Threatened medicinal plants of Gulmarg hills, Kashmir Himalayas: Distribution pattern and current conservation status.

1Nazir Ahmad Najar1, 2Dr Rajendra Prasad Misra , 3Javid Ahmad Kak.

Research scholar A.P.S. University,Rewa M. P.
Principal Govt. Model science college Rewa, M. P.
Research scholar A.P.S. University,Rewa M. P.

Abstract

With increasing anthropogenic activities and increasing demand of herbal ethno-medicines there is a great damage to various important medicinal plants of Kashmir Himalayas. It is now essential to understand the distribution and conservation status of these medicinal plants in their natural habitats. In our present study, we studied the distribution and conservation status of Podophyllum hexandrum, Berginia ligulata, Trillium govanianum, Atropa accuminata, and Artemisia amygdalina five threatened plants in Gulmarg valley in Kashmir himalays by random quadrant sampling (n=217) different habitat types. We found out that these different medicinal plant were used by indigenous people of the region for the treatment of various human and livestock ailments. Our results indicate that Podophyllum hexandrum Royle is most common and has the highest density. While Atropa accuminata and Artemisia amygdalina are least frequent. Moist rocky slopes (MR) were the most preferred habitat followed by flat tableland (FL) situated above the tree line. While the shady slopes (SSs), flat meadow (FM) and moist meadow (MM) were least preferred. Our findings can help to formulate a conservation strategy for the unknown grass lands and the threatened vital medicinal plants of Gulmarg valley. While the low and localized distribution of all studied species deserves effective conservation strategies, the scope of such measures should be explored in a way to address the reliance of local communities on these plants.

Keywords medicinal plants; Gulmarg valley; Kashmir Himalayas; indigenous people; ethno-medicine

1.Introduction

In recent years, the herbal medicine is gaining wide currency and acceptability and the documentation of valuable indigenous knowledge about medicinal plant species is assuming urgent priority (Anim et al., 2012), due to the recent controversies of illegal Bio-piracy. The indigenous knowledge about the use of valuable medicinal plants in the Kashmir Himalaya when validated by various scientific incites provides a holistic models of sustainable development that are suitable for all. The Kashmir Himalayas, often referred to as terrestrial paradise on earth, is located at the north-western tip of the Himalayan biodiversity hot spot. The region supports a rich and spectacular biodiversity of great scientific curiosity and promising economic benefits owing to its topographic variations spanning from valley floor.

The medicinal use of plants by the nomadic and migratory tribes like Gujjars and Bakerwals in Kashmir has been documented previously (Navchoo and Bhat, 1994; Khan et al., 2004). However a periodic and continuous monitoring of these species in the wild Habitat is largely lacking with the available information being either qualitative (Dhar and Kachroo, 1983) or ethno-botanical (Dar et al., 1984; Ara and Naqshi, 1992). A perusal of literature
indicates that the documentation of ethno-botany of Ladakh (Bhattacharyya, 1989; Kaul et al., 1995), Doda (Kaul et al., 1994; Singh, 1995), Bhaderwah hills (Kapur, 1995), Little Tibet (Sharma, 1995), Uri sector (Lone, 2003), Muzaffarabad (Dar, 2003), and Samahni valley (Ishtiaq et al., 2006a, b, 2007) of Kashmir Himalayas has been done. Therefore this study was undertaken in one of the high meadow alpine hills of Gulmarg on the distribution pattern, indigenous uses and availability of five threatened medicinal plants.

2. Study Area

The present study was carried out in Gulmarg valley which is geographically located at 34.05°N 74.38°E (Fig 1). Physiographically, Gulmarg lies in a cup shaped valley in the Pir Panjal Range of the Himalayas, at an altitude of 2,650 m (8,694 ft), 56 km from Srinagar. The soil in Gulmarg comprises glacial deposits, lacustrin deposits and moraines of Pleistocene age covering shales, limestone, sandstones and other varieties of rocks. The natural meadows of Gulmarg, which are covered with snow in winter, allow the growth of wild flowers such as daisies, forget-me-nots and buttercups during spring and summer. The meadows are interspersed by enclosed parks and small lakes, and surrounded by forests of green pine and fir. Skiing and other winter sports in Gulmarg are carried out on the slopes of Apharwat peak at a height of 4,267 m (13,999 ft). Many points on Apharwat peak and Khilanmarg offer a panoramic view of Nanga Parbat and Harmukh mountains. Due its distinct geographic location, the area is inhabited by different ethnic groups such as Gujjars, Bakerwals and other nomadic people. These groups have their own knowledge of traditional herbal medicine inherited from their forefathers. These medicines are well accepted by the local people since generations have experienced their efficacy in alleviating a variety of diseases.

3. Materials and Methods

The methods employed during the study were designed with the sole purpose of eliciting the precious wealth of information on the ethno-medicinal uses of plants practiced by the people residing in and around target site within Gulmarg Kashmir Himalaya. The area was visited several times for the collection of data during the year of 2017-2018. The local name, and traditional uses of plants, with emphasis on medicinal uses were documented by interviewing the local elderly knowledgeable persons including local hakims. Table 1: Characteristic features of selected medicinal plant species at Gulmarg kashmir

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Local name</th>
<th>Part used</th>
<th>Uses</th>
<th>Current Conservation status by IUCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podophyllum hexandrum</td>
<td>Banwangun</td>
<td>Fruits and roots</td>
<td>Skin diseases, gastric problems</td>
<td>Endangered</td>
</tr>
<tr>
<td>Berginia ligulata</td>
<td>Zakhmi hayat</td>
<td>Roots and Leaves</td>
<td>Intestine complaints and stomach ulcers</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Trillium govanianum</td>
<td>Tripater</td>
<td>Rhizome</td>
<td>Stomach problems, production of hormones</td>
<td>Endangered</td>
</tr>
<tr>
<td>Atropa accuminata</td>
<td>Chella lubbar</td>
<td>Roots / Leaves</td>
<td>Cough etc</td>
<td>Endangered</td>
</tr>
<tr>
<td>Artemisia amygydalina</td>
<td>Tethwan</td>
<td>Leaves</td>
<td>Cough, cold fever etc</td>
<td>Critically endangered</td>
</tr>
</tbody>
</table>

Literature concerning ethno-botany of this area has been consulted. Different quadrants (n=36) were laid down in Gulmarg hills particularly near the experimental tea garden and the observatory land of university of Kashmir, afrathwath hills, drung etc. to find out the
different parameters of medicinal plants living in the different vicinities of Gulmarg hills. Besides this our main focused study frequency, abundance and IVI was obtained from random quadrates (n=36) of 1m2 size (Misra, 1968). Analytical features for population study and distribution pattern like percentage frequency and density (plants per m2) were calculated for each species across all sights. The mean values were taken to calculate Important Value Index (IVI) of individual species (Cottam and Curtis, 1956).

Table 2 : Phytosociological Parameters of the threatened medicinal plants at Gulmarg

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Density (plants/m2)</th>
<th>Relative density(RD)</th>
<th>Frequency (%)</th>
<th>Relative frequency(RF)</th>
<th>Important value Index (IVI) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podophyllum hexandrum</td>
<td>1.02</td>
<td>0.92</td>
<td>94.44</td>
<td>1.62</td>
<td>2.54</td>
</tr>
<tr>
<td>Berginia ligulata</td>
<td>0.86</td>
<td>0.07</td>
<td>88.88</td>
<td>1.44</td>
<td>1.51</td>
</tr>
<tr>
<td>Trillium govanianum</td>
<td>0.72</td>
<td>0.006</td>
<td>77.77</td>
<td>1.34</td>
<td>1.34</td>
</tr>
<tr>
<td>Atropa accuminata</td>
<td>0.58</td>
<td>0.005</td>
<td>63.88</td>
<td>0.96</td>
<td>0.965</td>
</tr>
<tr>
<td>Artemisia amygydalina</td>
<td>0.38</td>
<td>0.003</td>
<td>47.22</td>
<td>0.68</td>
<td>0.683</td>
</tr>
</tbody>
</table>

4. Results and Discussion

During the present survey 5 species of plants has been recorded those are used by the tribal and non-tribal people against different diseases. The recorded plant species were enumerated alphabetically in Table 1 along with their botanical and vernacular names, parts used and ethno-medicinal aspects and current IUCN status. Different plant parts are used against different ailments but dominantly rhizomes, leaves and roots are used either in raw form or as aqueous extracts. The distribution of these five plant species varied differently in different habitats in Gulmarg hills. Some of these plant species showed more occurrence in different habitats of Gulmarg hills like Podophyllum hexandrum found mostly in Gulmarg hills (65%), followed by Berginia ligulata (44%), Trillium govanianum (37%) showed third in occurrence, Atropa accuminata (24%) showed fourth in occurrence and Artemisia amygydalina (13%) showed fifth and least appearance in the Gulmarg hills of Kashmir Himalaya. Podophyllum hexandrum was found in all habitats of Gulmarg hills like shady slopes, open gentle slopes, dry shady slopes, moist meadow and flat tabled land and is frequently present. Atropa accuminata showed there presence in moist slopes and moist shady places, Trillium govanianum are mostly found in open grasslands in Gulmarg hills in shady places, also found in bushy areas etc. Berginia ligulata mostly found in forest slopes in Gulmarg hills on moist rocks. Artemisia amygydalina found in lower forest slopes of Gulmarg hills. Important value Index (IVI) of each species was calculated to measure their numerical strength and assess their contribution to the total plant community. The highest IVI recorded is (2.54%) and lowest (0.683%) for P. hexandrum and A. amygydalina respectively. Highest density (1.02) was found for p. hexandrum and least density (0.38) was found for A. amygydalina.
5. Conclusion
The IVI provides an excellent marker for understanding the status of distribution and availability across varying environmental and biotic conditions (Ram and Arya, 1991; Negi et al., 1992). This paper has described the distribution pattern and the current conservation status of threatened medicinal plants from a Gulmarg valley, Kashmir. Relative values of the assessed species were tabulated and compared and based on this it was found *P. hexandrum* is widely distributed in different habitat types. The present study suggests that the traditional system of primary healthcare utilizes the plant resources as medicines in the studied area (Gulmarg Valley), India. The vigorous medicinal use of these medicinal plants by local people, anthropogenic activites like habitat destruction, grazing by animals, increasing demand of medicinal plants lead them to become threatened day by day. These ethno-medicinally important plants are un-paralled treasure of wealth hence a great boon for the humanity. Hence, documentation and conservation of such plant species should be done by the concerned authorities. It should be realized that conservation and management of potential species are of utmost importance.

Acknowledgment
Thanks to the Gujjars, Bakerwals and Chopans at the Gulmarg Valley and Gulzar sahab (gardener of university of Kashmir) sharing the ethno botanical knowledge with us.

References
- Asian journal of Plant Sciences, 2: 680-682
• Indian Biodiversity Act, 2002.
• Indian Patent (Amendments) Act, 2002.