**Ethnomedicinal uses of plant resources in Gilgit-Baltistan of Pakistan**

Arshad Ali Shedayi* and Bibi Gulshan

Departement of Biological Sciences, Karakoram International University, Gilgit, Pakistan.

Accepted 16 July, 2012

A survey was conducted to collect information regarding medicinal and traditional uses of the plant resources from northern areas of Pakistan. Plant species were collected from Gahkuch area, District Ghizer, Gilgit-Baltistan province, Pakistan. A total of 35 plant species belonging to 27 families were found to be commonly used for various medicinal purposes. Among these, 10, 4, 3, 2, 1 and 1 species belonged to families Asteraceae, Cupressaceae, Lamiaceae, Solanaceae, Papilionaceae, Rosaceae and Leguminosae, respectively. Most of the people in the area still depend on herbal medicines for treating different diseases, including asthma, cough, tonic, abdominal pain, jaundice, diarrhea, cancer, headache, diabetes, muscle pain, fever, skin infections, worms, wounds, broken bones, blood pressure, tuberculosis, swellings, anemia, joint pains, inflammation, dyspepsia, arthritis and rheumatism etc. Majority of the medicines prepared by the medicinal plants were taken in direct form, paste form and/or powder form. In some cases, the whole medicinal plants are used while in some other cases, either fruit or leaves/stem or flowers are used as medicine. Besides the use of plants to treat different human diseases, many livestock such as sheep, buffalo, goat and horse were also being treated with herbal medicines. Other than medical use, medicinal plants were also found to be used as fuel, fodder and vegetable/food by local peoples. The people aged 60-80 were found to be the most knowledgeable regarding use of medicinal plants as compared to the younger ones. The major threats to the medicinal plants of the area were overgrazing, cutting, natural disaster and exploitation.

**Key words:** Gahkuch, Ghizer, Gilgit-Baltistan, ethnobotany, ethnomedicine, medicinal plants, traditional uses, diseases.

**INTRODUCTION**

Human beings always depend on plants for various purposes like medicines and food etc that has created indigenous knowledge system. Especially, in harsh mountain environment, plants enhance human survival (Mc Corkle, 1992). The elemental/chemical contents of the medicinal plants are very important. To be used as medicines, it is a prerequisite to know organic constituents of the plant material like flavonoids, alkaloids, essential oils, vitamins and glycosides (Desideri et al., 2010). The medicinal plants of Himalaya are habitat specific (Dhar et al., 2000) and their distribution is scattered and restricted to small areas. The northern mountain of Pakistan is well known for its biodiversity; about 3000 species of plants have been reported from the area, out of which at least 124 have medicinal value (Hazarat et al., 2007; UNDP\|IUCN, 1999).

In Pakistan, the main source of medicinal plants is forest and rangeland. There are 50,000 registered Hakims (traditional/folk experts of medicinal plants) in Pakistan (William and Zahoor, 1999). Rafiq (1997) reported that approximately 400 - 600 medicinal plants are more frequently used in herbal preparation. Moreover, the three mountains ranges of the area viz.: Karakoram, Himalaya and Hindukush collectively contain about 25000 species (about 10% of world plant species), out of which around 10000 are economically or medically useful (Pei, 1992). Goodman and Ghafoor (1992) reported 171 species with local ethnobotanical usage.

*Corresponding author. E-mail: arshadbio@kiu.edu.pk.*
from Baluchistan province. Khan et al. (2007) also listed 15 plant species from high altitudes of Pakistan, which are being used ethnobotanically. Similar studies have been conducted in different parts of Pakistan and reported different plant species used for curing different diseases such as Hussain et al. (2004), (2006), (2007) and Shah and Hussain (2008). Khal et al. (2011) reported a total of 43 plant species belonging to 28 families from Khunjerab National Park, Gilgit, used to cure 29 different diseases. A total of 117 taxa belonging to 42 families used as medicine were recorded in Ayvacik city Canakkale in Turkey by Uysal et al. (2012). In this study, the ethnobotanical uses of some plants in Gilgit-Baltistan province, Pakistan, were reported.

MATERIALS AND METHODS

Gahkuch is the head quarter of District Ghizer in Gilgit-Baltistan province. Its latitude is 36° 17'00N and longitude is 73°26'50'E. The Gahkuch is situated at an elevation of about 5000- 9000 feet. It is one of the vast and serene places to visit round the year due to its beautiful weather and hospitable populace (IUCN, 2006). Several field trips were conducted to collect plant samples and the required information from June to 2010. Plants were pressed, dried and preserved in a herbarium for future use. Plant species were identified with the help of available literature especially “flora of Pakistan” (Ali and Qaiser, 1995 - 2007). The survey was spread across the seasons so as to obtain maximum data. The information on medicinal uses of the indigenous plants were described after gathering data from the general population, experienced aged and traditional herbal medicine practitioners (Hakeems, etc) and available literature. A total of 100 inhabitants of the village were interviewed. The randomly selected respondents of different ages from 20 to 80 years were interviewed in local language viz.; Shina. A questionnaire was used to elicit information from the local people using standard methods. Information on local name of plants, plant parts used for curing disease, their recipes and mode of administration were recorded.

RESULTS AND DISCUSSION

A total 35 species belonging to 27 families were collected. Among these, the families Asteraeaceae, Cupressaceae, Lamiaceae, Solanaceae, Papilionaceae, Rosaceae, Leguminosae, Elaeagnaceae, Berberidaceae, Capparidaceae, Chenopodiaceae, Polygonaceae, Ephedraceae, Zygophyllaceae, Urticaceae and Plantaginaceae had 10, 4, 3 species, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1 species, respectively. All the species are being used as medicine by the local inhabitants. The results in the Table 1 show the plant species and their uses for treating different diseases in the study area. In an earlier report (Khan et al., 2011), Asteraeaceae family was found having maximum number of medicinally used species (11.63% spp.) in Khunjerab National Park, Pakistan. Asteraeaceae family was also found having large number of species used in medicine in Ayvacik of Canakkale area in Turkey (Uysal et al., 2012). It was found that most of the derivatives were being used to cure diseases in the study area. Earlier, it was reported that 25% all medicinal prescription is based on substances derived from plants or plant derived synthetic analogs (Sara et al., 2009). Hazarat et al. (2010) reported 50 species belonging to 32 families of wild herbs, shrubs and trees of medicinal plants in Usheria valley Dir, Pakistan. Ali and Qaiser (2009) also discovered 83 taxa that were used locally in Chitral, District of Hindu Kush range. In addition, Shinwari et al. (2006) enlisted more than 500 species of flowering plants being used as medicine; Shinwari and Gilanni (2003) listed 45 medicinal plants from Northern Pakistan, while Athar and Siddiqui (2004) reported 95 species as medicinal plants from Pakistan.

During present study, it was found that some plant species were used for treatment of only one specific disease, while most of the plants have multiple uses. Likewise, most of the diseases were treated by many different plant species. It was also found that 35 species were to treat 22 different diseases as shown in the Table 1. Only 4 plant species; 11% (spp. number 1, 9, 23 and 28) used to treat one specific disease (3%), 3 plant species; 9% (6, 29 and 31) used to treat 2 different types of diseases (6%), 7 plant species; 20% (4, 12, 22, 26, 27, 33 and 34) used for 3 different types of diseases (9%), 4 plant species; 11% (5, 10, 19 and 32) used to treat 4 different diseases (11%), 4 plant species; 11% (7, 17, 18 and 33) used to treat 5 different diseases (14%), 5 plant species; 14% (13, 14, 15, 20 and 35), used to treat 6 different diseases (17%), 1 plant species; 3% (25) used to treat 7 different diseases (20%), 4 plant species; 11% (1, 16, 21 and 24) used to treat 8 different diseases (23%), 2 plant species; 6% (8 and 30) used to treat 9 different diseases (26%), 1 plant species; 3% (2) used to treat 10 different diseases (29%) and this number is the highest as compared to others. The results were similar to that of Muthu et al. (2006) who reported that a single plant is used for more than one disease, and to treat a single disease, different plants were used in Kancheepuram District of Tamil Nadu, India.

Stomachache and gastric diseases were treated by the highest number of medicinal plants (11 (31%),), followed by fever and flu with 10 (29%) plant species, cough 9 (26%), urine/kidney problems (diuretic) and as tonic/stimulant by 8 (23%) different plant species each; for blood related diseases (anemia, hemorrhage, astrin gent) 7 (20%) different plant species were used; arthritis/rheumatism, skin diseases, heart problems and cancer 5 (14%) different species each, for wounds, cold/catarh, jaundice and respiratory/lung problems used 4 (11%) different species each, diabetes, perspiration, earache, gonorrhea, ulcer, liver problems, as laxative/ purgative, bites (snake, fish, dog) and as antiseptic 3 (9%) different species used for each, burns, throat diseases, swelling, eye infection, hair fall/dandruff, blood pressure, polyps, warts and worms 2 (6%) different species used for each, while there are 22 diseases treated only by 1 (3%) plant species each; which are as
<table>
<thead>
<tr>
<th>Spp. no.</th>
<th>Plant species and Family</th>
<th>Parts used</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Artemisia maritima</em> (Linn) (Asteraceae)</td>
<td>Leaves and flowers</td>
<td>The ointment made is used for joint pains. It is used as stomachache remedy, acts as cardiac stimulant, fever and to kill the worms. It is also used as a tonic.</td>
</tr>
<tr>
<td>2</td>
<td><em>Artemisia annum</em> L. (Asteraceae)</td>
<td>Whole plant</td>
<td>A decoction of the whole plant is used for treatment of Malaria. Leaves are used for fever, cough and taken to treat diarrhea. Oil is used in local perfumes due to its pleasant fragrance.</td>
</tr>
<tr>
<td>3</td>
<td><em>Artemisia breviloba</em> Wall. ex DC. (Asteraceae)</td>
<td>Whole plant</td>
<td>Gastronomic herb and fodder for sheep.</td>
</tr>
<tr>
<td>4</td>
<td><em>Artemisia dubia</em> Wall. Ex Bess. (Asteraceae)</td>
<td>Whole plant</td>
<td>Leaf powder is used for gastric problem and intestinal worms. Paste of fresh leaves is applied externally for the treatment of wounds and skin infections.</td>
</tr>
<tr>
<td>5</td>
<td><em>Artemisia hera-alba</em> Asso (Asteraceae)</td>
<td>Whole plant</td>
<td>Whole plant powder is used for diabetes. A plant decoction is utilized for cooling purposes. Used for muscular pain and fumigation purpose.</td>
</tr>
<tr>
<td>6</td>
<td><em>Artemisia scoparia</em> Waldst. (Asteraceae)</td>
<td>Whole plant</td>
<td>Used for the treatment of ear pain. The smoke of twigs is considered good for burns. Considered as fodder for goats.</td>
</tr>
<tr>
<td>7</td>
<td><em>Elaeagnus angustifolia</em> L. (Eleagnaceae)</td>
<td>Fruits</td>
<td>The fruits are eaten raw or boiled for sour throat and treatment of cough, flu, cold and various types of fevers. Gum is used for asthma treatment.</td>
</tr>
<tr>
<td>8</td>
<td><em>Berberis lyceum</em> Royle. (Berberidaceae)</td>
<td>Roots, leaves and stem</td>
<td>The roots are used in gonorrhea, chronic diarrhea, piles, and remedy for swollen and sore eyes, broken bones, wounds, ulcers and acute conjunctive. Used as bitter tonic astringent. Leaves are given in jaundice. An ointment made from root powder is mix with oil and applied on broken bones. It is also used for fencing and hedges.</td>
</tr>
<tr>
<td>9</td>
<td><em>Cupressus sempervirens</em> L. (Cupressaceae)</td>
<td>Fruits and stem</td>
<td>The fruits and woods are astringent. Wood is used for carpentry.</td>
</tr>
<tr>
<td>10</td>
<td><em>Capparis spinosa</em> L. (Capparidaceae)</td>
<td>Fruit, flower</td>
<td>Roots bark is diuretic and expectorant. Used in paralysis, rheumatism and enlarged spleen. Used for arteriosclerosis, kidney disinfectants and tonic.</td>
</tr>
<tr>
<td>11</td>
<td><em>Carthamus tinctorious</em> L. (Asteraceae)</td>
<td>Petals, seeds</td>
<td>Used for perspiration, hysteria, weight loss and blood imbalance, flowers are laxative.</td>
</tr>
<tr>
<td>12</td>
<td><em>Chenopodium album</em> L. (Chenopodiaceae)</td>
<td>Whole plant</td>
<td>This plant is said to be laxative and used in hepatic disorder and enlarge spleen.</td>
</tr>
</tbody>
</table>
Table 1. Contd.

<table>
<thead>
<tr>
<th>No.</th>
<th>Common Name</th>
<th>Parts Used</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td><em>Datura stramonium</em> (Linn.)</td>
<td>Seeds, fruits, and leaves</td>
<td>The whole plant is poison and narcotic. Leaves are applied to boils, sores and fish bite. Juice of flowers is used in earache. Leaves and seeds are antiseptics. Fruit is sedative. Juice of fruit is used to cure dandruff and falling hairs.</td>
</tr>
<tr>
<td>14</td>
<td><em>Ephedra jerardiana</em> Wall.</td>
<td>Roots, stem and seed</td>
<td>Roots and stem are used as anti asthmatic. Stem as cardiac stimulants. The juice of the berries is useful in treating infection of the respiratory passage. Fruits are edible, used for fever and cough. Seeds are used as a cooling medicine.</td>
</tr>
<tr>
<td>15</td>
<td><em>Glycerrhiza glabra</em> (Linn.)</td>
<td>Dried roots and rhizome</td>
<td>Roots and rhizomes are used in expectorant, diuretic and weak laxative it is used in flavoring tobacco. Liquorices roots used as tooth brush, roots powder for cough and an extract made from the roots after boiling is given in case of cold and flu. It is believed to be good remedy for sore throat.</td>
</tr>
<tr>
<td>16</td>
<td><em>Hippophea rhamnoide L.</em></td>
<td>Fruit, stem, and leaves</td>
<td>The fruits are used as cough syrups. After decoction of the berries are used for skin and lung problems. Also used for cancer, ulcer, wounds, skin infection, joint pain, hair fall, diabetes, blood pressure, jaundice and heart problems. Locally it is utilized as firewood and forage, particularly for goats.</td>
</tr>
<tr>
<td>17</td>
<td><em>Juniperus excelsa</em> Bieb.</td>
<td>Berries</td>
<td>Berries are used for tuberculosis and diabetes. The berries are burnt over coal and smoke is spread in all corners of the house for repelling evils. The paste of berries is applied on painful joints and swelling.</td>
</tr>
<tr>
<td>18</td>
<td><em>Juniperus communis</em> L.</td>
<td>Berries</td>
<td>Infusion of barriers is diuretic. Berries, wood and oil are used for cancer, polyps, swellings, tumors, and warts. It is also used for curing skin disease, kidney disease.</td>
</tr>
<tr>
<td>19</td>
<td><em>Juniperus squamata</em> Buch.</td>
<td>Twigs and berries</td>
<td>Twigs are burnt as incense and barriers used similarly as that of <em>J. communis</em> and <em>J. excelsa</em>.</td>
</tr>
<tr>
<td>20</td>
<td><em>Medicago sativa</em> L.</td>
<td>Whole plant</td>
<td>The plant is tonic. Used in anemia, hemorrhage, earache and jaundice. It is also considered as antibacterial.</td>
</tr>
<tr>
<td>21</td>
<td><em>Mentha sylvestris</em> L.</td>
<td>Leaves and flower</td>
<td>Leaves and flowers are carminative and stimulant. Used for headache and Stomachache. Its tea is used to cure catarrh, fever, indigestion and profuse mucus discharge, whooping cough, asthma and respiratory inflammation. It is also used for curing digestive problems, acidity and increased fats.</td>
</tr>
<tr>
<td>22</td>
<td><em>Mentha arvensis</em> Linn</td>
<td>Whole plant</td>
<td>The plant is used to treat liver and spleen disorder, asthma and jaundice.</td>
</tr>
<tr>
<td>23</td>
<td><em>Melilotus officinalis</em> (L.)</td>
<td>Whole plant</td>
<td>This plant is carminative, aromatic and emollient.</td>
</tr>
</tbody>
</table>
Table 1. Contd.

<table>
<thead>
<tr>
<th>No.</th>
<th>Plant Name</th>
<th>Part Used</th>
<th>Uses and Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td><em>Pinus roxburghii</em> Sargent (Pinaceae)</td>
<td>Resin wood</td>
<td>Resin is stimulant. Internally it is used as stomachic and as remedy for gonorrhea. Wood is stimulant used in burning of body, cough, fainting and ulceration. Wood and oil resin is used in snake bite and scorpion sting.</td>
</tr>
<tr>
<td>25</td>
<td><em>Plantago major</em> L. (Plantaginaceae)</td>
<td>Seeds and leaves</td>
<td>Leaves are astringent and used in inflammation of the skin, malignant ulcer and intermittent fever. Seeds are used in chronic dysentery, diarrhea and constipation, kidney disorder and gonorrhea.</td>
</tr>
<tr>
<td>26</td>
<td><em>Rumex hastatus</em> (Don). (Polygonaceae)</td>
<td>Leaves and roots</td>
<td>Used for their sour taste and carminative, stomachic, flavoring and purgative characters.</td>
</tr>
<tr>
<td>27</td>
<td><em>Rosa indica</em> L. (Rosaceae)</td>
<td>Flower</td>
<td>Oil of the flower is useful in eye disease. Used in fever, stomach-ache and pneumonia.</td>
</tr>
<tr>
<td>28</td>
<td><em>Rosa macrophylla</em> Lindl. (Rosaceae)</td>
<td>Fruits</td>
<td>The ripen fruits are eaten and contain plenty of vitamin.</td>
</tr>
<tr>
<td>29</td>
<td><em>Saussurea lappa</em> (Dcne.) Sch. (Asteraceae)</td>
<td>Roots</td>
<td>The root is used against heart disease of cattle and for toothache. Powdered roots are sprinkled over crops as insecticide.</td>
</tr>
<tr>
<td>30</td>
<td><em>Solanum nigrum</em> L. (Solanaceae)</td>
<td>Fruit and whole plant</td>
<td>This herb is used for fever skin problems, wounds, diabetes stomach problems and tumors. Rubbing the seeds on the cheeks to remove freckles.</td>
</tr>
<tr>
<td>31</td>
<td><em>Taraxacum officinale</em> L. (Asteraceae)</td>
<td>leaves and root</td>
<td>Used for urinary problems, constipation, dyspepsia and liver problems.</td>
</tr>
<tr>
<td>32</td>
<td><em>Thymus serpyllum</em> Linn (Labiateae)</td>
<td>Whole plant</td>
<td>Used in stomach trouble and fever. The plant is used as tonic and in whooping cough.</td>
</tr>
<tr>
<td>33</td>
<td><em>Tribulus terrestris</em> L. (Zygophyllaceae)</td>
<td>Whole plant</td>
<td>It has long been a constituent in tonics also used as an aphrodisiac, diuretic and nerving.</td>
</tr>
<tr>
<td>34</td>
<td><em>Trigonella foenum graecum</em> L. (Papilionaceae)</td>
<td>Whole plant</td>
<td>Used as appetizer and general tonic for pellagra for treatment of pulmonary disorders.</td>
</tr>
<tr>
<td>35</td>
<td><em>Urtica dioica</em> (Linn). (Urticaceae)</td>
<td>Roots and leaves</td>
<td>Reduce allergies, stops bleeding, lower blood pressure and heals wounds. Used as a diuretic and to cure rheumatism. Externally it has been used to improve the appearance of the hair and is said to be a remedy for dandruff.</td>
</tr>
</tbody>
</table>
follows; malaria, piles, broken bones, paralysis, hysteria, weight loss, hepatic disorder, boils/sores, sedative, tuberculosis, headache, hysteria/emollient, pneumonia, vitamins deficiency, toothache, antiseptic, freckles, dyspepsia, aphrodisiac, pellagra and allergy. In a similar study conducted by Khan et al. (2011) in Khunjerab National Park, Gilgit, it was found that 9 spp. were used for fever, followed by cough and indigestion 5 spp., while wounds, eye infection, abdominal pain, jaundice, blood pressure and diarrhea had 4 spp. similar to our findings. In another similar study conducted in Ayvacik city of Canakkale in Turkey, it was found that the taxa used for the treatment of cough were 18.6%, stomachache 13.4%, kidney ailments 11.6%, cold, analgesic, diuretic and hemorrhoid 9.3%, injuries, tonic, abdominal pain, laxative and dyspepsia 6.9% (Uysal et al., 2012).

The largest family in the area is Asteraceae which is well known for its aromatic quality. The present study indicates that some plants are invariably used in Swat and other parts of Pakistan for human and animal health care system (Haq and Rehman, 1981; Haq and Gani, 1994; Khan et al., 2003). Most of the species were used for treating arthritis, rheumatism and stomach disorders, jaundice, backache, stomach disorders, ulcer, cold and even cancer. Medicinal plants, since the dawn of civilization, have been used in virtually all cultures as a source of medicine. There is growing interest in medicinal plants as a re-emerging health aid due to the rising costs of prescription drugs in the maintenance of personal health (Hoareau and DaSilva, 1999). Similarly Shinwari et al. (2000a) noted that as overall diversity increases so does medicinal plants species, reporting 345 medicinally used species from the biologically diverse. Plant products are the sources of medicines for 75 - 90% people in the developing countries (Saad et al., 2009). Artemisia is one of the oldest and best known medicinal plants and is still used effectively today by people of all cultures. Artemisia is used in many different ways and one of the most common practices is to insert fresh leaves into the nostrils to clear blocked nasal passages (Van et al., 2005).

In Pakistan, more than 60% of the people lives in rural areas where the generation old indigenous knowledge of medicinal plants used against many day to day diseases, still exist and practiced (Shinwari et al., 2006). The leaves, flowers, fruits and seeds are mostly used for treatment because these have more medicinal values, while whole plant and stem are used sometime. Different parts of medicinal plants used as medicine by the local traditional healers among the different plant parts, the leaves were most frequently used for the treatment of diseases followed by the whole plant parts, fruits, stem, root, seed and flowers. The tribal people of western Madhya Par dash of India uses 13 plants for the treatment of jaundice disease (Samvatsar and Diwanji, 2000). Likewise, Khan et al. (2007) discovered fifteen indigenous species used by the locals of Buner, Swat and Chitral for different diseases. Most of the plant species and the diseases treated are same as that of the present study. The documented medicinal plants were mostly used to cure skin diseases, poison bites, stomachache and nervous disorders in Kancheepuram District of Tamil Nadu, India (Muthu et al., 2006). The present study indicates that some plants are invariably used in Swat and other parts of Pakistan for human and animal health care system (Haq and Rehman, 1981; Haq and Gani, 1994; Sher et al., 2003).

**Common diseases of the area**

Although there are many diseases in the area treated by the medicinal plants, the most common diseases of the study area totaled 1; in which both fever and stomachache was 15%, followed by blood pressure 12%, headache ache, headache and respiratory problems 10% each, cancer 9%, asthma 8%, skin diseases 7%, arthritis 6% and then dyspepsia and diabetes 4% each, as shown in the Figure 1. In developing countries, medicinal plants provide a real alternative for primary health care system. According to a report, between 35000 and 70000 plant species are used in folk medicine worldwide (Ali and Qaisar, 2009). The indigenous communities of the Native American (NAS) have learned to use the bio-resources around them for the treatments of diseases; they depend upon the bio-resources for their primary health care because they perceive that the traditional medicines have no or lesser side affect (Kamboj, 2000). The usage of medicinal plants in the area falls in three categories the medicinal plant *Solanum nigrum* mixed with other herbal medicines has hepatoprotective effect in cirrhotic patients. This protective effect can be attributed to the diuretic, anti-inflammatory, anti-oxidative, immuno-modulating properties of the component herb (Fallah et al., 2005). The people living at high altitudes use medicinal plants for different diseases like rheumatism, arthritis, muscular pain, cough, diabetes, fever and migraine (Khan et al., 2007).

**Forms in which medicinal plants are used**

Overall, 45% of medicinal plants were used in direct form, followed by paste form (33%) and powdered form (22%) as shown in the Figure 2. According to local inhabitant, most people used medicinal plants as direct form, some use as paste form, and few use as powder form (Fallah et al., 2005).

**Animal treatment**

Live stock treated with medicinal plants in the area were sheep 35%, buffalo 30% goat 24% and horse 20%
The people of the area mostly used *Artemisia* spp., *Hippophae* spp. and *S. nigrum* for the treatment of their livestock. The *Artemisia* spp. is used for gastric problems and removal of intestinal worms. Various studies have reported on the indigenous use of medicinal plants in the treatment of livestock diseases like oral disease and eye disorder etc. (Tapsoba and Deschamps, 2006). According to Teklehaymanot and Giday (2007), eight species of medicinal plants have veterinary importance. The plant parts used were leaf (62.5%) and root (37.5%). These are used as remedy for seven internal and external illnesses. The number of veterinary important medicinal plants is low compared to those areas with culture of cattle rearing. Giday and Ameni (2003) documented 83 medicinal plants that are used to treat 37 types of livestock ailments.

**Parts of the plants used**

The Figure 4 indicates that medicinal plants as a whole were used mostly (28%), followed by fruit (27%), leaves (21%), stem (13%) and flowers (13%). The berries are included in the fruits and twigs in the stem portion. Among the different parts of medicinal plants used as medicine by the local traditional healers, the leaves were most frequently used for the treatment of diseases followed by the whole plant parts, fruits, stem, root, seed and flowers. The tribal people of western Madhya Par
dash of India use 13 plants for the treatment of jaundice disease (Samvatsar and Diwanji, 2000). In most of the cases (45%), underground parts were used for treating ailment, followed by leaves and aerial parts; stem and flowers were the least used plant parts (Uniyal et al., 2006). Plant parts were applied as a paste (38%), juice extracted from the fresh plant parts (24%), powder made from fresh or dried plant parts (20%), some fresh plant parts (6%), and decoction (12%) by traditional healers in Kancheepuram District of Tamil Nadu, India (Muthu et al., 2006).

**Seasons in which plants are collected**

Figure 5 shows the results of 45% plants collected in summer, 33% in spring and 22% in the autumn by the local inhabitants for healing purpose, while no plants of medicinal importance are collected during winter as no plants are found during this season due to decreased temperature. Most of the flora is available during summer, and these are then collected, used or stored for future use.

**Medicinal plants used for other purposes**

The percentage of medicinal plants used for other purposes are as follows; fuel 45%, fodder 44% and as vegetable/food 11% (Figure 6) since the study was conducted in a rural area where more than 80% people depend on agriculture and wild and cultivated plants are used as fuel. The people also domesticate livestock, which again graze on these plants. A plant in one place may be useful as food, feed, fiber and medicine, while in other places, it may be a weed (Shinwari and Malik, 1989). Various medicinal plant species are also used as food along with their medicinal benefits, evaluating their metal content can help to understand the suitability of these plants species (Husain et al., 2009). The 48 woody species of most native plants have uses by the residents of Haramosh and Bagrot valleys, predominantly as medicines, timber, shelter, domestic items and fuel (Wali and Khatoon, 2007). People living in the mountain of Pakistan use plants in many ways, including medicines, timber, wood, firewood, food and fodder (Hussain and Khaliq, 1996). According to Khan et al. (2011), plant species in Khunjerab National Park have been used for food, medicine, shelter, fuel and other purposes since long.

**Knowledgeable age groups**

The people aged 60 to 80 were found to be the most knowledgeable as compared to the younger ones. The percentage of knowledge about the uses of medicinal plants were as follows; 60 - 80 (50%), 40 - 60 (30%), 20 - 40 (25%) and 1 - 20 (5%) as shown in the Figure 7. The results indicate that with the increase age, the knowledge is also increased – that is the age and knowledge of...
medicinal plants is directly proportional to each other. The most familiar age group people with the medicinal plants are in-between 50 - 75 than 75 - 100. Older men and women were found to know more about medicinal plants (Quershi et al., 2007) because the older people have more experience to use medicinal plants since in those days hospital resources were not available. The knowledge about the medicinal plants increases with increasing age of the people, but after 75 it starts decreasing because of the memory loss in old aged people. According to Quershi et al. (2010) the knowledge of plants is based on trial and error. Consequently, the authentic knowledge of the uses of medicinal plants passed on from one generation to another after refining and addition with the passage of time wild plants were cleared from their original habitat to replace the desired cultivated crops on large scale.

The local communities of different regions of Pakistan have centuries old knowledge about traditional uses of plants occurring in their areas. This indigenous knowledge of plants has been transferred from generation to generation (Bhardwaja and Gahkhar, 2005). The older people of Gilgit were noted as being better informants and the vivid reason for this may be their personal experience of using these plants since old times. Respondents under 50 years of age were less aware of the potential of medicinal plants than their older counterparts who have gathered knowledge from the point of view of their traditional health care and their day to day practices. This difference in the perception of the two age classes will likely result in knowledge loss over time (Qureshi et al., 2006). In a study conducted in Rural Niger, it was found that compared to men, women reported more edible plants, different medicinal plants, and less detailed information on construction plants. The interview data indicated that ethnobotanical knowledge increased with age according to Guimbo et al. (2011).

**Major threats to the medicinal plants**

The major threats to the medicinal plants of the area were found to be overgrazing (40%), cutting for fuel and timber (30%), natural disaster (25%) and exploitation by the researchers, healers, conservationists and food organizations (5%) (Figure 8). During the last few years, the habitats of medicinal plants all across the Himalaya have been under pressure due to urbanization and exploitation of raw materials by pharmaceutical companies (Tendon, 1996). In Baluchistan, various wild herbs has been collected and sold in the local communities. However very limited scientific knowledge is there. The vulnerability of medicinal plants and species to over exploitation and extinction need to be dealt pragmatically (Khan and Aslam, 2004). The findings were similar to that of Khan et al. (2007) who reported exploitation and overgrazing as the major threats to the Medicinal plants of higher altitudes of Pakistan (Sadia, 2010).

**REFERENCES**

efficacy of Live 52 on liver cirrhotic patients: A randomized, double
blind, placebo- controlled first Approach Phytomedicine 12(9):619-
624.

Giday M, Ameni G (2003). An Ethnobotanical survey on plants of
veterinary importance in two Woreda of southern Tigray, Northern

Goodman SM, Ghafoor (1992). The ethnobotany of Southern
Balochistan, Pakistan with particular reference to Medicinal Plants
Filediana; Botany, New series 31(4):1-84.

of Men, Women and Children in Rural Niger: A mixed-methods

Medicus 30:51-86.

Haq I, Gani U (1994). Medicinal Plants of Lower Swat. Pakistan Study
Area J. 9:230-236


42(1):31-34.

Hoareau L, DaSilva EJ (1999). Medicinal plants: a re-emerging health

Hussain F, Khalil A (1996). Ethnobotanical studies on some plants of
on Ethno botany and its Application to Conservation, NARC, Islamabad.

Hussain J, Khan AL, Rehman N, Hamayune M, Shah T, Nisar, Bano T,
Shinwari ZK, Lee IJ (2009). Proximate and nutrient analysis of
selected vegetable species’ case study of Karak Region pakistan.


Hussain F, Sher H, Ibrar M (2004). Ethnobotanical Profile of some

Hussain F, Badshah L, Dastagar G (2006). Folk Medicinal Uses of

Hussain F, Shah SM, Sher H (2007). Traditional Resource Evaluation of

(Unpublished).

Res. applications 122 www. Ethnobotanyjournal.org/vol5/1547-3465-
05115.pdf.

Khan AM, Aslam M (2004). Medicinal plant of Balochistan. Project on
introduction of medicinal Herbs and species as crops.Ministry of food,
Agric. and livestock, Qarshi industries (Pvt) Ltd. pp.3-44.

Khan A, Gilani SS, Hussain F, Durrani MJ (2003). Ethnobotany of

Plants by the inhabitants of Khunjerab National Park, Gilgit, Pakistan.

Khan I, Razzaq, Islam M (2007). Ethnobotanical Studies of Some
Medicinal and Aromatic Plants at Higher Altitudes of Pakistan.


used by traditional healers in Kancheepuram District of Tamil Nadu,
India. J. Ethnobiol. Ethnomed. 2:43.

Himalaya. Po. 114-120 in Himalayan Ecosystem. Edited by D.W.
Tewari, Intel Book Distribution, Dehra Dun, India.

Ethnobotanical Studies of Medicinal Plants of Gilgit District and

Rafiq RA (1997). Medicinal plants of Pakistan: conservation, paper
presented at the expert consultation on medicinal plant species
prioritization for South Asia, IDRC/WWF-India, New Delhi, India.

the Ethnobotanically Important plants of F. R. Bannu NWFP,

Sadia R (2010). Scope of herbal based Agro Industrialization in

Sara V, Franca T, Gelsomina F (2009). Traditional uses of medicinal

14(2):91-95.


and aromatic plants of Pak (a pictorial guide) Kohat Univ. Sci.

Shinwari ZK, Gilani S (2003). Sustainable harvest of medicinal plants at

Progressive Farm. 9:39-42.

Shinwari ZK, Gilani SS, Kohjoma M, Nakaite T (2000a). Status of
Medicinal Plants in Pakistani Hindu-Kush Himalayas. In Proceedings
of Nepal-Japan Joint Symposium on Conservation of Natural Me-

Samwatsar S, Diwanji VB (2000). Plant sources for the treatment of
jaundice in the tribal's of Western Madhya Pradesh of India J.
Ethnopharmacol. 73:313-316.

 treatment of oral disease in Burinka Faro. J. Ethnopharmacol.
104:88-78.

Teklehaymanot T, Giday M (2007). Ethnobotanical study of medicinal
plants used by People in Zegie Peninsula, Northwestern Ethiopia. J.
Ethnobiol. Ethnomedicine 3:12.


UNDP/WWF (1999). Report on Biodiversity Of Northern Areas,
Pakistan. (Unpublished).

Uniyal SK, Singh KN, Jamwa P, Lal B (2006). Traditional use of
medicinal plants among the tribal communities of Chhota Bhangal,

Uysal I, Gucel S, Tutencokali T, Ozturk M (2012). Studies on the
44:239-244, Special Issue.


Wall SK, Khatoon S (2007). Ethnobotanical studies on useful trees and
shrubs of Haramoe and Bagrot valley. In Gilgit and Northern Areas

William, Zahoor A (1999). Priorities for Medicinal Plants Research and
Development in Pakistan. MPPA, New Delhi, India.
Data on ethnomedicinal plants and ethnographic profile of respondents was documented using semistructured questionnaires. The present study revealed utilization of 52 medicinal plants for the treatment of different gastrointestinal infections in studied regions. Apiaceae was the most dominant family reported to be used for the treatment of these infections (4 plants). Plants are an important resource of conventional medicines used against different ailments. Rural people who have century’s old traditional knowledge transferred from generation to generation still rely on plant resources for variety of purposes such as food, fodder, and medicines.