Journal of Ethnopharmacology ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Research Paper

New ethnomedicinal claims from Gujjar and Bakerwals tribes of Rajouri and Poonch districts of Jammu and Kashmir, India

Q1 Anwer Shah [a], Kumar Avinash Bharati [b], Javed Ahmad [a], M.P. Sharma [a,*]

Q2 [a] Department of Botany, Jamia Hamdard, Hamdard Nagar, New Delhi 110062, India
[b] Raw Materials Herbarium and Museum Delhi, CSIR-National Institute of Science Communication and Information Resources, New Delhi 110012, India

ARTICLE INFO

Article history:
Received 4 November 2014
Received in revised form
26 January 2015
Accepted 31 January 2015

Keywords:
Ethnomedicine
Gujjar
Bakerwals
Medicinal plants
Folk medicine

ABSTRACT

Background: Medicinal plants are frequently employed by Gujjar and Bakerwal tribes in Rajouri and Poonch districts of Jammu and Kashmir, India for treatment of various ailments in humans and livestock. Hence, extensive field work was conducted to document the ethnomedicinal plants used by these tribes.
Methodology: Ninety one key informants were interviewed using both in situ and ex situ type of survey methods. The data were analyzed using user value (UV), informant consensus factor (Fic), fidelity level (FL) and relative frequency of citation (Rfc).
Results: A total of 104 species of medicinal plants used in the treatment of 40 different non-communicable ailments with 138 remedies are reported. *Cephalanthera longifolia* (L.) Fritsch was recorded for the first time with ethnomedicinal uses and the rest of the species were previously reported with different medicinal uses by other tribal people. Out of 138 remedies, 129 were employed for human ailments and the remaining seven were used to treat livestock. Most of the species were harvested for leaves (24 species). Herbs (66 species) were the major life form used for medicinal purpose and the most common method of remedy preparation was decoction/tea (27.8%). The highest use value plant was *Verbascum thapsus* L. for the treatment of stomachache and snake bite.
Conclusions: Plants such as *Allium humile* Kunth, *Angelica glauca* Edgew, *Arnebia benthamii* (Wall. ex G. Don) I.M.Johnst, *Asparagus racemosus* Willd., *Balanophora involucrata* Hook. f. & Thomson, *C. longifolia* (L.) Fritsch, *Cuscuta epithymum* (L.) L., *Geranium wallichianum* D. Don ex Sweet, *Gloriosa superb* L., *Habenaria intermedia* D. Don, *Phyllanthus emblica* L., *Ramaria Formosa* (Pers.) Quel. and *V. thapsus* L. showing high Rfc and FL values may be studied for associated pharmacological activities.

1. Introduction

Majority of the world's population is dependent on traditional medicines for Primary Health Care (Upton et al., 2011). Medicinal plants are frequently used to ameliorate various ailments in developing countries and are also in great demand in the developed world because people believe "natural is better" (Lewis, 2003). New diseases are emerging and many pathogens have developed resistance to currently used drugs. About 223,300 species of seed plant have so far been reported (Scotland and Worthy, 2003) and less than one percent of them have been chemically and pharmacologically studied thus far (Cox and Balick, 1994). Phytochemical and pharmacological study for rest of the seed plants (i.e. 221,067 species) is implausible. Ethnomedicine demonstrates the value of some of the plants as a source of new modern drugs. It has played a significant role in modern drug discovery programmes and is a source for a large number of modern drugs (Newman and Cragg, 2007; Miller, 2011).

The Himalayas are rich repositories of biodiversity. The Jammu and Kashmir region, which is a part of the western Himalayas has about 2000 species of angiosperms, 12 species of gymnosperms and 90 species of pteridophytes (Dar et al., 2002). The ethnobotany of the study area is well developed and may be due to the presence of primitive tribes in large number, diversity of species and remote location. Fragmented information on ethnomedicines of Gujjar and Bakerwal tribes of Rajouri and Poonch districts is available in the work of Sharma and Singh (1989), Nawchoo et al. (1994), Pant and Verma (2008), Rashid et al. (2008), Rashid (2012a, 2012b, 2013), Mahmood and Kadam (2012), Shah et al. (2012), Azad and Bhat (2013) and Kumari et al. (2013). A larger part of the indigenous knowledge is still lying with the ethnic groups of the study area and needs to be explored and documented. Therefore, a survey was conducted to explore and document the ethnomedicinal plants used by the Gujjar and Bakerwal tribes to identify new

* Corresponding author. Mobile: +91 9968172445.
E-mail address: k.avinash@hotmail.com (K.A. Bharati).

http://dx.doi.org/10.1016/j.jep.2015.01.056
0378-8741/

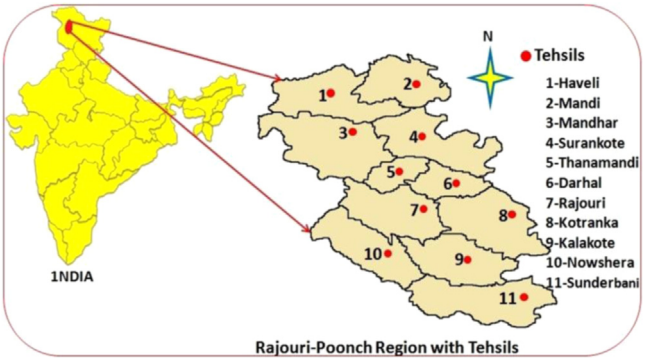

Fig. 1. Location of Rajouri–Poonch districts and map of surveyed blocks.

ethnomedicines used for Primary Health Care management and to identify popular medicines among Gujjar and Bakerwal in the study area.

2. Methodology and study area

2.1. Study area and Gujjar–Bakerwal communities

The present study was focused on Gujjar and Bakerwal tribes of Rajouri–Poonch districts of Jammu and Kashmir state. Together both the districts consist of 11 Tehsils and 14 Blocks, surrounded by Baramulla from the north, Budgham in the north-east, Reasi, Kulgham, Shopyan in east, Jammu district in south and Pakistan in the west (Fig. 1). These districts are located on the foothills of "Pir Panjal range" of the Himalayas at 450 m to 4500 m above sea level. Due to huge variation in altitude, the climate varies from semitropical to temperate, subalpine and alpine (Dar et al., 2014). These two districts are inhabited by people of all linguistic groups but the major chunk of the population belongs to nomadic tribes Gujjar and Bakerwal (about 60%). Originally both the tribes were nomadic pastoralists (Fig. 5). At present, cultivation and animal husbandry are the major occupation for the both. Ethnically, Gujjar and Bakerwal communities are similar; speak same language named "*Gojri*". The Bakerwals are the offshoots of Gujjar and the difference between tribes is only in the type of animal rearing and nature of migration. Gujjars rear buffalo, possess small pieces of land, houses and are semi-nomadic. On the other hand, Bakerwals are completely nomadic people, rear flock of sheep and goats and in search of green pastures they are always migratory. They are true nomadic without any land, live in tents and keep horses for transportation and dogs for protection. The socio-economic condition of Gujjar community is better because they are semi-nomadic, educated and own home with small piece of land. Both the tribes are dependent on high altitude pastures for animal rearing. Since modern medicine and doctors are not available in interior areas, Gujjar and Bakerwal tribals are still dependent upon plants for primary therapy from the diverse flora of their surroundings. It has been observed that specialist herbal-healers are neither available in Gujjar nor in Bakerwals communities. The traditional knowledge is scattered among common mass and passed on to later generation through oral communication.

2.2. Data collection

About four years (August, 2010–May, 2014) of field studies have been carried out to document raw information on ethnomedicines of Gujjar and Bakerwal tribes. The sampling villages were in Poonch and Rajouri districts of Jammu and Kashmir, India (Fig. 1). A semi-structured interview was planned and printed questionnaires were prepared in the local language (i.e. *Gojri*) for the face-to-face interaction with informants. The printed questionnaires ensure same questions are presented to all informants (Martin, 2008) and vital information could be sourced during discussion. Both in situ and ex situ methods of interviewing were adopted. Since both methodologies have certain advantages and disadvantages. Logically, a combination of both produces maximum information with high accuracy. Therefore, "walk-in-the-wood" for in situ and "freshly collected plant material" for ex situ method were selected. The "walk-in-the-wood" gives better quality and reliable data whereas "freshly collected plant material" is suitable for people with limited mobility (old people, women, etc.) and involves a large number of participants (Thomas et al., 2007).

After prior consent, a total number of 91 participants (73 male and 18 female) were interviewed of which 46 were Gujjar and 45 were Bakerwals in between 30 and 70 years of age (Fig. 5). It has been observed that in rural areas female members have better understanding of traditional knowledge than males. Further, initially women were little bit shy but after brief persuasion they were more enthusiastic in sharing their traditional knowledge on medicinal plants. Common ailments, medicinal plants, other raw materials, methods of preparation and dosage of remedies used were documented during discussion. The plant specimens and useful parts were also collected for identification. The plant species were identified with the help of Flora of Jammu and plants of neighborhood (Sharma and Kachroo, 1983), Flowers of Himalayas (Polunin and Stainton, 1984) and Flora of Pir Panjal range of north-west Himalayas (Singh and Kachroo, 1994). Additional identification was carried out by matching voucher specimens with previously identified specimens deposited in Botanical Survey of India, Dehradun (BSD) and Forest Research Institute, Dehradun (DD). Herbarium specimens and plant parts collected during this study have been deposited in the herbarium of Department of Botany, Jamia Hamdard, New Delhi for future references. The botanical names of the plant species were updated according to the Plant List (www.theplantlist.org). A comparative assessment through literature review on the subject was made to ascertain new findings and similarities with past research.

2.3. Quantitative methods for data analysis

The following statistical techniques were used during data collection and interpretation. Quantitative ethnobotanical techniques have great scientific interest as they provide relative importance of plant species to different ethnic groups, preference information on different species and may also aid in the conservation of biodiversity (Byg and Balslev, 2001).

2.3.1. Relative frequency of citation (Rfc)

The popular medicine among community was identified by citation-frequency. Logically, popular medicine received very high citations (Kumar and Bharati, 2013); it is calculated by following formula:

$$\text{Relative frequency of citation}(\%) = \frac{\text{Frequency of citation}}{\sum \text{Frequency of citation of all species}} \times 100$$

$$\text{Frequency of citation}\ (\%) = \frac{\text{Number of informants who cited the medicine}}{\text{Total number of informants interviewed}} \times 100$$

2.3.2. Informant consensus factor (Fic)

The informant consensus factor (Fic) was used to determine the consensus between the informants for specific use category. It is calculated as the number of mentions in each usage category (n_{ur}) minus the number of taxa used in each category (n_t), divided by