

Diversity of medicinal plants of Sewa catchment area (J&K) for herbal products in the Northwest Himalaya.

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Abstract: Climate and topographic diversity of Sewa catchment area provides a variety of habitats for the luxuriant growth of different plant species. The altitudinal distribution of the species revealed that the areas lies between 1500-2000m by maximum number of species followed by the altitude 2000-2500m, 2500-3000m and so on. Angiospermic species are considerably decreases in number at all the three hierarchical levels (Family, Genera and Species) along altitudinal gradient, however family: species ratio remains almost constant. Many of these are used by locals in remote and inaccessible areas. Continuous overexploitation, revival of use of herbal drugs and degradation of the habitats has brought medicinal plants on priority for conservation. Keeping in view these aspects, the medicinal plant wealth of Sewa catchment has been explored and accessed by interaction with the local inhabitants and after surveying the literature. The plant parts used for medicinal preparation by the indigenous people are leaf, root, bark, flower, fruit, rhizome, tuber, wood etc. The herbal preparations are used in treatment of respiratory tract infections, gastro-intestinal problems, skeleton-muscular problems, dermatological problems, cuts and wounds, dental, cardiovascular system etc. The preparation methods include decoction, juice, oil paste, powder, extract, smoke and even raw (unprocessed). The plants were also important as tonic astringent, antihelminthic, insecticide etc. The results have been compiled in some medicinal plant species and the paper will discuss Diversity, altitudinal distribution, life form spectrum, flowering phenology and survey of market for herbal products.

Key words: Conservation; herbal products; medicinal plants; Northwest Himalaya.

1. Introduction

The tribal people and ethnic races throughout the world have developed their own cultures, customs, cults, religious rites, taboos, totems, legends and myths, folk tales and songs, foods and medicinal practices, etc. Numerous wild and cultivated plants play a very important and vital role among these cultures and this interrelationship has evolved over generation of experience and practices. The modern civilization is penetrating into most regions of the world still held by primitive societies. There is a steady decline in human expertise capable of recognizing the various medicinal plants.

On account of the hilly and inaccessible terrain, the local populace has been utilizing plant resources for their sustenance since times earlier. Some plants are used as fuel, some prove helpful in providing raw food material, vegetables, fruit and some are used as

curatives for various ailments. The observations are based on local folklore and interview of various communities and tribes of the catchment. Stress is also laid upon the herbal products which are available in the market and are prepared by using medicinal plant species.

Himalayas are known to provide life support system to human beings, particularly due to fact that on account of remoteness and inaccessible terrain, the local populace has largely depended on local plants. Northwest Himalaya is a distinct Himalayan region with a characteristic climate, geology and flora. The floristic diversity is fascinating because of species richness and diverse community structure. The diversity has evolved in time and space due to various geological and ecological changes, accompanied by speciation, isolation and competition. Ethnomedicinal assessment have been made by several workers in different pockets of Himalayas (Kaul *et al.*, 1985, 1986, 1989, 1990; Gurung, 1988; Kapur, 1989; Sharma and Singh, 1989; Amatya, 1996; Kiran *et al.*, 1999; Samant and Dhar, 1997; Samant *et al.*, 1998; Kiran and Kapahi, 2001b; Samant and Pal, 2003; Beigh *et al.*, 2004; Borthakur *et al.*, 2004; Gupta *et al.*, 2004; Kant and Dutt, 2004; Samant *et al.*, 2007). Besides Himalaya, many workers have made notable contribution to ethnomedicinal studies of various parts of India and abroad (Brahmam and Saxena, 1990; Aswal, 1994; Brahma and Boissya, 1996; Mahatto *et al.*, 1996; Rajendran *et al.*, 2003; Augustine and

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Sivadasan, 2004; Hui and Pei, 2004; Hermans *et al.*, 2004; Ji *et al.*, 2004).

2. Materials and methods

2.1 Study area

The Sewa catchment area is spread over 384 Km² located between latitude 32° 26' 38" – 32° 41' 00" N and longitude 75° 48' 46" – 75° 55' 38" E forming a part of Northwest Himalaya in district Kathua of Jammu and Kashmir state (India). Altitudinal gradient of the catchment varies from 578m at Mashka to 4300m at Kaplash peak. The climate varies from sub-tropical to temperate and extremely cold at higher altitudes. Depending upon the altitude, summer temperature varies from 18 – 35 °C and winter temperature oscillates between 1 – 15 °C.

2.2 Methodology

Exploration of the study area was made fortnightly, during 2006-2010. The area was surveyed during all seasons of the year and care was taken to cover all the possible watersheds. Plant identification was done from various local, regional and national floras besides consulting taxonomic expertise of Botanical Survey of India, Northern-Circle, Dehradun and Centre for plant taxonomy, University of Kashmir. Ethnobotanical information was obtained by interacting with the local populace during exploration trips to the area and also from published literature on the plants inhabiting the study area.

3. Results and Discussion

The paper provides comprehensive information of the diversity, distribution and medicinal plants which are used in different herbal products in the study area (Annexure I). However, after developing intimacy with some knowledgeable and experienced medicine men and other traditional healers, some information on medicinal use of the less known or the plants that have not been reported earlier, has been documented. Assessment has revealed 182 phanerogamic and cryptogamic species, belonging to 159 genera distributed over 84 families in the Sewa catchment. This rich diversity may be due to mild climatic conditions and diverse habitats together with large number of human habitations with diverse cultures and communities that utilize this diversity for the treatment of various ailments (Samant and Dhar, 1997; Samant *et al.*, 1998). Based on the number of species within families, Asteraceae is the most dominant species; Ranunculaceae occupies the 2nd place, followed by Lamiaceae, Fabaceae, Euphorbiaceae, Pinaceae, Polygonaceae and Solanaceae. Asteraceae is notably the largest family not only in Northwest Himalaya, but also the largest and most wide spread family of flowering plants in the world (Good, 1974). This can be attributed to their high reproductive potential, wide ecological range of tolerance, and to their high seed dispersal capability.

Altitudinal distribution of the Sewa flora has revealed that 46 plant species exclusively inhabit areas below 1500m, 89 species between 1500-2500 m, 38 species between 2500-3500 m and 9 species grow in areas above 3500 m, indicating that maximum plant species are distributed in the temperate region. The richness of the species in this zone seems to be on account of the fact that most part of the Sewa catchment experiences temperate climate besides heterogeneity in physiognomy, aspect and other temporal or spatial factors. The areas above 3500 m support mostly those species having underground perenating organs during unfavorable winter. Majority of species growing in the Sewa catchment area are Therophytes followed by hemicryptophytes, chamaephytes, Nanophanerophytes, macrophanerophytes and geophytes. Hydrophytes, lianas and epiphytes represent the lowest in numbers. Most of the angiosperm species were in flowering during the month of April to August.

Utilization of leaves, roots, whole plants, bark, latex, tubers, fruits, seed, flowers, gums and resins, rhizome etc. of various plant species indicated a high degree of threat to these medicinal plants. These species are used in the plant based pharmaceutical industries in traditional systems of medicine and most are extracted from natural habitats. If the over exploitation of entire medicinal plant and their various parts continues, many species may decrease in, and ultimately disappear from their natural habitats. This implies particularly to medicinal plants with multiple uses (Samant *et al.*, 1998; Samant and Pal, 2003). These medicinal plants are used against cuts, cough, fever, gout, rheumatism, stomach ailments, sinusitis, boils, headache and antihelminthic etc.

Assessment of the economic utility of the plant species in Sewa catchment from indigenous folklore as well as from data available in literature has revealed tremendous potential. From time immemorial, plants have played a significant role as protectants and curative agents. At present, about 76% of the medicines with curative properties are based on plants. There are several rational prescriptions based on plant species. Human societies have had several years to observe the good or bad effects by eating a particular leaf, fruit or tuber. Human beings, like grazing animals, have an instinct that recognizes poisonous or medicinal nature of plants in their surroundings (Kaul *et al.*, 1995, 1986, 1989, 1990; Gurung, 1988; Kapur, 1989; Sharma and Singh, 1989; Amatya, 1996; Beigh *et al.*, 2004; Borthakur *et al.*, 2004; Gupta *et al.*, 2004; Kant and Dutt, 2004; Uniyal, *et al.*, 2006; Samant *et al.*, 2011; Rana and Samant, 2012; Satapathy *et al.*, 2012).

The study revealed that the local inhabitants of the area have sound knowledge about the use of medicinal plants available in the region. Unfortunately, they are not interested to share their traditional knowledge with others and their lore ends

with the end of their life. However, after developing intimacy with some knowledgeable and experienced medicine men and other traditional healers, some information on medicinal use of the less known or the plants that have not been reported earlier, has been documented. Although, a brief account of some ethnomedicinal uses of plant species has been documented and verified by cross checking with the local healers, knowledgeable persons and experienced informants of the region, even then further investigation on pharmaceutical, therapeutic as well as safety aspects are very much desired for their use in human health care. The plants used are found growing wild and cases are immediately available for therapeutic use. Nevertheless, plant species having medicinal value for a variety of disorders form constituents of a variety of formulations available in the market for treatment of a number of diseases.

Perusal of the data (Annexure I) reveals that the study area has a good potential for medicinal plants provided by a rich diversity of the medicinal products. These herbal products are effective against a number of diseases like cuts, cough, fever, gout, rheumatism, stomach ailments, sinusitis, boils, headache and as antihelminthic etc. Thus, the area serves as a primary source of herbal products and people need to be encouraged to cultivate all these species which form ingredients of these medicinal products. Moreover, diverse climatic as well as altitudinal variation in the area provide suitability for their cultivation, which in turn will be fruitful in maintaining the phytodiversity of the region, besides improving economy and lifestyle of the people.

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Annexure I. Showing plants of Sewa catchment used as ingredients of some common herbal products and their medicinal use.

| Name of the product | Contents | Therapeutic use |
|-----------------------------|--|--|
| Alfa-alfa | <i>Medicago sativa, Zingiber officinale</i> | Tonic |
| Alfa alfa tonic | <i>Mentha arvensis, Cinnamomum sp.</i> | Body building tonic. |
| Angioton | <i>Valeriana sp.</i> | Heart troubles of adolescence, vaso and cardio tonic before and after operations. |
| Ayurvedic face pack. | <i>Curcoma domestica</i> | Cleaning the face. |
| Brahmi | <i>Baccopa monnieri</i> | Promote alertness |
| Boraplus (antiseptic cream) | <i>Citrus sp. Ocimum sanctum, Emblica officinale.</i> | A preventive, curative and healing Ayurvedic ointment for dry skin diseases, cuts, scratches, minor burns, wounds cold, sores. |
| Bryorheum | <i>Phytolacca acinosa, Gnaphalium leutoalbum</i> | Rheumatic diseases such as muscular and articular rheumatism; rheumatic pains accompanying colds. |
| Calicarmin drops | <i>Ferula sp.</i> | Against indigestion. |
| Chawanprash. | <i>Emblica officinalis, Withania somnifera, Adhatoda vasica.</i> | Provides resistance against diseases. |
| Damagian | <i>Emblica officinalis</i> | Tonic for headache. |
| Distone | <i>Raphanus sativus, Achyranthes aspera, Boerhavia diffusa</i> | Burning micturition and crystalluria. |
| Easy life | <i>Asparagus racemosus, capsicum species</i> | |
| Eraser | <i>Triticum aestivum, Curcuma sp. Azadirachta indica, Ocimum sanctum, Citrus sp., Aloe sp.</i> | Removes scars, blemishes, burns marks and wrinkles. |
| Evicare | <i>Boerhavia diffusa, Acacia sp.</i> | Against digestive problems. |
| Emami cream | <i>Cucumis sativus</i> | Skin ointment |
| Giron | <i>Emblica officinalis, Withania somnifera</i> | As iron tonic and vitamins C. |
| Garniersynergie | <i>Coriandrum sativum.</i> | Anti-wrinkle cream. |

Diversity of medicinal plants of Sewa catchment area - Khan and Hussain

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| Garlic pearl | <i>Allium sativum</i> | Relieves indigestion control cholesterol. |
| Gulabari | <i>Rosa indica</i> | Eye and skin care. |
| Hajmola | <i>Ferula asafoetida, Ocimum sanctum</i> | Used for digestion. |
| Himalayan Pure herb-Tulsi | <i>Ocimum sanctum</i> | Anti-inflammatory, promotes respiration, relieves cough, cold throat pain. |
| Himalayan Pure herb-Neem | <i>Azadirachta indica</i> | Prevents disorder and blemishes of skin. |
| Honitus | <i>Ocimum sanctum, Viola odorata, Mentha arvensis, Adhatoda vasica</i> | Relieves muscles pains. |
| Itone | <i>Mentha arvensis, Ocimum sanctum</i> | Eye drops. |
| Joshina | <i>Viola odorata, Ocimum sanctum</i> | Relieves cough. |
| Kayam-churn | <i>Trachyspermum ammi</i> | Used for digestion. |
| Lahsun | <i>Allium sativum</i> | Prevents cholesterol accumulation. |
| Livtech | <i>Phyllanthus niruri, Boerhavia diffusa, Picrorrhiza kurroa, Fumaria sp.</i> | Ladies health restorative. |
| Margo | <i>Azadirachta indica</i> | Soap. |
| Medimix soap | <i>Azadirachta indica</i> | Soap. |
| Mudgal-Ex | <i>Phyllanthus emblica, Holorrhena sp.</i> | Gastric acidity, constipation and indigestion. |
| Mudgal tone | <i>Phyllanthus emblica, Holorrhena antidysenterica, Berberis sp.</i> | Gastric acidity, constipation and indigestion. |
| M2-Tone | <i>Asparagus racemosus, Emblica officinalis, Cedrus deodara, Nardostachys jatamansi, Zingiber officinale.</i> | Against eye infection. |
| Narijiwan | <i>Symplocas racemosa, Withania somnifera, Asparagus racemosus, Adhatoda vasica, Aegle marmelos, Nardostachys jatamansi, Bombax sp.</i> | Ladies health restorative. |
| Nomarks face pack | <i>Aloe barbadensis, Rosa indica, Citrus sp., Azadirachta indica</i> | Used as skin preparation having anti-bacterial and antipimple properties. |
| Neem active toothpaste (complete care) | <i>Azadirachta indica, Mentha sp.</i> | Prevents cavities, strengthens gums and gives freshness. |
| Nyle-Shampoo | <i>Emblica officinale, Acacia sp.</i> | Shampoo. |
| Olivia | <i>Curcuma sp. Citrus sp., Aloe vera</i> | Herbal bleach. |
| Patlon | <i>Withania somnifera</i> | Power capsule. |
| Prozyme | <i>Ferulasp, Feniculum vugare, Phyllanthus emblica,</i> | Prevents gas formation, Improves digestion. |
| Pudinhara tablets | <i>Mentha arvensis</i> | Tablets used against gastric problem. |
| Rex's Dimagi | <i>Emblica officinale, Phoenix sylvestris.</i> | Brain tonic, Keeps Brain, heart and eyes energetic. Makes memory sharp promotes alertness. |
| Rose water | <i>Rosa indica</i> | Face wash for face freshener. |
| Safi | <i>Azadirachta indica, Ocimum sanctum Bauhenia variegata, Dalbergia sissoo</i> | Blood purifier, for skin problem, making skin clear and beautiful. |
| Shahiuptan | <i>Triticum aestivum, Ocimum sanctum, Citrus sp., Curcuma sp., Acorus calamus</i> | Helps in removing superfluous hair from the face and body. |
| SunavaKarela | <i>Momordia charantia</i> | Regulates carbohydrate metabolism. |
| Swalin | <i>Cinnamomum sp.</i> | Used against cough. |
| Triphala | <i>Phyllanthus emblica,</i> | Used against indigestion. |
| Triphalachurna | <i>Trachyspermum ammi, Emblica officinalis</i> | Used against indigestion. |
| Vatika oil | <i>Citrus sp. Ocimum sanctum</i> | Hair oil. |
| Vicks vaporub | <i>Eucalyptus globules</i> | Nasal respiration and chest problem. |
| Vico-turmeric | <i>Curcuma domestica</i> | Skin ointment. |
| Vito 99 | <i>Daucus carota, Withania somnifera, Asparagus racemosus,</i> | Brain stimulation and general weakness. |
| Zandu balm | <i>Mentha arvensis</i> | Used for cough and cold. |
| Zerub | <i>Mentha sp., Cinnamomum sp.</i> | Relieves headache and muscle pain. |