

Ethnobotanical knowledge of local communities of Bumdeling Wildlife Sanctuary, Trashiyangtse, Bhutan

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Received 16.05.2011; revised 03.10.2011

This paper discusses the ethnobotanical knowledge of the three ethnic groups, viz. *Sharchogpa*, *Zalakha* speaking people and the Bhutanese of Tibetan origin, that inhabit the wildlife sanctuary. Of the 165 ethnobotanical species used by the communities, 67 are used for treating different diseases while 98 are used for woodcrafts, handicraft, vegetables, fodder, fibres, dying clothes and making tea, etc. Ericaceae with 16 species was found to be the most used plant family. *Ophiocordyceps sinensis* [Berk.] Sacc., was found next most useful to locals as the main source of cash income for the upland dwellers.

Keywords: Bumdeling Wildlife Sanctuary, Traditional Knowledge, *Sharchogpa*, *Zalakha*

IPC Int. Cl.:⁸:A61K 36/00, A61K, A61D 7/00

Bumdeling Wildlife Sanctuary (BWS) located in North-eastern Bhutan with its headquarter in Trashiyangtse was established for protection, utilization and management of natural resources for Gewogs of Khoma (Lhuentse), Sherimung (Mongar) and Bumdeling (Trashiyangtse). It is known for its rich wildlife which is supplemented by the presences of wide number of ethnobotanically important plant species on which most of the residents depend for their livelihood¹. Ethnobotanical species are good source of food and medicine for the rural people²⁻³. Villagers living within or on the fringes of the sanctuary collect forest produce from the area. Construction wood and fuel wood are the most important uses, while vegetables, mushrooms and other edible products are of secondary use, collected mainly for home use. By and large, the conventional cognition on the use of plant resources is decreasing because of shifting attitude for westernized lifestyle and slumping pursuit of newer generations to carry forward the tradition⁴. According to Kala⁵ the ethno botanical knowledge at the moment is mostly confined to rural areas away from modernized localities. So to take an advantage, information to understand the ethno botanical value of the rural people living in BWS was taken during the field visits. Three ethnic groups live in BWS, viz. the *Sharchogpa* speaking people in the South, the *Zalakha* (as explained by the local people of BWS)

speaking people in the middle altitudes and the *Tibetan* speaking people of the alpine zone (they know the values of the plant resources in detail). Therefore, the survey clubbed with other enumerations for management planning, was carried out in the Sanctuary (Fig. 1) with the major objectives to assess the traditional knowledge of ethnic communities associated with the local flora, so that management prescription can be put in place to keep the tradition going.

Further, it was found necessary to document the local knowledge as there was very little documented information on use of natural resources despite visible bartering of bamboo mats, *Dappas*, *Dheyshos* etc., which could have existed long time ago. One of the main objectives of the Sanctuary management is to promote, preserve and protect the cultural heritage of the sanctuary. Therefore, it is befitting that information on ethno botany is collected and incorporated in the plan so that culture is preserved and that the status quo of unique identity of the ethnic communities residing therein is maintained. Through documentation of this data, awareness amongst people will be created on sustainability, market information and species availability, which will ultimately help people as well as the sanctuary management, who has the mandate of striking the balance between conservation and development.

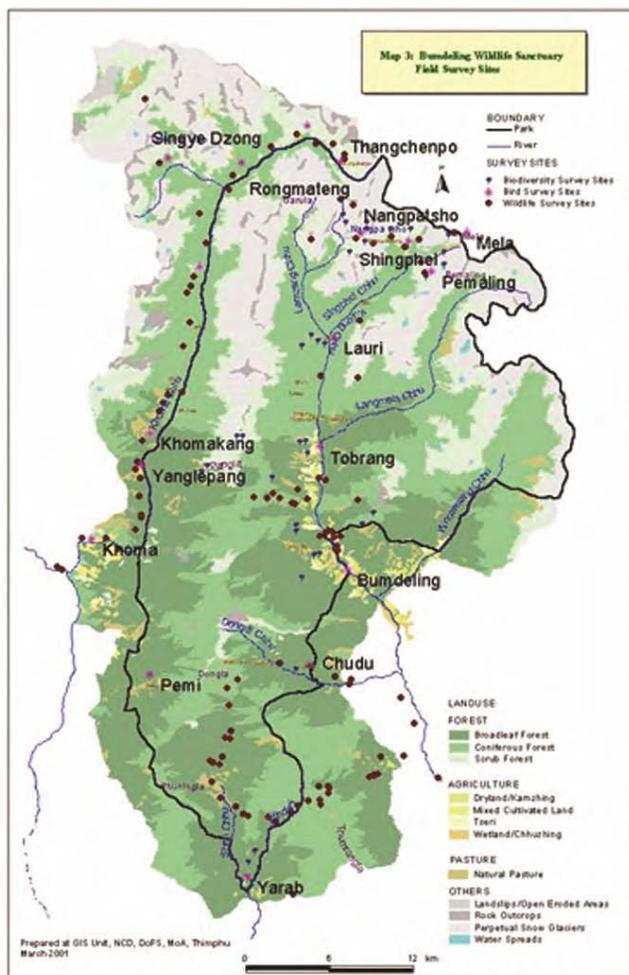


Fig. 1—Field survey sites (Courtesy: BWS management)

Methodology

Data on ethno botanical knowledge of the people were collected opportunistically following semi-structured interviews⁶ from 115 respondents in 23 villages, while carrying out socio-economic surveys, biodiversity surveys and patrolling the forest. Semi-structured interviews contained questions on uses of forest resources as well as on plant parts used for medicine, food, vegetable, agricultural implements, fibres, dyes, and types of diseases cured by the use of plant species. In addition to the surveys, personal observations were made to collect the data on what they use and for what purpose, whenever foresters were on patrolling duties. For most of the information gathered, a formal prior informed consent was taken from the informants while personal observations were at the discretion of the surveyors.

Results and discussion

The study revealed total 165 species of plants belonging to 48 families being used by locals/communities for various purposes. Of these, 67 species are used as medicinal plants whereas 98 species are used for other purposes, *viz.* woodcrafts, handicraft, vegetables, fodder, fibres, dyeing clothes and making tea. The recorded other ethnobotanical species (excluding the ethnomedicinal species) were of various forms, e.g., 39 were tree species, 20 shrubs, 28 herbs, 5 woody climbers, and 6 others. The other categories here include plants with unique uses like *Calamus erectus* Roxb. (Cane), whose shoots and fronds are eaten, *Borinda grossa* (T. P. Yi) Stapleton., a bamboo which is explicitly used for manufacture of mats, baskets and bags, etc. *Bulbophyllum affine* Lindl. whose flowers are eaten as well as raised for show, *Ophiocordyceps sinensis* (Berk.) Sacc., which has very high commercial value, *Cymbidium longifolium* D. Don, which has beautiful flowers for show and *Scurrula elata* (Edgeworth) Danser., a parasite whose leaves are used for making tea leaf for local *suja*. Besides, the surrounding forest resources are used for food, fodder, fibre, woodcrafts, handicrafts, construction of houses, making household and agricultural implements, dyes, and for fire, gums, etc.

For commercial purposes, villagers collect burs, *Daphne* D. Don. bark for making traditional paper, and some amount of bamboo for various products. They also collect some medicinal plants, and cane *viz.*, *Plectocomia himalayana* Griff. (especially in Lhuentse). Some of these products, wooden cups and bowls (locally called *Karshoop* and *Dappas* respectively) are traded with Tibet/China. In order to conserve and maintain the natural populations of some of these ethnobotanical species (especially cane, bamboo and star anise) and as well as to meet their requirements, the three communities of Laber–Kemtsong village in Khoma, Womanang village in Bumdeling and Thilling–Thramo village in Sherimung under the Sanctuary have formed community management groups for cane (*Plectocomia himalayana*), bamboo, (*Yushania* sp.) and Star anise, (*Illicium griffithii* Hook. f. & Thomson), respectively. They also aim to deal with various conservation, development and livelihood issues at community level through sustainable use of these species. A large number of people from these areas depend on forest of BWS and meet their daily

requirements from the surrounding forest resources. The people of the sanctuary are the examples of those who use the surrounding biodiversity to their advantage with great precision. The knowledge which must have come through oral transmission must have been acquired through trial and error over several years^{7,8,4,9,10}. The rural communities derive food and medicines from use of plants⁴. Mr. Minjur, a traditional healer in Soenakhar (Sherimung), uses a large number of plants (which are hardly disclosed) to treat wounds in people, while others who are not proficient like him in medicine were seen using plants for variety of other things.

Of the 48 families recorded from the Sanctuary which are ethnobotanically vital, Ericaceae was found to be the most dominant family with 16 species. Besides the all important uses for timber, food, medicine and agricultural tools, these species of ethnobotanical importance has diverse uses such as fodder, fibres, dyeing clothes and making tea, etc. The number of species used for medicine was found to be maximum (n=67), followed by fuel wood (n = 16), fodder (n=11) and vegetable (n=10) (Fig. 2), excluding the medicinal plants. While plants like *Aconitum ferox* Wall., were used for poisoning the tips of the arrows to hunt wildlife, flowering of plant like *Cardiocrinum giganteum* Wall., is even known to signal the sowing time for rice and millet in the area. Species of *Hedychium* J. Koneg., were found being used for making a material to hold the round end of pots. Species of *Lycopodium* were found being used for washing utensils and insulating the house. Dried leaves of *Pieris formosa* (Wall.) D. Don, are used for smoking while a bamboo species locally called *Tsari Nyugma* of Phunying area is used for blessing the people, the touch of which is considered sacred on an annual religious ritual days of the residents.

Medicinal plants

A total of 67 species belonging to 31 families were documented as medicinal plants most of which happened to be herbs with the exception of *Rhododendron anthopogon* D. Don, and *Rhododendron setusum* D. Don being shrubs. Asteraceae with highest number of species (n= 9) was found to be the most dominant family whose representative species were used in curing diseases followed by Polygonaceae (6 species), Ranunculaceae (6 species), Scrophulariaceae (6 species)

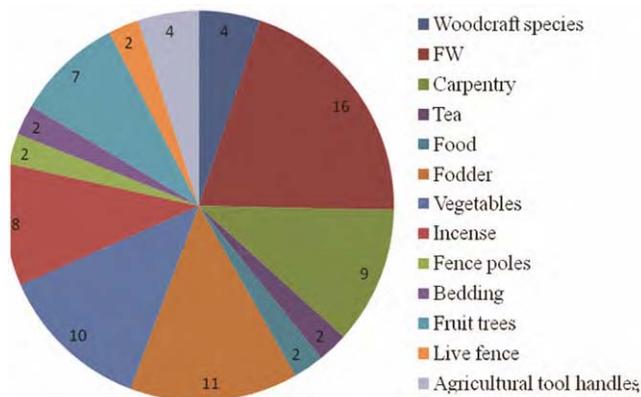


Fig. 2—Number of species in each category of uses excluding medicinal plants

and Gentianaceae (6 species). Different plant parts of these species, such as, root, tuber, leaf, fruit, bark, resin, seed and latex were used as medicine. All parts of some plants are used while in some cases, only roots, or shoots, fruits, seeds and other parts are used (Fig. 3). Fever, bile related disorders and lung diseases, diarrhoea, dysentery, bone fractures, wounds and stomach diseases were among the ailments treated by using these species.

Besides, the fungus *Ophiocordyceps sinensis*, the other most important medicinal plant in southern BWS is *Tsa Awa Doti* (Fig. 4) a ground orchid (*Neottia acuminata* Schlechter). While this plant is treated as a medicine for all kinds of diseases, it is better known as religiously important species because anybody visiting Aja should eat it to purify oneself. A piece of root of this plant and a handful of the *Sechu-Ngechu* (a stone based metal from Pema Yangzong area in Aja) is what one should expect as very important gift from the local residents. This species after proper assessment must be listed on the schedule I (totally protected plants) of Forest and Nature Conservation Act of Bhutan, 1995 as it might go extinct if proper actions are not taken.

Wild food plant species

Rural communities of Shingphel, Longkhar, and Tarphe (Bumdeling Gewog) and Khomakang, Dhengchung and Singye Dzong (Khoma Gewog) are primarily dependant on BWS for wild edible plants and fodder species in addition to medicinal plants. In all total 33 wild edible plant species were documented during present study of which, 22 species were vegetables, 7 fruit trees, 2 eaten raw and 2 species

used for making tea. Almost all parts, viz. fruits, leaf, flower, tuber, rhizome, root and seeds are used as source of food by these local people.

Other ethnobotanical species

Apart from food and medicine, fuel wood, carpentry species, the use of locally made bamboo products like *lho* (mat), baskets, bags, boxes, etc. were found to be manufactured from *Yushania* sp. while wooden containers to churn the milk, and *Palang*, container to keep and carry locally brewed *Arra* was made from *Taxus wallichiana* Zucc. The cane, *Plectocomia himalayana* Griff. shoot production from Kemtsong and Laber area as vegetable need a mention as most of the villagers depend on the cane shoot directly or indirectly to make cash as well as consume it. Once matured, the cane is also used for manufacture of ropes, baskets and other souvenirs of relevance. Another important tree of local importance is star anise *Illicium griffithii* Hook. f. & Thomson., locally called *Sengpasey* or *Woonbatsinang* in Aja area. Fruits of the species are used to make the *Arra* strong and are used as paste and spice for various medicine and edible items. A kilogram of fruit is known to earn them a cash of about Nu. 50.00 (Ngultrum Fifty Only) if sold outside the community. The people of Thilling and Thramo used *Nyssa javanica* (Blume) Wang. and *Alnus nepalensis* D. Don., to make irrigation canals for irrigating their paddy fields. The *cham* (3'-3'11"gbh) sized trees of this species are cored in to make convenient canals and joined to make it long enough to reach the paddy fields and are placed on the cliffs, wherever the natural canals are blocked due to cliffs diverting the stream direction. Other species worth mentioning here are woodcraft species like *Acer campbellii* Heirn.,

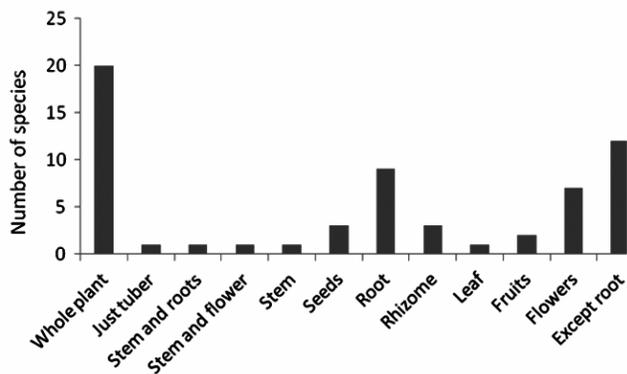


Fig. 3—The number of species with the different part usage with family for medicine

Betula utilis D. Don., *Alnus nepalensis*, etc. of Bumdeling area. Many villagers collect wood burs to make *Dappas* and earn cash. The art of wood-crafting is inherited from generation to generation. However, this trend might be changing with modernization and other available avenues to make a living. The people of Bumdeling are also known for production of *Dheysho* (local handmade paper). They use *Daphne bholua* D. Don to make local paper at their homes and sell them to market. Further, species of *Sorbus* L. and *Rhododendron falconeri* Hook. f., are used as material for packing butter and cheese products.

The study also revealed *Rubia manjith* Roxb. and *Symplocos paniculata* (Thunb.) Miquel., as red and yellow dye, respectively. The natural dyes used by villagers are eco-friendly and do not impinge negative impacts like synthetic dyes^{11 12}. The forest department encouraging the communities to start natural local dye processing units by providing initial financial support may help sustainable ecosystem and environment management as this would help reduce the use of hazardous synthetic products. *Rhus succedanea* L. was found to be used for varnishing the wooden items while *Smilax ferox* Wall. ex Kunth., was being used as drum stick as it can be worked to desired shapes. *Panax pseudoginseng* Wall., famous as a haemostatic herb that both invigorates and builds blood (pers. com with local Botanist) is available in the study area but people do not seem to know about the plant. Thus,



Fig. 4—*Tsa Awa Doti* (Photo: Author)

educating the communities about the potential of the species would be good for use by the people. Poorer sections of the community in higher altitudes use 'Maling bamboo' to make their houses. Arrows and bows made of a bamboo species locally called *Yangka* (*Arundinaria* D. Don sp.) and *Dendrocalamus* Nees., sp. respectively is used while enjoying to celebrate festivals and holidays. *Cannabis sativa*, locally called *Phagpanam* is used to treat wounds in cattle by crushing the leaves to extract liquid from the plant while it is green.

Community ethno botanical species management groups in the sanctuary

In the recent past, the management of ethno botanical species have changed. Traditionally communities managed their species in such a way that they are sustained. But of late, things have changed due to increasing demands in the market. Therefore, locals have become greedier than the past and it is likely that the species will not be sustainable. In order to ensure sustainability of the species, the government has created three community forests in the sanctuary area, one each in Bumdeling, Sherimung and Khoma for bamboo, star anise and cane respectively. This is supposed to reduce over exploitation and increase sustainability. While the result is yet to be seen, the step taken is commendable for sustainable management.

Conclusion

The local people of BWS depend on the forest resources for food, fodder, fibre and medicine, etc., and they collect many ethno botanically important species for their day-to-day activities. The wild medicinal plants, food plant and other ethno botanical species documented by this study should be verified and evaluated as per scientific norms for medicinal effectiveness and nutrition values for their wider recognition. What is needed at the moment is the dissemination of the valuable information about the vital ethno botanical species and knowledge for betterment of society and science. Education and awareness programs for the local people on ethno botanical species are necessary to make them understand the future consequences of nature resource over-exploitation and environmental degradation. The rural communities may also be offered enough resources for their basic necessity so that they are encouraged to harvest sustainably. Instead of

exporting the important ethno botanical species in raw forms, efforts to promote their processing and value addition through formation of user groups should be encouraged at the village level. Development of demand driven agro-techniques for ethno botanical species needs to be initiated¹⁰. The Royal Government should encourage communities to take up ethno botanically useful tree species as agro-forestry species. Similarly, community resources management groups for cane in Lhuentse, Star anise in Mongar and bamboo in Trashiyangtse should encourage agro-forestry, farm forestry and on-farm cultivation of ethno botanically useful species for the residents of BWS.

Acknowledgement

Thanks are due to the present and ex-Heads of management of Bumdeling Wildlife Sanctuary for their permission to work and to the staff of the Sanctuary for sharing and reporting the ethnobotanical ideas every time they got it from the villages. Thanks are also due to the indigenous traditional knowledge holders of the Sanctuary for their response to the queries on uses of plants. Minjur, 55, a traditional healer needs a special mention for his kind support for sharing medicinal plant information to the author when he was posted as Serzhong Field Office-in-Charge (during 2004–2006). Special thanks to Dr. G. S. Rawat, Professor, Wildlife Institute of India, Dehradun for scrutiny and advice as to where this paper should be submitted for publication.

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