Journal of Applied and Natural Science 6 (1): 164-169 (2014)

JANS

Exploration of wild edible plants used by Gujjar and Bakerwal tribes of District Rajouri (J&K), India

L. R. Dangwal, Tajinder Singh* and Amandeep Singh

Herbarium and Plant Systematic Lab., H.N.B. Garhwal Central University, S.R.T. Campus, Badshahithaul, Tehri-Garhwal-249199 (Uttarakhand), INDIA
*Corresponding author. E-mail:tajkhalsa@gmail.com

Received: January 2, 2014; Revised received: April 15, 2014; Accepted: April 25, 2014

Abstract: The analysis of wild plant exploration was carried out to document the wild edible plants of district Rajouri (J&K), India. The present investigation of wild edible plants were based on extensive and intensive field survey during 2009- 2011. A total of 58 wild edible plant species belonging to 50 genera and 39 families have been reported from the area. Rosaceae was the dominant family that represented 7 taxa, while Brassiceae, Fabaceae, Moraceae and Poaceae represented with 3 taxa each and other 33 families have less representation. Tree make up was the highest proportion of the edible species 28 (41%) followed by 26 were herbs (38%) and 14 were shrubs (21%). Based on the requirements/edibility, majority of the plant species (26 species) are commonly used as fruits, 14 serve as vegetables, 1 species as flavoring agents (spices), roots, tubers of 3 species are eaten as raw and seeds/grains from 8 species for various substitute of food, whereas 2 species are used in making special drinks.

Keywords: District Rajouri, Gujjar and Bakarwal tribe, Wild edible plants

INTRODUCTION

Wild plants play a very vital role in the livelihoods of tribal communities. Wild resources provide materials for utensils and construction, and contribute to improved diets and health, food security, income generation and genetic experimentation (Kumar and Hamal, 2009). In developing countries, rural population 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 Schaik *et al.*, 1997; Saberwal and Ranagarajan, 2003). Understanding the local people's indigenous knowledge in biodiversity/resource management is one of the key issues for the development in present times (Kunwar and Duwadee, 2003).

Wild edible plants are major source of food for tribal inhabitants in forests. Edible parts of wild plants (fruits, flowers, leaves, tubers, inflorescence, roots, tubers, rhizome, etc.) are the nature's gift to mankind; these are not only delicious and refreshing but also the chief source of vitamins, minerals and proteins (Kumar and Hamal, 2009). About 1,000 species of these plants provide sustenance to tribal inhabitants in India (Ravikiran, 2008). In many parts of the world, wild edible plants are reported from forest, designated for extractive resources and managed by local communities for their own and other purposes (Jadhav *et al*., 2011). Food plants serve as alternatives to staple food during the period of food deficit are a valuable supplement for a nutritionally balanced diet and also one of the primary alternative sources of income for many rural and tribal communities (Shrestha and Dhillion, 2006).

The popularity of the wild forms of fruits, flowers and tubers declining continuously due to increasing of their demands for other food products, hence resulted the degradation of traditional knowledge, and it has been considered that, special attention should be paid to these wild food plants, which play a very important role in the livelihoods of the rural as well tribal communities (Jadhav *et al*., 2011).

Earlier, plants and their uses have been explored by several plant explorers in western Himalaya (Kachroo and Nahvi, 1976; Gupta *et al.*, 1982; Kaul *et al.*, 1987; Jain, 1991; Anonmyous, 1994; Lal *et al.*, 1996; Maheswari, 2000; Rashid *et al.*, 2008 and Dangwal *et al.*, 2011, 2012a, 2012b). The present study help us to documents the wild relative of the plants. It provides information about valuable plants on which the tribal community depends. It also provides crop improvement due to their rich nutrient value. It also provides information about nutrient rich diet for tribal and landless communities. The study also helps for the development of silviculture practices in barren area and roadsides for approaching to drought conditions and in food deficient. Keeping above in view the main focus of the present study was to document the some wild edible plants of the district Rajouri used by Gujjar and Bakarwal tribes.

MATERIALS AND METHODS

Study area: District Rajouri is one of the district of

J&K having rich plant diversity with different topography and climate reaches up to alpine zones. It lies in western circle of Jammu division and bounded by district Poonch in North, district Reasi in West and (Mirpur) Pakistan in South and East. It lies in 30^0-50′ N to 33^0-30′ N and 74^0 E to 74^0-10′ E. with an altitudinal range from 370-6000 m above sea level. The total forest area of district Rajouri is 1,267 sq. kms. During the present study, Nowshera and Budhal blocks were selected for the study. Nowshera block (33^0-10′ N and 74^0-18′E) was lies at elevation of 470 m-1200 m above sea level, covering an area of 482 sq. kms and Budhal block (33^0-23′N and 74^0-41′E) was lies at elevation of 1000m – 4660m above sea level and covering an area of 477 sq. kms.

Gujjar and Bakarwal tribes constitute the major segment of the district population and tribal race of J&K state leading the nomadic life who graze their herds of sheep, goat and cattle from south of Pir Panjal range to Alpine pasture of the greater Himalaya in north, using mainly forest resources to fulfill their needs like food, fodder, forage, shelter, fuel wood, fiber and medicines etc. In winter season, they migrate from alpine pasture to subtropical zone of the district (Kalakote, Nowshera, Sunderbani) and in summer season they migrate to alpine zone of Pir Panjal range. The primary occupation of the tribes is livestock and secondary forest product on which they depend for food and fodder.

The extensive and intensive field survey of the slected blocks was made during 2009 to 2011 based on seasonal migration of Gujjar and Bakarwal tribes. During the course of the study, 5 different sites were selected (i.e. Nowshera and Lam in Nowshera block and Khawas, Koteranka and Budhal in Budhal block). Frequently field trips were made twice a month in each site of the blocks. Questionnaire was made for the documentation of information of plants being used as

Table. 1. List of wild edible plants and their parts used as food.

S. N.	Family	Botanical name	Habit	Local name	Flowering and fruiting	Part used as food
1	Acanthaceae	*Pteracanthus alatus* (Clarke)	Herb	-	Fl.: Aug.-Oct. Fr.: Oct.-Nov.	Leaves and flowers occasionally cooked as vegetable.
2	Amaranthaceae	*Amaranthus viridis* L.	Herb	Jungli Ganaer	Fl. & Fr.: Jan.-Dec.	Young shoots and leaves cooked as vegetable.
		Celosia argentea Moq. in DC	Herb	-	Fl. & Fr.: Aug.-Dec	Leaves cooked as vegetable
3	Anacardiaceae	*Rhus parviflora* Roxb.	Shrub or small tree	Kakco	Fl.: May-Jun. Fr.: Jul.-Nov	Fruits are edible.
4	Apocynaceae	*Carissa opaca* Stapy ex.Hains.	Shrub	Granda	Fl. & Fr. Aug.-Dec	Fruits are edible
5	Asteraceae	*Taraxacum officinale* Weber	Herb	Hand	Fl. & Fr: Feb.-Oct.	Cooked as vegetable
6	Balsaminaceae	*Impatiens balsamina* Linn.	Herb	Boti	Fl. & Fr.: Jul.-Oct.	Seed are edible, used as condiments
		Impatiens sulcata Wallich in Roxb.	Herb	-	Fl.: Jul.-Sept. Fr.: Sept.-Oct.	Seeds are edible.
7	Berberidacaea	*Berberis lycium* Royle in Trans. Linn. Soc.	Shrub	Simblu or krumble	Fl.: Apr.-Jun. Fr.: Aug.-Sept.	Ripe fruits edible, also made into sauce.
8	Brassicaceae	*Lepidium sativum* L.	Herb	Sag	Fl.: Feb.-Apr. Fr.: Apr.-May	Young leaves or plant cooked as vegetable.
		Lepidium virginicum L.	Herb	Sag	Fl.: Feb.-Apr. Fr.: Apr.-May	Young shoot occasionally taken as vegetable
9	Caesalpiniaceae	*Bauhinia variegata* L.	Tree	-	Fl.: Feb.-Apr. Fr.: May-Aug.	Young flowers eaten as vegetable.
10	Caprifoliaceae	*Viburnum grandiflorum* Wallich ec DC.	Shrub	Gucjh	Fl.: Mar.-May Fr. & Fr.: Aug.-Oct.	Fruits are edible

Contd…..

S. N.	Family	Botanical name	Habit	Local name	Flowering and fruiting	Part used as food
11	Combretaceae	*Terminalia bellirica* (Gaertner) Roxb.,	Tree	Rheed	Fl.: Apr.-Jun. Fr.: Jun.-Jul.	Fruits kernels edible.
12	Cucurbitaceae	*Coccinia grandis* (L.) Voigt.	Herb	Jangli Kakhdi or khera	Fl.: Jun.-Jul. Fr.: Aug.-Oct.	Fruits are cooked as vegetable.
13	Dioscoreaceae	*Dioscorea bulbifera* L.	Herb	-	Fl.: Jul.-Nov. Fr.: Oct.-Jan.	Tubers are edible as well as medicinal, much liked by wild life.
14	Elaeagnaceae	*Eleagnus parvifolia* wallich ex Royle.	Shrub	-	Fl.: Mar.-Apr. Fr.: Jun.-Sept.	Fruits are edible
15	Ericaceae	*Rhododendron arboreum* Smith	Tree	Harduli	Fl.: Mar.-May Fr. Apr.-Nov.	Flowers eaten raw or made into sauce, jellies, jams or refreshing drinks.
16	Euphorbiaceae	*Phyllanthus emblica* L.	Tree	Ambla	Fl.: Feb.-Apr. Fr.: Sept.-Nov.	Fruits eaten as raw and also made Pickles from fruits
17	Fabaceae	*Indigofera heterantha* Wallich ex Brandis	Shrub	-	Fl.: May-Aug. Fr.: Sept.-Nov.	Flower used as vegetable.
		Vigna vexillata L.	Herb	Jangli Dal	Fl. & Fr.: Aug.-Nov.	Fusiform root edible, sometimes seeds also
		Quercus leucotrichophora A. Camus in Riviera Sci.	Tree	Rhain	Fl.: Mar.-Apr. Fr.: Oct.-Jan.	Fruits are eaten by monkeys and bears and some time by tribal people also.
18	Flacourtiaceae	*Flacourtia indica* (Burm.f.)	Tree	-	Fl.: Feb.-Mar. Fr.; Apr.-Jun.	Fruits are edible.
19	Hippocastanaceae	*Aesculus indica* (Coler. ex Cambess) Hook. in Curtis	Tree	Bankhori	Fl.: Mar.-Apr. Fr.: Jul.-Aug.	Sub-acid pulp (aril) of fruit is edible.
20	Lamiaceae	*Leucus lanata* Benth. in Wallich	Herb	-	Fl.& Fr.: Almost throughout the year	Young shoots cooked as vegetable.
21	Moraceae	*Ficus auriculata* Lour.	Tree	Tose	Fl.: Mar.-May Fr.: Jun.-Jul.	Fruits are edible when ripe and unripe fruits are used as vegetable.
		*Ficus palmat*a Forsk.	Tree	Fagwara	Fr. & Fr.: Jun. -Aug.	Fruits delicious in taste, often taken raw with salt or filled inside the bread.
		Ficus semicordata Buch.-Ham.ex J. E. Smith in Rees.	Tree	-	Fl.: May- Jun. Fr.: Jun.-Oct.	Fruits edible.
22	Myrtaceae	*Syzygium cumini* (L.) Skeels	Tree	Jamun	Fl.: Mar.-May Fr.: Jun.-Jul.	Ripe fruits are edible.
23	Nyctaginaceae	*Boerhavia diffusa* L.	Herb	Bal kakra	Fl. & Fr.: Aug.-Dec.	Leaves and tender shoots occasionally made into vegetable; roots Chewed as energy tonic
24	Oleaceae	*Olea ferruginea* Royle	Tree	Kaaw	Fl.: Feb.-Apr. Fr.: Oct.-Nov.	Fruits edible.
25	Oxalidaceae	*Oxalis corniculata* L.	Herb	Kathimili	Fl. & Fr.: Almost throughout the year	Leaves taken as salad or cooked as vegetable.
26	Pinaceae	*Picea smithiana* (Wallich) Boisser.	Tree	-	Fl. & Fr.: Sept.-Dec.	Seeds are edible
		Pinus roxburghii Sargent	Tree	Chir	Fl. & Fr.: Mar. -Jun.	Seeds are edible.
27	Poaceae	*Echinochloa colona* (L.) Link.	Herb	Gass	Fl. & Fr.: Jul.-Oct.	Grains are edible, prepared as rice.
		Setaria glauca (L.) P. Beav.	Herb	Gass	Fl. & Fr.: Aug.-Nov.	Grains occasionally eaten, often used in local beverages.
		Setaria viridis (L.) P. Beauv.	Herb	Gass	Fl. & Fr.: Aug.-Dec.	The grains are edible.

Contd…...

S. N.	Family	Botanical name	Habit	Local name	Flowering and fruiting	Part used as food
28	Polygonaceae	*Rumex nepalensis* Sprengel	Herb	Hebli	Fl.: Apr.-Aug. Fr.: Aug.-Oct.	Leaves cooked as vegetables
		Fagopyrum dibotrys D. Don.	Herb	Sag ka	Fl.: Jul.-Sept. Fr.: Sept.-Nov.	Occasionally used as vegetable.
29	Puniceae	*Punica granatum* L.	Shrub or small tree	Durni.	Fl.: Apr.-Jun. Fr.: Jul.-Dec.	Fruits are edible, wild ones sour, made into sauce or chatney.
30	Rhamnaceae	*Ziziphus glaberrima* (Sedgwick)	Shrub or small tree	Bari	Fl.: Sept.-Oct. Fr.: Dec.-Feb.	Fruits are edible.
		Ziziphus maurtiana Lam.	Shrub or small tree	Baari	Fl.: Jun.-Aug. Fr.: Feb.-Mar.	Fruits are edible.
31	Rosaceae	*Duchesnea indica* (Andrews)Focke in Engler.	Herb	Jangli akare.	Fl.: Mar.-Jul. Fr.: Oct.-Apr.	Fruits are edible but not much tasty, taken by wild life.
		Fragaria nubicola Lindley ex Lacaita in J. Linn	Herb	Mava	Fl.: Mar.-Apr. Fr.: Jun.-Jul.	Fruits are edible.
		Prinsepia utilis Royle	Shrub	Burkhui	Fl.: Feb.-Mar. Fr.: May-Jun.	Seeds yield oil, used as edible purposes. Fruits are edible
		Pyrus pashia Buch.-Ham. ex D.Don.	Tree	Kathari	Fl.: Feb.-Mar. Fr.: May-Dec.	Ripe fruits are edible.
		Rubus ellipticus Smith in Rees.	Shrub	Akhare	Fl.: Mar.-Apr. Fr.: May-Jun.	Fruits are edible.
		Rubus macilentus Cambess. in Jacquem.	Shrub	Kale Akhare	Fl.: Mar.-May Fr.: Jun.-Sept.	Fruits are edible.
		Rubus niveus Thumb.	Shrub	Akhare	Fl. & Fr.: Feb.-Aug.	Fruits are edible.
32	Sapindaceae	*Dodonea angustifolia* L.	Shrub	Snatha	Fl.: Aug.-Nov. Fr.: Oct.-Jan.	Seeds occasionally edible, liked by monkey.
33	Smilacaceae	*Smilax aspera* L.	Climber shrub	-	Fl.: Jun.-Nov. Fr.: Sept.-Dec.	Occasionally young-leaves are cooked.
		Smilax parviflora Wall	Climber shrub	-	Fl.: Apr.-Jun.	Occasionally young shoots used as vegetable.
34	Solanaceae	*Solanum nigrum* L.	Herb	Kach mach	Fl. & Fr.: Almost throughout the year	Fruits are edible.
35	Tiliaceae	*Grewia opitva* J.R Drummond ex Burret in Notizbl.	Tree	Thaman or Dhaman	Fl.: Apr.-Jun. Fr.: Aug.-Nov.	Fruits are edible and medicinal.
36	Ulmaceae	*Celtis eriocarpa* Decne.	Tree	Kharik	Fl.: Mar.-Apr. Fr.: Sept.-Nov.	Fruits are edible.
37	Urticaceae	*Urtica dioica* L.	Herb	Panayali or Kinji	Fl. & Fr.: Aug. -Apr.	Young branches and leaves used as delicious pot herb, seed oil is edible.
38	Verbenaceae	*Callicarpa macrophylla* Vahal	Shrub	-	Fl.: Jul.-Sept. Fr.: Aug.-Oct.	Fruits edible.
39	Vitaceae	*Ampelocissus rugosa* Wallich	Climber herb	-	Fl.: Apr. - Jun. Fr.: Sept.-Oct.	Ripe fruit is edible

Fl = Flowering & Fr. = Fruiting

food, their available vernacular names etc. from local inhabitants. The collected plants were identified with the help of published floras, literature and monographs *i.e.* Hooker (1906); Sharma and Kachroo (1983); Swami and Gupta (1998); Gaur (1999) and were confirmed from the authentic regional Herbaria at Botanical Survey of India, Northern Circle, Dehradun (BSD), Herbarium of Forest Research Institute (DD), Dehradun and HNB Garhwal University, Herbarium (GUH), Srinagar Garhwal, Uttarakhand and deposited in the Herbarium of Department of Botany, SRT Campus Badshahi Thaul, district Tehri Garhwal.

RESULTS AND DISCUSSION

During the present study, a total of 58 wild edible plants belonging to 50 genera and 39 families were reported (Table 1). Family Rosaceae was the dominant family representing 7 taxa, while Brassiceae, Fabaceae, Moraceae and Poaceae followed with 3 taxa each and other 33 families had less representation. Trees made up the highest proportion of the edible species 28 (41%), followed by 26 herbs (38%) and 14 shrubs (21%).

Earlier, Rashid *et al.* (2008), have reported 57 wild edible plants belonging to 33 families from district Rajouri (J&K), while Kumar and Hamal (2009) reported 50 wild edible plants belong to 33 families from Kishtwar high altitude National Park in northwest Himalaya. Jadhav *et al.* (2011) reported total 50 wild edible plants from Kolhapur district of Maharashtra. Based on the edibility/consumption, 26 wild plant species were used as fruit, 14 plant species as a vegetable, 1 species as flavoring agents (spices), roots as well as tubers of 3 species were eaten as raw, seeds/ grains of 8 species sometimes used as substitute of food, whereas 2 species were used in making special drinks.

Due to the remoteness of these tribal people, they are economically weak due lack of modern facilities. The use of wild edible plants can substantiate vitamins, proteins and fat contents in the human diet besides being an important source of cash earning to these tribes. The fruits of the plant species like *Ficus palmata*, *Punica granatum*, *Phyllanthus emblica*, *Pyrus pashia*, *Rubus ellipticus*, *Syzygium cumini*, *Terminalia bellirica*, *Ziziphus mauritiana* and leaves of *Amaranthus viridis*, *Rumex nepalensis* and flowers of *Rhododendron arboreum* are highly utilized by local people and are highly commercialized in the market. Due to over exploitation, overgrazing, urbanization etc. the status of *Phyllanthus emblica*, *Punica granatum* are at risk.

Conclusion

It was concluded that, the local inhabitants of the study area use 58 plants as wild food plants. These are not only delicious and refreshing but also rich in nutrients such as fats, carbohydrates and proteins. Due to their rich nutrient values most the tribal communities depend on these wild plants for their livelihood as well as commercial purposes. It is also noticed that due to over exploitation of forest recourses by them, these valuable plants are loosing their existence, so it is necessary to develop the socioeconomic as well as sustainable use these forest resources and also to develop agro-based and silvicultural practices in the forest so that these valuable gift of nature do not vanish from the area of J & K.

REFERENCES

Anonmyous (1994). Ethno-botany in India- A attains report (Ministry of Environment and Forests, Govt. of India).

Dangwal, L. R. and Singh, T. (2012a). Comparative vegetational analysis and *Pinus roxburghii* Sarg regeneration in relation to their disturbances in some Chirpine forest of Block Nowshera, district Rajouri, J&K, India, *ISCA J. Biological Sci.*, 1(1): 47-54.

Dangwal, L.R., Singh, A., Sharma A. and Singh, T. (2011). Diversity of weed species in wheat fields of block Nowshera District Rajouri (J&K), *Indian J. Weed Sc.*, 43(1&2): 94-96.

Dangwal, L.R., Singh, T., Singh, A. and Sharma, A.(2012b). Species composition of woody plants in forest of Block Nowshera, District Rajouri (J&K), India. *International Journal of Current Research*, 4 (5):5-10.

Gaur, R. D. (1999). Flora of district Garhwal: North-West Himalaya (with ethnobotanical Notes). Transmedia, Srinagar Garhwal.

Gupta, O.P., Srivastava, T.N., Gupta, S.C. and Badola, D.P. (1982). An ethnobotany and phytochemical screening of higher altitude plants of Ladakh Part II. *Bull. Medico-Ethnobot. Res.*, 1: 301-317.

Hooker, J. D. (1906). *A sketch of the Flora of British India*, Oxford Publication.

Jadhav, V.D., Mahadkar, S.D. and Valvi, S.R. (2011). Documentation and ethnobotanical survey of wild edible plants from Kolapur district. *Recent research in Science and Technology*, 3(12):58-63.

Jain, S.K. (1991). Dictionary of Indian folk medicine and ethnobotany (Deep Publication, New Delhi).

Kachroo, P. and Navi, I.M. (1976). Ethno botany of Kashmiris forest flora of Srinagar and plants of Neighborhood Dehra Dun, India, pp. 239-263.

Kaul, M.K., Sharma, P.K. and Singh. V. (1987). Ethnobotanical studies in North-West and trans-Himalaya IV. Some traditionally tea substitutes from J&K state. *Himalayan Plant J*., 4:23-28.

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.

Kumar, S. and Hamal, I.A. (2009). Wild edibles of Kishtwar high altitude National Park in northwest Himalaya, Jammu & Kashmir (India); *Ethnobotanical Leaflet*, 13: 195-202.

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.

Lal, B., Vats, S.K., Singh R.D. and Gupta, A.K. (1996). *Plants used as ethnomedicine and supplement food by Gaddis of Himachal Pradesh, India*, In**:** Jain S.K. (*eds.*)

Ethnobiology in Human Welfare, New Delhi.

Maheswari, J.K. (2000). (Ed.) Ethno botany and medicinal plants of Indian Subcontinant, (Scientific Publishers, Jodhpur, pp. 672.

Rashid, A., Anand, V.K. and Serwar J. (2008). Less known wild edible plants used by the Gujjar Tribe of District Rajouri, Jammu & Kashmir State, India; *Int. J. Bot*., 4 (2):219- 224.

Ravikiran, G. (2008). A taste of Wild- Undiscovered riches, *The Hindu*.

Saberwal, V. and Rangarajan, M. (2003). Battles over nature: Science and politics of conservation. NewDelhi, India.

Sharma, B.M. and Kachroo, P. (1983). Flora of Jammu and Plants of neighborhood. Bishen Singh Mahendra Pal Singh, Dehradun.

Shrestha, P. M. and Dhillion, S. S. (2006). Diversity and traditional knowledge concerning wild food species in a locally managed forest in Nepal. *Agroforestry Systems*, 66:55–63.

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.