

HIGH ALTITUDE MEDICINAL PLANTS OF CHOKHOR GEOG, BUMTHANG

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Introduction

The Pharmaceutical and Research Unit (PRU) under the Institute of Traditional Medicine Services (ITMS) of the Ministry of Health, manufactures 98 essential traditional medicines and supplies them to twenty districts and a few selected Basic Health Units (BHUs) in Bhutan (ITMS 2005). Medicinal plants are the main ingredients of these essential traditional medicines and the commercial products produced. Around 70 % of these plant materials are sourced from within the country (Wangchuk et al. 2007).

Since the inclusion of the *gSo-ba Rig-pa* medical tradition as part of Bhutan's primary health care system in 1967, the principal collection sites for its medicinal plants has been Lingzhi region under Thimphu Dzongkhag and Langthel region under Trongsa Dzongkhag. The collection seasons for high altitude medicinal plants are June-November and for low altitude medicinal plants, November-January. The persistent collections of medicinal plant species from these collection areas for over 35 years have inevitably exerted pressure on medicinal plant resources at those localities. To ease the pressure on the existing collection areas, it has become crucial to identify new collection sites especially for high altitude medicinal plants.

Thus, in a view to document, identify, recommend, facilitate the rotation of the collection programme for high altitude medicinal plants and ultimately provide income opportunities to the communities involved; a study to find out the availability of medicinal plants was carried out in Chokhor Geog of Bumthang. Our paper presents this finding and for the first time makes such information available to the wider communities.

Materials and Methods

Study area and population

The Bumthang Dzongkhag was chosen as the study area mainly for two reasons:

- a) The local informants from Bumthang reported the presence of many high altitude medicinal plants in Bumthang.
- b) Bumthang is not far from the Pharmaceutical and Research Unit located at Kawang Jangsa, Thimphu and thus made economic sense for possible collection and transportation of raw materials.

Bumthang Dzongkhag has four geogs: Chokhor, Chumey, Tang and Ura. For this study, Chokhor geog was selected as the study area and along the trails, about 17 halt points were covered (Fig. 1). The medicinal plant population in the study area was unknown at the time of this study.



Fig 1: Survey area showing the trails and the halt places used during the survey

Study design and sampling method

The high altitude medicinal plants growing in Chokhor Geog were observed, identified and recorded by a research team comprising of several multidisciplinary professions of Drungtsho, sMenpa, Senior Research Officer and Ethno-botanist from PRU. Purposive and convenience sampling methods was used to identify and locate the medicinal plants species. The sample size *per se* was not an issue in this study, as it included all the medicinal plants available within the proximity of the study area.

Data collection methods, tools and analysis

This study was carried out in September 2007. All medicinal plants seen within 100 meters around the trail points were recorded and identified. The survey range extended approximately 500 meters around the halt points.

The leaves, flowers, fruits, stems and roots of the medicinal plants were observed on the spot and were identified by the field research team based on their experiences and *gSo-ba Rig-pa* approaches.

Organoleptic observations such as taste, odour and colour were used to aid the identification of the medicinal plants. Live specimens were collected on the way to reconfirm them on reaching the halt points. Photographs of the live medicinal plants were also taken during the survey. The altitude and the name of the places where the medicinal plants grew were recorded.

Pruning scissors, hand plow, altimeter, digital camera, film camera, plastic bag, pen and paper were used for collecting the data during the field work. All the information was entered into MS excel sheet and the analysis was done using simple statistics.

The medicinal plants at the field sites were mostly identified using *gSo-ba Rig-pa* nomenclature. Some of the plants which had not previously been identified botanically were identified by comparative plant photo analysis and the cross-checking of the *gso-ba-rig-pa* names in reference to the traditional medical texts like ‘Khrung-dpe-dre-med-shel-gi-me-long’ (Dorji 1995) and ‘Boed-ljong-rgyun-spyod-krung-dbyi’-sman-rig’ (1971).

Results and discussion

High altitude medicinal plants growing in Chokhor Geog

During the survey, a total of 134 species of medicinal plants were identified in Chokhor Geog of Bumthang. Out of these, only 74 species of medicinal plants were found to be currently in use at the PRU. However, only 13 of them can be collected constantly by PRU for its use in the formulation of traditional medicines. Those which are found to be in moderate occurrence could be collected occasionally. About 60 species were found not to be currently in use by PRU and of these; about 14 species could not be identified botanically. One species, *Caragana franchetiana* (*gra-ma-shing*) was identified for the first time in Bhutan.

Some of the pictures of medicinal plants identified from Chokhor Geog, Bumthang are given in Fig. 2a-c.



Fig. 2 a. *Podophyllum emodi*



Fig.2b. *Dactylorhiza hatagirea*



Fig. 2.c *Delphinium brunonianum*

Distribution patterns of medicinal plants by relative occurrences

The term “Relative Occurrence” in this context is defined as the fact or act of happening in comparison with each other or with something else in measurable terms or descriptors like the availability, area and altitude. The descriptor “availability” is defined as the condition of being easily accessible or obtainable in measurable terms and the descriptors of availability used here are abundant, moderate or rare. The criterion for ranking the availability of medicinal plants as abundant, moderate or rare was based on the team’s scoring of visible occurrence of medicinal plants in Chokhor Geog. An individual plant count of ≤ 50 was considered “rare”, $51 \leq 100$ as “moderate” and 100 and over as “abundant”.

From the distribution pattern of medicinal plants by their availability, of the 134 species present, 78 were found to grow moderately, 22 were found abundantly growing in the selected areas, and 34 were found to be rare

From the distribution pattern by areas, Tshampa was found to host maximum number of medicinal plant species (54 species) followed by Lamthrang (34 species), Tolela (11 species), Jeuthang (10 species), Kurpang and Bobtsher (7 species each). Medicinal plants found in the localities like Brumchen, Tokchung, Khagtang and Zhabjithang were put under Tshampa locality mainly because these places are either very close or on the way to Tshampa. Similarly, medicinal plants located in Tashisa were grouped under Lamthrang locality, and those plants located in and around Gorsum and Chogchogmet were grouped under Kurpang locality.

The distribution pattern of medicinal plants by altitudes found that maximum number of medicinal plant species grows in an altitude ranging from 3000-3999 meters above sea level (78 species) followed by an altitude range of 4000-4999 meters above sea level (52 species). Only few species grow in the top most fringes of alpine areas and nothing grows in the mountaintop of Gangkar Puensum, which is about 7239 meters above sea level.

Study limitation

This study covered only one Geog of Bumthang Dzongkhag due to shortages of data collection timeframe and budget. Even under Chokhor geog, the places like nGon-dong, Dur Tshachu area and Manlha Kachung could not be covered. Technically, except for not doing the survey using GIS-GPS-plot measuring system, the survey was best done against all the odds and limitations.

Conclusion and future direction

From this study, it was concluded that as many as 134 species of high altitude medicinal plants grow in Chokhor geog. Since there are many medicinal plants growing in abundance, PRU could initiate the rotation of the medicinal plants collection program with Bumthang as an alternative sourcing area. This would ultimately provide income opportunities to the communities of Chokhor Geog of Bumthang.

In future, similar survey should be carried out covering the places which were not covered by this study under Chokhor Geog and also three other remaining Geogs. This would give the clear picture of total medicinal plants inhabiting Bumthang Dzongkhag.

References

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