



Original Contribution

A SURVEY OF USEFUL MEDICINAL PLANTS OF ABBOTTABAD IN NORTHERN PAKISTAN

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ABSTRACT

Abbottabad District has an interesting location of biodiversity, which serves a starting point for the great mountainous areas of Himalayan ranges. This survey was undertaken with an aim to document the indigenous knowledge of this area as new sources of drugs. The inhabitants of the area have always used medicinal plants for various ailments and have for a long time been dependent on surrounding plant resources for their food, shelter, fodder, health care and other cultural purposes. However, encroaching industrialization and the accompanying changes in their life styles are responsible for the declining of practice in the local use of plants for medicine. After thorough study, 47 plants were found to be ethnobotanically important. For each species the following information is provided: Latin binomial, relevant synonyms, voucher specimen number, vernacular names, flowering period, distribution, parts used and medicinal use(s). The important species of the area are *Colchicum luteum*, *Cichorium intybus*, *Hypericum oblongatum*, *Ficus carica*, *Lactuca serriola*, *Justicia adhatoda*, *Otostegia limbata*, *Incarvillea emodi*, *Dodonaea viscosa* and *Cyperus rotundus*. *Dodonaea viscosa* is an excellent remedy for toothache. *Incarvillea emodi* is vulnerable due to loss of habitats. Most of the reported medicinal plants are effective in antihelmintic, carminative, expectorant, stomachic and antiseptic activities.

Key Words: Ethnobotany, medicinal plants, decoction, indigenous knowledge, Abbottabad

INTRODUCTION

According to Israr-ud-Din (1), the total population of Abbottabad is 1,169,432 and urban population is 151,975. The total area is 3730 Sq. Km., while the cultivated area is 1198 Sq. Km (**Figure A**). Abbottabad has rugged topography comprising mainly of steep slopes and gullies where rocks are classified as metamorphic. Rock structure is basically limestone. Deforestation and grazing have caused soil erosion leaving little but parent rock with shallow residual soil and silty loess. The average maximum temperature is 34.3°C while the average minimum temperature is 3.4°C; snow is occasional. Rainfall occurs in the monsoon and winter, the average being 1200 mm per year. Agriculture is the major occupation, although

sheep and cattle rearing are practised over the adjacent mountainous areas. A few people are engaged in trade and local labour. Main crops grown in the area are wheat, maize, rice, tobacco etc. The area is under pressure because of illegal settlements, fires, extensive tree cuttings, urban encroachment and pollution.

Ethnobotany is the science, which studies the relationship between a given society and its environment, particularly the plant world (2). Indigenous knowledge is as old as human civilization but the term ethnobotany was first coined by an American Botanist Harshburge (3), for the study of plants used by primitive and aboriginal people. Later scientists redefined ethnobotany by using modern ecological terms, and ethnobotany was described as "The study of direct interaction between human and plant population through its culture; each human population develops attitudes and beliefs and learns the use of plants, while human behaviour has a direct impact on the plant communities with which they interact; the

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plant themselves also impose limitations on humans; these mixture interaction are the

focus of ethnobotany”(4).

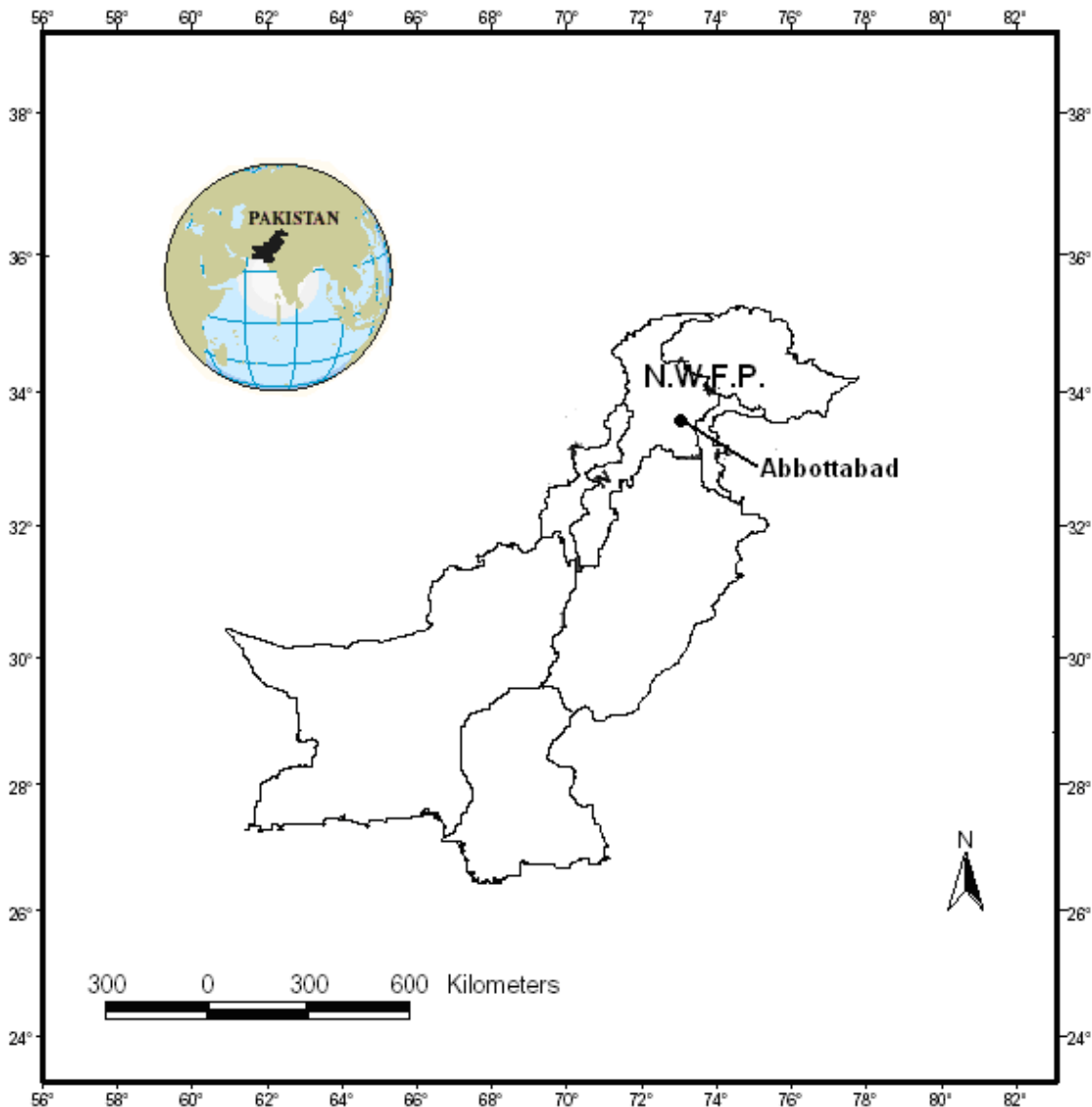


Figure 1: Location of Abbottabad sampling sites from Pakistan

Hocking (5), concluded in his work of 1950 that 84% of Pakistan’s population was dependent on traditional medicines for all or most of their medicinal needs. Bedi (6) studied the ethnobotany of Rattan Mahal hills, Gujrat, India and listed the plants used by aboriginal tribes of that area. He also recorded many uses of plants for the first time. Datta and Banerjee (7), collected 158 weed species from fields of Hooghly and Midanapore districts of west Bengal, out of which 124 were economically important. These weeds of rice fields are used in crude drugs, plant products another beneficial aspect. Khan (8) described the past and present status of natural tropical thorn forest in Punjab, which were the main sources of fire wood supplies for urban and rural populations. The past distribution and gradual decline of these forests is traced by research literature. The present status of natural tropical thorn forest was appraised by

surveying areas formally under these forests. He concluded that the natural tropical thorn forest system of the Punjab had almost disappeared due to overgrazing, salinity and water-logging.

ETHNOBOTANY IN PAKISTAN

Pakistan is endowed with a variety of ecological zones and fascinating plant resources. Most of these plants are known to possess medicinal and economic values and the local people in the rural areas have known their uses for the past several hundred years. Some of these plants are now commercially exploited for the extraction of various types of active ingredients.

It is however surprising that though numerous floristic surveys of our local flora have been conducted, very little attention has been paid to the ethnobotanical aspects of the

study. The Hakeems, on the other hand, are mainly concerned with the supply of the floral and vegetative parts of the medicinal plants and they are least bothered about the botanical characteristics, especially of their occurrence and distribution in the various regions or ecological zones of Pakistan. From the contemporary studies we come to know that ethnobotany is a well-established discipline in our neighbouring countries like China, India and Bangladesh but unfortunately it is neglected in Pakistan. Strong efforts are now being made to establish it as a field of Biology.

In Pakistan, the field of ethnobotany is quite virgin. Qureshi and Khan (9), conducted an ethnobotanical studies in the Rawalpindi District of Kahuta and collected information on 25 species of herbs belonging to 18 families, used by inhabitants of the area for nutritional, utilitarian and medicinal purposes, while some species are dispensed by herbalists or herbal doctors residing in population centres. Qureshi et al. (10), surveyed the tehsil Kahuta and collected information on the poisonous potential of medicinal plants. They enlisted these medicinal plants with botanical and vernacular names, family name, parts used, distribution, chemical constituents, and medicinal use.

The present work is based on the floristic studies conducted in one of the most backward regions of Pakistan. The present studies have revealed that the area is rich in folklore vis-a-vis the plant wealth. The folk life knows very little about plants of this area and whenever such information is available concerted efforts are called to verify the facts. Primitive people used plants for their well being. Rich plant lore has been passed on by tradition, from generation to generation of tribes in different parts of the country. Modern research has often borne out the efficacy of many of the crude plant drugs used by aboriginals. The botanist is naturally interested in obtaining such data from the tribes and recording it for further research work. Apart from such current direct ethnobotanical observation, it is also possible to scan through the specimens deposited in large herbaria and from the field notes on such specimen, to gather data that may prove quite helpful. Such efforts have been made by (11, 12, 13, 14, 15, 16, 17), who have made significant contributions on the role of ethnobotanical studies through herbaria and reported economic and medicinal uses of plants, which were not known earlier.

Keeping in view the significance of

ethnobotanical studies and the need to discover new and potential sources of forest products, new drug plants etc, it is necessary to collect information on the traditional uses of plants made by the local people "Paharis" and other nomadic tribes before it is forgotten or permanently lost. Khan et al.(18), investigated 5 tree species belonging to Papilionaceae, 2 tree species belonging to Caesalpiniaceae and 6 tree species of family Mimosiaceae, along with their description, macroscopic characters and medicinal use of their bark.

FUTURE OF ETHNOBOTANY

Two major challenges mark the future of ethnobotany. First, the long standing task of cataloguing the different species of plants based on their importance to a society, so as to accelerate the work on plants which prove to be useful according to the folk beliefs. In struggling to preserve even certain elements of this knowledge, the ethnobotanist must record not only a list of plant uses but also a vision of life itself. The second and much more difficult task is to understand how those activities, in turn, influence the ambient vegetation and the ecosystem upon which the society depends.

It is generally acknowledged that people with the richest botanical knowledge have the least formal education, live in the remotest areas and have a low level of bargaining power in urban industrial society; while ethnobotanists work at the interface between traditional society and urban industrial society and are at the "sharp end" of urban industrial society.

One significant trend in contemporary ethnobotany is the active collaboration in the field between ethnographers and botanists and between western scientists in general and native collectors (19). One of the most commonly faced problems is the lack of fluency in the local language. The only means to circumvent this dilemma is the active collaboration of an ethnographer already fluent in the native language.

FUTURE PROSPECT OF ETHNOBOTANY

The future prospect of ethnobotany is focussed on conservation. It is widely accepted in international conservation circles that innovative funding mechanism will be required to support conservation and that this should be based on the principle of those who benefit from biological resources. This

requires;

1. Efforts at the community level to provide incentives for conservation.
2. At the national level to ensure that government policy is compatible with such incentives.
3. At the international level to ensure that wealthy nations benefiting from the biological resources are able to invest in conserving the productive capacity of those resources.

MATERIALS AND METHODS

During the fieldwork, trips were arranged in proper harvest time of the plants and information about their use was gathered from inhabitants of the area. Interviews were done / conducted and observations were made during guided and transect walks. To eliminate any chance of error in identification, the specimens are collected in flowering and fruiting condition. Plant specimens were preserved and identified in the herbarium of Quaid-e-Azam University, Islamabad, Pakistan. Interviews of about ~150 informants including local inhabitants, herbalists, pansaries and societies were conducted on random basis. Analysis of the data was carried out and indigenous knowledge was documented.

RESULTS

Family Acanthaceae

Justicia adhatoda L.

Synonym: *Adhatoda vesica* Nees.

Voucher specimen No: 38

Local Name: Bansa, Bhaker

Flowering period: March-May

Parts used: Leaves, flowers and roots

Distribution: North West Frontier Province, Hazara, Chitral, Swa.; Malakand, Punjab, Rawalpindi, Sind and Karachi

Occurrence: Common in open lands

Medicinal use: Paste of the leaves is used for cough; also used in dysentery, especially for cattle. Leaves are used for softening boils. Leaves and roots are used as expectorant and antispasmodic. Leaves are boiled and are given for sore throat. Decoction of leaves is useful for scabies and other skin diseases.

Family Amaranthaceae

Achyranthus aspera L.

Voucher specimen No: 13

Local Name: Puth Kanda

Flowering period: September-April

Distribution: North West Frontier Province, Hazara, Punjab and Sind.

Occurrence: Uncommon

Parts used: Whole plant

Medicinal use: Decoction of both leaves and roots is used for toothache. It is also used for abdominal pain. The juice of the herb is given in dysentery and skin diseases. The paste of fresh leaves is applied over insect bites. An infusion of the root is used for bowel complaints, night blindness and skin diseases. The ash of the plant with honey is given in cough and asthma.

Amaranthus viridis L.

Voucher specimen No: 25

Local Name: Chaulai

Flowering period: March-November

Distribution: North West Frontier Province, Hazara, Sind and Baluchistan.

Occurrence: Common

Parts used: Whole plant

Medicinal use: The plant is sweet, cooling, laxative, diuretic, stomachic, appetizer and tonic. Its leaves are used as potherbs. The leaves are used as emollient and are used in amenorrhoea. They are useful in menorrhagia, haemoptysis and for vomiting of blood as a result of bleeding ulcer.

Family Apocynaceae

Catharanthus roseus (L.) G. Don

Synonym: *Vinca rosea* L.

Voucher specimen No: 105

Local Name: Madagascar periwinkle (English)

Flowering period: March-June

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara and Punjab.

Occurrence: Widely distributed throughout the area particularly in wastelands, and is also cultivated in gardens

Medicinal use: The whole plant particularly the root bark is used as a sedative with tranquilizing properties. It is used as a folk remedy for diabetes. The juice of the leaves is good for wasp-stings and menorrhagia.

Family Asclepiadaceae

Calotropis procera Ait.

Synonym: *Asclepias procera* Wild.

Voucher specimen No: 14

Local Name: Ak (Urdu), Milkweed (English), Spalmai (Pushto)

Flowering period: September-November

Parts used: Whole plant

Distribution: North West Frontier Province,

Hazara, Punjab, Sind and lower Baluchistan.

Occurrence: Sparse

Medicinal use: Roots and bark are antispasmodic, expectorant, in large dose emetic while flowers are digestive and stomachic. Milky juice is poisonous. Also used in leprosy, asthma, fever with enlarged liver and cough, skin diseases, visceral enlargement and in constitutional syphilitic affection.

Family Asteraceae / Compositae

Artemisia scoparia Walds and Kit

Voucher specimen No: 70

Local Name: Done Jhan (English)

Flowering period: August-November

Distribution: North West Frontier Province, Hazara, Punjab (plains upto 2000m) and Baluchistan.

Occurrence: Common

Parts used: Whole plant

Medicinal use: Plant is used as cure for earache. Smoke is good for burns. The decoction of the plant is used for asthma, spasms and nervous diseases. Dried leaves and stem, in powdered form, are effective for skin diseases. It is also prescribed for jaundice and is anti-inflammatory to toothache.

Carthamus oxycantha Bieb

Voucher specimen No: 75

Local Name: Pholi

Flowering period: April-May

Distribution: North West Frontier Province, Hazara, Swat and arid area of Punjab.

Occurrence: Common

Parts used: Seeds

Medicinal use: Oil extracted from the seeds is used for dressing ulcer and against itch.

Conyza canadensis (L.) Cronquist

Voucher specimen No: 18

Local Name: Paleet

Flowering period: August-October

Distribution: North West Frontier Province, Hazara, Chitral, Swat, Kurram, Punjab, Baluchistan, Loralai and Islamabad.

Occurrence: Common

Medicinal used: The herb is used as homeostatic, stimulant, astringent, and diuretic. It is used to cure dysentery, diarrhoea and uterine haemorrhage.

Lactuca serriola L.

Synonym: *Lactuca scariola* L.

Voucher specimen No: 19

Local Name: Kahu

Flowering period: April-June

Distribution: North West Frontier Province,

Hazara, Chitral, Swat, Kurram, Punjab, Baluchistan, Loralai and Islamabad.

Occurrence: Common

Parts used: Whole plant

Medicinal use: Tea is used as stomachic. The herb is used as cooling, sedative, diaphoretic, diuretic and is useful in the treatment of coughs in phthisis, bronchitis, asthma, and whooping cough.

Saussurea heteromalla D. Don

Voucher specimen No: 40

Local Name: Kali Ziri

Flowering period: March-June

Distribution: North West Frontier Province, Hazara, Swat, Punjab, Rawalpindi, Salt Range and Kashmir.

Occurrence: Common

Parts used: Seeds

Medicinal use: Seeds are known as carminative, used as tonic for horses and other animals.

Silybum marianum (L.) Gaertner

Voucher specimen No: 73

Local Name: Kandiali

Flowering period: March -June

Distribution: North West Frontier Province, Hazara, Swat, Punjab, Rawalpindi and Lahore.

Occurrence: Common

Parts used: Leaves and seeds

Medicinal use: Leaves are used as aperient sudorific. Seeds are known as demulcent and are used in haemorrhage and liver diseases. Seeds are also used as a cure for horse bite.

Sonchus arvensis L.

Voucher specimen No: 109

Local Name: Dodak

Flowering period: March-May

Distribution: North West Frontier Province, Hazara, Swat, Peshawar, Punjab, Rawalpindi, Jhelum and Attock.

Occurrence: Fairly common

Parts used: Whole plant

Medicinal use: Leaves are used in cough, bronchitis, asthma and phthisis. Root is useful in jaundice

Artemisia brevifolia Wall

Synonym: *Artemisia maritima* L.

Voucher specimen No: 35

Local Name: Santhonica

Flowering period: June-September

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Chitral, Kagan, Baluchistan and Kashmir

Occurrence: Common throughout the area
Medicinal use: The plant is used for roundworms and also used for removing threadworms from small intestine. It is useful in dysentery and sprue. The herb is administered to children as stomachic.

Cichorium intybus L.

Voucher specimen No: 79

Flowering period: March-May

Parts used: Seeds, roots and flowers

Distribution: North West Frontier Province, Hazara, Swat, Kurram, Gilgit, Punjab and Kashmir

Occurrence: Sparsely distributed throughout the area

Medicinal use: It increases the bile secretion and promotes digestion. Also used as stomachic and tonic. Seeds are carminative and cordial. Decoction of seeds or powdered seeds is used in obstructed or disordered menstruation. A strong infusion of powdered seed is useful in obstruction or in checking bilious enlargement of the spleen with general dropsy.

Family Boraginaceae

Trichodesma indicum (L.) R.Br.

Synonym: *Borago indica* L.

Voucher specimen No: 10

Local Name: Nile Karaji

Flowering period: August-October

Distribution: North West Frontier Province, Hazara, Chitral, Swat, Punjab, Rawalpindi, Jhelum, Chakwal and Attock

Occurrence: Very common

Parts used: Whole plant

Medicinal use: Plant parts ground into powder mixed with water, are applied to all kinds of tumours. Leaves and roots are effective against snakebite; plant is diuretic and depuratives and is used in urinary diseases.

Family Brassicaceae / Cruciferae

Sisymbrium irio L.

Voucher specimen No: 5

Local Name: Jangli Sarson

Flowering period: February-April

Parts used: Leaves and seeds

Distribution: North West Frontier Province, Hazara, Swat, Peshawar, Kohat, Punjab, Rawalpindi, Baluchistan and Islamabad

Occurrence: Common

Medicinal use: Infusion of the leaves is used for throat and chest infections. The seeds are expectorant, stimulant and antiseptic.

Family Cannabinaceae

Cannabis sativa L.

Voucher specimen No: 7

Local Name: Bhang

Flowering period: April-October

Distribution: North West Frontier Province, Hazara, Swat, Peshawar, Kohat, Punjab, Rawalpindi, Attock, Chakwal, Jhelum and Baluchistan

Occurrence: Very common

Medicinal use: Dried and crushed leaves are used as narcotic. The plant is used as tonic, and sedative. Paste of fresh leaves is used for tumours. The preparation made from dried leaves and flowers is locally known as "Bhang" or "Hashish" is given in dyspepsia, gonorrhoea and bowel complaints.

Family Caryophyllaceae

Stellaria media (L.) Carillo

Voucher specimen No: 27

Local Name: Gander, Chickweed (English)

Flowering period: April-August

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Peshawar, Punjab, Rawalpindi and Islamabad

Occurrence: Common weed

Medicinal use: It is common fodder for cattle and goats. The plant is known as diuretic, sedative, hypnotic and antiseptic.

Family Chenopodiaceae

Chenopodium album L.

Voucher specimen No: 34

Local Name: Bathu

Flowering period: January-April

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Peshawar, Kohat, Kurram, Swat; Gilgit, Chitral, Punjab, Sind, Karachi and Baluchistan

Occurrence: Common

Medicinal use: The leaves are used as vegetable food. This plant is used as snake repellent because of its root and fruit, which are known as antidote to snake poison. It is useful for peptic ulcer, helminthiasis, dyspepsia, seminal weakness, haemorrhoids, cardiac disorders and general debility.

Family Convolvulaceae

Convolvulus arvensis L.

Voucher specimen No: 54

Local Name: Hirran, Khurry (Urdu), Erlai (Hindko)

Flowering period: January-March

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Punjab, Rawalpindi, Lahore, Chakwal, Jhelum, Sind, Baluchistan and Lasbella

Occurrence: Common weed in open places

Medicinal use: The plant is used as brain tonic, diuretic, sedative, antiseptic and useful in skin diseases. The roots of plant are purgative. Powdered leaves are used by women as under arm deodorant.

Family Cuscutaceae

Cuscuta reflexa L.

Voucher specimen No: 62

Local Name: Akashbel

Flowering period: January-February.

Parts used: Stem, fruit, seeds.

Distribution: North West Frontier Province; Hazara; Peshawar; Dir; Swat; Chitral, Punjab; Rawalpindi; Salt Range; Jhelum; Lahore, Sind; Karachi, Baluchistan and Islamabad

Occurrence: Common twining parasite.

Medicinal use: Seeds are anthelmintic and carminative. Plants cure bilious disorders. Seeds are carminative and alternative. The plant is bitter, sweet, astringent, expectorant, carminative, tonic, anthelmintic and is useful in jaundice, cough, bronchitis, fever and paralysis.

Family Cyperaceae

Cyperus rotundas L.

Voucher specimen No: 4

Local Name: Deela

Flowering period: April-June.

Distribution: North West Frontier Province, Hazara, Peshawar, Kohat, Swat, Chitral, Gilgit, Punjab, Rawalpindi, Jhelum, Sind and Baluchistan

Occurrence: Very common.

Parts used: Whole plant.

Medicinal use: The starchy under ground tubers are used as food. The plant is eaten raw as well as cooked. The rhizome yields oil, which is used in perfumery and in manufacturing of soaps. It cures dyspepsia, vomiting, cholera and fevers. The tubers are useful for inflammations.

Family Ebenaceae

Diospyros lotus L.

Voucher specimen No: 106

Flowering period: May-July

Parts used: Bark and fruit

Distribution: North West Frontier Province, Hazara, Chitral, Swat and Baluchistan

Occurrence: Common

Medicinal use: The fruit, when unripe, is said to be cold, light and astringent; when ripe is beneficial in blood diseases, gonorrhoea and leprosy. Juice of the unripe fruit is given in chronic dysentery.

Family Euphorbiaceae

Euphorbia helioscopia L.

Voucher specimen No: 8

Local Name: Chattri Dodak

Flowering period: February-April

Parts used: Leaves, roots and milky juice

Distribution: North West Frontier Province, Lower Hazara, Punjab and Baluchistan

Occurrence: Common on waste places

Medicinal use: It is used as glactagogue. Leaves are cooked and given to mad dogs. Milky latex of plant is poisonous and causes swellings on the skin. Roots are laxative.

Ricinus communis L.

Voucher specimen No: 108

Flowering period: March-July

Parts used: Seeds, leaves

Distribution: North West Frontier Province, Hazara, Chitral, Punjab, Sind and Baluchistan

Occurrence: Common, cultivated and naturalized along streams, river beds and waste places

Medicinal use: Castor oil is used as purgative and lubricant. It is given after childbirth to in women and before childbirth to facilitate delivery. It is also used to cure dysentery and inflammatory diseases of the urinary organs. The oil is put into ears to treat earache. It is also dropped into the eye in conjunctivitis. The roots of the plant are used as an ingredient in various compound mixtures for nervous rheumatic affections such as lumbago, pleurodynia and sciatica. The bark is used for healing wounds and sores.

Family Fabaceae / Leguminosae

Medicago polymorpha L.

Voucher specimen No: 11

Local Name: Maina (Urdu)

Flowering period: January-April

Distribution: North West Frontier Province, Hazara, Punjab, Sind and Baluchistan

Occurrence: Common throughout the area, usually in cultivated fields

Parts used: Whole plant

Medicinal use: It causes bloating in animals when eaten.

Melilotus indicus (L.) All.

Synonym: *Melilotus parviflora* Desf.

Voucher specimen No: 16

Local Name: Sinji (Hindko)
Flowering period: January- April
Distribution: North West Frontier Province, Punjab, Sind and Baluchistan
Occurrence: Common throughout the area, usually in cultivated fields
Parts used: Whole plant
Medicinal use: It is emollient and is externally applied as poultice on swellings and for fomentation. Seeds are recommended in infantile diarrhoea and bowel complaints.

Acacia modesta Wall.

Synonym: *Mimosa dumosa* Rox.
Voucher specimen No: 9
Local Name: Phulahi
Flowering period: May-June
Parts used: Gum from the bark
Distribution: North West Frontier Province, Lower Hazara, Swat, Dir, Punjab, Salt Range, Jhelum, Baluchistan, Harnai and Fort Sandeman
Occurrence: Sparsely distributed throughout the area
Medicinal use: The gum obtained from the bark is used as tonic and stimulant. Usually the natives mix the gum with wheat flour; sugar and roast in ghee. The gum (chir) is also used in the preparation of "Halwa" which is given as tonic, especially to women in childbirth. Gum is used as restorative.

Acacia nilotica (L.) Delile

Synonym: *Acacia arabica* (Lam.) Willd, *Mimosa nilotica* L., *M. arabica* Lamk.
Voucher specimen No: 41
Local Name: Babul tree, kikar
Flowering period: April-June
Parts used: Bark, gum, leaves, seeds and pods
Distribution: North West Frontier Province, Hazara, Peshawar, Kohat, Punjab, Attock, Rawalpindi, Jhelum, Salt Range, Sind, Karachi, Baluchistan and Lasbella
Occurrence: Sparsely distributed throughout the area
Medicinal use: The bark is boiled with water and extract of the bark is used for severe toothache, especially when the gums are septic. The bark is used in diarrhoea and dysentery. It is nutritive, aphrodisiac, demulcent and stomachic. Bark is powerful astringent. Pods are powerful expectorant.

Family Labiatae / Lamiaceae

Otostegia limbata (Benth.) Boiss.
Synonym: *Ballota limbata* Benth.
Voucher specimen No: 52
Local Name: Kandiyari

Flowering period: March-June
Parts used: Leaves
Distribution: North West Frontier Province, Hazara, Kaghan, Parachnar, Peshawar, Swat, Punjab, Rawalpindi, Salt Range, Kashmir, Mirpur and Poonch
Occurrence: Sparse
Medicinal use: Leaves are applied to gums and leaf extract is useful in ophthalmia.

Family Malvaceae

Abutilon indicum (L.) Sweet
Voucher specimen No: 95
Local Name: Kanghi
Flowering period: January-March
Distribution: North West Frontier Province, Hazara, Punjab, Rawalpindi, Salt Range, Jhelum, Sind, Karachi and Indus Delta
Occurrence: Common
Parts used: Whole plant
Medicinal use: The decoction of the leaves is useful for diarrhoea, gonorrhoea and for inflammation of bladder and urethra.

Family Meliaceae

Melia azedarach L.
Synonym: *Melia orientalis*, *M. sempervirens*, *M. bukayun* Royle.
Voucher specimen No: 58
Local Name: Drek
Flowering period: March-April
Parts used: Leaves, flower, root, fruit and seeds
Distribution: North West Frontier Province, Hazara, Punjab, Sind and Baluchistan
Occurrence: Common throughout the area and naturalized throughout Pakistan
Medicinal use: Bark is cathartic and emetic. Root bark is bitter, emetic, anthelmintic and in large doses is narcotic. Leaves are anthelmintic, diuretic and their decoction is astringent and stomachic. Flowers and leaves are applied as a poultice to relieve nervous headaches. A decoction of leaves is employed in hysteria. Leaves and bark are used internally and externally in leprosy, scrofula and other skin diseases. Leaves and bark are used to cure eruptive skin diseases. Seeds are used in rheumatism; oil is used similarly as that of Neem oil. Gum is remedy for splenic enlargement.

Family Moraceae

Ficus carica L.
Voucher specimen No: 76
Local Name: Anjeer
Flowering period: March-June
Parts used: Ripe partially dried fruit

Distribution: North West Frontier Province, Hazara and Baluchistan

Occurrence: Common throughout the area

Medicinal use: Fruit is used as food. The fruit is laxative and is used in constipation. It is also useful in renal and vesicle calculus, visceral obstructions, piles and for cracks in mouth.

Morus alba L.

Synonym: *Morus serrata* Wall

Voucher specimen No: 88

Local Name: Tut, White Mulberry

Flowering period: March-April

Parts used: Leaves, stem, bark and fruit

Distribution: North West Frontier Province, Hazara, Hunza, Peshawar, Gilgit, Chitral, Punjab and Baluchistan

Occurrence: Wild as well as cultivated throughout the area

Medicinal use: Mulberry leaves are used as diaphoretic and emollient. A decoction of leaves is used as gargle in inflammation of the throat. The fruit is cooling and laxative. It is used for sore throat. Roots are astringent. Bark is used as purgative and vermifuge.

Family Nyctaginaceae

Boerhavia diffusa L.

Voucher specimen No: 99

Flowering period: March-June

Distribution: North West Frontier Province, Hazara, Peshawar, Kurram, Punjab, Rawalpindi, Attock, Salt Range, Multan, Lahore, Sind, Karachi, Baluchistan, Lasbella and Islamabad.

Occurrence: Common.

Parts used: Whole plant.

Medicinal use: Leaf juice is useful for jaundice and liver complaints. The roots are useful for gonorrhoea and dropsy.

Family Oxalidaceae

Oxalis corniculata L.

Voucher specimen No: 74

Local Name: Khatti buti

Flowering period: March-December

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Chitral, Hunza, Peshawar, Punjab, Rawalpindi, Attock, Jhelum, Lahore, Sind and Baluchistan

Occurrence: Common in shady places

Medicinal use: The extract of the plant is antiseptic and is used for skin curing. The juice of the plant is given in stomach troubles and is used to clean rusted vessel.

Family Poaceae

Cynodon dactylon L.

Voucher specimen No: 91

Local Name: Khabal Grass, Dhub grass, Barmuda or Bahama grass, Conch grasses.

Flowering period: February-April

Parts used: Leaves stem

Distribution: North West Frontier Province, Punjab, Sind and Baluchistan

Occurrence: Common

Medicinal use: Plant is used as fodder by grazing animals especially in dry season. The juice of root is an excellent remedy in dysentery with fever.

Desmostachya bipinnata (L.) Stapf

Synonym: *Eragrostis cynosuroides* (Retz) P. Beauv.

Voucher specimen No: 94

Local Name: Sacrificial grass

Flowering period: March-April

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Gilgit, Dir, Lower Swat, Punjab, Rawalpindi, Lahore, Jhelum, Sind and Baluchistan

Occurrence: Throughout the area, as a weed in wastelands

Medicinal use: The roots are useful in asthma, jaundice and hyperdipsia. The culms are sweet, diuretic, stimulant, acrid and aphrodisiac and are useful in dysentery, menorrhagia jaundice and skin eruptions.

Cymbopogon citratus (DC.) stapf

Synonym: *Andropogon citratus* DC.

Voucher specimen No: 64

Local Name: Lemon grass

Flowering period: March-June

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Punjab, Sind and Baluchistan

Occurrence: Cultivated as ornamental

Medicinal use: The plant is aromatic, bitter, acrid, useful in flatulence, gastric irritations, anorexia, poisonous bites, bronchitis, epilepsy, skin diseases, cholera and neuralgia.

Cymbopogon jawarancusa (Jones.) Schult

Synonym: *Andropogon jawarancusa* Jones. *A. himalayensis* Gran.

Voucher specimen No: 78

Local Name: Khuskus grass

Flowering period: March-August

Parts used: Whole plant

Distribution: North West Frontier Province, Hazara, Peshawar, Punjab, Rawalpindi, Kala Chitta Hills, Salt Range, Sind, Karachi, Baluchistan, Lasbella, Harnai and Quetta

Occurrence: Growing wild on all hills of the area

Medicinal use: The plant is aromatic and used as blood purifier and tonic.

Family Rhamnaceae

Zizyphus nummularia (Burm) Weight

Voucher specimen No: 6

Local Name: Berry

Flowering period: March-May

Distribution: North West Frontier Province, Hazara, Peshawar, Kohat, Banu, Punjab, Rawalpindi, Attock, Saltrange, Talagang, Sind and Baluchistan

Occurrence: Common

Parts used: Leaves, fruit and seeds

Medicinal use: It is a popular edible wild fruit. It is a palatable shrub for grazing animals. Its leaves are antiseptic. The leaves in powder form are used for healing of wounds. The seeds are aphrodisiac. Decoction of the leaves is useful in diabetes.

Family Sapindaceae

Dodonea viscosa (L.) Jacq.

Synonym: *Ptelea viscosa* L., *Dodonea dioica* Roxb.

Voucher specimen No: 2

Flowering period: February-March

Parts used: Leaves, bark and seeds

Distribution: North West Frontier Province, Hazara, Swat, Dir, Gilgit, Kurram, Punjab, Rawalpindi, Attock, Salt Range, Baluchistan, Kashmir and Poonch

Occurrence: Common throughout the area

Medicinal use: Leaves are used in the treatment of wounds, swellings and burns. It is also used as febrifuge and is useful in rheumatism. The fruit is used as a fish poison. The application of leaf decoction of *Dodonea viscosa* for toothache has been tested on some patients by the author Mir Ajab Khan who is a herbal physician. The decoction should be used as mouthwash only and should not be swallowed.

Family Scrophulariaceae

Verbascum thapsus L.

Voucher specimen No: 92

Local Name: Jangli tambaco, Gidhar tambaco (Urdu)

Flowering period: March-October

Distribution: North West Frontier Province, Hazara, Chitral, Swat, Dir, Malakand and Kashmir

Occurrence: Rare

Parts used: Roots, Seeds, flowers and Leaves

Medicinal use: Leaves and flowers are used

as stimulant .They are useful for earache and also used in diarrhoea and cough.

Family Solanaceae

Datura stramonium L.

Voucher specimen No: 88

Local Name: Jimson weed, Sada dhatura

Flowering period: March-July

Parts used: Dried leaves and seeds

Distribution: North West Frontier Province, Hazara, Chitral, Swat, Dir, Punjab, Murree, Baluchistan and Loralai

Occurrence: Sparse, waste places

Medicinal use: The plant as a whole has narcotic, anodyne and antispasmodic properties. The local application of *Datura* leaves poultice is used for rheumatic swelling of joints, lumbago, neuralgia, painful tumour, glandular inflammation such as mumps etc. Tendril and fresh leaves may be used along with 'ghee' or 'butter' to cover inflamed areas. Internally, juice of the leaves is administered with curdled milk in gonorrhoea. It is a popular internal remedy for the prevention of hydrophobia. The juice of flowers is useful for earache. Seeds are useful as astringent in bowel complaints, fever and skin diseases. The seeds have a strong aphrodisiac effect.

PROCESSING OF MEDICINAL PLANTS

The important steps involved are given below:

Collection, Identification and Drying:

The collection of medicinal plants is a matter of considerable care and skill for several reasons. It is essential to collect the right species of plant, which requires knowledge of botanical identification. The illustrations in ancient herbals were made for this reason, enabling people to identify plants simply and surely, even when there were no adequate written description; it is important because the consequences of an error in collection can be tragic. Most commercial supplies of medicinal plants are, in fact, cultivated under standard conditions in the USA, Europe and the Far East. Some are available for home extraction, while others are legally controlled as regards sale and possession. Another legal point, apart from the protection of the public, is that in some areas plants have been picked for their medicinal properties to such an extent that they have become scarce and the law has stepped in to conserve them.

Just as with food plants, the time of harvesting medicinal plants is of considerable importance. Simply knowing which part of

the plant holds the active principle is not enough; the amount of it in the plant will vary with the seasons – just like edible fruits, which becomes sweeter, then begins to deteriorate and the herbalists' presence is more efficiently served by collection of the plant at a time when it is at its most optimum level. Quite commonly, this is the time when the part to be collected is at full maturity. The experienced grower of herbal plants also observes other practices, in order to achieve the most reliable effect from his products. For example, it is best to gather the plants in warm and dry weather, when there is no dew. Moreover, different parts of plants require different methods of collection and drying, and must be considered separately.

Beginning with the parts that grow underground, it must be remembered that these are not all roots, although they are often referred to as such in popular usage. In fact, many are modified stems, including tubers (for example, the potato), rhizomes (rhubarb) and bulbs (onion). Whatever type of underground growth is to be collected, the plant must be pulled out of the ground with care, causing as little damage as possible. The roots or other parts must then be cleaned of the soil. Sandy soil may be shaken off, but when the soil contains clay, the plant must be washed carefully and dried at once.

Large roots are sometimes cut into smaller pieces, and the next step is to place all the clean parts on a cloth to dry. Traditionally, drying was done in the sun, but today's ovens are set to controlled temperatures, usually in the region of 50 °C and the roots or rhizomes put there to dry. Drying is a critical step in the preparation of herbs because the presence of any residual moisture will encourage the growth of moulds, leading in turn to the deterioration of the plant and destruction of its active principles. Collection of roots and other underground parts of annual plants is usually done just before the plant is due to flower, while for others the best time is autumn and winter. There are always exceptions to this kind of rule of thumb; for example, the tubers of orchids and the rhizomes of the male fern are collected in summer.

Turning to the aerial or over-ground parts of a plant, the bark is removed from the branches that are at least two years old and is usually taken in either autumn or spring. In autumn, it can be peeled easily from the branch, using a knife. In spring, however, it is more successful to make two circular cuts, a few inches apart and a third one along the bark to release it. This technique releases a

complete ring of bark, which is then dried in the same manner as the underground parts. Buds, not surprisingly, have to be gathered at springtime, when they are about to bloom. They need to be dried very carefully, in the shade rather than in the open sunshine and not in a heated oven. Similarly care must be taken while drying leaves, which are usually collected in the growing season (although there are exceptions: mallow leaves are collected when the plant is flowering). Leaves have to be chosen carefully; any that are yellow, partially eaten or showing signs of disease must be rejected.

TRUE HERBS

By definition plants that have no woody stem above the ground are collected at the start of the flowering season. Again, the damaged or yellow parts are thrown away and the plant is dried in the same manner as for buds.

Finally, the seeds of pulpy fruits, such as gourds, marrow's and quinces, are gathered just before the fruit is fully ripe. The small seeds of dry fruits are also collected before full maturity, at the same time as the plant. Then, after drying they are obtained merely by shaking the plant.

STORAGE

Normally no storage is involved at the collector's level, because they try to sell them as soon as possible. The village grocers have to store small quantities with them for a short while till they are able to dispose them off to the wholesalers. Like drying, if the storage is not carried out in hygienic conditions, the crude drug often gets infected with insects and fungi. The storage places are generally dark and ventilation is extremely poor. This often results in the deterioration of the dried herbal drugs and ultimately causes a financial loss to the traders in order to maintain quality. Storage facilities need a definite improvement.

DISCUSSION

The research in hand was made to make a list of all those plants which are exposed to the danger of extinction due to rapid urbanization. It would be appropriate to prepare an inventory, collect and preserve this wealth. As an example, the principal medicinal plants of the area are *Cyperus rotundus* L., which is mainly used for cholera, dyspepsia and fevers. The important species of the area are *Colchicum luteum*, *Cichorium intybus*, *Hypericum oblongatum*, *Ficus carica*,

Lactuca serriola, *Justicia adhatoda*, *Otostegia limbata*, *Incarvillea emodi*, *Dodonaea viscosa* and *Cyperus rotundus*. *Dodonaea viscosa* is an excellent remedy for toothache. The degree of importance of these different kinds of plants for the local inhabitants varies from area to area. These medicinal plants play a vital role in maintaining the ecosystem of a particular zone. However, these vary from place to place as per the prevailing agro-ecological situations.

Protection can help in the restoration of diverse vegetation and rehabilitation of natural habitats to undo degradation due to heavy grazing and illicit cutting. Moreover, controlled / rotational grazing and one or two years protection, as introduced by Environmental Rehabilitation Project (ERP) results in increased diversity of plants, increased cover of grasses and herbs. The foremost important thing is to give awareness and training to the local communities on holistic approaches concerning the sustainable exploitation of medicinal plants in Abbottabad.

The plants are either used singly or in combination with some other plant or plant parts. Some plant species of the area are claimed to be quite effective remedies against certain ailments such as abdominal disorder, ulcer, dysentery, uterine haemorrhage, dyspepsia etc. Since the uses are based on empirical knowledge, the scientific study of all these herbal drugs is highly desirable to establish the efficacy for safe use. In Bulgaria, about 750 native plant species or 21 % of the total flora, are used in folk medicine, to flavour food, as teas and in pharmaceutical industry. *Hypericum oblongatum* is locally used as a herbal tea for the treatment of depression and insomnia. Tea is also prepared from *Lactuca serriola* to cure stomach ache, cough, bronchitis, asthma and whooping cough. According to Loeb (20), tea from the leaves of *Lactuca serriola* is used as female douche when finely grated and mixed with water. *Melilotus indica* is astringent and narcotic. Kirtkar and Basu (21), reported that *Melilotus indica* is used as discutient. *Verbascum thapsus* is used as demulcent and emollient.

The present survey has shown that Abbottabad is an important area for medicinal plants, which are gradually disappearing or are on the verge of local extinction due to exploitation, overgrazing, deforestation and fragmentation of wrong harvesting techniques. Many of the medicinal plants are frequently used by the local inhabitant of the

area. But rapid urbanization and industrialization result in the loss of not only the medicinally important plant species but also in the loss of traditional knowledge. The population of *Incarvillea emodi* is decreasing due to loss of habitat. The younger generation is switching over to the modern system of medicine and distancing itself from folk medicines. It is, therefore, imperative to document the maximum possible portion of this knowledge with a sense of urgency. The wild species are hardly resistant to drought, diseases, and pest whilst maintaining itself in spite of the abrupt variations in temperature, frost, hails etc. These can be fitted into a strategy of land reclamation and revised cropping system.

CONCLUSION

It is concluded that the medicinal species should be focused for regeneration and propagation. *Sisymbrium irio*, *Colchicum luteum* and *Hypericum oblongatum* are needed to be cultivated in this area for commercial purposes for the betterment of the people of the area. Establishment of a Botanical Garden is suggested in this regard. Therefore, it is necessary to establish management and conservation areas of adequate size in their native habitat with the co-operation and co-ordination of the forest department, local non-government organizations, Village Development Committees (VDC) and Women Organizations (WOs). Periodic grazing should be replaced by rotator grazing. Local people should be considered in decisions making. There is need to propagate awareness for the protection of wild medicinal plants so that not all plants from any area should be plucked.

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