews. A total of 200 individuals interviewed were community elders, shephereds, indigenous pharmacists (hakims) or notables of age 60 and above. Identification and selection of individuals was made randomly and using snow ball survey technique. Followed by the questionnaire test in the field, floro-fungal utilization were grouped into nine (9) categories i.e. medicinal plants (MD, human and veterinary), fuel wood (FW), food (FD, edible fruits, bread and vegetables), fodder (FDR), oil producing (OL), condiments (CND), timber (TMB) yielding, cash crops (CA) and others (OT).

*Comparative Use Score*

comparative use scores (CUS) has been used as a technique to assess the scope of usage. Scores are a representation of species usage diversification base. Each plant use category (total nine) was allotted 1 value. Multiple uses were recorded accordingly. Each plant species therefore fell in different ranges between 1-9. Value 9 means the versatile use of that specific plant species in all 9 categories and 1 means least usage and limited to only one category.

**Results and discussion**

A total of 108 species belonging to 84 genera from 37 families were documented. 37 species out of 108 belonging to 38(35.45%) families were found medicinal (fig.3). Similarly, species used for food purposes by the indigenous communities were recorded 45 (41.6%), whereas 102 (94.4%) species are used for fodder and forage, 24 (22.22%) species are grown as their cash crops, 19 (17.59%) species are used as timber wood, 7 (6.48%) species are commonly used for oil extraction and 10 (9.25%) species are in used as condiments.(Fig.1)

**Table 1.** Ethnobotanical uses of non-medicinal plant species.

| Local Name | Species | FW | MD | FD | FDR | OL | CND | TMB | CA | OT | CUS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bukpa | *Allium sativum L.* | - | √ | √ | √ | - | √ | - | - | - | 4 |
| Ghashoo | *Allium cepa* | - | √ | √ | √ | - | √ | - | √ | - | 5 |
| Daraw | *Pistacia mutica* | √ | √ | – | √ | – | – | – | – | √ | 4 |
| Ishkeen | *Berberis lycium* | √ | √ | – | √ | – | – | – | – | √ | 4 |
| Xuxi | *Betula utilis D.Don* | √ | - | - | √ | - | - | √ | √ | - | 4 |
| Kawam | *Brassica campestris L.* | – | – | √ | √ | – | – | – | – | – | 2 |
| BandGobi | *B. oleracea var. capitata* | – | – | √ | √ | – | – | – | – | – | 2 |
| Phul Gobi | *B.oleracea var. botrytis* | – | – | √ | √ | – | – | – | – | – | 2 |
| Un known | *Capsella bursa-pastoris* | – | – | – | √ | – | – | – | – - | – | 1 |
| Moolo | *Raphanus sativus* | – | – | √ | √ | – | – | – | √ | – | 3 |
| Thoonch | *Cannabis sativa L.* | √ | √ | √ | √ | √ | – | – | – | – | 5 |
| Chopir | *Capparis spinosa L.* | √ | √ | – | √ | √ | √ | – | – | – | 5 |
| Birghal | *Stellaria sp.* | – | – | √ | √ | – | – | – | – | – | 2 |
| Fophoos | *Kochia scoparia* | – | – | – | √ | – | – | – | – | √ | 2 |
| Groii | *Kochia indica* | – | – | – | √ | – | – | – | – | – | 1 |
| Kunoaw | *Chenopodium album* | – | √ | √ | √ | – | – | – | – | – | 3 |
| Buldar | *Atriplex tatarica* | – | – | – | √ | – | – | – | – | – | 1 |
| Hamango | *Un identified* | – | – | – | √ | – | – | – | – | – | 1 |
| Xoon | *Artemisia maritima* | √ | √ | – | √ | – | – | – | – | √ | 4 |
| Shikinachi | *Taraxacum officinale* | – | – | √ | √ | – | – | – | – | – | 2 |
| Ja'chir | *Echinops echinatus* | – | – | – | √ | – | – | – | – | – | 1 |
| Pong | *Carthamus tinctorius L.* | √ | √ | - | √ | - | √ | - | - | √ | 5 |
| Suriphonar | *Helianthus annuus* | √ | - | √ | √ | √ | - | - | - | - | 4 |
| Her'gal | *Convolvulus arvensis* | - | - | - | √ | - | - | - | - | - | 1 |
| Ho'sar | *Cucurbita pepo* | - | - | √ | √ | - | - | - | √ | - | 3 |
| Ho'sar | *C. maxima* | - | - | √ | √ | - | - | - | √ | - | 3 |
| Ghone | *Cucumis melo* | - | - | √ | √ | - | - | - | - | - | 2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lawo | *Cucumis sativus* | - | - | √ | √ | - | - | - | - | - | 2 |
| Bowar | *Citrullus vulgaris* | - | √ | √ | √ | - | - | - | - | - | 3 |
| Chilli | *Juniperus macropoda* | √ | - | - | - | - | - | √ | - | - | 2 |
| Kil Char | *Carex sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Chhanso | *Hippophae rhamnoides* | √ | √ | √ | √ | - | - | - | - | - | 4 |
| Ghundair | *Elaeagnus angustifolia* | √ | √ | √ | √ | - | - | √ | - | √ | 6 |
| Sopat | *Ephedra gerardiana* | - | √ | √ | - | - | - | - | - | √ | 3 |
| Aachow | *Juglans regia L.* | √ | √ | √ | √ | √ | - | √ | √ | √ | 8 |
| Bundoo | *Mentha sylvestris L.* | - | √ | - | √ | - | √ | - | - | - | 3 |
| Podina | *Mentha spicata L.* | - | √ | √ | √ | - | √ | - | - | - | 4 |
| Tumuro | *Thymus serpyllum* | - | √ | √ | √ | - | - | - | - | - | 3 |
| Sonphonar | *Lotus corniculatus* | - | - | - | √ | - | - | - | - | - | 1 |
| Hapoocho | *Astragalus psilocentros* | √ | - | - | √ | - | - | - | - | √ | 3 |
| Daso Kukunori | *Astragalus sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Pushool | *Sophora mollis* | √ | - | - | √ | - | - | - | - | √ | 3 |
| Kikar | *Rubinia pseudo-acacia* | - | - | - | √ | - | - | - | - | - | 1 |
| Ishpit | *Medicago polymorpha* | – | √ | – | √ | – | – | – | – | – | 2 |
| Jangli Shaftl | *Trifolium pratense L.* | - | - | √ | √ | - | - | - | - | - | 2 |
| Rabong | *Phaseolus lunatus* | - | - | √ | √ | - | - | - | - | - | 2 |
| Gulgal | *Cladonia sp.* | - | √ | - | - | - | - | - | - | √ | 2 |
| Human kach | *Linum strictum* | - | - | - | √ | - | - | - | - | - | 1 |
| Human | *L.usitatissimum* | √ | √ | √ | √ | √ | √ | - | - | - | 6 |
| Bhindi | *Abelmoschus esculentus* | √ | - | √ | √ | - | - | - | - | - | 3 |
| Shae Maroch | *Morus alba L.* | √ | √ | √ | √ | - | - | √ | √ | √ | 7 |
| Kini Maroch | *M. nigra* | √ | √ | √ | √ | - | - | √ | √ | √ | 7 |
| Fhaak | *Ficus carica L.* | √ | √ | √ | √ | - | - | √ | - | √ | 6 |
| Dha'nu | *Punica granatum* | √ | √ | √ | √ | - | - | √ | √ | - | 6 |
| Mardakhav | *Papaver somniferum* | - | √ | - | √ | - | - | - | - | - | 2 |
| Sas'per | *Bergenia stracheyi* | - | √ | - | √ | - | - | - | - | - | 2 |
| Shiltive | *Plantago major* | - | √ | - | √ | - | - | - | - | - | 2 |
| Shasher | *Avena sativa L.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Agrostis canina L.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *A. pilosulaTrin.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Agropyron* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Aristida cyanantha* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Bromus sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Cynodon dactylon* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Deschampsia sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Dichanthium annulatum* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Eragrostis cilianensis* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Festuca altaica Trin.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *F. gigantea (L.) Vill.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *F. kashmiriana Stapf* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *F. pumila Du.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *F. rubra L. var. rubra* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *F. valesiaca* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Hordium sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Lolium perenne* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Paspalidium sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Phleum sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Kawch | *Poa sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Frowo | *Saccharum sp.* | - | - | - | √ | - | - | - | - | - | 1 |
| Maka'yee | *Zea mays* | - | √ | √ | √ | - | - | - | - | √ | 4 |
| Ghoom | *Triticum aestivum* | - | - | √ | √ | - | - | - | - | - | 2 |
| Baraw | *Fagopyrum esculentum* | - | √ | √ | √ | - | - | - | - | √ | 4 |
| Chontal | *Rheum emodi* | - | - | - | √ | - | - | - | - | - | 1 |
| Mor'gush | *Clematis baltistanica* | - | - | - | √ | - | - | - | - | - | 1 |
| Ghulab | *Rosa sp.* | √ | - | - | √ | - | - | - | - | - | 2 |
| Shing'gai | *Rosa webbiana Wallich.* | √ | - | - | √ | - | - | - | - | - | 2 |
| Jui | *Prunus armeniaca* | √ | √ | √ | √ | √ | - | √ | √ | - | 7 |
| Ghulaice | *P.avium (L.) L.* | √ | - | √ | √ | - | - | √ | √ | √ | 6 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Badam | *P. amygdalus* | √ | - | √ | √ | √ | - | √ | √ | - | 6 |
| Alo'bukhara | *P. bokhariensis* | √ | - | √ | √ | - | - | √ | √ | - | 5 |
| Chukunar | *P. persica* | √ | - | √ | √ | - | - | √ | √ | √ | 6 |
| Peso | *Pyrus communis* | √ | - | √ | √ | - | - | √ | √ | √ | 6 |
| Phala | *Malus pumila* | √ | - | √ | √ | - | - | √ | √ | √ | 6 |
| Tu'raq | *Populus alba* | √ | √ | - | √ | - | - | √ | - | √ | 5 |
| Jerpa | *P. nigra / P. ciliata* | √ | √ | - | √ | - | - | √ | - | √ | 5 |
| Bew | *Salix tetrasperma Roxb.* | √ | - | - | - | - | - | √ | - | √ | 3 |
| Mu'choor | *Salix babylonica L.* | √ | - | - | - | - | - | √ | - | √ | 3 |
| Aloo | *Solanum tuberosum* | - | - | √ | √ | - | - | - | √ | √ | 4 |
| Balogan | *Lycopersicon esculentum* | - | - | √ | √ | - | √ | - | - | - | 3 |
| Ma'rooch | *Capsicum annuum L.* | - | - | - | √ | - | √ | - | √ | - | 3 |
| Dhatura | *Datura stramonium L.* | - | √ | - | - | - | - | - | - | - | 1 |
| Naski | *Coriandrum sativum* | - | √ | √ | √ | - | √ | - | √ | - | 5 |
| JangliGhchon | *Daucus carota L. var. A* | - | √ | - | √ | - | - | - | - | - | 2 |
| Gha'chon | *Daucus carota L.* | - | - | √ | √ | - | - | - | - | - | 2 |
| Lilo | *Viola serpens* | - | - | - | √ | - | - | - | - | - | 1 |
| Zuwach | *Vitis vinifera L.* | √ | - | √ | √ | - | - | - | √ | - | 4 |
| Supandur | *Peganum harmala* | - | √ | - | √ | - | - | - | - | √ | 3 |
| Hukgukuris | *Tribulus terrestris L.* | - | √ | - | √ | - | - | - | - | | 2 |

Among 37 families Cupressaceae and Ephedraceae were two Gymnospermic families representing one species each i.e., Juniperus macropoda and Ephedra sp. respectively. No traditional use of Algae, Bryophytes and Pteridophytes was observed. Fungi except many pathogenic and non-edible species, represented by Helvelaceae, a single family with a single species, i.e., *Morchella esculenta* (Linn.). A single *Cladonia* sp. from Lichens was found in traditional use.

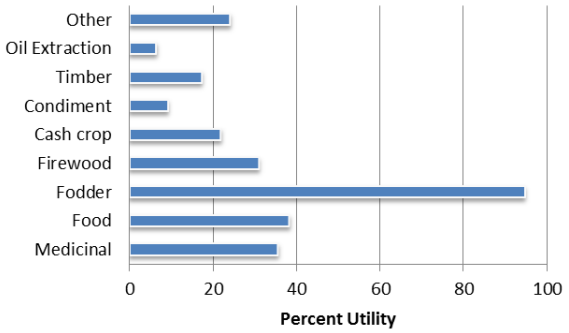


**Fig. 1.** Use categories of species and their utilization percentage.

Angiosperms are major part of livelihood source and ethnobotany in the area comprising upon 34 families. Among these, 3 families were Monocotyledonous i.e. Cyperaceae, Alliaceae and Poaceae. Family Poaceae is the largest family among all. 31 families were Dicotyledonous and Rosaceae stood first (1st) with 9 species and Leguminosae on second (2nd) representing 8 species, Compositae on third (3rd) with 6 species and Cucurbitaceae, Brassicaceae and Chenopodiaceae with 5 species each. Umbelliferae, Salicaceae and Solanaceae with 4 representatives each, Moraceae and Labiatae with 3 species each, Linaceae, Polygonaceae, Elaeagnaceae and Zygophyllaceae with 2 species each, while the remaining 15 families were represented by only one species each (Table).

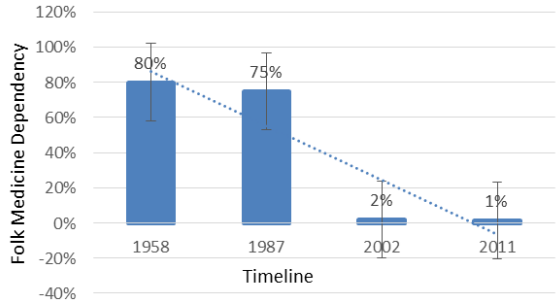


**Fig. 2.** Folk Medicine Declining Linear Trend.

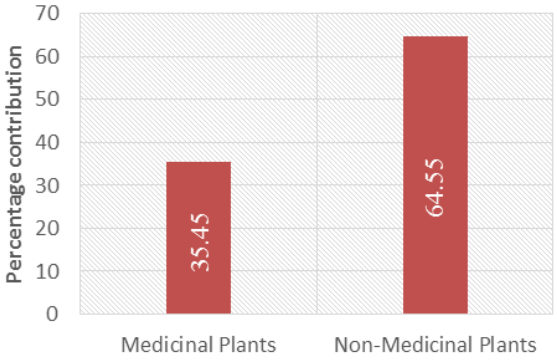


**Fig. 3.** Medicinal and Non Medicinal Species.

Comparative utilization scores show that *Juglans regia L.* (CUS=8) is the most versatile plant species used followed by *Morus alba L., Morus nigra* and *Prunus armeniaca* (CUS=7) which are more common and possess diverse uses. *Elaeagnus angustifolia, Linum usitatissimum, Ficus carica L., Punica granatum, Prunus avium (L.) L., Prunus amygdalus, Prunus persica, Pyrus communis* and *Malus pumila* showed 3rd major plant species for their wide and important utilization having 6 CUS. (Fig.4 and 5)

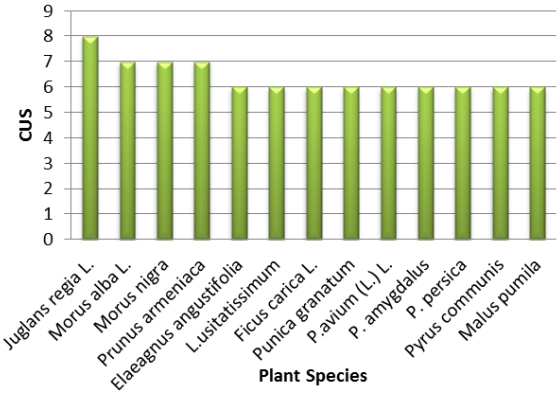


**Fig. 4.** Comparative Utility Scores (CUS) of non Medicinal plant Species.

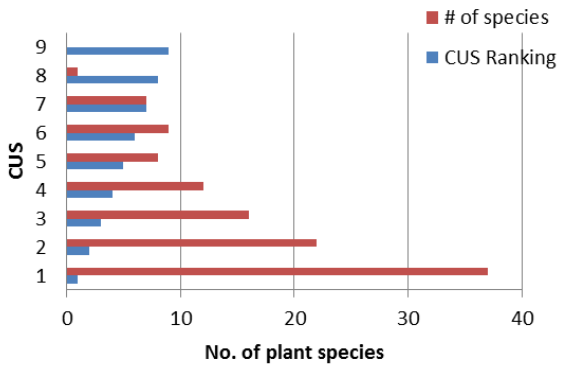


**Fig. 5.** Comparative Utility Scores vs. no. Of Species.

Contrary to the communities' 80% dependency on natural resources for folk medication in late 50s (Hocking, 1958) only 1.4% of people (shepherds, Tabibs and elders) depend on folk medication (Fig. 2). Detailed usage recorded is presented with CUS..

**Abrreviations**

FW: Fire Wood, MD: Medicinal, FD: Food, FDR: Fodder, OL: Oil Extraction, CND: Condiments, TMB: Timber, CA: Cash, OT: Other Uses In the study area most of the people depend on agriculture, agroforestry and mountain resources but the trend has diverted the attention away from the indigenous wisdom. Rapid inclination towards allopathic medicines has alienated folk medication which may be an unrepairable loss. Khan and Khatoon, 2007 reported the same from Haramosh and Bagurot valleys in Gilgit-Baltistan. Although non-governmental organizations have encouraged social forestry and agro-forestry but people continue to extract natural resources unwisely from the mountains and associated pastures. In the area, as such, there is no conservation efforts are made to save important medicinal plant species from their extinction.

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