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THE ETHNOBOTANY OF CHITRAL VALLEY, PAKISTAN WITH PARTICULAR REFERENCE TO MEDICINAL PLANTS

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Abstract

An ethnobotanical survey was carried out to collect information regarding the various indigenous uses, especially the medicinal plants in Chitral valley. A total of 83 taxa are reported as being used locally for various purposes. Our results suggest that root is the major plant part used in most of the recipes. Majority of the recipes are prepared in the form of decoction from freshly collected plant parts. Mostly a single species is used and are mainly taken orally. All of these plants are collected from the wild, 7 of which are reported as scarce locally. Unsustainable collection methods, poor post harvest methods, soil erosion and intense deforestation are the main causes of the depletion of local flora. As the Chitrali people still partly depend on medicinal plants for majority of their ailments, therefore loss of these plant resources will, to a certain extent, hamper the existing healthcare system in the area. Measures for the conservation of plant resources especially medicinal plants of Chitral valley are urgently needed.

Introduction

The use of plants by man is dated back to the origin of life on earth. In the beginning plant use was restricted to food, medicine and shelter but with the passage of time man explored the potential of plants for a number of other purposes. Hence, their dependency on plants increased both directly and indirectly. Wild plants have always been the matter of high concern and have always been used for their potential of human well being (Ali *et al.*, 2003; Ali, 2003). With the passage of time wild plants were cleared from their original habitat to replace the desired cultivated crops on large scale. This practice has always been affected by the availability of plants in their natural habitat and the way these resources are used by the local people are imperative. In developing countries medicinal plants provide a real alternative for primary health care system (Buitron, 1999). Due to the high cost of conventional allopathic medicine and inaccessibility of medicinal health care facilities especially in rural areas, the locals are compelled to rely on medicinal plants. According to an estimate between 35,000 and 70,000 plant species are used in folk medicine worldwide (Lewington, 1990; Fransworth & Soejarto, 1991), since comparability of foreign trade statistics is limited and compilation of the trade figures of all botanicals is impossible (Lange, 2006). Products from hundreds of species are being collected from remote forests and meadows and traded to international markets and consumed (Olsen, 2005). These harvests provide an important source of income to huge number of rural households.

About 70-80% of the world population use traditional medicine for curing their illness and ailments (Fransworth & Soejarto, 1991; Pei, 2001). But this was estimated about a decade ago. The percentage of people using traditional medicine decreased in developed countries: 40-50% in Germany, 42% in the USA, 48% in Australia and 49% in France (Titz, 2004). This might be due to the unavailability of medicinal plants in the wild.

In the period 1991-2003, an average of 467,000 tones (valued at US $ 1.2 billion) of pharmaceutical plants were traded annually on the global scale, with the dominance of few countries (Lange, 2006).

For Pakistan a total of 1572 genera and 5521 species are identified (Ali, 2008), most of which are confined to the mountainous areas (Ali & Qaiser, 1986). Very few attempts have been made to document the indigenous uses of medicinal plants such as Ahmad & Sher (2003) and Khan (1996). But this information is rather incomplete as very few common plants are listed. Many of the species reported in these studies are either misidentified or no identification has been made up to species level. Hussain (2003) collected ethnobotanical information of fruit plants of Chitral and listed about 19 cultivated fruit plant species. Similarly, Hussain *et al.,* (2007) documented the uses of 111 plants of Mastuj. They have also included number of cultivated species. In addition to that no information is available about the exact locality, habitat and the voucher specimen. We have not included those plants which have already been listed by Hussain *et al.,* (2007) while the exception of few taxa which have different vernacular names in other parts of Chitral valley and used differently.

Main objective of the present study is to document the indigenous knowledge of wild plants of entire Chitral valley and provide scientific basis for further research.

The study area

Chitral is located in the extreme north-east of N.W.F.P., parallel to the pan handle shaped Wakhan corridor of Afghanistan. It is the largest district of the province with 14850 sq. km area, covering 20% of the provincial landscape. It lies within 35^0 15′ 06" to 36^0 55′32" North and 71^0 11′ 32" to 73^0 51′ 34" East with a population of 3,20,000 (Anon., 1998).

It is bordered on the east by district Ghizer of Northern areas of Pakistan, on the south by districts of Dir and Swat. Nooristan of Afghanistan lies across the border to the West and on the north-west by the Wakhan corridor, which separates Pakistan and Tajikistan (Fig.1). Three distinct mountain ranges surround the Chitral region, to the north-west bordering Afghanistan is the Hindu Kush range, to the east-south is the Hindu Raj range and in between there is Shandoor-Karakoram range.

Chitral's main valley is 354 km long with a maximum width c. 4800 m. However, at some places it is barely 180 m wide, while the side valleys are even narrower. Fan-deposits may be found in open spaces along both the main and side valleys. These are the places where most of the villages and cultivated fields are formed (Ali & Qaiser, 2006).

High mountain topography is the characteristic feature of Chitral, which is the only cause of its isolated nature. Therefore the entry into Chitral is limited to only few passes i.e., Lowari Pass and Shandoor Pass, which are at an altitude of 3300m and 3800m respectively. But these passes are closed due to heavy snowfall for almost 6 months of the year and the area is totally inaccessible during winter (Ali & Qaiser, 2005).

Elevation of the area varies from about 1070 m (about 3500 ft) in the extreme south in Arandu to 7,690 m (25,230 ft) at the summit of Tirich Mir in the Hindu Kush. High mountain and rough topography of the area have given rise to lot of narrow side valleys. Erosion and glacial drift have contributed to fan-deposits along both the main and side valleys. These fan deposits are the main areas of habitation by human, hence villages and cultivated fields are found on these alluvial deposits (Ali & Qaiser, 2006).

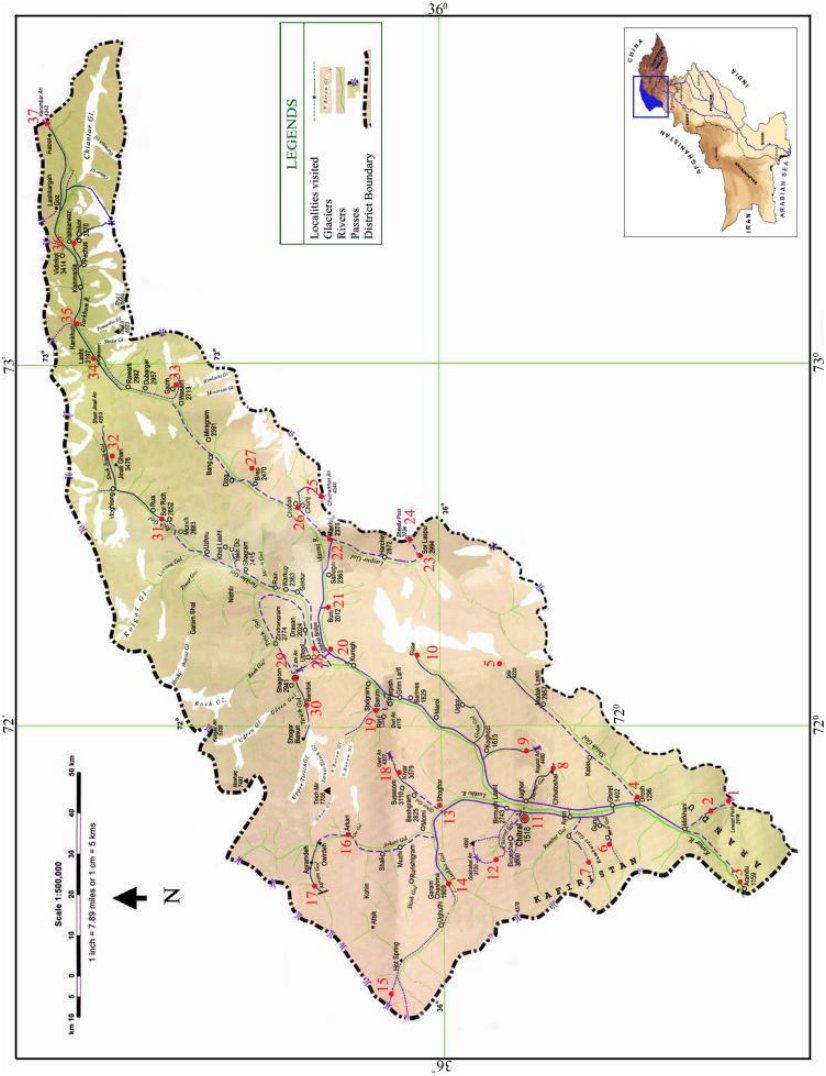

Fig. 1. Location map of the study area showing the localities visited. 1. Lowari top, 2. Ziarat, 3. Arandu, 4. Drosh, 5. Madaklasht, 6. Birir, 7. Bomboret, 8. Joghore, 9. Koghozi, 10. Goleen, 11. Chitral, 12. Chitral Gol, 13. Shoghore, 14. Garm Chashma, 15. Shah Sadin, 16. Arkari, 17. Agram Gol, 18. Kiyar, 19. Barum, 20. Charun, 21. Booni, 22. Mastuj, 23. Laspur, 24. Shandoor, 25. Chumarkan, 26. Chuinch, 27. Brep, 28. Qaq lasht, 29. Shagram, 30. Bendok, 31. Rich Gol, 32. Shah Jinali, 33. Wasam, 34. Yarkhun Lasht, 35. Kankhoon, 36. Chikar, 37. Karambar An., 38. Shajinali An, 39. Khote lasht, 40. Shoghore.

Fig. 2. Traditional agricultural tools and techniques are still commonly used in Chitral: A, Agricultural land in Ayun-Chitral; B, Oxen are still used for threshing purposes; C, Traditional ploughing is still used even in the lower Chitral.

Most of the land (72%) is either glaciated or covered with bare mountains and rocks. Small patches of forests, alpine and pasture meadows cover only 24% and croplands make only 1-2% of the total land in the district (Haserodt, 1996). Approximately 34% of the Chitral district lies above 4500 m (Kolb, 1994). About 686 km^2 of Chitral is covered by glaciers, which is about 10% of the total area of Chitral. There are about 22 glaciers which are more than 10 km long including the longest Chianter glacier, which is 32 km long, covering an area ca. 170 km^2 (Gruber, 1977). In some places, some glacier tongues extend down to 3200 m into the semi-arid valleys. In the high glacier regions, precipitation may be as high as four times, whereas the valley bottoms are dry and desert-like (Haserodt, 1989).

In Chitral the population is heterogeneous, with ethnic diversity inhabiting in 37 valleys. The Kalash people are "Kafir" i.e., non Muslims and their religion is known as "Kalasha". Tehsil Chitral has a majority of Khowar people and about 10,000 are Kalash people. Whereas, tehsils Drosh and Arandu of the lower Chitral are inhabited by three communities i.e., Khowar, Gujars and Afghans (Shaw & Shaw, 1993). In view of ethnic diversity, Chitral is a land of great contrast and variability. Six ethnic groups reside in Chitral speaking 11 indigenous languages; each ethnic group is distinct enough to hold its own culture and has their own distinct way of plant resource use. Ethnobotanical use in Chitral is intricately linked to local culture and it is as old as the history of the area.

Materials and Methods

Comprehensive field studies were conducted throughout the Chitral valley. Starting from May to the end of September, continuously for three years i.e., 2005-2007, 40 localities were studied thoroughly. These localities were selected as representatives of the whole Chitral valley. The emphasis was given to the inaccessible and previously non-visited localities during long excursions of 7-10 days campaign in these areas. These excursions were conducted with the help of local guides and porters, using horses or sometimes yaks for transportation of plants and plant pressers. The lower Chitral was studied in May and June while upper Chitral was studied from July to the end of September, because of the inaccessibility (snow bound area) and also the lack of flowering period. Plant specimens were collected along with extensive field notes including habit, habitat, life form, phenological status, abundance, GPS value and altitude etc. Efforts were made to photograph habit including flowers, fruits and habitat of most of the plant species. In each smaller valley local inhabitants were interviewed regarding the local names and various indigenous uses. Importance was given to the educated or elderly people especially women and village leaders, as their knowledge and experience are considered as comparatively more authentic. For each plant, ethnobotanical information was collected from people of different ages belonging to different ethnic groups, because sometimes the information collected from different ethnic groups were different from each other. It was emphasized to collect as much information as possible so that the relatively most authentic and most reliable information could be screened by tallying them with the information collected from the other ethnic groups. During the interviews, semi-structured questionnaire was developed as per modification from Croom (1983) and Lipp (1989). Audio visual recording devices were used to record the complete interviews for future reference. Majority of the informants were uneducated and reluctant to give information but with the passage of time they became used to it and gave complete information regarding the complete recipe preparation and procedures. All the collected plants are properly pressed, dried and mounted on standard herbarium sheets and the voucher specimens are deposited at Karachi University Herbarium (KUH). Specimens were identified with the help of pertinent Floras and confirmed with the authentically identified specimens already present in the Karachi University Herbarium. As all the specimens are collected by the first author, therefore, in voucher specimen only the collection number is cited. The nomenclature is based on Flora of Pakistan (Nasir & Ali, 1970-1979: Nasir & Ali, 1980-1989: Ali & Nasir, 1989-1992: Ali & Qaiser, 1993-2009) and Flora Iranica (Rechinger 1957-2001) or as far as possible on more recent available data on other taxonomic work. We have generally followed Boulos (1983) for western medical terminology.

Results

Total of 83 taxa are recorded for their ethnobotanical uses, belonging to 78 genera and 48 families. Of these, 13 are trees, 14 shrubs, 41 perennial herbs, 3 biennial herbs and 12 annual herbs.

According to three years field observations, 7 taxa viz., *Aesculus indica, Allium barszczewskii, Anthemis cotula, Bunium persicum, Delphinium nordhagenii, Ferula narthex* and *Paeonia emodi* are extensively exploited by the local people for their various ethnobotanical uses. Due to over exploitation by the local people, a drastic decrease has been observed in the population of these taxa in the wild. These taxa deserve special attention on urgent basis, as their populations have alarmingly decreased in the wild.

Delphinium nordhagenii is endemic to Chitral (Riedl & Nasir, 1991) and *Allium barszczewskii* has been collected only from Chitral in Pakistan (Nasir, 1975). These two taxa are overexploited for their medicinal value. Unsustainable means of collection and ignorance of the people regarding the rarity of these taxa are the main causes of depletion of their population in the wild. Conservation measures should be adapted immediately to protect these taxa from becoming extinct.

Pinus gerardiana is listed in the IUCN Red List 2008 (Anon., 2008) as Near Threatened (NT). According to our observations the local people are ignorant of the proper season and methods of seed collection and sometimes they damage the whole tree. These unsustainable means of seed collection has directly decreased the rate of juvenile growth.

According to our observations the far flung and remote villages, representing more than 60% of the district's populations, are still depending on wild plants for their various needs. Particularly the local medicinal plants are exploited for the remedy of different ailments. The local "Hakims" and "Tabibs" (local medical practitioners) usually prescribe a useful drug plant or its part for the treatment of various diseases. These "Hakims" and "Tabibs" never had formal education in medicine from any institute; rather it was inherited from ancestors, passed down through generations.

1. **Botanical name:** *Acer pentapomicum* J.L. Stewart ex Brandis
   Family: Aceraceae
   Habit: Tree
   Voucher specimen: 5074
   Locality: Beband, Madaklasht, 3333m
   Vernacular name: Zrong
   Part used: Leaves and wood
   Ethnobotanical use: Leaves are used as fodder and wood is used as firewood.

2. **Botanical name:** *Achillea wilhelmsii* C. Koch
   Family: Asteraceae
   Habit: Perennial herb
   Voucher specimen: 5704
   Locality: Beband, Madaklasht, 3333m
   Vernacular name: Boi baro
   Part used: Whole plant
   Ethnobotanical use: Decoction is used for stomach disorder and diarrhoea. The whole plant is boiled in milk and used as remedy in severe constipation. Young shoots are used as green tea especially for stomach disorders.

3. **Botanical Name:** *Aesculus indica* (Wall. ex Camb.) Hook.f.
   Family: Hippocastanaceae
   Habit: Tree
   Voucher specimen: 180
   Locality: Bakamak Chitral, 1300m
   Vernacular name: Bankhor
   Part used: Fruits
   Ethnobotanical use: Fruits are eaten raw for colic. Only few trees are found in the

lower Chitral. According to the locals this plant had a very thick population in lower Chitral some twenty years back, but its ruthless cutting for fuel wood has locally threatened this plant.

4. **Botanical name** *Ajuga bracteosa* Wall. ex Benth.
Family: Labiatae
Habit: Perennial herb
Voucher specimen: 6310
Locality: Riri Chatho ghari Chitral, 2766m
Vernacular name: Boti
Part used: Leaves
Ethnobotanical use: Leaves are bitter in taste and used in fever. The young leaves are dried, powdered and eaten three times a day for throat infection and fever.

5. **Botanical name:** *Allium barszczewskii* Lipsky
Family: Alliaceae
Habit: Biennial herb
Voucher specimen: 7060
Locality: Bandook Terich Molikhoo, 3212m
Vernacular name: Kach
Part used: Leaves
Ethnobotanical use: Leaves are bitter in taste and are eaten raw or cooked along with other pot herbs for gastrointestinal disorders especially stomachache. This taxon has been extensively utilized unsustainably, for medicinal purposes in various preparations, therefore it has become very rare in the wild.

6. **Botanical name:** *Anthemis cotula* L. (Fig. 3)
Family: Asteraceae
Habit: Perennial herb
Voucher specimen: 5080
Locality: Agram gol Arkari Lutkhoo, 3063m
Vernacular name: Sherisht
Part used: Inflorescence
Ethnobotanical use: Flowers are boiled in water or tea and used for various gastrointestinal disorders like stomachache and gas trouble.

7. **Botanical name:** *Arnebia euchroma* (Royle ex Benth.) I.M. Johnston
Family: Boraginaceae
Habit: Perennial herb
Voucher specimen: 2380A
Locality: Arkari gol Lutkhoo, 2033m
Vernacular name: Phosuk
Part used: Root and stem

Fig. 3. *Anthemis cotula* known as "Sherisht" is exploited for gastrointestinal disorders by the local people. A drastic decrease has been observed in its population during the last three years of field studies.

Ethnobotanical use: It is used as dyes for cloths. The roots and lower stem contain dye, which is used for dying carpets made of wool. In ancient times it was used for colouring cloths. The paste prepared by boiling the roots in water is applied for boils and wound.

8. **Botanical name:** *Arisaema jacquemontii* Blume
Family: Araceae
Habit: Biennial herb
Voucher specimen: 3831
Locality: Shoghore Kiyar Lutkhoo, 1875m
Vernacular name: Marjarai
Part used: Fruits and rhizome
Ethnobotanical use: Fruits and rhizomes are poisonous and cause sedation. Very small quantity is used during meal for relieving body pain. Also used in small quantities in various preparations by "Hakims" for psychic and nervous disorders.

9. **Botanical name:** *Artemisia rutifolia* Spreng.
Family: Asteraceae
Habit: Shrub
Voucher specimen: 2915

Locality: Chikar Baroghill, 3503m
Vernacular name: Afsanteen
Part used: Flower head
Ethnobotanical use: The flowers are dried, powdered and used as anthelmintic.

10. **Botanical name:** *Astragalus oplites* Benth. ex Parker
Family: Fabaceae-Papilionoideae
Habit: Shrub
Voucher specimen: 1184B
Locality: Madaklasht Drosh, 2689m
Vernacular name: Dume ruba
Part used: Shoot
Ethnobotanical use: Shoots are collected in summer, stored and used as fuel wood in winter.

11. **Botanical name:** *Berberis calliobotrys* Aitch. ex Koehne
Family: Berberidaceae
Habit: Shrub
Voucher specimen: 6907
Locality: Petch Otch Thiole Arkari, 2140m
Vernacular name: Chowenj
Part used: Fruits and bark
Ethnobotanical use: The fruits are crushed, boiled in water and are used for fever. Bark of the rhizome is powdered, mixed with same weight of black pepper, same weight of "Desi ghee" (type of butter) a paste is prepared which is applied for backache. Decoction of root bark is used as a gargle for pharyngitis. It is also considered to be equally beneficial for the relief of intestinal colic.

12. **Botanical name:** *Bergenia stracheyi* (Hook.f. & Thorns.) Engl.
Family: Saxifragaceae
Habit: Perennial herb
Voucher specimen: 1027A
Locality: Chitral Gol, 3132m
Vernacular name: Bisabur
Part used: Leaves, roots and latex
Ethnobotanical use: Latex is directly applied on pimples. Decoction of roots or leaves is prepared and is used for toothache and bleeding of gums.

13. **Botanical name:** *Bunium persicum* (Boiss.) Fedtsch.
Family: Umbelliferae
Habit: Perennial herb
Voucher specimen: 2689
Locality: Langar Torikhoo, 3035m
Vernacular name: Hojoj
Part used: Fruits

Ethnobotanical use: Fruits of this plant are used locally for indigestion, gastrointestinal disturbances and abdominal pain. Fruit is collected mainly for commercial purposes as it fetches a high price in the local market. Due to expansion in agriculture, unrestricted collection and overgrazing, this plant is rapidly disappearing from its natural habitat with an alarming rate.

14. **Botanical name:** *Carex stenophylla* Wahlenb. subsp. *stenophylloides* (V. Krecz.) Egor.
Family: Cyperaceae
Habit: Perennial herb
Voucher specimen: 5111
Locality: Danespawee Torokhoo, 3200m
Vernacular name: Lokh
Part used: Leaves and flowers
Ethnobotanical use: Leaves and flowers are mixed with mud and applied on the walls for plaster. Also used as fodder for cattle. Mats are also made from the young shoots. This practice is common among the poor Wakhi community in Baroghill valley, upper Chitral.

15. **Botanical name:** *Cedrus deodara* (Roxb. ex D.Don) G.Don
Family: Pinaceae
Habit: Tree
Voucher specimen: 5619
Locality: Zeenor Chitral, 2539m
Vernacular name: Diyar
Part used: Wood
Ethnobotanical use: Oil extracted from the freshly cut wood is used for various skin diseases. Wood is very famous for making furniture, also used for constructional purposes etc. The wood is over exploited by local and nomadic Gujurs for fuel purposes.

16. **Botanical name:** *Chenopodium botrys* L.
Family: Chenopodiaceae
Habit: Annual herb
Voucher specimen: 4632
Locality: Darband shekhlasht Yarkhoon, 2749m
Vernacular name: Kunakh
Part used: Whole Plant
Ethnobotanical use: Decoction is used in treatment of catarrh also used as anthelmintic.

17. **Botanical name:** *Chenopodium foliosum* Asch.
Family: Chenopodiaceae
Habit: Annual herb
Voucher specimen: 6505

Locality: Pasti Rabat ghari, 3728m
Vernacular name: Pelili mrach
Part used: Ripe fruits
Ethnobotanical use: The ripe fruits are eaten raw for its taste; they are also used for eye infection. Juice is extracted from the ripe and clean fruits and is applied for eye infections.

18. **Botanical name:** *Chenopodium murale* L.
Family: Chenopodiaceae
Habit: Annual herb
Voucher specimen: 4576B
Locality: Birir proper, Chitral, 2490m
Vernacular name: Darkunakh
Part used: Whole plant
Ethnobotanical use: Used as pot herb. Especially used for abdominal pains, diuretic and considered as anthelmintic.

19. **Botanical name:** *Cirsium arvense* (L.) Scop.
Family: Asteraceae
Habit: Perennial herb
Voucher specimen: 1593B
Locality: Birir proper, 2050m
Vernacular name: Lata khar
Part used: Shoot
Ethnobotanical use: Eaten only by donkeys as fodder.

20. **Botanical name:** *Clematis orientalis* L.
Family: Ranunculaceae
Habit: Shrub
Voucher specimen: 7125
Locality: Rowa Torikhoo, 2459m
Vernacular name: Chontruk
Part used: Flowers and fruits
Ethnobotanical use: Flowers and fruits are fried in oil, then wheat flour and water are added, a soup is prepared and given to the patient in diarrhoea and dysentery.

21. **Botanical name:** *Codonopsis clematidea* (Schrenk) C. B. Clarke
Family: Campanulaceae
Habit: Perennial herb
Voucher specimen: 4814
Locality: Ashat Yarkhoon, 3800m
Vernacular Name: Ganda Mazakh, Danu
Part used: Root
Ethnobotanical use: Roots are boiled in water and then dried until a solid substance is prepared, which is broken into pieces and mixed with boiled milk and then eaten in solid form for urinary tract problems. It is also used as aphrodisiac.

22. **Botanical name:** *Convolvulus arvensis* L.
Family: Convolvulaceae
Habit: Perennial herb
Voucher specimen: 1520
Locality: Birir proper, 2489m
Vernacular name: Bakarbali
Part used: Root
Ethnobotanical use: The roots are dried, powdered and used as purgative i.e. for evacuation of bowels.

23. **Botanical name:** *Cousinia thomsonii* C. B. Clarke
Family: Asteraceae
Habit: Perennial herb
Voucher specimen: 5071
Locality: Danespawee Yarkhoon, 2979m
Vernacular name: Khar
Part used: Root
Ethnobotanical use: Root is chewed as gum and used as aphrodisiac.

24. **Botanical name:** *Crataegus songarica* C. Koch
Family: Rosaceae
Habit: Tree
Voucher specimen: 5771
Locality Shermali Sahat Molikhoo, 3347m
Vernacular name: Gooni
Part used: Fruits, wood and leaves
Ethnobotanical use: Fruits are edible and considered as cardio tonic. Wood is heavy, hard and tough and used for making tool hands, mallets and other small items. Also used as fuel wood. Leaves are used for fodder.

25. **Botanical name:** *Daphne mucronata* Royle
Family: Thymelaeaceae
Habit: Shrub
Voucher specimen: 3355
Locality: Near TV booster Chitral, 2470m
Vernacular name: Lovomekeen
Part used: Fruits
Ethnobotanical use: Fruits are ground, mixed with water and the paste produced is used for pimples and freckles on face.

26. **Botanical name:** *Delphinium nordhagenii* Wendelbo (Fig. 4)
Family: Ranunculaceae
Habit: Perennial herb
Voucher specimen: 7103
Locality: Atthak Terich Molikhoo, 3471m
Vernacular name: Jagh Josho
Part used: Roots and flowers

Ethnobotanical use: Used as hair tonic. Flowers and roots are powdered, mixed with mustard oil and applied on hairs for 6-7 hours and then washed. This taxon is endemic to Chitral and due to the unsustainable use by the locals a drastic decrease has been observed in its population during the course of study.

27. **Botanical name:** *Descurainia sophia* (L.) Webb. & Berth.
Family name: Brassicaceae
Habit: Annual herb
Voucher specimen: 8
Locality Danin gol Chitral, 1506m
Vernacular name: Kheli Kheli
Part used: Young shoot, leaves and seeds
Ethnobotanical use: Young shoots and seeds are powdered and used for gas trouble and intestinal disorders. The decoction is used as painkiller. Freshly collected leaves are taken with milk for reducing high fever.

28. **Botanical name:** *Elaeagnus angustifolia* L. var. *angustifolia*
Family: Eleagnaceae
Habit: Tree
Voucher specimen: 531
Locality: Booni gol Mastooj, 2243m
Vernacular name: Shinjoor
Part used: Fruit and flowers
Ethnobotanical use: Young flowers are strongly aromatic and are extensively plucked for its fragrance. The local people place the flowers in their caps. Ripe fruits are eaten raw for their taste. Ripe fruits are boiled in water, sugar is added to enhance flavor and syrup is prepared. This syrup is used for sour throat and high fever.

29. **Botanical name:** *Ephedra intermedia* Schrenk & Meyer (Fig. 5)
Family: Ephedraceae
Habit: Shrub
Voucher specimen: 6295A
Locality: Agram Gol Ghari, Arkari, 3351m
Vernacular name: Somani
Part used: Whole plant
Ethnobotanical use: The plant is extensively used in snuff preparation. Ripe fruits are boiled in water and used for asthma and tuberculosis.

30. **Botanical name:** *Eremurus stenophyllus* (Boiss. & Buhse) Baker subsp. *stenophyllus*
Family: Asphodelaceae
Habit: Perennial herb

Fig. 4. *Delphinium nordhagenii* Wendelbo; A, habit; B, flower close up. (An important medicinal plant-endemic to Chitral).

Voucher specimen: 5133
Locality: Yashkist Yarkhoon, 2979m
Vernacular name: Sheresh
Part used: Roots and leaves
Ethnobotanical use: Root is dried, powdered and used as glue for its clinging power. Also used as potherb.

31. **Botanical name:** *Euphorbia prostrata* Ait.
Family: Euphorbiaceae
Habit: Annual herb
Voucher specimen: 5130
Locality: Danespawee Yarkhoon, 2979m
Vernacular name: Sherak, Darkunakh
Part used: Latex
Ethnobotanical use: Latex is known as "Sherak" and is applied on skin for eruptions and ringworm.

32. **Botanical name:** *Ferula narthex* Boiss. (Fig. 6)
Family: Umbelliferae
Habit: Perennial herb
Voucher specimen: 336
Locality: Booni gol Mastook, 2282m

Vernacular name: Raw
Part used: Whole plant
Ethnobotanical use: Leaves and young shoots are edible and used as potherb and the gum obtained from the roots and stem by making incisions is used as a condiment. Locally this species is used for cough, asthma, toothache, gastric problems and anti-constipation. Owing to the usefulness of this species for different local remedies, many local people and nomadic Gujurs are actively involved in the collection and marketing of this drug plant. The collectors being ignorant, uproot and over exploit this important medicinal plant in unscientific and unsustainable way. Consequently, the plant is disappearing from the wild and becoming rare in its natural habitat.

33. **Botanical name:** *Fraxinus hookeri* Wenzig
Family: Oleaceae
Habit: Tree
Voucher specimen: 1207A
Locality: Moroi hill Chitral, 2010m
Vernacular name: Soom, Toor
Part used: Bark and leaves
Ethnobotanical use: Decoction prepared from the bark of the stem is used for high fever. Sugar is added to reduce astringency. The plant is extensively exploited for fodder and fuel wood purposes; therefore it has become very rare.

34. **Botanical name:** *Fumaria indica* (Hausskn.) Pugsley
Family: Fumariaceae
Habit: Annual herb
Voucher specimen: 127
Locality: Bakamak hill Chitral, 2000m
Vernacular name: Shahtara
Part used: Whole plant
Ethnobotanical use: Whole plant is boiled in water to prepare a decoction and is used for constipation.

35. **Botanical name:** *Galium elegans* Wall.
Family: Rubiaceae
Habit: Perennial herb
Voucher specimen: 4054
Locality: Surwat towards Terich gol, 2332m
Vernacular name: Mattar
Part used: Whole plant
Ethnobotanical use: Juice is extracted from the whole plant and is used as aperients and diuretic.

Fig. 5. A, Mr. Naik Zada, a local resident of *Chowinch-Mastuj* collected *Ephedra intermedia* Schrenk & Meyer, commonly known as "Somani" for preparing snuff; B, fruiting.

Fig. 6. *Ferula narthex*: A, habitat; B, an incision is made in the stem and latex is collected and sold in the market with a trade name "Hinj". Local population is under tremendous pressure, due to the unsustainable means of plant collection by the locals. (Mr. Abdul Hameed Khan; a local informant in the foreground).

36. **Botanical name:** *Gentianodes olivieri* (Griseb.) Omer, Ali & Qaiser
Synonym: *Gentiana olivieri* Griseb.
Family: Gentianaceae
Habit: Perennial herb
Voucher specimen: 138
Locality: Bakamak hill Chitral, 2114m
Vernacular name: Nilkant
Part used: Root
Ethnobotanical use: Decoction of root is used for urinary tract infections, also used for stomachic.

37. **Botanical name:** *Geranium wallichianum* D. Don ex Sweet
Family: Geraniaceae
Habit: Perennial herb
Voucher specimen: 5162
Locality: Yashkist Yarkhoon, 2973m
Vernacular name: Ratanjothe
Part used: Rhizome

Ethnobotanical use: Rhizome is dried, powdered, boiled in water and used for lowering blood pressure, also used for Leucorrhoea. Rhizome is mixed in a sweet dish and used for backache. Also used as a tonic in various preparations.

38. **Botanical name:** *Hyoscyamus niger* L.
Family: Solanaceae
Habit: Biennial herb
Voucher specimen: 3929
Locality: Kiyar Sosoom Chitral, 2886m
Vernacular name: Joli gao
Part used: Leaves
Ethnobotanical use: The plant is considered as poisonous. Leaves are boiled in excess quantity of water and used in small quantity for asthma and woofing cough.

39. **Botanical name:** *Hypericum perforatum* L.
Family: Guttiferae (Clusiceae)
Habit: Perennial herb
Voucher specimen: 3192A
Locality: Sosoom Ghari Chitral, 2686m
Vernacular name: Matali, Zarbali
Part used: Flowers
Ethnobotanical use: Flowers are dried, powdered and used for abdominal pain. Especially used for backache when taken with milk after dinner.

40. **Botanical name:** *Juncus thomsonii* Buchenau
Family: Juncaceae
Habit: Perennial herb
Voucher specimen: 5123
Locality: Mnband Yarkhoon, 2973m
Vernacular name: Gawag
Part used: Whole plant
Ethnobotanical use: Used as fodder, the roots are considered as food for wild ducks.

41. **Botanical name:** *Lepidium sativum* L.
Family: Brassicaceae
Habit: Annual herb
Voucher specimen: 2341B
Locality: Papoon arkari Lutkhoo, 3156m
Vernacular name: Sat-bootey
Part used: Leaves and seeds
Ethnobotanical use: Leaves are dried, powdered and used for abdominal problems; seeds are also used for colic.

42. **Botanical name:** *Linum perenne* L.
Family: Linaceae
Habit: Perennial herb
Voucher specimen: 5989
Locality: Parsan ghari Molikhoo, 2722m
Vernacular name: Shetiki
Part used: Seeds
Ethnobotanical use: Seeds are ground and fried. Then a paste is prepared which is used in urinary tract infections. Seeds are chewed and kept for few minutes in between the jaws for toothache. Also used for high blood pressure in various preparations.

43. **Botanical name:** *Malva neglecta* Wallr.
Family: Malvaceae
Habit: Perennial herb
Voucher specimen: 3811
Locality: Birir Shekhandeh Chitral, 1900m
Vernacular name: Yor paghusu
Part used: Whole plant
Ethnobotanical use: Young shoots are used as potherb. The roots are boiled and mixed with the seeds of *Lepidium sativum* and used as purgative for young cattle.

44. **Botanical name:** *Marrubium vulgare* L.
Family: Labiatae
Habit: Perennial herb
Voucher specimen: 3081A
Locality: Birir Shekhandeh Chitral, 1900m
Vernacular name: Istore Zokho
Part used: Young leaves
Ethnobotanical use: Decoction is made from the young leaves and is used against cough. Sugar is added for enhancing flavor. It is commonly used in Ashrete valley especially during winter when other medicines are not available.

45. **Botanical name:** *Mentha royleana* Benth.
Family: Labiatae
Habit: Perennial herb
Voucher specimen: 4032A
Locality: Chitral college, 1523m
Vernacular name: Bain
Part used: Leaves
Ethnobotanical use: The dried leaves are mixed with green tea and are taken for the treatment of vomiting. The powdered leaves are mixed with curd and eaten for the treatment of dysentery and diarrhoea. Decoction of the leaves is taken as a cooling agent. Dried leaves and flower tops are carminative and are used in the form of tea.

46. **Botanical name:** *Myrtama elegans* (Royle) Ovcz. & Kinzik.
Synonym: *Tamaricaria elegans* (Royle) Qaiser & Ali
Family: Tamaricaceae
Habit: Shrub
Voucher specimen: 196A
Locality: Joghore gol Chitral, 1528m
Vernacular name: Phapaki
Part used: Flowers
Ethnobotanical use: Flowers are dried, crushed and its paste is used in backache.

47. **Botanical name:** *Onosma hispida* Wall. & G.Don
Family: Boraginaceae
Habit: Perennial herb
Voucher specimen: 87
Locality: Shahdoke Lowari Ziarat, 2927m
Vernacular name: Phusuk
Part used: Roots
Ethnobotanical use: Roots are dried in shade for several days, and then powdered and mixed with mustard oil and is used to remove dandruff. Decoction of roots is used for colouring clothes.

48. **Botanical name:** *Origanum vulgare* L.
Family: Labiatae
Habit: Perennial herb
Voucher specimen: 1157
Locality: Madaklasht Drosh, 2689m
Vernacular name: Ishpain
Part used: Whole plant
Ethnobotanical use: Shoot is chewed for toothache. It is also used as flavoring agent. Roots are boiled in water and are used for coloring clothes.

49. **Botanical name:** *Orobanche cernua* Leofl.
Family: Orobanchaceae
Habit: Perennial herb
Voucher specimen: 5047
Locality: Danespawe Yarkhoon, 2979m
Vernacular name: Shomandaw
Part used: Whole plant
Ethnobotanical use: Whole plant is eaten raw for its taste.

50. **Botanical name:** *Oxalis corniculata* L.
Family: Oxalidaceae
Habit: Annual herb
Voucher specimen: 5782
Locality: Shershan towards Shoghore, 1584m
Vernacular name: Mayoono gamboori

Part used: Leaves and roots
Ethnobotanical use: Juice is extracted from fresh leaves and is used for stomach troubles. Leaves are also used as vegetables. Fresh leaves are crushed and used to stop bleeding from wounds. Decoction of the root is anthelmintic.

51. **Botanical name:** *Paeonia emodi* Wall. ex Royle var. *emodi*
Family: Paeoniaceae
Habit: Perennial herb
Voucher specimen: 1167
Locality: Petao Madaklasht, 2689m
Vernacular name: Mamekhi
Part used: Stem and roots
Ethnobotanical use: Stem is dried, powdered and a paste is produced, which is applied externally for joints pain. It is also used as a plaster on bone fractures. Roots are dried and their decoction is applied externally for backache.

52. **Botanical name:** *Peganum harmala* L.
Family: Zygophyllaceae
Habit: Perennial herb
Voucher specimen: 89
Locality: Shahdok Lowari Ziarat, 2928m
Vernacular name: Ispand
Part used: Seeds and roots
Ethnobotanical use: Seeds are powdered and used as anthelmintic. Root is boiled in water and used to kill lice.

53. **Botanical name:** *Perovskia abrotanoides* Benth.
Family: Labiatae
Habit: Shrub
Voucher specimen: 6959A
Locality: Drosh Gol Ghari, 2123m
Vernacular name: Pharbek josho
Part used: Young shoot and leaves
Ethnobotanical use: The strongly aromatic young shoots are dried in shade and wrapped in a fine cloth which is kept in traditional grain stores for the effective control of pest infection. Fresh leaves are ground to extract juice, which is applied externally for cold sponging to reduce high fever.

54. **Botanical name:** *Pinus gerardiana* Wall. ex Lamb.
Family: Pinaceae
Habit: Tree
Voucher specimen: 1595
Locality: Birir proper, 2050m
Vernacular name: Chilghoza
Part used: Seeds

Ethnobotanical use: The seeds are commonly used as tonic, carminative, appetizer and aphrodisiac. The oil extracted from the kernels is valued highly for its stimulating and healing power. The nuts of this tree are being over harvested and in some cases the local people remove all of the cones. As a result, there is virtually no natural regeneration of this species. The nuts are sold in the market as dry fruit and fetch a good price. The unsustainable means of "Chilghoza" collection has drastically decreased its plant population in the wild.

55. **Botanical name:** *Pistacia chinensis* Bunge subsp. *integerrima* (J.L. Stewart) Rech.f.
Family: Anacardiaceae
Habit: Tree
Voucher specimen: 2667A
Locality: Istar Terich Torikhoo, 2256m
Vernacular name: Kakkar
Part used: Galls
Ethnobotanical use: The galls are powdered, fried in ghee and given for dysentery.

56. **Botanical name:** *Pistacia khinjuk* Stocks
Family: Anacardiaceae
Habit: Tree
Voucher specimen: 238
Locality: Joghore gol Chitral, 1774m
Vernacular name: Binju
Part used: Dried leaves and seeds
Ethnobotanical use: Dried leaves are burnt in smoke and are considering as devil repellent.

57. **Botanical name:** *Plantago major* L.
Family: Plantaginaceae
Habit: Perennial herb
Voucher specimen: 2013
Locality: Chowinch Mastook, 2900m
Vernacular name: Hojoj, Brono Achar
Part used: Leaves and seeds
Ethnobotanical use: Fresh leaves are wrapped around the boils, after a day or two the pus drains out and the heal fills up within three days. Leaves are chopped and used for skin discoloration caused by injury. Seeds are used in dysentery.

58. **Botanical name:** *Podophyllum emodi* Wall. ex Royle
Family: Podophyllaceae
Habit: Perennial herb
Voucher specimen: 32

Locality: Ziarat Lowari Drosh, 3227m
Vernacular name: Mamekhi
Part used: Roots
Ethnobotanical use: Roots are used as tonic and analgesic. It is also used for uterine diseases and as a blood purifier. Due to the high price and demand of its roots, it is uprooted and sold in the market. This practice has drastically decreased its population in the wild.

59. **Botanical name:** *Populus euphratica* Olivier
Family: Salicaceae
Habit: Tree
Voucher specimen: 1899A
Locality: Chowincj Mastooj, 2800m
Vernacular name: Terik
Part used: Wood and young leaves
Ethnobotanical use: Wood is used for furniture and young leaves are used for thatching roofs. It is also used for making brooms.

60. **Botanical name:** *Prangos pabularia* Lindl.
Family: Umbelliferae
Habit: Perennial herb
Voucher specimen: 935
Locality: Ishpeder Chitral Gol, 2829m
Vernacular name: Moshain
Part used: Whole plant
Ethnobotanical use: Leaves and seeds are dried and powdered and are used in various gastric problems especially in constipation. The dried plants are stored and used as fodder for cattle during winter, especially used for increasing milk.

61. **Botanical name:** *Punica granatum* L.
Family: Punicaceae
Habit: Tree
Voucher specimen: 5498
Locality: Hashthnaghri Arandu, 1335m
Vernacular name: Dadlum
Part used: Fruit
Ethnobotanical use: The fruit pericarp is dried, powdered, mixed with sugar and used for diarrhoea and dysentery. It is also used against swellings resulted from injuries. Fruit is astringent, cooling agent and blood purifier. The fruit pericarp is mixed with tea and is given for whooping cough; it is also used as laxative.

62. **Botanical name:** *Rheum spiciforme* Royle (Fig. 7)
Family: Polygonaceae
Habit: Perennial herb
Voucher specimen: 5155
Locality: Mnband Yarkhoon, 2960m

Vernacular name: Rewand
Part used: Shoot
Ethnobotanical use: Used as potherb. It is purgative i.e., used for evacuation of bowels.

63. **Botanical name:** *Rheum webbianum* Royle
Family: Polygonaceae
Habit: Perennial herb
Voucher specimen: 1990
Locality: Chowinch Mastooj, 3000m
Vernacular name: Ishpar
Part used: Root, leaf stalk and stem
Ethnobotanical use: Root is used as purgative. Leaf stalk is cooked as vegetable. The unripe stem and leaf stalk are also eaten raw for its taste. The young poor children collect the plant and sell it in the market to fetch some money.

64. **Botanical name:** *Rosa webbiana* L.
Family: Rosaceae
Habit: Shrub
Voucher specimen: 408
Locality: Parwak Mastooj, 2243m
Vernacular name: Throni
Part used: Fruits
Ethnobotanical use: Decoction is prepared from the fruits in boiled water and then strained overnight to treat asthma.

65. **Botanical name:** *Rubus anatolicus* (Focke) Focke ex Hausskn.
Family: Rosaceae
Habit: Shrub
Voucher specimen: 4183
Locality: Moni Lutkhoo, 1967m
Vernacular name: Atchu
Part used: Fruits
Ethnobotanical use: Fruits are edible and are considered as tonic and are used as aphrodisiac. Fruits are carminative and are also used for diarrhoea and looseness of bowel.

66. **Botanical name:** *Rumex hastatus* D. Don.
Family: Polygonaceae
Habit: Shrub
Voucher specimen: 3576
Locality: Owyon Chitral, 1500m
Vernacular name: Sirkonzu
Part used: Leaves
Ethnobotanical use: Leaves are eaten to increase appetite, also used as purgative, astringent and diuretic.

Fig. 7. *Rheum spiciforme:* a very rare plant of higher altitude, found only in Yarkhoon valley upper Chitral.

67. **Botanical name:** *Salix iliensis* Regel
Family: Salicaceae
Habit: Tree
Voucher specimen: 450
Locality: Dodorgas Mastooj, 3010m
Vernacular name: Theli
Part used: Wood and young leaves
Ethnobotanical use: Wood is used in roofs of mud houses. Young leaves are used for thatching and basketry; they are also used for binding the bundles of fodder and firewood.

68. **Botanical name:** *Salix denticulata* Anderson subsp. *denticulata*
Family: Salicaceae
Habit: Tree
Voucher specimen: 6606
Locality: Bashqaar Gol Chat, 3624m
Vernacular name: Terik, Jangali Bed
Part used: Whole tree
Ethnobotanical use: Thin flexible branches are bent for making baskets. Leaves are eaten by cattle and the wood is used for fuel and other domestic purposes.

69. **Botanical name:** *Saponaria griffithiana* Boiss.
Family: Caryophyllaceae
Habit: Perennial herb
Voucher specimen: 2217
Locality: Sor Laspur Mastooj, 3135m
Vernacular name: Zennah
Part used: Roots
Ethnobotanical use: The fleshy rootstock is used as a substitute for soap.

70. **Botanical name:** *Saxifraga sibirica* L.
Family: Saxifragaceae
Habit: Perennial herb
Voucher specimen: 4010
Locality: Degheri Shah Saleem Lutkhoo, 3045m
Vernacular name: Dromosoro
Part used: Shoot
Ethnobotanical use: Used as general body tonic. Decoction is used for backache.

71. **Botanical name:** *Seriphidium brevifolium* (Wall. ex DC.) Ling & Y.R.Ling
Synonym: *Artemisia brevifolia* Wall. ex DC.
Family: Asteraceae
Habit: Shrub
Voucher specimen: 5061
Locality: Danespawee Yarkhoon, 2979m
Vernacular name: Shashgeen
Part used: Shoot
Ethnobotanical use: Shoot is used as broom, especially used at high altitude like Yarkhoon lasht, Baroghill and Chikar etc., where there is no availability of other grasses.

72. **Botanical name:** *Silene conoidea* L.
Family: Caryophyllaceae
Habit: Annual herb
Voucher specimen: 651
Locality: Warich Gol Molikhoo, 2348m
Vernacular name: Apupar
Part used: Seeds and leaves
Ethnobotanical use: A paste is prepared by grinding seeds and young leaves which is applied on pimples. This paste is also used for backache.

73. **Botanical name:** *Sisymbrium irio* L.
Family: Brassicaceae
Habit: Annual herb
Voucher specimen: 2545A
Locality: Terich ghari Molikhoo, 3087m
Vernacular name: Khelikheli

Part used: Seeds
Ethnobotanical use: Seeds are powdered and a paste is prepared, which is applied externally for stabbing pain. The paste is also used for clearing facial pimples and against sunburn.

74. **Botanical name:** *Spirea canescense* D.Don.
Family: Rosaceae
Habit: Shrub
Voucher specimen: 2190A
Locality: Danespawee Yarkhoon, 2886m
Vernacular name: Tharghalik
Part used: Young branches
Ethnobotanical use: Young branches are especially used for their elasticity when making carpets and woolen shawls. Young shoots are finely ground and a paste is prepared which is used as sun block in summer and against the chilling effect of cold weather in winter.

75. **Botanical name:** *Swertia petiolata* D. Don
Family: Gentianaceae
Habit: Perennial herb
Voucher specimen: 5140A
Locality: Danespawee Yarkhoon, 2886m
Vernacular name: Momera
Part used: Shoot
Ethnobotanical use: The ripe shoots have powder-like substance which is used for curing eye diseases.

76. **Botanical name:** *Thymus linearis* Benth. subsp. *linearis* Jalas (Fig 8)
Family: Labiatae
Habit: Annual herb
Voucher specimen: 4101
Locality: Bakhtoli gol Lutkhoo, 3145m
Vernacular name: Sew
Part used: Whole plant
Ethnobotanical use: Whole plant is boiled in water and used for stomach disorders. It is also considered as carminative and tonic. Leaves are dried and are mixed in tea for its taste.

77. **Botanical name:** *Trachydium roylei* Lindl.
Family: Umbelliferae
Habit: Perennial herb
Voucher specimen: 3859A
Locality: Droneel Sosoom Lutkhoo, 2476m
Vernacular name: Mushen
Part used: Leaves

Fig. 8. A, Mr. Shah Feroz demonstrates the indigenous uses of *Thymus linnearis* var. *linearis* in Sosoon Kiyar valley Lutkhoo; B, close up of the flower.

Ethnobotanical use: Leaves are strongly aromatic. They are crushed and a thick paste is produced, which is applied to scorpion stings.

78. **Botanical name:** *Trigonella foenum-graecum* L.
Family: Fabaceae-Papilionoideae
Habit: Annual herb
Voucher specimen: 4233A
Locality: Lowari top Drosh, 3192m
Vernacular name: Sugon
Part used: Seeds and leaves
Ethnobotanical use: Seeds and leaves are used as potherb. It is also used to stop loose motions and emmenegogue.

79. **Botanical name:** *Urtica dioica* L.
Family: Urticaceae
Habit: Perennial herb
Voucher specimen: 1285
Locality: Madaklasht Drosh, 2939m
Vernacular name: Drozono
Part used: Whole plant

Ethnobotanical use: Decoction of the plant is astringent and anthelmintic. Leaves cause severe irritation which can be soothed by rubbing leaves of *Rumex*. Young leaves are used as potherb.

80. **Botanical name:** *Viola rupestris* Schm. (Fig. 9)
Family: Violaceae
Habit: Perennial herb
Voucher specimen: 6840
Locality: Shekhlasht Khot Torikhoo, 3838m
Vernacular name: Milkhon, Banafsha
Part used: Whole plant
Ethnobotanical use: Leaves are powdered and used for fever, headache and constipation. Decoction is used in chest infection.

81. **Botanical name:** *Xanthium strumarium* L.
Family: Asteraceae
Habit: Perennial herb
Voucher specimen: 6209
Locality: Merene gol Chitral, 2189m
Vernacular name: Chaspak
Part used: Leaves and roots
Ethnobotanical Use: Leaves are chewed for dental sourness. Root is used in earache and strumous disease.

82. **Botanical name:** *Zataria multiflora* Boiss.
Family: Labiatae
Habit: Shrub
Voucher specimen: 275
Locality: Arandu gol, 1125m
Vernacular name: Thrushnaghooli
Part used: Shoot
Ethnobotanical use: Shoot is dried, powdered and used as stomachache and intestinal pain.

83. **Botanical name:** *Ziziphora clinopodioides* Lam. subsp. *pseudodasyantha* (Rech.f.) Rech.f.
Family: Labiatae
Habit: Perennial herb
Voucher specimen: 6813
Locality: Shekhlasht Khot Torikhoo, 3819m
Vernacular name: *Kawkoti*
Part used: Shoot
Ethnobotanical use: Young shoots of the plant are dried, powdered and used in the preparation of aromatic tea for gastrointestinal disorders, especially in severe diarrhoea. It is also used as carminative.

Fig. 9. *Viola rupestris* Schm.: A, habit; B, flower close up, locally known as "Milkhon" is used for chest infection.

Discussion

It can be rightly assumed that the present day ethnobotanical pharmacology is as old as man himself. Different medicinal plants have been in use from the time immemorial (Lama *et al.*, 2001; Pärtel *et al.*, 2005). Rig Veda between 4500-1600 BC and Ayurveda between 2500-600 BC are considered among the first compiled records of medicinal plants in Indo-Pak (Ahmad, 2002). The prevalent system of traditional medicine traces its origin to Greek medicine system, which was adopted by the Arabs, and spread to the subcontinent and Europe (Iqbal & Hamayun, 2004). Whereas, Susruta Samhita (600 BC), a Sanskrit text on surgery, mentioned the progress made during Buddhist period, where medicinal plants were cultivated by qualified specialists (Ahmad, 2002; Raju, 2003). Even in the present age of science and technology, in the developed countries people still rely on traditional system of healthcare not only because of its low price, but also due to very less side effects, as compared to the modern allopathic medicines (Khan, 2003). That is why they are being used extensively world over especially in the third world countries.

The people of the valley have been using plant resources for their various ailments since time immemorial. The local people know the beneficial plants and preparation of raw drugs through personal experience and ancestral prescription and long utility. In addition, the costly allopathic medicines are out of reach of a common man.

Chitral is a remote area and remains cutoff from rest of the world for almost 6 months of the year due to heavy snowfall. Therefore, people of the valley are more

dependants on plant resources as compared to other adjacent areas. It is recommended that the local community should be educated regarding the importance, pre and post harvest methods. In addition, they should also be trained regarding the cultivation of these highly valuable medicinal plants on commercial basis, and thereafter their trade and marketing. This will ultimately generate extra sources of income and will reduce pressure on the extraction of these valuable medicinal plants.

In Chitral valley the use of plant resources is also a source of income, besides fulfilling their various utilitarian needs. The plant collectors are often herders, shepherds or other poor village dwellers of the population. Settlements of majority of the population are subject to the seasonal changes in the valley. In winter they come down to the valley bottoms due to the unavailability of fodder for their cattle, and at the onset of summer as the snow melts and new plants start sprouting, they move towards the higher altitudes. In upper Chitral, each Chitrali family has 2-3 houses located at different altitudes as they keep on shifting from one house to the other throughout the year, subject to the seasonal changes and availability of fodder for their cattle.

The local people are ignorant about the importance of these plants at global level. Sometimes they collect plants in excess quantity and in most cases the whole plant is uprooted. It is pertinent to mention that majority of the plant collectors in upper Chitral are children. They don't know about the proper methods and time of plant collection, as a result most of their collection is useless. On the other hand they are ignorant about the drying, storing or preserving techniques which ultimately leads to wastage of plant resource.

During our excursion to Chitral Gol National Park, it was observed that about 94% of the *Ferula narthex* plants were destroyed. Sometime they were cut just above the root for collecting the latex. Chitral Gol is a protected area and all these destructive practices should be stopped immediately, in order to ensure the survival of these valuable plant resources.

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