ETHNOBOTANICAL STUDIES ON SOME USEFUL HERBS OF HARAMOSH AND BUGROTE VALLEYS IN GILGIT, NORTHERN AREAS OF PAKISTAN

SHER WALI KHAN AND SURAYYA KHATOON

Department of Botany
University of Karachi, Karachi -75270 Pakistan

Abstract

Field studies were made on the herbaceous medicinal plants of Haramosh and Bugrote valleys. Folk medicinal uses of herbs in these valleys have helped people prevent and cure various diseases such as rheumatism, asthma, diabetes, blood pressure, stomach problems, abdominal problems etc. The most common medicinal herbs found in the region belong to the families Labiatae, Compositae, Ranunculaceae, Umbelliferae and Gentianaceae. In the present paper 98 herbaceous plant species are reported on the basis of information gathered from local peoples of both valleys. Out of 98 plants 21 are cultivated and 77 are wild.

Introduction

Ethnobotany is the study of plants in relation to the inhabitants of an area and deals with folk concepts of classification by habit, habitat and usage or some other parameters (Berlin et al., 1973). Ethnobotany was originally based on quantitative methods such as inventories of plants and their uses, with major focus on the economic importance. Studies by national and international organizations (WHO) have shown that for 75-90 % of the rural population of the world, the local herbalists alone attend to their medical problems. Some ethnobotanical studies have covered total relationship of the target human society with plants but they have been directed mainly to plants used in medicine and food (Aikman, 1977; Morton, 1975; Jain, 1965). Botanists are involved in the investigation of folk medicines (Bolyard, 1981; Morton, 1974; Rao, 1981) and the ecological interaction of people and plants (Bye, 1981). In recent past, ethnobotany has been recognized as a valid discipline having a very strong role in the advancement of many aspects of scientific and historic studies. A number of investigators have devoted their attention to the vast store of knowledge of plant properties still intact in native culture in different parts of the world (Morgan, 1981).

Ethnobotany, being a multidisciplinary study, has not been attempted much in Northern Areas of Pakistan although there is an ample scope. However, such studies recently have gained momentum. The Haramosh and Bugrote valleys of Gilgit district situated in the northern side of Indus River offer immense scope for ethnobotanical studies due to their rich floristic diversity and old civilization of local peoples. There are quite a large number of plants used by the local peoples for various diseases such as fever, rheumatism, asthma, stomach problems, constipation, eye problems, and skin problems. In recent times there has been increasing deforestation in the area (Khan & Khatoon, 2007), resulting in the loss of many important species. In addition, with the intrusion of modern civilization to these areas, local uses of the plants are diminishing day by day with the death of older peoples. Hence, we attempted to record local uses of these plants before the information is lost forever. The present paper is in continuation with the earlier papers (Khan & Khatoon, 2004; 2007) on ethnobotany of these valleys. In this paper ethnobotanical uses of another 98 herbaceous species are documented.
Material and Methods

Plant specimens were collected during the springs of 2001-2006 from various localities of both valleys and identified with the help of Flora of Pakistan (Nasir & Ali, 1970-89; Ali & Nasir, 1989-1991; Ali & Qaiser, 1993-2007). The identification was also done by comparing with the authentic specimens available in the Karachi University Herbarium. After identification voucher specimens were deposited in the Karachi University Herbarium (KUH). During this period those people particularly the old men and women were interviewed whose empirical knowledge was respected by everyone. The data recorded from the local people of both valleys were checked against the available literature (Akbar & Athar, 2006; Basu, 1991; Bown, 1995; Pullaiah, 2006; Robert & Henry, 2002; Sala, 1995). Although some species of the present study are mentioned in these works, but their uses recorded by us were not reported earlier. Thus, the present study provides some additional uses of the species which are otherwise used in other areas.

Results

Ethnobotanical uses were enumerated for 98 herbaceous species (1 Pteridophyte, 12 Monocots, 85 Dicots) belonging to 75 genera (1 Pteridophyte, 6 Monocots, 68 Dicots) and 33 families (1 Pteridophyte, 5 monocots, 27 Dicots). Of these 22 are cultivated (4 Monocot, 18 Dicots) and 76 are wild (1 Pteridophyte, 8 Monocots, 67 Dicots). The data collected through interviews with local people indicate that these species are mostly used in fever, cough, asthma, stomach and abdominal disorders, jaundice, rheumatism, joints pain etc. It is interesting to note that most of these plants were Dicots while Monocots and Pteridophytes constitute only a minor fraction of them. The most important family was Compositae containing 14 species. This was followed by Labiatae with 8 species then Gentianaceae, Ranunculaceae and Umbelliferae (6 species each). The listed plants are grouped under Pteridophyte, Monocots and Dicots. Families and species within them are arranged alphabetically. Local names and uses are provided for each species.

Pteridophytes

Family Equisetaceae

1. *Equisetum arvense* L.
   Local name: Chihly
   Voucher specimen # 183
   Whole plant is used for urine and kidney problems especially for kidney stone.

Angiosperms-Monocots

Family Alliaceae

2. *Allium carolinianum* DC.
   Local name: Khush
   Voucher specimen # 398
   Whole plant is used as vegetable and medicinally used for swellings, dysentery and joints pain and also considered as a tonic.
3. *Allium cepa* L. (Cultivated)
   Local name: Kashuh
   Leaves and bulbs are mostly used as salads and also used in cooking. Bulbs are chief source of income. Medicinally bulbs are used as aphrodisiac and extract is used in ear pains, flatulence and skin diseases.

4. *Allium humile* Kunth
   Local name: Cherum
   Voucher specimen # 565
   Whole plant is used in blood purification and swellings.

5. *Allium sativum* L. (Cultivated)
   Local name: Bukpa
   Bulbs are used in kitchens and medicinally it is used for cough, colic, constipation, flatulence, asthma and cardiac troubles.

6. *Allium victorialis* L.
   Local name: Faloon
   Voucher specimen # 202
   Whole plant is used for abdominal troubles, swellings, asthma, respiratory, problems and dysentery.

**Family Asparagaceae**

7. *Asparagus filicinus* Ham.
   Local name: Not known
   Voucher specimen # 57
   Roots are internally used for uterine tumor, increase blood formation, leucorrhoea, disturbed menstruation and nervous disorders.

**Family Convallariaceae**

   Local name: Saat Ashee
   Voucher specimen # 196
   Roots are used for disturbed menstruation, uterine tumor, swellings and its related problems.
   Some people used its roots as general tonic with milk and ghee.

   Local name: Saat Ashee
   Voucher specimen # 471

    Local name: Saat Ashee
    Voucher specimen # 367
    All the uses are same as *P. geminiflorum* and all the species are locally known by the same local name.
Family Orchidaceae

11. *Dactylorhiza hatagirea* (D.Don) Soo
   Local name: Jadughar Char
   Voucher specimen # 513
   Roots are used for backache and sexual problems. Some people use it for witchcraft.

Family Poaceae

12. *Triticum aestivum* L. (Cultivated)
   Local name: Ghoom
   Wheat is a chief source of food and straw. Some people use its stem for making domestic items.

13. *Zea mays* L. (Cultivated)
   Local name: Makayi
   Maize is the second chief source of food and straw and its grain is also used medicinally for dysentery, jaundice and cough problems.

Angiosperms-Dicots

Family Asclepiadaceae

14. *Caralluma tuberculata* N.E. Brown
    Local name: Joonay Char
    Voucher specimen # 819
    Whole plant is extensively used for paralysis and joints pain and fever.

Family Balsaminaceae

15. *Impatiens edgeworthii* Hook. f.
    Local name: Chatty Char
    Voucher specimen # 40
    Plant extract is used in burns.

Family Boraginaceae

16. *Onosma hispida* Wall. ex G.Don
    Local name: Tul Charung
    Voucher specimen # 104
    Root extract is used for pneumonia and typhoid fever and also used for dyeing hairs.

Family Brassicaceae

17. *Brassica napus* Reichb. (Cultivated)
    Local name: Molo
    Roots and leaves are used as vegetable and medicinally used as tonic and aphrodisiac.
Local name: Burribory
Voucher specimen # 18
Whole plant is used for chest complains and cough.

19. *Lepidium sativum* L. (Cultivated)
Local name: Zachik
Seeds are used in constipation, abdominal problems of children and feminine problems during delivery, bleeding, uterine tumors, menstruation, swellings and eye problems.

20. *Raphanus sativus* L. (Cultivated)
Local name: Choo Molo
Roots, seeds and leaves are used for indigestion, stomachic, jaundice, inflammation, colic, flatulence and skin diseases. Some people used these roots against asthma, diarrhoea and paralysis. Seeds are used as aphrodisiac.

**Family Campanulaceae**

21. *Codonopsis clematidea* (Schrenk) C. B. Clarke
Local name: Pichiktulooh
Voucher specimen # 21
Roots of this plant are used as aphrodisiac.

**Family Cannabaceae**

22. *Cannabis sativa* L. (Cultivated)
Local name: Bung
Plant powder is used for cough, bronchitis and chest problems.

**Family Chenopodiaceae**

23. *Chenopodium album* L.
Local name: Khunnah
Voucher specimen # 318
Whole plant is used for ulcers, swellings and seminal weakness.

24. *Chenopodium botrys* L.
Local name: Hamaghee
Voucher specimen # 275
Whole plant is used as antiseptic and also for abdominal problems, uterus problems, tumors, swellings, bleeding and disturbed menstruation.

Local name: Us
Voucher specimen # 144
Roots are used for making tooth brush and also used for toothache and whole plant is best fodder for goats.
Family Compositae

26. Arctium lappa L.
Local name: Chero
Voucher specimen # 38
   Seeds and roots are used for diabetes, blood pressure, joints pain including gout and rheumatism.

27. Artemisia absinthium L.
Local name: Kakamush
Voucher specimen # 1018
   Extract of plant is externally used for itching and other skin problems. It is also internally used for indigestion, flatulence, colic, ring worms, blood pressure and diabetes.

28. Artemisia brevifolium (Wall.ex DC.) Ling & Y.R.Ling
Local name: Zoon
Voucher specimen # 825
   Plant extract is internally used for fever, cough, blood pressure and abdominal pains.

29. Artemisia scoparia Waldst. & Kit.
Local name: Jaanh
Voucher specimen # 826, 31
   Whole plant is used for fever, cough and heart problems.

30. Artemisia sieversiana Ehrh. ex Willd.
Local name: Kakamush
Voucher specimen # 948
   Whole plant is used for abdominal pains, intestinal worms, blood pressure and indigestion.

31. Carthamus tinctorius L. (Cultivated)
Local name: Pungh
   Flowers are used for fever, cough, throat problems and typhoid fever. Locally the petals are used as dye for making colour bread particularly in Eid festival days.

32. Cichorium intybus L.
Local name: Ishkanachi
Voucher specimen # 1036
   Whole plant is used for indigestion, abdominal disorders, headache, asthma, liver complaints, gouts, joints pain and jaundice.

33. Helianthus annuus L. (Cultivated)
Local name: Chupati Phoonar
   Seeds and flowers are used for fever, cough and throat problems.

34. Inula obtusifolia Kern.
Local name: Khunay
Voucher specimen # 54
   Whole plant is used for tuberculosis, chest problems cough and also used as an antiseptic.
35. *Inula royleana* DC.  
Local name: Chupati Phoonar  
Voucher specimen # 966  
  Whole plant is used for intestinal problems.

36. *Saussurea lappa* (Decne.) Sch.  
Local name: Minal  
Voucher specimen # 970  
  Roots are internally used for asthma, cough, paralysis, brain problems, nervous problems, rheumatism, gouts, throat problems and influenza and as a sex stimulant.

Local name: Paloyo Zoon  
Voucher specimen # 32  
  Whole plant is used for blood pressure, diabetes, abdominal disorders, ringworms, flatulence, headache and fever.

Local name: Zoon  
Voucher specimen # 984  
  Flowers and leaves of this plant used for ring worms, flatulence, colic, stomach problems, respiratory problems and asthma.

Local name: Dado  
Voucher specimen # 497  
  Roots and leaves are used for jaundice, abdominal problems, liver problems and acidity. Some people used its leaves for constipation and diarrhoea.

**Family Convolvulaceae**

40. *Convolvulus arvensis* L.  
Local name: Hargul  
Voucher specimen # 44  
  Whole plant was used as detergent for washing clothes and hairs.

**Family Cucurbitaceae**

41. *Cucumis sativus* L. (Cultivated)  
Local name: Lawh  
  Unripe fruits are used for fever, general debility, indigestion and burns.

42. *Cucurbita maxima* Duch.ex Lam. (Cultivated)  
Local name: Wun  
  Unripe and ripe fruits are used as vegetable and medicinally for burns, inflammations, jaundice and nervous disorders.
43. *Lagenaria siceraria* (Molina) Standley (Cultivated)
Local name: Toky
Unripe fruits are used as vegetable and medicinally for jaundice and as a tonic.
The hollowed ripe fruits are used as water and milk container.

**Family Cuscutaceae**

44. *Cuscuta europaea* L.
Local name: Kaay Shain
Voucher specimen # 872
Whole plant is used for jaundice, cough, blood purification, bronchitis and fever.
Some people use it for sex stimulation.

**Family Fumariaceae**

45. *Corydalis falconeri* Hook. f.&Thomson
Voucher specimen # 445
Local name: Lusker Char
Roots are used for cough, fever, nerve disease and hair elongation.

**Family Gentianaceae**

46. *Comastoma borealis* (Bunge) T.N.Ho.
Local name: Shalay Char
Voucher specimen # 394
Whole plant used for pneumonia, sore throat and fever.

47. *Gentianodes eumarginata* Omer var. *eumarginata*
Local name: Shotay Lileo
Voucher specimen # 1043
Leaves of this plant are used for killing lice and hair elongation and it is very useful for jaundice. Whole plant paste is used for throat problems of children (externally).

48. *Gentianodes tianschanica* (Rupr.ex Kusn.) Omer, Ali & Qaiser
Local name: Kamalay Char
Voucher specimen # 957
Leaves of this plant are commonly used for abdominal disorders, liver problems, cough, bronchitis and jaundice. It is also used for malarial fever, pneumonia, hair elongation, lice control, gastric troubles, dyspepsia, diabetes, eye problems and for blood purification.

49. *Gentianopsis vvedenskyi* (Grossh.) V.V.Pis.
Local name: Not known
Voucher specimen # 760
Whole plant is used for typhoid and pneumonia fever, throat problems and cough.
50. *Swertia cordata* (G.Don) Clarke
Local name: Plamas
Voucher specimen # 573

51. *Swertia petiolata* D. Don
Local name: Plamas
Voucher specimen # 411

Both species are known by the same local name and uses of these plants are also same. Both are used for typhoid fever, pneumonia fever, throat problems and bronchitis.

**Family Geraniaceae**

52. *Geranium collinum* Stapf ex Willd.
Local name: Kuratkachoo
Voucher specimen # 1035

53. *Geranium lucidum* L.
Local name: Kuratkachoo
Voucher specimen # 283

54. *Geranium pratense* L.
Local name: Kuratkachoo
Voucher specimen # 374

All the members of the genus *Geranium* are known by same local name Khuratkachoo. These plants are used for internal and external wounds, swellings, inflammations, tumors, bleeding, uterus problems and nerve problems.

**Family Labiatae**

55. *Clinopodium umbrosum* (M.Bieb.) C. Koch
Local name: Nasuray Char
Voucher Specimen # 748

56. *Clinopodium vulgare* L.
Local name: Nasuray Char
Voucher specimen # 629

Both species are known by same local name and used in similar manner. Plant powder is used for wounds, bleeding and cardiac problems.

57. *Lamium album* L.
Local name: Not known
Voucher specimen # 489

Whole plant is used for typhoid fever.

58. *Mentha arvensis* L. (Cultivated)
Local name: Pudina

Leaves are mostly used as salad and medicinally used for stomach problems, allergy and as carminative. Powder of leaves is used for birth control.
59. *Mentha longifolia* (L.) L.
Local name: Bonooh
Voucher specimen # 1026
Plant extract is used for stomach problems, carminative, liver problems, vomiting and indigestion.

60. *Nepeta erecta* (Royle ex Benth.) Benth.
Local name: Not known
Voucher specimen # 459
Leaves are used for blood pressure, cold, cough, fever and influenza.

61. *Ocimum basilicum* L. (Cultivated)
Local name: Gusmaly
Leaf and flower decoction is used for flu, fever, stomach problems and headache.

62. *Salvia nubicola* Wall. ex Sweet
Local name: Khoropo
Voucher specimen # 322
Root decoction is used for cold cough and leaf paste is applied for skin eruptions.

**Family Malvaceae**

63. *Abelmoschus esculentus* (L.) Moench (Cultivated)
Local name: Bhindi
Unripe fruits are used as vegetable and seeds are useful for cough, asthma, diarrhoea, neural disorders, aphrodisiac and general debility.

64. *Malva sylvestris* L. (Cultivated)
Local name: Shaneeh
Young plants are used as vegetable and old plant stem is used for toothache.

**Family Papaveraceae**

65. *Papaver nudicaule* L.
Local name: Ghoshal
Voucher specimen # 352
Flowers are used as a dye and some people prescribed it for cough, fever, chest complains and heart problems.

66. *Papaver somniferum* L. (Cultivated)
Local name: Burdakha
Seeds are used for cough, chest troubles, diarrhoea and dysentery.

**Family Papilionaceae**

67. *Cicer microphyllum* Benth.
Local name: Kukunnory
Voucher specimen # 904
Whole plant is used for increasing milk production and as general tonic for cows.
68. *Glycyrrhiza glabra* L.
   Local name: Shalaco
   Voucher specimen # 96
   Roots are used for cough, bronchitis, asthma, sore throat, fever and abdominal disorders.

69. *Medicago sativa* L (Cultivated)
   Local name: Ishpith
   It is a chief source of fodder and some people use it as vegetable. Seeds are used for joints pain, gouts and indigestion and also used as a general tonic.

70. *Trifolium pratense* L.
    Voucher specimen # 17

71. *Trifolium repens* L.
    Local name: Chupatti Phunnar
    Voucher specimen # 25
    Both species are known by same local name and are used for sore throat, fever, pneumonia, meningitis and feverish feeling.

**Family Plantaginaceae**

    Local name: Kayay Khapay
    Voucher specimen # 958

73. *Plantago lanceolata* L.
    Voucher specimen # 1034
    The uses of these plants are same and they are known by the same local name. Leaf extract is used for wounds and seeds are used for constipation, abdominal problems, eye redness and for washing hairs.

**Family Polygonaceae**

74. *Bistorta affinis* (D.Don) Green
    Local name: Chughuy
    Voucher specimen # 248
    Seeds are used for dysentery and weakness of urinary bladder.

75. *Rheum spiciforme* Royle
    Local name: Jaro Chotal
    Voucher specimen # 400
    Roots are frequently used for the treatment of bone fractures, backache and joints pain.

76. *Rumex acetosa* L.
    Local name: Churkuy
    Voucher specimen # 887
    Whole plant is used for jaundice, vomiting and liver problems.
77. *Rumex nepalensis* Spreng.  
Local name: Obabal  
Voucher specimen # 18  
Roots are boiled in water and applied externally for swellings and joints pain.

**Family Primulaceae**

78. *Primula macrophylla* D.Don  
Local name: Lilio  
Voucher specimen # 342  
The flowers of this plant are used for eye redness, itching and its related problems.

79. *Actaea spicata* L.  
Local name: Kayay Zuch  
Voucher specimen # 243  
Berries and roots are used for asthma, nerves disorders, rheumatism and paralysis.

80. *Aquilegia fragrans* Benth.  
Local name: Ghamuk Phoonar  
Voucher specimen # 84  
Whole plant is used for pneumonia fever and headache.

81. *Clematis orientalis* L.  
Local name: Murghushi  
Voucher specimen # 674  
Plant paste is externally applied for joints problems and as an antiseptic. Leaf extract is used as an insecticide.

82. *Delphinium vestitum* Wall. ex Royle  
Local name: Makhooti  
Voucher specimen # 79  
All the species of the genus *Delphinium* are locally known by the same name (Makhooti) which is widely used by local people of the area. Flower extract is used for eye redness and glaucoma and particularly for infections of eyes. Root decoction is used for heart problems, cough, typhoid, malaria and pneumonia fever.

83. *Ranunculus palmatifidus* H. Riedl  
Local name: Not known  
Voucher specimen # 169  
Leaf and stem paste is externally applied for boils and for removing skin outgrowth.

84. *Thalictrum foetidum* L.  
Local name: Halizee  
Voucher specimen # 767  
Tubers are used for wounds, swellings, uterine tumors, paralysis, joints pain and nervous disorders.
Family Rosaceae

85. *Fragaria nubicola* Lindl. ex Lac.
Local name: Groose
Voucher specimen # 56
   Roots are used for heart problems and asthma. Fruits are edible and considered as general tonic.

Family Rubiaceae

86. *Rubia cordifolia* L.
Local name: Chero
Voucher specimen # 51
   Roots are used for blood purification, liver problems, swellings, nervous disorders, gouts, rheumatism, uterine tumors, bleeding control, leucorrhoea, wounds, cough, bone fractures and general debility.

Family Solanaceae

87. *Datura stramonium* L.
Local name: Daturoo
Voucher specimen # 55
   Leaf paste and extract is externally used for injuries, wounds, bleedings and pains. Seeds in small quantity used for asthma and tonsil problems. The extract of leaves is also used for baldness.

88. *Hyoscyamus niger* L.
Local name: Not known
Voucher specimen # 539
   Leaves and seeds are sedative and narcotic, used for cough and asthma in small quantity.

89. *Solanum nigrum* L.
Local name: Ghabily
Voucher specimen # 839
   Ripe berries are edible and used for heart diseases and fever and leaves are used for gouts, rheumatism, joints pain, enlargement of spleen and liver. Fruits are also used for hepatitis.

90. *Solanum surattense* Burm. f.
Local name: Not known
Voucher specimen # 312
   The decoction of plant is used for sore throat, body pains, fever, rheumatism, cough and chest complains.

91. *Solanum tuberosum* L. (Cultivated)
Local name: Aalooh
   The raw tubers paste is used for burns externally. Being widely used as vegetable, potato is one of the best source of income.
Family Umbelliferae

92. *Carum carvi* L.  
Local name: Filizooh  
Voucher specimen # 12  
Seeds are used for stomach problems, ulcers, uterine tumors, internal wounds and dysentery.

93. *Coriandrum sativum* L. (Cultivated)  
Local name: Nasky  
Fruits and leaves are used as spice and garnishing. Medicinally used for flatulence, dysentery, diarrhoea, cough, stomach problems, jaundice and vomiting.

94. *Ferula assa-foetida* L.  
Local name: Sup  
Voucher specimen # 231  
Resin and roots are used for asthma, stomach problems, ulcer, cough, anxiety and fever.

95. *Foeniculum vulgare* Mill. (Cultivated)  
Local name: Badian  
Seeds are used for flu, fever, cardiac problems, digestive problems and flatulence.

96. *Heracleum candicans* Wall. ex DC.  
Local name: Ichflah  
Voucher specimen # 08  
Plant is a good fodder for goats which increases milk production and medicinally it is used for nerve disorders and sexual problems.

97. *Selinum papyraceum* C.B.Clarke  
Local name: Burdayh  
Voucher specimen # 26  
Whole plant is used for asthma and heart problems.

Family Valerianaceae

98. *Valeriana himalayana* Grubov  
Local name: Not known  
Voucher specimen # 687  
Roots of this plant are used for psychiatric problems, for increasing memory, and in cough, asthma, paralysis and nerve problems.

Discussion

We have identified 98 species of which many are native having some uses by the resident of both valleys. These plants are mostly used for fever, cough, asthma, respiratory problems, stomach and abdominal disorders, rheumatism, joints pain etc. The present investigation has shown that the local peoples make use of a great range of plants
from their environment. All the 98 plants have one or more medicinal uses. *Caralluma tuberculata, Onosma hispida, Lepidium sativum, Artemisia spp., Carthamus tinctorius, Tanacetum artemisioides, Legenaria siceraria, Gentianodes tianschanica, and Geranium spp.*, are extensively used for medicinal purposes by the local peoples. There was a little evidence of this knowledge being transmitted to successive generations except to specific individuals interested in preserving their traditions. Knowledge of the uses of these plants probably will continue to dwindle because of the availability of modern medicines and other facilities. For example, *Convolvulus arvensis, Corydalis falconeri, Plantago spp., Delphinium spp.*, were used as detergents and for hair elongation but nowadays these plants are not used for such purposes due to availability of modern soaps and many other detergents. Despite the availability of wild medicinal plants, there is a significant reduction in their use. Of these herbaceous plants identified as having some medicinal uses, about 50 percent are not used nowadays. These plants are mostly medicinal and edible for which modern substitutes are now available. In short it would appear that the people have a concept of wild plant species with active constituents that are useful for medicinal and edible purposes but prefer to depend upon few cultivated species, i.e. for food and fodder; there is not a tendency to bring useful wild species into cultivation. A large livestock population cannot be maintained on fodder produced on arable land alone. Therefore, to maintain healthy livestock farmers have to largely depend on the forest resources.

These plants are mostly found in croplands, shaded forests and alpine habitats such as *Actaea spicata and Podophyllum emodi*. Due to the deforestation and habitat destruction in the last one decade these plants are becoming locally threatened. On the other hand there is collection of medicinal plants for commercial sale, such as *Delphinium brunonianum, Delphinium vestitum, Saussurea simpsoniana, Rheum spiciforme* and *Aconitum violaceum var. weileri*. All these species are found in the alpine zone above 4000m. These commercially exploited species had declined in abundance during the last 5 years. An obvious conclusion to be drawn is that deforestation, habitat destruction, overexploitation, expansion of agriculture, grazing in forest, selective removal of species and environmental degradation would pose a threat to the local occurrence of these species. The increasing human population during the last few decades is demanding developments in all spheres including agriculture. There is a vast expansion of agricultural land to meet the growing need of mankind. Clearing of forest for agriculture is a common activity of local peoples. Grazing in forest land has also led to the excessive removal of undergrowth in the forests. It is estimated that currently over 44,700 animals graze in the forests and as much as 80% of the land is subject to grazing.

In addition to the above, developmental activities such as the growth of large urban areas, road building on hills and forests areas etc. are examples of direct onslaughts on nature resulting in the loss of local flora. On the other hand the rich treasure of indigenous knowledge about local medicinal plants is under threat due to the availability of modern medicines and other facilities. It is now widely accepted that anthropogenic disturbances would result in the extinction of up to 20 % of the world’s species over the next 30 years (Arroyo et al., 1992). Hence, intensive ethnobotanical studies are very much warranted to bring out more useful information.
References


(Received for publication 12 November 2007)