Ethnobotanical Leaflets 13: 195-202. 2009.

Wild Edibles of Kishtwar High Altitude National Park in Northwest Himalaya, Jammu and Kashmir (India)

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Issued 30 January 2009

ABSTRACT

The use of wild edible plants can contribute vitamins, protein and fat to the human diet besides being an important source of cash-earning to the locals. Spread over an area of 425 km^2, Kishtwar High Altitude National Park lies between 33° 20′ to 34º 40′ North latitude and 75º 40′ to 76º 10′ East longitude. A sizable area of the National Park is inhabited by the indigenous population. The area of the National Park includes 35 villages with about 20000 human population besides nomadic Gujjar and Bakerwals who bring their sheep and cattle for grazing during summer. The economically weak populace of the area is mostly dependent on the agriculture and the wild resources for their day today needs. This paper presents information on the edibility of 50 plants species used traditionally by local inhabitants in Kishtwar High Altitude National Park (KHANP). Majority of plant species belong to angiosperms (42 species) followed by gymnosperms (2 species) and Pteridophytes (2 species), whereas 4 species belong to fungi. As for as the edibility is concerned majority of the plant species (21 species) are exploited for fruit, 19 serve as vegetables, 4 species as flavoring agents (spices), roots and/or leaves of 3 species are eaten as raw, 3 species as tea substitute, whereas 2 species are used in making special drinks. Edible oils are obtained from the kernels of *Juglans regia* and *Prunus armeniaca* which are served with meals as such or used as cooking oil. Some of these species also play an important role in income generation for most of the families living in KHANP.

INTRODUCTION

This view that the rural household is dependent on forest resources is a well-shared one among researchers and development practitioners. Studies from around the world illustrate how wild resources often form an integral part of livelihood (Scoones et al., 1992). Wild resources provide materials for utensils and construction, and contribute to improved diets and health, food security, income generation, and genetic experimentation. In developing countries, rural populace who mainly comprise of herders, shepherds or other economically marginalized sections of the population use forests for grazing, firewood collection and numerous other subsistence needs (Kothari et. al., 1989; van Shaik et. al., 1997; Sabarwal and Ranagarajan, 2003). Understanding the local people's indigenous knowledge in relation to biodiversity/resource management is one of the key issues for the development in present times (Kunwar and Duwadee, 2003). In recent years, there has been increasing interests to understand the contribution that forest resources make to local employment, income and the wellbeing of rural communities (Arnold and Townson 1998; Mamo et al. 2007). However, due to changing perception of the forest dwellers, commercialization and socio-economic transformation all over the world, there has been a general observation that the indigenous knowledge on resource use has degraded severely (Gadgil et. al., 1993; Silori and Rana, 2000). One of the most critical issues on the national and global agenda is the need to preserve biodiversity for future generations while trying to understand and document the indigenous knowledge of resource management practices (Farooque et. al., 2004). The earth summit in Rio de Janeiro in 1992, firmly acknowledged the role of indigenous knowledge in biodiversity conservation, especially under article 8j, thus promoting its use as a new norm in environmental management (Cormier-Salem and Roussel, 2002). The importance of ethno-biological knowledge for suggesting new paths in scientific research, for conservation monitoring or for understanding ecological processes, has received much attention in resource management (Berkes et. al., 2000; Huntington, 2000; Olsson and Folke, 2001). International agencies such as the World Wildlife Fund (WWF) and UNESCO, in the context of their joint program, the people and plant

initiative, have also promoted research on ethno-botanical knowledge, as well as integration of people's perceptions and practices in resource management at local level (Cunningham, 2001).

It has been estimated that 46% of world's poor live in South Asia (Bhattarai, 1998) of which 75 million dwell Himalayas (Dutta and Pant, 2003) and the biomass extraction is most widespread pressure on forests where rural people significantly depend for their household and livelihood needs (Chopra, 1997; Hedge and Enlers, 2000; Pattanayak et. al., 2003) and income generation through the sale of wild harvested materials (Hamilton, 2004). Wild edible plants are major source of food for tribal inhabitants of forests. About 1,000 species of these plants provide sustenance to tribal inhabitants in India (Ravikiran, 2008). Knowledge of these plants is based on belief, observation and a rich wild edible plant history. In remote rural settlements where vegetable cultivation is not practiced and market supplies are not organized, local inhabitants depend on indigenous vegetables, both cultivated in kitchen gardens and wild, for enriching the diversity of food. Knowledge of such foods is part of traditional knowledge which is largely transmitted through participation of individuals of households (Misra, 2008). Wild foods are valuable sources of energy and micronutrients in the diets of isolated communities. Further, such plants may serve as income source and may be marketed or traded locally, regionally, even internationally, and the primary importance of edible wild species during periods of drought and or social unrest or war is well documented (Grivetti, 1978, Agrahar-Murugkar and Subbulakshmi, 2005). The most important nutrients present in plants are: carbohydrates, such as the starch and free sugars, oils, proteins, minerals, ascorbic acid, and the antioxidant phenols, such as Chlorogenic acid and its polymers (Ekanayake and Nair, 1998; Ali and Deokule, 2009).

Study Area

Spread over an area of 425 km^2, Kishtwar High Altitude National Park (KHANP) is situated in the North of Kishtwar town in newly created district Kishtwar of Jammu and Kashmir State (India). The area of Kishtwar High Altitude National Park lies between 33° 20′ to 34º 40′ North latitude and 75º 40′ to 76º 10′ East longitude. Being situated at an altitude of 1500-6500 m, the climate is temperate

with severe winters and moderate summers. It generally confirms to the sub-Mediterranean type and depends upon the duration and magnitude of precipitation and temperature. The KHANP harbours 35 villages with about 20000 human population apart from the nomadic population who visit highlands of the area with their livestock during the summer. The indigenous populace is very much dependant on the wild resources of National Park for day to day needs. One of the reasons for their continued dependence on wild resources is the tough terrain, lack of motarable roads and electricity.

Materials and Methods

Out of the 35 villages present in the National Park 20 villages were selected for the study. To assess the traditional knowledge on wild plant edibles, frequent interactions and discussions were made with the local villagers, which included farmers, herdsmen, shepherds, housewives and children, and further supplemented by watching their daily routine, food habits, wild food supplements. The indigenous knowledge received from them was noted in special field books. Live specimens and available photographs were shown to them for local identification. Plants collected from Kishtwar High Altitude National Park were dried, preserved and identified with the help of available literature (Hooker, 1872-1897; Anonymous, 1993; Sharma and Kachroo, 1983; Swami and Gupta 1998; Singh and Kachroo, 1994; Polunin and Stainton, 1997)). Further identification was done by matching the collected plant specimen with herbarium sheet lying in the Herbarium Department of Botany University of Jammu, Jammu.

Results and discussion

The local populace of the KHANP is economically weak and the area is not connected by roads which remains cut off for 3-5 months from rest of the country during winters. The scarcity of the green vegetables is a common feature; the remedy is provided by wild edibles which are cooked fresh during summers and are dried for use in winters. The use of wild edible plants can substantiate vitamin, protein and fat contents in the human diet besides being an important source of cash-earning to these

locals. During present work 50 plant species distributed among 33 families have been observed to be used as wild edibles by the indigenous people in KHANP. Rosaceae and Asteraceae with difference, the most frequently encountered families with 8 and 4 species respectively, whilst, Berberidaceae, Polygonaceae, Apiaceae, Brassicaceae, Liliaceae, Moraceae and Dryopteridaceae follow with 2 species each. Other 24 families have single representation in edible flora of KHNP. The wild edible plants reported during the course of study with their botanical name arranged alphabetically, local name, family, part used and preparation are shown in table 1. Herbs make up the highest proportion of wild edible species, followed by shrub, trees and fungi. Majority of plant species belong to angiosperms (42 species) followed by gymnosperms (2 species) and Pteridophytes (2 species), whereas 4 species belong to fungi. As for as the edibility is concerned majority of the plant species (21 species) are exploited for fruit, 19 serve as vegetables, 4 species as flavoring agents (spices), roots and/or leaves of 3 species are eaten as raw, 3 species as tea substitute, whereas 2 species are used in making special drinks. Edible oils are obtained from the kernels of *Juglans regia* and *Prunus armeniaca* which are served with meals as such or used as cooking oil. Seeds of *Pinus gerardiana* and *Bunium persicum*, nuts of *Corylus cornuta, Juglans regia* and fruitification of *Morchella esculenta, Geopora sp., Pleurotus sp.* and *Rhizopogon sp.* are sold in the market and play an important role in income generation for most of the families living in KHANP. Among the 19 species used as wild vegetables 7 species are cooked fresh 11 species are cooked both fresh as well as after drying for winters where as only one species is cooked only after proper processing and drying.

Table-1:- wild edible plants used by local populace in Kishtwar High Altitude National Park

Botanical Name	Family	local Name	Part used and preparation
Allium roylei Stearn	Alliaceae	Bazun	dried leaves used as spices
Berberis aristata DC.	Berberidaceae	Khumlai	fruit is edible
Berberis lycium Royle	Berberidaceae	Khumlai	fruit is edible
Bistorta amplexicaulis (D. Don) Greene	Polygonaceae		roots used as a tea substitute
Bunium persicum (Boiss.) B. Fedtsch.	Apiaceae	Zoor	seeds used as spices and condiment
Cannabis sativa L.	Cannabaceae	Bhange	leaves used in sedative drinks
Capsella bursa-pastoris (L.) Medik.	Brassicaceae	Khathkram	leaves cooked as vegetable
Celtis australis L.	Ulmaceae	Breng	fruit is edible
Cirsium arvense (L.) Scop.	Asteraceae	Kandmool	roots eaten as raw

Colocasia esculenta (L.) Schott	Araceae	Alvathur	leaves cooked as vegetable
Coriaria nepalensis Wall.	Coriariaceae	Hang	fruit is edible
Corylus jacquemontii Decne.	Corylaceae	Virvoin	kernels are edible
Crataegus songarica K. Koch	Rosaceae	Khring	fruit is edible
Diplazium esculantum (Retz.) Sw.	Dryopteridaceae	Vani	fronds cooked as vegetable
Diplazium frondosum	Dryopteridaceae	kakhish	young leaves and fronds cooked as vegetable
Dipsacus inermis Wall.	Dipsacaceae	wapal hakh	leaves cooked as vegetable
Duchesnea indica (Andrews) Focke	Rosaceae	sarpingdach	fruit is edible
Elaeagnus umbellata Thunb.	Elaeagnaceae	Goain	fruit is edible
Eremurus himalaicus Baker	Liliaceae	Hulla	leaves cooked as vegetable
Ficus palmata Forssk.	Moraceae	Fag	fruit is edible
Foeniculum vulgare Mill.	Apiaceae	Fakhbaidan	seeds used as spices and condiment
Fragaria nubicola Lindl. ex Lacaita	Rosaceae	Ingdach	fruit is edible, roots used as tea substitute
Geopora sp.	Pyronemataceae	Kancuch	fruitification cooked as vegetable
Juglans regia L.	Juglandaceae	Dun	kernels edible, catkins cooked as vegetable
Malva neglecta Wallr.	Malvaceae	Sonchal	leaves cooked as vegetable
Mentha arvensis L.	Lamiaceae	Pudun	leaves used as spices and condiment
Morchella esculenta	Helvellaceae	Kuch	fruitification edible
Morus serrata Roxb.	Moraceae	Tul	fruit is edible
Nasturtium officinale W. T. Aiton	Brassicaceae		leaves are cooked as vegetable
Oxalis corniculata L.	Oxalidaceae	Dangchuch	leaves eaten as raw
Phytolacca acinosa Roxb.	Phytolaccaceae	Arail	leaves cooked as vegetable
Pinus gerardiana Wall. ex D. Don	Pinaceae	Fita	seeds are edible
Pleurotus sp.	Polyporaceae	sirza	Fruitification cooked as vegetable
Prunus armeniaca L.	Rosaceae	cheir	fruit edible
Prunus cornuta (Wall. ex Royle) Steud.	Rosaceae	Zamb	fruit is edible
Punica granatum L.	Punicaceae	Dan	fruit is edible
Pyrus pashia Buch.-Ham. ex D. Don	Rosaceae	Heind	fruit is edible
Rhizopogon sp.	Rhizopogonaceae	bhav lukhad	Fruitification cooked as vegetable
Rosa webbiana Wall. ex Royle	Rosaceae	jungle gulab	petals used in making drinks
Rubus hoffmeisterianus Kunth & Bouch.	Rosaceae	chanchlai	fruit is edible
Rumex nepalensis Spreng.	Polygonaceae	Habul	leaves cooked as vegetable
Saussurea heteromalla Hand.-Mazz.	Asteraceae	Shublut	roots eaten as raw
Solanum nigrum L.	Solanaceae	Kambai	fruit is edible
Sonchus asper (L.) Hill	Asteraceae	Dudhand	leaves cooked as vegetable
Taraxacum officinale F. H. Wigg. aggr	Asteraceae	Hand	leaves cooked as vegetable
Taxus wallichiana Zucc.	Taxaceae	Pustil	bark used as substitute for tea
Trillidium govanianum	Liliaceae		leaves cooked as vegetable
Urtica dioica L.	Urticaceae	Soi	leaves cooked as vegetable
Viburnum grandiflorum Wall. ex DC.	Caprifoliaceae	Kullam	fruit is edible
Ziziphus oxyphylla Edgew.	Rhamnaceae	Bir	fruit is edible

References

Agrahar-murugkar, D. and Subbulakshmi, G. 2005. Nutritive values of wild edible fruits, berries, nuts, roots and spices consumed by the Khasi tribes of India. *Ecology of Food and Nutrition*, 44: 207–223.

Ali, A. and Deokule, S.S. 2009. Studies on Nutritional values of some wild edible plants from Iran and India. *Pakistan Journal of Nutrition*, 8 (1): 26-31

Annonymous. 1993. Flora of India. Botanical Survey of Inda, Culcutta.

Berkes, F., Colding, J. and Folke, C. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, 10: 1251-1262.

Bhattarai, N.K. 1988. Home herbal remedies of the urban population of Kathmandu valley, Nepal. Journal of Nepalese Pharmacog. *Association*, 15(1-2):13-27.

Chopra, K. 1997. The valuevation and pricing of non timber forest products: conceptual issues and a case study from India. *In*: F. Smith (ed.), Environmental sustainability: practical global implications, pp: 107-140, St. Lucie Press, Florida, USA.

Cormier-Salem, M.C. and Roussel, B. 2002. Patrimonies et saviors naturalists locaux. *In*: J.Y. Martin (ed.), Development durable? Doctrine, pratiques, evaluations, pp: 125-142, IRD, Paris, France.

Cunningham, A.B. 2001. Applied ethnobotany: people, wild plant use and conservation. Earth Scan, London, U.K.

Dutta, A. and Pant, K. 2003. The nutritional status of indigenous people in the Garwal Himalayas, India. *Mountain Research and Development*, 23(3): 278-283.

Ekanayake, E.R. and B.M. Nair, 1998. Proximate composition, mineral and amino acid content of mature *Canavalia gladiata* seeds. *Food Chem.,* 66: 115-119.

Farooquee, N.A., Majila, B.S. and Kala, C.P. 2004. Indigenous knowledge system and sustainable management of natural resources in high altitude society in Kamaun Himalaya. *Ind. J. Hum. Ecol.,* 16 (1): 33-42.

Gadgil, M., Birkes, F. and Folkes, C. 1993. Indigenous knowledge of biodiversity conservation. *Ambio,* 22:151-160.

Grivetti, L.E. (1978). Nutritional success in a semi–arid land: Examination of Tswana agro-pastorals of the eastern Kalahari, Botswana. *Am. J. Clin. Nut,* 31, 1204–1220.

Hamilton, A.C. 2004. Medicinal plants, conservation and livelihoods. *Biodiversity and Conservation*, 13: 1477-1517.

Hedge, R. and Enlers, T. 2000. Forest products and house hold economy: A case study from Mudumalai Wildlife Sanctuary, Southern India. *Environmental Conservation*, 27 (3): 250-259.

Hooker, J.D. 1872-1897. Flora of British India. Vol. I-VII. London.

Huntington, H.P. 2000. Using traditional ecological knowledge in science: methods and applications. *Ecological Applicatons*, 10: 1270-1274.

Kothari, A., Pande, P., Singh, S. and Variava, D. 1989. Management of National Parks and Wildlife Sanctuaries in India: A status report. Indian Institute of Public Adminstration, Delhi, India.

Kunwar, R. M. and Duwadee, N. P. S. 2003. Ethnobotanical notes on flora of Khaptad National Park, far-western Nepal. *Himalayan Journal of Sciences,* 1(1): 25-30.

Misra, S., Maikhuri, R. K., Kala, C. P., Rao, K. S. and Saxena, K. G. 2008. Wild leafy vegetables: a study of their subsistence dietetic support to the inhabitants of Nanda Devi Biosphere Reserve, India. *Journal of Ethnobiology and Ethnomedicine.* http://www.ethnobiomed.com/content/4/1/15

Olsson, P. and Folke. 2001. Local ecological knowledge and institutional dynamics for ecosystem management: a case study of lake Racken watershed, Sweden. *Ecosystems,* 4: 85-104.

Pattanayak, S., Sills, E.O., Mehta, A.D. and Kramer, R.A. 2003. Local use of parks: uncovering use of

household production from forests of Siburet, Indonesia. *Conservation and Society*, 1(2): 209-222.

Polunin, O. and Stainton, A. 1997. Flowers of the Himalaya. Oxford University Press. RAVIKIRAN, G. 2008. A taste of Wild- Undiscovered riches, *The Hindu*. http://www.thehindu.com/thehindu/edu/2005/08/15/stories/2005081500270100.htm

Saberwal, V. And Rangarajan, M. 2003. Battles over nature: Science and politics of conservation. New Delhi, India.

Sharma, B.M. and Kachroo, P. 1983. Flora of Jammu and plants of neighborhood. Dehradun.

Silori, C. S. and Rana, A. R. 2000. Indigenous knowledge on medicinal plants and their use in Narayan Sarovar Sanctuary, Kachchh. *Ethnobotany*, 12:1-7.

Singh, J. B. and Kachroo, P. 1994. Forest flora of Pir Panjal range (Northwest Himalaya), Bishen Singh and Mahendra pal Singh Dehra Dun, India.

Swami, A. and Gupta, B.K. 1998. Flora of Udhampur. Bishen Singh Mahendra Pal Singh, Dehradun, India.

Van Schaik, C.P., Terborgh, J. and Dugelby, B. 1997. The silent crisis: the state of rain forest nature preserves. *In*: R. Kramer, C. van Schaik and J. Jonson, (eds.), Last stand: protected area and defence of tropical biodiversity, pp: 64-89. Oxford University Press, New York, USA.

Scoones, I., Melnyk, M. and Pretty, J.N. 1992. *The Hidden Harvest: Wild Foods and Agricultural Systems: A Literature Review and Annotated Bibliography*. IIED, Swedish International Development Authority and World Wide Fund for Nature, London and Gland.

Arnold, M., & Townson, I. (1998). Assessing the potential of forest product activities to contribute to rural incomes in Africa. ODI Natural Resource Perspectives 37 (November).

Mamo, G., Sjaastad, E., & Vedeld, P. (2007). Economic dependence on forest resources: A case from

Dendi District, Ethiopia. *Forest Policy and Economics*, 9(8), 916–927.