



WILD EDIBLE PLANTS USED BY RURAL PEOPLE OF PONG DAM WILDLIFE SANCTUARY IN DISTRICT KANGRA OF HIMACHAL PRADESH

MAMTA THAKUR¹, PREM KUMAR KHOSLA¹, RADHA¹,
NEERAJ KUMARI¹, ASHOK PUNDIR²

¹School of Biological and Environmental Sciences, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal Pradesh

²School of Mechanical and Civil Engineering, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal Pradesh

ABSTRACT

Wild edible plants are still consumed by a considerable portion of the world's population, ensuring both inexpensive food and nutritional security. The present study was conducted to document a wide variety of wild edible plants and their uses from the Pong Dam Wildlife Sanctuary in district Kangra, Himachal Pradesh. In the present study, ethnobotanical data was collected through a pre-tested questionnaire, direct interviews, group discussions and participatory observations. A total of 29 wild edible plant species were collected from the study site. Of these plants and trees accounted for 55%. Moraceae family was reported highest followed by Combretaceae, Fabaceae and Rosaceae family. Fruits were the most commonly used plant part as compared to others like leaves, seeds, bark, flowers, shoots and wood. During the survey or field visits at the study site, most of the informants were old people including both men and women, who possessed a rich and vast variety of traditional knowledge. They concluded that generally traditional ethnobotanical knowledge passes from one generation to another. However, due to urbanization, change in lifestyle and culture, our present or young generation is not showing much interest in carrying traditional knowledge. Therefore, traditional indigenous knowledge is degrading day by day and is on the verge of extinction. There is a need for protection and conservation of traditional knowledge not only from the current study area but also from different parts of the world. This will help in the protection and conservation of knowledge as well as protection of endangered and exotic plant species.

Key words: Wild plants, traditional knowledge, Kangra, Pong Dam Wildlife Sanctuary, rural people.

INTRODUCTION

India is a developing country, known as the land of villages, with high rates of poverty among rural inhabitants. Despite the increase in economic growth, the country has failed to improve the food security among rural inhabitants living in the Himalayan region (Thakur *et al.*, 2020). The state of Himachal Pradesh, ranging from 30°22' 40" N to 33°12' 40" N latitude and 75°45' 55" E to 79°04' 20" E longitude, blessed with great biodiversity, topography and climatic conditions. These factors make Himachal Pradesh the home of a number of wild edible plants (Kishor *et al.*, 2018). The wild plants in the Himalayan areas play an important role in ensuring and improving the food requirements, providing essential nutritional benefits improving the health of the people (Puri and Kumar, 2018). Hence, the presence of active components such as sterols, tannins, flavonoids, saponins, terpenes and alkaloids



make them a strong competitor for protective food (Radha *et al.*, 2019; Kumar *et al.*, 2021a, b). The rural population of the Himalayan region, such as shepherds, herders and other local tribal communities frequently uses wild edible plants for their food demands and also as a source of additional income by selling in the local markets as fruits, vegetables, and others (Prakash *et al.*, 2021). However, there is a need to understand biodiversity to manage the Himalayan resources. This necessitates resource documenting via ethnobotanical studies, as well as resource conservation and exploitation. Furthermore, traditional knowledge transfer from older to younger generations is no longer feasible; hence, it is critical to document resources, particularly wild edible plants from the Himalayas (Radha *et al.*, 2021). Documentation of edible wild plants, their edible parts and composition, and mode of use can serve as an aid for researchers in better understanding the potential of wild produce in the production of supplementary food and nutraceuticals (Kumar *et al.*, 2021c). The use of wild edible plants as a supplemental food source has a lot of potential (Prasad *et al.*, 2015). This area requires further exploration in order to encourage the domestication of commercially relevant species. Furthermore, it expands the fresh produce market's possibilities and may aid in meeting the current production problem of producing million tons of vegetables for the suggested demand in next coming years (Kishor *et al.*, 2018).

MATERIALS AND METHODS

The Maharana Pratap Sagar reservoir, commonly known as the Pong reservoir, was constructed in 1976 by damming the River Beas in the Himalayan foothills on the Indo-Gangetic plain's northern border. Pong Dam was established as an irrigation reservoir, but the reservoir was classified as a bird sanctuary in 1983 when a large number of birds began migrating there. The Pong Dam reservoir is located in Himachal Pradesh's Kangra region, at an elevation of 335 to 436 m above mean sea level. It has an area of 30, 729 ha and is located between 32°0' 0" North (32.00°) latitude and 76°2' 59" East (76.05°) longitude (Fig. 1). Due to seasonal water level variations, there is some submerged vegetation, but the shoreline does not support much emergent vegetation. The wetland area is 307 km², and the catchment area is 12,650 km², having a length of 41.8 km and a width of 19 km. In general, the area has a subtropical climate (BLI, 2021).

The present survey was done during 2019 to 2021. The main aim of the present study was to document some important wild edible plants from Pong Dam Wildlife Sanctuary of district Kangra located in Himachal Pradesh. Plant samples were collected during the field visits with the help of local informants. For ethnobotanical data collection, informants were selected through the snowball method, while for

interviews and group discussions, a pre-tested questionnaire (Radha *et al.*, 2019b; Thakur *et al.*, 2021) was used. After the collection, the plant samples were identified, following herbarium preparation.

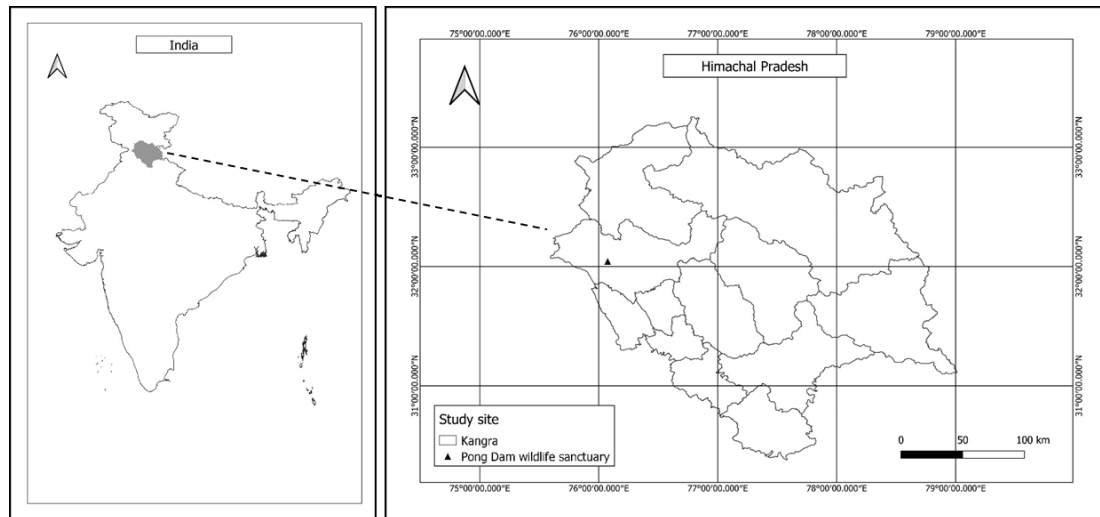


Figure 1. Representation of study site, Pong Dam Wildlife Sanctuary district Kangra, Himachal Pradesh.

RESULTS AND DISCUSSION

Wild edible plant refers to the edible plant species available from the wild, which are not cultivated or domesticated (Bhatia *et al.*, 2018). Globally, wild edible plants are still a vital source of food and income for people living in rural areas of developing countries (Shikov *et al.*, 2017). Wild edible plants play a major role in ensuring food security, diversifying agriculture practices, generating additional resources of income, and reducing malnutrition (Sulaiman *et al.*, 2022). In the present study, a survey was carried out in the Pong Dam Wildlife Sanctuary area located in district Kangra of Himachal Pradesh for the documentation and collection of ethnobotanical data on some important wild edible plants. Puri and Kumar (2018) have reported 50 wild edible plants used by the migratory shepherds while moving from high hills to low hills whereas Thakur *et al.* (2020) have recorded 49 edible plant species used by the people of the Gaddi community. There are many other studies from different parts of Himachal Pradesh as well as around the world (Jhamta *et al.*, 2019; Sreekumar *et al.*, 2020). The use of wild plants as a food source was due to their easy availability, low cost and well known to local people whether edible or not. However, there are many



other benefits of employing wild edible plants in day-to-day requirements (Aloo et al., 2021).

In the present study, a total of 29 wild edible plants belonging to 19 different or same families were recorded (Table 1). The plant species was identified with the help of Botanical Survey of India (BSI), Dehradun, India. Of the collected plant specimens, an herbarium was prepared and submitted to herbarium of Shoolini University, Solan, Himachal Pradesh following proper protocols. Out of the total plant species, 55% were trees, 24% were shrubs and 21% were herbs. The representation of the families was as Moraceae (4 spp.), Combretaceae, Fabaceae and Rosaceae (3 spp. each), Rutaceae (2 spp.), Amaranthaceae, Apocynaceae, Bombacaceae, Boraginaceae, Cannabaceae, Chenopodiaceae, Juglandaceae, Lauraceae, Liliaceae, Lythraceae, Moraceae, Myrtaceae, Polygonaceae, Sapindaceae and Solanaceae (1 spp. each). Out of the 29 species, 55% were trees, 24% were shrubs and 21% were herbs. The data was collected through direct interviews, group discussions, a pre-tested questionnaire, from the selected informants using snowball method. From the recorded information, it was observed that fruits (50%) were the most commonly used edible plant part as compared to leaves (17%), seeds (9%), bark (9%), flowers (9%), shoots (3%) and wood (3%). The native people of the study region were using plants in the form of vegetables, pickles, jams, juices and beverages such as tea. Different edible parts of the plants were either eaten raw or cooked or mixed with others such as flour for the preparation of different local dishes. The plants collected from the study site were also used as medicinal plants for the treatment and prevention of different ailments. Such as, the petals of the rose with sugar were used to make 'gulkand' used for curing mouth ulcers and blisters in the traditional medicinal systems. The fruits of *Aegle marmelos* known as 'bael' were used to make refreshing drinks which also helped in the treatment of various gastrointestinal disorders. The fruits of *Aegle marmelos*, *Morus alba* and *Morus rubra* were used to make refreshing drinks that also helped in the treatment of various gastrointestinal disorders. The fruit powder of *Terminalia bellirica* and *T. chebula* were used for the treatment of stomach pain and constipation. Leaves of *Murraya koenigii* were used as a spice in the Indian kitchen as well as for the treatment of diseases such as diabetes, ulcer and diarrhea (Kumar et al., 2021c; Radha et al., 2021; Thakur et al., 2021). However, the present study referred to the documentation of wild edible plants which were used by the inhabitants of the study area. The documentation of plant species not only helped in the assessment of plant diversity but also helped in the conservation and protection of wild species which were at the risk of extinction. The present study also helped in creating awareness



among the local population for the protection of forest resources for better livelihood and sustainability.

Table 1. Wild edible plants consumed by local people of Pong Wildlife Sanctuary.

Botanical name	Family	Local name	Habit	Voucher no.	Part used	Edible uses
<i>Acacia catechu</i> (L.f.) Willd.	Fabaceae	Khair, Katha	Tree	SUBMS/BOT-3821	Bark, Wood	Extract obtained from the wood is edible. Gum extracted from bark is edible and is used in herbal preparations.
<i>Aegle marmelos</i> (L.) Corrêa	Rutaceae	Baelpatta, Bill	Herb	SUBMS/BOT-3825	Fruits	Ripe fruit is eaten.
<i>Aesculus indica</i> (Wall. ex Cambess.) Hook.	Sapindaceae	Khanor, Bankhor	Tree	SUBMS/BOT-3764	Fruits	Flour is prepared from fruits which is used to prepare desert.
<i>Amaranthus spinosus</i> L.	Amaranthaceae	Chualai	Herb	SUBMS/BOT-3829	Leaves	Leaves are cooked as vegetable.
<i>Asparagus racemosus</i> Willd.	Liliaceae	Satavar, Sansarpali	Shrub	SUBMS/BOT-3831	Shoots	Tender shoots are cooked and consumed as vegetable.
<i>Bauhinia variegata</i> L.	Fabaceae	Kachnar, Karyala	Tree	SUBMS/BOT-3834	Flowers	Flower and flower buds are boiled and used as vegetable.
<i>Bombax ceiba</i> L.	Bombacaceae	Simbal	Tree	SUBMS/BOT-3836	Fruits	Young fruits are cooked and consumed as vegetable.
<i>Cannabis sativa</i> L.	Cannabaceae	Bhang	Herb	SUBMS/BOT-3839	Seeds	Roasted seeds are eaten.
<i>Carissa opaca</i> Stapf ex Haines	Apocynaceae	Karaunda, Garna	Shrub	SUBMS/BOT-3840	Fruits	Ripe fruits are eaten.
<i>Cassia occidentalis</i> L.	Fabaceae	Alon	Shrub	SUBMS/BOT-3841	Seeds	Seeds are pickled and consumed.
<i>Chenopodium album</i> L.	Chenopodiaceae	Bathu	Herb	SUBMS/BOT-3845	Leaves, Seeds	Leaves are cooked as vegetable. Seeds are roasted and used in various traditional dishes.
<i>Cinnamomum tamala</i> (Buch. - Ham.) T.Nees&Eberm.	Lauraceae	Tejptta	Tree	SUBMS/BOT-3846	Leaves	Leaves are used as spice.
<i>Cordia dichotoma</i> G.Forst.	Boraginaceae	Lasura	Tree	SUBMS/BOT-3848	Fruits	Unripe fruits are pickled after removing their seeds.
<i>Ficus palmata</i> Forssk.	Moraceae	Khasra	Tree	SUBMS/BOT-3855	Fruits	Unripe fruits are boiled and used as vegetable. Ripe fruits are eaten.
<i>Ficus racemosa</i> L.	Moraceae	Rumbal	Tree	SUBMS/BOT-3854	Fruits	Unripe fruits are boiled and consumed as vegetable.
<i>Juglans regia</i> L.	Juglandaceae	Akhrot	Tree	SUBMS/BOT-	Fruits,	Fruits are edible.



				3857	Bark, Leaves	Bark and leaves are used to clean teeth.
<i>Morus alba</i> L.	Moraceae	Toot	Tree	SUBMS/BOT-3862	Fruits	Ripe fruits are eaten.
<i>Morus rubra</i> L.	Moraceae	Toot	Tree	SUBMS/BOT-3863	Fruits	Ripe fruits are eaten.
<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Gandhela	Shrub	SUBMS/BOT-3864	Leaves, Fruits	Leaves are used as flavoring agent. Ripe fruits are eaten.
<i>Pyrus pashia</i> Buch. -Ham. ex D. Don	Rosaceae	Kainth	Tree	SUBMS/BOT-3866	Fruits	Ripe fruits are eaten.
<i>Rosa brunonii</i> Lindl.	Rosaceae	Kuja	Shrub	SUBMS/BOT-3869	Flowers	Petals of flowers are used to prepare 'Gulkand'.
<i>Rubus ellipticus</i> Sm.	Rosaceae	Aakhe	Shrub	SUBMS/BOT-3870	Fruits	Ripe fruits are eaten.
<i>Rumex hastatus</i> D. Don	Polygonaceae	Khatmith	Herb	SUBMS/BOT-3871	Leaves	Leaves are eaten.
<i>Solanum nigrum</i> L.	Solanaceae	Makoi	Herb	SUBMS/BOT-4793	Fruits	Ripe fruits are eaten.
<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun	Tree	SUBMS/BOT-3873	Fruits	Ripe fruits are eaten.
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Tree	SUBMS/BOT-3874	Bark	Bark powder is used to prepare tea.
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Behda	Tree	SUBMS/BOT-3875	Fruits	Fruit powder is used to relieve acidity.
<i>Terminalia chebula</i> Retz.	Combretaceae	Harde	Tree	SUBMS/BOT-3876	Fruits	Fruits are pickled.
<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	Jhinjari, Dhai	Shrub	SUBMS/BOT-3879	Flowers	Fresh or sun-dried flowers are mixed with gram flour and spices to prepare locally made pancakes.

CONCLUSION

The present study aimed to document wild edible plants from the Pong Dam Wildlife Sanctuary of district Kangra, Himachal Pradesh. The wild plants are used by the local tribal and non-tribal communities to meet their food demands. Edible plant parts such as leaves, fruits, seeds, bark, flowers, shoot, rhizome etc. were used by the local population. Wild plants were either consumed raw or cooked in the form of vegetables, jams, pickles, juices, tea, chutneys etc. Consumption of wild plants provided supplementary food as well as nutrition such as vitamins, minerals, and amino acids, leading to a healthy lifestyle. Besides their numerous health benefits, traditional knowledge on the use of wild edible plant species was vanishing rapidly. Therefore, there is a need to document the traditional knowledge and take certain



measures and actions for the protection and conservation of traditional knowledge and wild plant species around the world.

ACKNOWLEDGEMENTS

The authors express their gratitude to the rural people of Sanctuary areas for their assistance during the field survey and for sharing their traditional, useful, and worthwhile knowledge of the wild plants found in the study sites.

REFERENCES

- Aloo, S. O., Ofosu, F. K., Kilonzi, S. M., Shabbir, U. and Oh, D. H. (2021). Edible plant sprouts: Health benefits, trends, and opportunities for novel exploration. *Nutrients* **13** : 2882.
- Bhatia, H., Sharma, Y. P., Manhas, R. K. and Kumar, K. (2018). Traditionally used wild edible plants of district Udhampur, J&K, India. *J. Ethnobiol. Ethnomed.* **14** : 01-13.
- Bird Life International (BLI; 2021). Important Bird Areas factsheet: Pong Dam Wildlife Sanctuary. Downloaded from <http://www.birdlife.org> on 24/09/2021.
- Jhamta, R., Puri, R., Sharma, M. L., Khan, S. and Kaur, H. (2019). Traditional knowledge and ways of consumption of wild edible plants by rural communities of Shimla District, Himachal Pradesh (India). *Plant Sci. Today* **6** : 201-207.
- Kishor, A., Kumar, A., Tomer, V., Kumar, V. and Gupta, K. (2018). Wild food plants of Himachal Pradesh: a review. *Plant Arch.* **18** : 2737-2751.
- Kumar, M., Devi, H., Prakash, S., Rathore, S., Thakur, M., Puri, S., Pundir, A., Bangar, S. P., Changan, S., Ilakiya, T. and Samota, M. K. (2021c). Ethnomedicinal plants used in the health care system: Survey of the mid hills of solan district, Himachal Pradesh, India. *Plants* **10** : 1842.
- Kumar, M., Prakash, S., Kumari, N., Pundir, A., Punia, S., Saurabh, V., Choudhary, P., Changan, S., Dhumal, S., Pradhan, P. C. and Alajil, O. (2021a). Beneficial role of antioxidant secondary metabolites from medicinal plants in maintaining oral health. *Antioxidants* **10** : 1061.
- Kumar, M., Puri, S., Pundir, A., Bangar, S. P., Changan, S., Choudhary, P., Parameswari, E., Alhariri, A., Samota, M. K., Damale, R. D. and Singh, S. (2021b). Evaluation of nutritional, phytochemical, and mineral composition of selected medicinal plants for therapeutic uses from cold desert of Western Himalaya. *Plants* **10** : 1429.
- Prakash, P., Kumar, M., Kumari, N., Prakash, S., Rathour, S., Thakur, M., Jamwal, R., Janjua, S., Ali, M., Pundir, A. and Puri, S. (2021). Therapeutic uses of wild plants by rural inhabitants of Maraog region in district Shimla, Himachal Pradesh, India. *Horticulturae* **7** : 343.
- Prasad, S., Rathore, H., Sharma, S. and Yadav, A. S. (2015). Medicinal mushrooms as a source of novel functional food. *Int. J. Food Sci. Nutr. Diet.* **4** : 221-225.



- Puri, S. and Kumar, S. (2018). Diversity and use of wild edible plants by migratory shepherds in the Himachal Pradesh of the western Himalayas, India. *J. Med. Plant Res.* **12** : 601-610.
- Radha, I., Janjua, S., Ali, M., Thakur, M., Jamwal, R., Rathour, S., Kumar, P. A., Kumari, N., Puri, S. and Pundir, A. (2021). Documenting Traditional Knowledge before they are Forgotten: A Study on the Ethnomedicinal uses of Wild Plants by Rural People of Jubbarhatti in District Shimla. *Int. J. Theor. Appl. Sci.* **13** : 37-51.
- Radha, Puri, S. and Kumar, V. (2019a). Phytochemical screening of medicinal plants used by tribal migratory shepherds in Western Himalaya. *Ann. Biol.* **35** : 11-14.
- Radha, S. P. and Pundir, A. (2019b). Survey of wild medicinal plants used by migratory shepherds in summer hill of district Shimla in Himachal Pradesh. *Bio. Bull.* **5** : 18-24.
- Shikov, A. N., Tsitsilin, A. N., Pozharitskaya, O. N., Makarov, V. G. and Heinrich, M. (2017). Traditional and current food use of wild plants listed in the Russian pharmacopoeia. *Front. Pharmacol.* **8** : 841.
- Sreekumar, V. B., Sreejith, K. A., Hareesh, V. S. and Sanil, M. S. (2020). An overview of wild edible fruits of Western Ghats, India. *Genet. Resour. Crop Evol.* **67** : 1689-1693.
- Sulaiman, N., Pieroni, A., Söukand, R. and Polesny, Z. (2022). Food Behavior in Emergency Time: Wild Plant Use for Human Nutrition during the Conflict in Syria. *Foods* **11** : 177.
- Thakur, A., Singh, S., and Puri, S. (2020). Exploration of wild edible plants used as food by Gaddis-A tribal community of the Western Himalaya. *The Sci. World J.* 2020: <https://doi.org/10.1155/2020/6280153>
- Thakur, K. B. D., Guleria, M., Kumar, A., Ali, M., Janjua, S., Kumari, N., Prakash, S., Chandel, A., Kumar, B., Prakash, P. and Puri, S. (2021). Ethnoveterinary Plants used by Rural People of Dagshai Region in District Solan of Himachal Pradesh, India. *Biological Forum – An International Journal* **13(3a)** : 189-209.