

SPECIES DIVERSITY OF VASCULAR PLANTS OF NANDIAR VALLEY WESTERN HIMALAYA, PAKISTAN

**FAIZ UL HAQ¹, HABIB AHMAD², MUKHTAR ALAM³,
ISHTIAQ AHMAD¹ AND RAHATULLAH²**

Department of Botany, Government Degree College Battagram, Pakistan¹

Department of Genetics, Hazara University Mansehra, Pakistan (drhahmad@gmail.com)²

Directorate Research and Planning, Hazara University Mansehra, Pakistan³

Abstract

Species diversity of Nandiar Valley District Battagram, Pakistan was evaluated with special reference to vascular plant diversity of the area. Floristically the area is placed in Western Himalayan Province. It is located on the western edge of Himalayas, dominated by Sino-Japanese elements. Aim of the study was to document the vascular plant resources, conservation issues and usage of the selected plants. An ethno-botanical survey was also carried out for collecting information regarding the various indigenous uses of the vascular plants in different parts of Nandiar Valley. Field observations showed that vegetation of the area was generally threatened due to unwise of local communities. The trend of urbanization, deforestation, over grazing, habitat fragmentation, unscientific extraction of natural vegetation, introduction of the exotic taxa and habitat loss were the visible threats. Sum 402 taxa belongs to 110 families of vascular plants were evaluated. Among the 402 species reported, 237 species were herbs, 71 shrubs, 68 trees, 06 climbing shrubs, 18 climbers and 03 epiphytes. The plants were classified according to local, traditional and economic value. Based on local uses, there were 178 medicinal plants, 21 were poisonous, 258 were fodder species, 122 were fuel wood species, 37 were timber yielding plants, 41 were thatching and sheltering plants, 29 were hedge plants, 71 were wild ornamental, 100 were weeds, 47 species yield edible fruits and seeds, 43 were used as vegetable and pot herb. Measures for the conservation of plant resources of Nandiar Valley are urgently needed. The fragile hot spots recorded were Baleja Forests of Hillian, Chail Forests and Shaeed Forests of Nandiar Valley.

Introduction

Biorichness or biodiversity is described as the integrity of genes, ecological processes and ecosystems in a region. Biodiversity consists of four main parts; namely genetic diversity, species diversity, ecosystem diversity and finally the diversity of ecological processes (Kilic and Arslan, 2010). Species diversity implies the diversity of species in a certain region or all over the world (Bulut and Yilmaz, 2010). The flora of Pakistan is very rich due to the diverse climatic, soil conditions and multiple ecological regions. Among 270,000 total species diversity of vascular plants found on the earth (Walter & Gillet, 1998), more than 6000 species of higher plants exists in Pakistan including about 2000 medicinal plant species (Ahmad, 2003). Pakistan is under tremendous ecological pressure due to its population explosion, unplanned urbanization, deforestation, and overexploitation of natural resources (Alam and Ali, 2009). Pakistan with its limited natural forests, less than 4 % is rapidly declining at a rate of 4 – 6 % per year (Ibrar, 2003). The loss and degradation of natural forests clearly implies a decline in species number and genetic diversity of population (Afzal *et al*, 2001).

The Study Area: The Nandiar Valley is located in the Western Himalayan Province between 34° 33` and 34° 47` N and 72° 55` and 73° 14` E with a total area of 37521 ha. The Nandiar Valley is bounded by Allai valley in the north, by Siran valley in the east, by the Konsh and Agror valleys in the south and by the Black mountain and river Indus in the west. (Fig-1) Nandiar Valley comprises of four categories of land, i.e. agricultural, wasteland, forest and alpine range. The area is mostly mountainous ranging in altitude from 525m at Thakot to 3817m above mean sea level at Malkisar. All the small streams coming from sub valleys join the main Nandiar Khuwarr a tributary of river Indus, at different locations, which runs from northeast of Hillian and flows across the Hill and Battagram arty to join River Indus at Thakot. The nullahs, which feed the main stream, are Nilban, Hill, Shahkhel, Kakarshung, Mirani, Largram, Nilishang and Tikri Khwars (Ahmad *et al.*, 2010).

Forest Types: According to the classification of forest types of Pakistan coupled with ecological condition, most of the forest of Nandiar Valley fall under Moist Temperate category (Champion *et al.*, 1965), of the internationally known Western Himalayan Moist Temperate ecology. On the basis of available indicator species the Nandiar Valley forests can further be classified into the following six categories:

Tropical Sub Humid Forest: It is a scrub forest, consisting mainly of dry bushy shrubs and small trees. This type of forest is found up to an elevation of 900 m, consisting of small trees and thorny shrubs. The thorny species are mostly present on dry exposed places in the foothills. Representative areas of such forest are Thakot, Kashmirichena and Peshora. *Acacia modesta*, *Mallotus philippensis*, *Albizia lebbeck*, *Bauhinia variegata*, *Dalbergia sisso*, *Ficus racemosa* and *Zanthoxylum armatum* are the dominant trees of the forest. *Dodonaea viscosa*, *Justicia adhatoda*, *Rubus fruticosus* and *Mytus royleanus* are the common shrubs.

Sub Tropical Chir-Pine Forests: Chir pine (*Pinus roxburghii*) forest occurs at the altitudinal zone ranging between 900 to 1500 m, occupying an area of 345 ha. Only pole and sub mature trees are available. Pure chir forests are found in Ghazikot, Nilishang and Noshehra guzaras. Broad-leaved associates in these forests are *Quercus incana*, *Rhododendron arboreum*, *Glochidon velutinum*, *Pistacia integerrhima* and *Grewia optiva*. The undergrowth consists of *Woodfordia fruticosa*, *Indigofera heterantha*, *Berberis lycium*, *Colebrookia oppositifolia*, *Zizyphus oxyphylla*, *Rosa moschata*(climber) and *Rubus* species. Ground flora mainly consists of grasses.

The Moist Temperate Blue Pine Forest: Blue pine (*Pinus wallichiana*) locally known as Biar (Pewouch) occurs at the altitudinal zone ranging between 1500 to 2300 m. The blue pine forests are found in Hill, Rukhban, Dheri, Serai, Jutial, Anora, Sarmast, Gada, Dharian, Khairabad, Shaeed and Mirani. The crop on the whole varies from pole to sub mature. Scattered matures and over-mature trees can be seen in some compartment of Hill territory whereas rest of the Biar forests are devoid of mature crop. The broad-leaved associates in these forests are *Juglans regia*, *Quercus dilatata*, *Quercus incana*, *Rhododendron arboreum* that are found singly scattered or in groups in moist places. Undergrowth consists of *Viburnum cotonifolium*, *Cotoneaster microphylla*, *Cotoneaster nummalaria*, *Sarcococca saligna*, *Berberis lycium*, *Indigofera heterantha*, *Rubus fruticosus* and *Rosa moschata*, which are frequently found. Ground flora consists of *Paeonia emodi*, *Fragaria nubicola* and *Viola* species.

Mixed Coniferous Forests: It is an important forest type, with Silver fir (*Abies pindrow*) and Spruce (*Picea smithiana*) as the predominant species. This type of forest occupies an area of 4,363 ha. Western mixed coniferous forests occur between elevations of 2300 to 2800 m in Baleja, Shaeed and Chail. The composition of the forest is strongly influenced by aspect. Hot southern slopes contain more of blue pine while on northern aspect Silver fir are predominant. The forest is generally heterogeneous in nature having mixed age classes. The broad-leaved associates are *Quercus dilatata*, *Juglans regia*, *Aesculus indica*, and *Prunus padus*. *Taxus wallichiana* is rare. Undergrowth consists of *Berberis lycium*, *Spiraea vacciniifolia*, *Lonicera quinquelocularis*, *Rosa moschata* and *Viburnum* species. Ground flora consists of *Podophyllum emodi*, *Paeonia emodi*, *Geranium wallichianum*, *Skimmia laureola*, and *Euphorbia* species.

Pure Fir and Spruce Forests: Silver fir (*Abies pindrow*) and Spruce (*Picea smithiana*) locally known as “Achal” and “Kachar” respectively are usually found on the elevation ranging from 2800 to 3050 m. This type of forest covers an area of 957 ha. On cooler aspects it merges with blue pine in the lower reaches. This type of forest is found in Baleja and other components of Hill. The crop consists of mature and over mature trees. Old fir trees are mostly top dry. The broad-leaved associates are *Juglans regia*, *Aesculus indica*, *Prunus padus*, *Quercus semicarpifolia* and *Betula utilis*. Undergrowth consists of *Berberis lycium*, *Indigofera heterantha*, *Desmodium elegans*, and *Spiraea vacciniifolia*. Ground flora consists of *Ranunculus*, *Aquilegia*, *Aconitum*, *Skimmia*, *Fragaria* and *Geranium* species.

Alpine Pastures: The meadows locally known as “Mali” stretches above the tree limit with excellent grasses and forbs available during summer season. These pastures support a large number of sheep, goats and cattle during summer. Some Birch trees and bushes of *Juniperus communis* are found occasionally on steep rocky places. Birch trees are badly loped for fodder by grazers.

Objectives of the study were to explore species diversity of vascular plants of Nandiar Valley and to document plant uses, rate of consumption and availability profile of vascular plants. It was also aimed to recommend ways for sustainable utilization of the local resources, for introducing effective conservation measures in the area.

Materials and Methods

Field trips to various parts of the selected area of Nandiar Valley were undertaken from 1st May 2008 to 30th April 2010 to collect the information and specimens to be used for future reference. The information was collected from people of different ages belonging to different sub localities. The voucher specimens were deposited in Herbarium Hazara University (HUP). The identification was done with the help of Flora of Pakistan (Nasir & Ali 1970 – 1989; Ali & Nasir 1990 – 1992; Ali & Qaiser 1993 – 2009).

Results

Sum 402 species of vascular plants, belonging to 110 families were collected and identified from Nandiar Valley. Among them Pteridophytes were represented by 9 families and 23 species, Gymnosperms by 3 families and 8 species, Angiosperms by 98

families and 371 species. The well-represented families were Asteraceae contributing 36 species, Rosaceae by 28 species, Labiatae and Papilionaceae by 22 species each; Poaceae followed them by 16 species. Among the 402 species reported, 237 species were herbs, 71 shrubs, 68 trees, 06 climbing shrubs, 18 climbers and 03 epiphytes. The plants were classified according to local, traditional and economic value. Most of the plant species were used for multipurpose. Based on local uses, there were 178 medicinal plants, 21 were poisonous, 258 were fodder species, 122 were fuel wood species, 37 were timber yielding plants, 41 were thatching and sheltering plants, 29 were hedge plants, 71 were wild ornamental, 100 were weeds, 47 species yield edible fruits and seeds, 43 were used as vegetable and pot herb.

Medicinal Plants: Out of the total 402 species 178 plant species are used for medicinal purpose for both human and livestock. During the survey it was noted some of the plants are used individually, while other are in mixtures. The same plant drug was generally used for curing several diseases, such as *Acacia modesta*, *Acorus calamus*, *Ajuga bracteosa*, *Berberis lycium*, *Mentha longifolia*, *Punica granatum*, *Podophyllum emodi*, *Valeriana jatamansi*, *Viola canescens* and *Zanthoxylum armatum*. There are some plant species that are used as healing agents for livestock. Plants important with respect to ethnoveterinary use are *Asparagus officinalis*, *Cedrus deodara*, *Cissampelos pareira*, *Cotinus coggyria*, *Jasminum officinale*, *Paeonia emodi*, *Podophyllum emodi*, *Poligonatum verticellatum*, *Bistorta amplexicaulis*, *Populus alba*, *Pteris cretica*, *Rumex dentatus*, *Urtica dioica* and *Valeriana jatamansi*.

Poisonous Plants: Twenty-one plant species are locally considered poisonous to man, livestock and fishes. These included the whole plant of *Andrachne cordifolia* for livestock; the red fruits of *Arisaema flavum* as it causes numbness of tongue, vomiting and coma, leaves of *Cedrella serrata* to cattle, fruits of *Datura innoxia* and *Datura stramonium*, whole plant of *Nerium indicum*, *lotus corniculatus* and *Urtica dioica*. *Persicaria stagnina* and *Dioscorea deltoidea* are crushed and used as fish poison.

Fodder Plant Species: The livestock feed on 258 plant species. Some of the wild plants fed to livestock included *Avena fatua*, *Agrostis hissarica*, *Amaranthus caudatus*, *Amaranthus viridus*, *Cyperus iria*, *Cyperus neveux*, *Dactylis glomerata*, *Heteropogon contortus*, *Kyllinga brevifolia*, *Lygodium hazaricum*, *Phleum pratense*, *Poa infirma*, *Themeda anathera* and *Trifolium repens*. Leaves of certain plants like *Acacia modesta*, *Ailanthus altissima*, *Alangium chinense*, *Betula utilis*, *Morus alba*, *Morus nigra*, *Olea ferrugenea*, *Quercus* species and *Robinia pseudo acacia* are used as fodder for goats and sheep.

Fuel Wood Species: There are 122 plant species that are used as fuel wood; some of them are *Abies pindrow*, *Acacia modesta*, *Ailanthus altissima*, *Aesculus indica*, *Alnus nitida*, *Bauhinia variegata*, *Berberis lycium*, *Diospyrus lotus*, *Dodonaea viscosa*, *Indigofera heterantha*, *Pinus roxburghii*, *Pinus wallichiana*, *Prunus padus*, *Taxus wallichiana*, *Ulmus wallichiana*, *Ficus*, *Morus* and *Quercus* species.

Timber Yielding Plants: There are 37 timber wood species. some of them are *Abies pindrow*, *Aesculus indica*, *Diospyros lotus*, *Juglans regia*, *Picea smithiana*, *Pinus*

roxburghii, *Pinus wallichiana*, *Platanus orientalis* and *Ulmus wallichiana*. Locally the wood of *Taxus wallichiana* is used in graves.

Thatching / Sheltering Plants: Local people use 41 plant species for thatching and sheltering purposes. Leaves and branches of *Abies pindrow*, *Cotinus coggyria*, *Desmodium elegans*, *Deutzia staminea*, *Dodonaea viscosa*, *Indigofera heterantha*, *Picea smithiana*, *Pinus roxburghii*, *Pinus wallichiana*, *Phragmites australis*, *Sarcococca saligna* and *Spiraea vacciniifolia* are placed on roofs for thatching purposes.

Fencing and Hedge Plants: Fences and hedges are made by 30 bushy and spiny plant species. Such species consists of *Acacia modesta*, *Berberis lycium*, *Caesalpinia decapitala*, *Gymnosporia royleana*, *Robinia pseudoacacia*, *Rosa moschata*, *Rubus ellipticus*, *Rubus fruticosus*, *Rubus ulmifolius*, *Zanthoxylum armatum*, *Zizyphus oxyphylla* and *Zizyphus vulgare*. These plants are either cultivated on the margins of the fields and form a permanent fencing or branches of these plants are fixed in the soil for making temporary fencing.

Wild Ornamental Plants: There are 71 plant species that are considered as ornamental in the area including *Androsace hazarica*, *Althaea ludwigii*, *Aquilegia pubiflora*, *Delphinium vestitum*, *Hypericum oblongifolium*, *Impatiens bicolor*, *Inula royleana*, *Jasminum humile*, *Jasminum officinale*, *Narcissus tazetta*, *Onopordum acanthium*, *Rosa moschata*, *Solanum pseudocapsicum*, *Spiraea vacciniifolia* and *Tulipa stellata*.

Weeds: There are 100 plant species that are weeds including *Conyza canadensis*, *Cynodon dactylon*, *Ipomoea eriocarpa*, *Ipomoea turbinata*, *Ranunculus arvensis*, *Tagetes minuta* and *Xanthium stromarium*.

Plants Yielding Edible Fruits: There are 47 plants that bear edible fruits and seeds like *Berberis lycium*, *Diospyros lotus*, *Duchesnea indica*, *Ficus carica*, *Ficus palmata*, *Juglans regia*, *Morus alba*, *Morus nigra*, *Rubus ellipticus*, *Rubus fruticosus*, *Rubus ulmifolius*, *Solanum nigrum*, *Vitis Jacquemontii*, *Zizyphus oxyphylla* and *Zizyphus vulgare*.

Vegetable and Potherb Species: There are also 43 wild plants that are used as vegetable and potherb, including *Allium filidens*, *Amaranthus viridus*, *Capsella bursa-pastoris*, *Dryopteris jaxtapostia*, *Lepidium apetalum*, *Lepidium pinnatifidum*, *Medicago denticulata*, *Medicago lupulina*, *Mentha longifolia*, *Mentha spicata*, *Portulaca oleracea* and *Thymus linearis*.

Major Threats to the flora of Nadiar Valley: Due to increase of human population and constant over use of vascular plants for medicinal, timber, firewood, leaf fodder and for thatching purposes has resulted in ill or unplanned collection of wild vascular plants particularly medicinal (and broad leaved) plant species. This over exploitation has damaged the flora and is one of one of the major threats to many plant species. Other threats to the flora are loss of habitat, unplanned collection, deforestation, over grazing, erosion, change of environment, attack of pathogens and effect of introduced taxa.



Fig. 1. A huge tree of *Ulmus wallichiana* (Critically Endangered) having 26ft girth at ground level preserved in the Graveyard of Trari Baba near the Town Shamlai at an elevation of 4943ft (GPS grid: 34 42. 008N and 073 07. 211E).

Discussion

Species diversity may be analyzed as a coexistence of different life objects within taxa and in a territory. Globally, important biological diversity territories are called hot spot territories which are 34 in number. (A hot spot has at least 1500 endemic vascular plant species and at least 70 % of original vegetation is destroyed). One half of all plant species in the planet grow in hot spots, but not yet destroyed vegetation of these territories occupies only 2.3 % of the Earth (Motiekaityte, 2006). Worldwide land cover, is altered principally by direct human use; through agriculture, pasture, forestry, and development (Meyer & Turner, 1992). Land-use activities may alter the relative abundances of natural habitats and result in the establishment of new land-cover types. Species richness may be enhanced by the addition of new cover types, but natural habitats are often reduced, leaving less area available for native species (Walker, 1992). Exotic species may become established and out compete the native biota. The spatial pattern of habitats may be altered, often resulting in fragmentation of once-continuous habitat. Species that differ in their patterns of survival, fecundity, and dispersal, as well as in habitat needs, will likely differ in their response to habitat loss and fragmentation (Pearson *et al.*, 1996). Species having specialized habitat needs, requiring a large area for home range, or having limited agility, will be impacted more

than generalist species that disperse well and can live in small isolated patches (Terborgh 1992, Matlack, 1994).

Plants are precious endowment of nature and floral biodiversity have a key role upon which mankind has always been dependent. They knowledge of plants is based on trial and error. Consequently, the authentic knowledge of uses of plants passed on from one generation to another, after refining and additions. 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 (Qureshi *et al.*, 2010). In developing countries medicinal plants provide a real alternative for primary health care system. According to an estimate between 35,000 and 70,000 plant species are used in folk medicine worldwide (Ali & Qaiser, 2009). The man-induced activities are unplanned land use, cultivation on steep slopes, over grazing, over exploitation of forests, shifting cultivation and urbanization. The moist temperate Himalayas deserve specific attention to the conservation of environment and the sustainable development of natural resources. During the last hundred years, the area has been subjected to major structural changes leading to a decrease of about fifty per cent of the potential forest area (Ibrar, 2003). The loss and degradation of natural forests clearly implies a decline in species number and genetic diversity of population (Afzal *et al.*, 2001).

During the current study species diversity and distribution of 402 species of vascular plants was explored from sub tropical foothills to alpine pastures. Among 402 species of vascular plants 178 plants are used for medicinal purposes. Present investigation reveals that the alien flora of Nandiar Valley is comprised of 13 plants species, which are crucial element of flora of the study area. The alien plants have been introduced from other parts of Asia, Australia, Africa, Europe and America. These alien plant species have been naturalized and established in the study area. In some parts of the globe humans are using these natural resources very ruthlessly and one such area is the Himalayan region (Hamayun, 2005). The people of the valley have been using plant resources for their various ailments. The local people know the beneficial plants and preparation of raw drugs through personal experience and ancestral prescription and long utility. They collect the plant for medicinal uses, fuel wood, fodder, timber, and many other purposes (Ahmad *et al.*, 2010), so there is a great impact of human life on the local vegetation and vice versa. The local people are ignorant about the importance of these plants at global level. They collect plants in access quantity and in most cases the whole plant is uprooted. As the people are ignorant about the drying, storing or preservation techniques, which ultimately lead to the wastage of plant resource.

A rare species is not only important at national or local level but also from the point of view of the global biodiversity. Plants in general and medicinal plants in particular in the study area are a finite and precious resource that requires efficient, wise and sustainable management and conservation strategies. Hence, immediate conservation measures are urgently necessary in order to protect the taxa from extinction.

Table 1. Ethnobotanical information of vascular plants of Nandiar Valley

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
1.	<i>Abies pindrow</i> Royle	+	-	-	+	+	+	-	-	-	-	-
2.	<i>Abelia triflora</i> R. Br. ex Wallich.	-	-	-	+	-	-	+	-	-	-	-
3.	<i>Acacia farnesiana</i> (L.) Willd.	-	-	-	+	-	-	-	+	-	-	-
4.	<i>Acacia modesta</i> Wall.	+	-	+	+	-	-	+	-	-	-	-
5.	<i>Acer caesium</i> Wall.	-	-	+	+	+	-	-	-	-	-	-
6.	<i>Achillea millefolium</i> L.	+	-	+	-	-	-	-	+	+	-	+
7.	<i>Achyranthus aspera</i> L.	+	-	+	-	-	-	-	-	+	-	-
8.	<i>Achyranthus bidentata</i> Blume	-	-	+	-	-	-	-	-	+	-	-
9.	<i>Acorus calamus</i> L.	+	-	-	-	-	-	-	-	-	-	-
10.	<i>Adiantum capillus veneris</i> L.	+	-	-	-	-	-	-	-	-	-	-
11.	<i>Adiantum incisum</i> Forssk	+	-	-	-	-	-	-	-	-	-	-
12.	<i>Adiantum venustum</i> D. Don	+	-	-	-	-	-	-	-	-	-	-
13.	<i>Aegopodium burttii</i> E. Nasir	-	-	+	-	-	-	-	-	-	-	-
14.	<i>Aeschynomene indica</i> L.	-	-	+	-	-	-	-	-	+	-	-
15.	<i>Aesculus indica</i> (Wall. ex Camb.) Hook.f.	+	-	-	+	+	-	-	-	-	-	-
16.	<i>Agrimonia eupatoria</i> L.	-	-	+	-	-	-	-	+	-	-	-
17.	<i>Agrostis hissarica</i> Rozhev.	-	-	+	-	-	-	-	-	-	-	-
18.	<i>Ailanthus altissima</i> (Mill.) Swingle	-	-	+	+	+	-	-	-	-	-	-
19.	<i>Ajuga bracteosa</i> Wall.ex Benth	+	-	-	-	-	-	-	-	-	-	+
20.	<i>Alangium chinense</i> (Lour.) Harm.	-	-	+	+	+	-	-	+	-	-	-
21.	<i>Albizia lebeck</i> (Asbeck) Stewart	+	-	-	+	+	-	-	-	-	-	-
22.	<i>Alliaria petiolata</i> (M. Bieb.) Cavara	-	-	+	-	-	-	-	-	+	-	+
23.	<i>Allium filidens</i> Regel	+	-	-	-	-	-	-	+	-	-	+
24.	<i>Alnus nitida</i> (Spach.) Endl	-	-	-	+	+	-	-	-	-	-	-
25.	<i>Alotis stoliczkai</i> Clarke	-	-	+	-	-	-	-	-	+	-	-
26.	<i>Althaea ludwigii</i> L.	-	-	+	-	-	-	-	+	+	+	+
27.	<i>Amaranthus caudatus</i> L.	+	-	+	-	-	-	-	-	+	-	-
28.	<i>Amaranthus viridus</i> L.	+	-	+	-	-	-	-	-	+	-	+
29.	<i>Anagalis arvensis</i> L.	+	-	+	-	-	-	-	-	+	-	+
30.	<i>Anagalis phoenicea</i> Gern.	-	-	+	-	-	-	-	-	+	-	-
31.	<i>Anaphalis busa</i> DC.	-	-	+	-	-	-	-	-	+	-	+
32.	<i>Andrachne cordifolia</i> (Wall.ex Dc.) Muell.	-	+	+	+	-	+	-	-	-	-	-
33.	<i>Androsace hazarica</i> Y. J. Nasir	-	-	+	-	-	-	-	+	-	-	-
34.	<i>Androsace rotundifolia</i> Hardw.	-	-	+	-	-	-	-	+	-	-	-
35.	<i>Aquilegia pubiflora</i> Wall.ex Royle	-	+	-	-	-	-	-	+	-	-	-
36.	<i>Arabis bijuga</i> G. Watt.	-	-	+	-	-	-	-	-	+	-	+
37.	<i>Arisaema flavum</i> Forssk.	+	+	-	-	-	-	-	-	-	-	-
38.	<i>Arisaema jacquemontii</i> Blume	+	+	-	-	-	-	-	-	-	-	-
39.	<i>Artemisia japonica</i> Thunb.	+	-	-	-	-	+	-	-	-	-	-
40.	<i>Artemisia roxburghiana</i> Wall. ex Bess.	+	+	-	-	-	+	-	-	-	-	-
41.	<i>Artemisia vulgaris</i> L.	+	-	-	+	-	+	-	-	-	-	-
42.	<i>Asparagus filicinus</i> Bunch–Ham.ex D.Doi	+	-	+	-	-	-	-	-	+	-	-
43.	<i>Asparagus officinalis</i> L.	+	-	-	-	-	-	-	-	-	-	-
44.	<i>Asplenium cordatum</i> G. Forst.	-	-	+	-	-	-	-	-	-	-	-
45.	<i>Asplenium cunifolium</i> Altunat.	-	-	+	-	-	-	-	-	-	-	-
46.	<i>Asplenium trichomonas</i> L.	-	-	+	-	-	-	-	-	-	-	-
47.	<i>Aster himalaicus</i> C. B. Clarke	-	-	+	-	-	-	-	+	-	-	-

Table 1. (Cont'd.).

S. No.	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
48.	<i>Astragalus ammophilus</i> Karelin.	-	-	+	-	-	-	-	-	-	-	-
49.	<i>Astragalus graveolens</i> Buch.	-	-	+	-	-	-	-	-	-	-	+
50.	<i>Astragalus leucocephalus</i> Grach.ex Benth-	-	-	+	-	-	-	-	-	-	-	+
51.	<i>Atylosia platycarpa</i> Benth	-	-	+	-	-	-	-	-	-	-	-
52.	<i>Avena fatua</i> L.	-	-	+	-	-	-	-	+	-	-	-
53.	<i>Bauhinia variegata</i> L.	-	-	-	+	+	-	-	-	-	-	-
54.	<i>Berberis lycium</i> Royle	+	-	+	+	-	-	+	-	-	+	-
55.	<i>Bergenia ciliata</i> Sternb.	+	-	-	-	-	-	-	-	-	-	-
56.	<i>Betula utilis</i> D. Don	+	-	+	+	+	-	-	-	-	-	-
57.	<i>Bistorta amplexicaulis</i> (D. Don) Green	+	-	+	-	-	-	-	-	-	-	+
58.	<i>Bistorta emodi</i> (Meisn) Hara	+	-	+	-	-	-	-	+	-	-	-
59.	<i>Broussonetia papyrifera</i> Vent	-	-	-	+	+	-	-	+	-	-	-
60.	<i>Buplerum hazaricum</i> Nasir	+	-	+	-	-	-	-	-	+	-	-
61.	<i>Buplerum longicaule</i> Wall .ex DC.	-	-	+	-	-	-	-	-	+	-	-
62.	<i>Caesalpinia decapitala</i> (Roth) Alston	+	-	-	+	-	-	+	-	-	-	-
63.	<i>Calotropis procera</i> (Willd) R. Br.	+	+	-	-	-	-	-	+	-	-	-
64.	<i>Caltha alba</i> .	+	-	+	-	-	-	-	-	-	-	-
65.	<i>Cannabis sativa</i> L.	+	-	-	+	-	-	-	-	-	-	-
66.	<i>Capsella bursa pastoris</i> (L.) Medik.	-	-	+	-	-	-	-	-	-	-	+
67.	<i>Cardamine impatiens</i> L.	-	-	+	-	-	-	-	-	+	-	+
68.	<i>Carex cardiolepis</i> Nees.	-	-	+	-	-	-	-	-	-	-	-
69.	<i>Carex foliosa</i> D. Don	-	-	+	-	-	-	-	-	-	-	-
70.	<i>Carex serotina</i> Mcrat.	-	-	+	-	-	-	-	-	-	-	-
71.	<i>Caropteris grata</i> Benth.	-	-	+	-	-	+	-	-	-	-	-
72.	<i>Carpesium abrotanoides</i> L.	-	-	+	-	-	-	-	-	-	-	-
73.	<i>Carpesium nepalense</i> Less.	-	-	+	-	-	-	-	-	-	-	-
74.	<i>Cedrella serrata</i> Royle	+	+	-	+	+	-	-	-	-	-	-
75.	<i>Cedrus deodara</i> Roxb. ex Lamb.	+	-	-	+	+	-	-	-	-	-	-
76.	<i>Celosia argentea</i> L.	-	-	+	-	-	-	-	+	+	-	-
77.	<i>Celtis australis</i> L.	+	-	+	+	+	-	-	-	-	-	-
78.	<i>Centaurea ibeica</i> Trevir ex Sprengel	-	-	-	-	-	-	-	-	+	-	-
79.	<i>Cephalanthera longifolia</i> (L.) Fritsch	+	-	-	-	-	-	-	+	-	-	-
80.	<i>Cheilanthes albo-marginata</i> Clarke	-	-	-	-	-	-	-	-	-	-	-
81.	<i>Cheilanthes dalhousiae</i> Hook.f.	-	-	-	-	-	-	-	-	-	-	-
82.	<i>Chenopodium album</i> L.	-	-	+	-	-	-	-	-	+	-	+
83.	<i>Chloris pilosa</i> Schumachar	-	-	+	-	-	-	-	-	+	-	+
84.	<i>Cichorium intybus</i> L.	+	-	-	-	-	-	-	-	+	-	-
85.	<i>Cichorium nandiaricum</i>	-	-	+	-	-	-	-	-	-	-	-
86.	<i>Circium falconeri</i> (Hook. f.) Petrak.	-	-	+	-	-	-	-	-	-	-	-
87.	<i>Cissampelos pareira</i> L.	+	-	+	-	-	-	-	-	-	-	-
88.	<i>Clematis connata</i> DC.	-	-	+	-	-	-	-	-	-	-	-
89.	<i>Clematis grata</i> Wall.	+	-	+	-	-	-	-	-	-	-	-
90.	<i>Clematis montana</i> Buch.	+	-	+	-	-	-	-	-	-	-	-
91.	<i>Colebrookia oppositifolia</i> Smith	-	-	+	+	-	+	+	-	-	-	-
92.	<i>Convolvulus arvensis</i> L.	+	-	+	-	-	-	-	-	+	-	-
93.	<i>Conyza Canadensis</i> L. Cronquist	-	-	+	-	-	-	-	-	+	-	-
94.	<i>Cornus macrophylla</i> Wall.	+	-	+	+	+	-	-	+	-	-	-
95.	<i>Cortaderia selloana</i>	-	-	+	-	-	-	-	+	-	-	-
96.	<i>Corydalis stewartii</i> Fedde	+	-	+	-	-	-	-	-	-	-	-
97.	<i>Cotinus coggyria</i> Scop.	+	-	-	+	-	+	-	-	-	-	-

Table 1. (Cont'd.).

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
148.	<i>Euphorbia helioscopia</i> L.	-	+	-	-	-	-	-	-	+	-	-
149.	<i>Euphorbia indica</i> Lam.	+	-	-	-	-	-	-	-	-	-	-
150.	<i>Euphorbia wallichii</i> Hook.f.	+	+	-	-	-	-	-	-	-	-	-
151.	<i>Fagopyrum dibotrys</i> (D. Don) Hara	-	-	+	-	-	-	-	-	-	-	-
152.	<i>Fallopia convolvulus</i> L.	-	-	+	-	-	-	-	+	-	-	-
153.	<i>Ficus carica</i> Forsk.	+	-	-	+	-	-	-	-	-	+	-
154.	<i>Ficus palmata</i> Forsk.	+	-	-	+	-	-	-	-	-	+	-
155.	<i>Ficus racemosa</i> L.	+	-	-	+	-	-	-	-	-	+	-
156.	<i>Ficus sarmentosa</i> Buch.	-	-	-	-	-	-	-	+	-	+	-
157.	<i>Filipendula vestita</i> Maxim.	-	-	+	-	-	-	-	-	-	-	-
158.	<i>Foeniculum vulgare</i> Miller	+	-	-	-	-	-	-	-	-	+	+
159.	<i>Fragaria nubicola</i> Lindl.	+	-	+	-	-	-	-	+	-	+	-
160.	<i>Fumaria indica</i> (Husskin) H. N.	+	-	+	-	-	-	-	-	-	-	-
161.	<i>Gagea satifolia</i> Baker.	-	-	+	-	-	-	-	+	+	-	-
162.	<i>Galinsoga parviflora</i> Cav.	-	-	+	-	-	-	-	-	+	-	-
163.	<i>Gallium aparine</i> L.	+	-	+	-	-	-	-	-	+	-	-
164.	<i>Gentiana karelinii</i> DC.	-	-	+	-	-	-	-	-	-	-	-
165.	<i>Gentianodes pedicellata</i> D. Don	+	-	-	-	-	-	-	-	-	-	-
166.	<i>Geranium collinum</i> Steph .ex Willd.	-	-	+	-	-	-	-	-	-	-	-
167.	<i>Geranium lucidum</i> L.	-	-	+	-	-	-	-	-	-	-	-
168.	<i>Geranium rotundifolium</i> L.	+	-	+	-	-	-	-	-	-	-	-
169.	<i>Geranium wallichianum</i> D.Don	+	-	+	-	-	-	-	-	-	-	-
170.	<i>Geum roylei</i> Bolle.	-	-	+	-	-	-	-	-	+	-	-
171.	<i>Girardiana palmata</i> (Forssk) Gaugich.	-	-	-	-	-	-	-	-	+	-	-
172.	<i>Glochidon velutinum</i> Wight	-	-	-	+	-	-	+	-	-	-	-
173.	<i>Grewia optiva</i> Drum.ex Burret.	+	-	+	+	+	-	-	-	-	-	-
174.	<i>Gymnosporia royleana</i> Wall.ex Lawson.	+	-	-	+	-	-	+	-	-	-	-
175.	<i>Hedra nepalensis</i> K. Koch.	+	-	+	-	-	-	-	-	-	-	-
176.	<i>Heliotropium cabulicum</i> Bunge	-	-	+	-	-	-	-	-	+	-	-
177.	<i>Heracleum cochemiricum</i> C. B. Clarke	-	-	+	-	-	-	-	-	+	-	-
178.	<i>Heteropogon contortus</i> L.	-	-	+	-	-	-	-	-	-	-	-
179.	<i>Himalrandia tetrasperma</i> (Roxb.)	-	-	-	+	-	-	+	-	-	-	-
180.	<i>Hypericum oblongifolium</i> Choisy	-	-	+	-	-	+	-	+	-	-	-
181.	<i>Hypericum perforatum</i> L.	+	-	+	-	-	-	-	-	+	-	-
182.	<i>Ilex dipyrena</i> Wall.	-	-	-	+	-	-	-	-	-	-	-
183.	<i>Impatiens bicolor</i> Royle	+	-	+	-	-	-	-	+	+	-	-
184.	<i>Impatiens brachycentra</i> Kar.	-	-	+	-	-	-	-	+	-	-	-
185.	<i>Impatiens edgeworthii</i> Hook.f.	-	-	+	-	-	-	-	+	+	-	-
186.	<i>Impatiens sulcata</i> Wall.	-	-	+	-	-	-	-	+	-	-	-
187.	<i>Indigofera heterantha</i> Well.ex Brandis	+	-	-	+	-	+	-	-	-	-	-
188.	<i>Inula acuminata</i> Royle ex DC.	-	-	+	-	-	-	-	-	-	-	-
189.	<i>Inula royleana</i> DC.	+	-	+	-	-	-	-	+	-	-	-
190.	<i>Ipomoea eriocarpa</i> R. Br. Proder	-	-	+	-	-	-	-	-	+	-	-
191.	<i>Ipomoea nil</i> (L.) Roth	-	-	+	-	-	-	-	-	+	-	-
192.	<i>Ipomoea turbinate</i> Lag.	-	-	+	-	-	-	-	-	+	-	-
193.	<i>Iris germanica</i> L.	-	-	-	-	-	-	-	+	+	-	-
194.	<i>Isodon coetsa</i> Buch. Ham .ex D. Don	-	-	+	+	-	+	-	-	-	-	-
195.	<i>Isodon rugosus</i> L.	+	-	+	+	-	+	-	-	-	-	-
196.	<i>Jasminum humile</i> L.	+	-	-	-	-	-	-	+	-	-	-
197.	<i>Jasminum officinale</i> L.	+	-	-	-	-	-	-	+	-	-	-

Table 1. (Cont'd.).

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
198.	<i>Juglans regia</i> L.	+	-	-	+	+	-	-	-	-	+	-
199.	<i>Juncus articulatus</i> L.	-	-	+	-	-	-	-	-	-	-	-
200.	<i>Juniperus communis</i> Brand.	+	-	-	+	-	-	-	-	-	-	-
201.	<i>Justicia adhatoda</i> L.	+	+	-	-	-	+	-	+	-	-	-
202.	<i>Koeleria macrantha</i> Schult	-	-	+	-	-	-	-	-	+	-	+
203.	<i>Kyllinga brevifolia</i> Rottb.	-	-	+	-	-	-	-	-	+	-	-
204.	<i>Lallemantia royleana</i> Benth.	-	-	+	-	-	-	-	-	-	-	-
205.	<i>Lamium album</i> L.	-	-	+	-	-	-	-	-	-	-	-
206.	<i>Lathyrus aphaca</i> L.	+	-	+	-	-	-	-	-	+	+	-
207.	<i>Lathyrus sphaericus</i> Retz.	-	-	+	-	-	-	-	-	+	+	-
208.	<i>Launea procumbens</i> Roxb.	+	-	-	-	-	-	-	-	-	-	-
209.	<i>Leontopodium brachyoctis</i> Gandoger	-	-	+	-	-	-	-	-	-	-	-
210.	<i>Lepidium apetalum</i> Willd.	-	-	+	-	-	-	-	-	+	-	+
211.	<i>Lepidium pinnatifidum</i> Ledeb.	-	-	+	-	-	-	-	-	+	-	+
212.	<i>Lespedeza gerardiana</i> Graham ex Maxim.	-	-	+	-	-	-	-	-	-	-	-
213.	<i>Leucostegia pulchra</i> D. Don	-	-	+	-	-	-	-	+	-	-	-
214.	<i>Lindelofia stylosa</i> Brand.	-	-	+	-	-	-	-	-	-	-	-
215.	<i>Lonicera quinquelocularis</i> Hardw.	-	-	+	+	-	+	-	+	-	-	-
216.	<i>Lotus corniculatus</i> L.	-	+	-	-	-	-	-	-	+	-	-
217.	<i>Lygodium hazaricum</i>	-	-	+	-	-	-	-	-	-	-	-
218.	<i>Lyonia ovalifolia</i> (Wall.) Prude	-	+	-	+	-	-	+	-	-	-	-
219.	<i>Mallotus philippensis</i> (Lam) Muell	+	-	-	+	-	-	+	-	-	-	-
220.	<i>Malva neglecta</i> Wall.	+	-	+	-	-	-	-	-	+	-	+
221.	<i>Marrubium vulgare</i> L.	+	-	+	-	-	-	-	-	-	-	-
222.	<i>Marsilea quadrifolia</i> L.	-	-	-	-	-	-	-	-	+	-	-
223.	<i>Matricaria aurea</i> (Loefl.) Schultz.	-	-	+	-	-	-	-	-	+	-	-
224.	<i>Medicago denticulata</i> Willd.	-	-	+	-	-	-	-	-	+	-	+
225.	<i>Medicago lupulina</i> L.	-	-	+	-	-	-	-	-	+	-	+
226.	<i>Melia azedarach</i> L.	+	-	-	+	+	-	-	-	-	-	-
227.	<i>Melilotos altissima</i> Thiull.	-	-	+	-	-	-	-	-	-	-	-
228.	<i>Mentha longifolia</i> (L.) Huds.	+	-	-	-	-	-	-	-	-	-	+
229.	<i>Mentha spicata</i> L.	+	-	-	-	-	-	-	-	-	-	+
230.	<i>Micromeria biflora</i> Buch.	+	-	+	-	-	-	-	-	-	-	-
231.	<i>Mirabalis jalapa</i> L.	+	-	+	-	-	-	-	+	-	-	-
232.	<i>Morus alba</i> L.	+	-	+	+	+	-	-	-	-	+	-
233.	<i>Morus nigra</i> L.	+	-	+	+	+	-	-	-	-	+	-
234.	<i>Morus serrata</i> Roxb.	+	-	+	+	-	-	-	-	-	+	-
235.	<i>Mosla dianthera</i> (Buch. –Ham.) Maxim.	-	-	+	-	-	-	-	-	+	-	-
236.	<i>Myrsine africana</i> L.	-	-	+	+	-	+	-	-	-	+	-
237.	<i>Myrtus communis</i> L.	+	-	-	+	-	-	-	-	-	-	-
238.	<i>Narcissus tazetta</i> L.	-	-	-	-	-	-	-	+	-	-	-
239.	<i>Nasturtium officinale</i> R. Br.	-	-	+	-	-	-	-	-	-	-	+
240.	<i>Nepeta cataria</i> L.	-	-	+	-	-	-	-	-	+	-	-
241.	<i>Nerium indicum</i> Mill.	+	+	-	+	-	-	-	+	-	-	-
242.	<i>Neslia apiculata</i> Fisch.	-	-	+	-	-	-	-	-	+	-	-
243.	<i>Notholirion thomsonianum</i> (D. Don) Stapf	-	-	+	-	-	-	-	+	-	-	-
244.	<i>Oenothera affinis</i> Camb.	-	-	+	-	-	-	-	+	-	-	-
245.	<i>Oenothera rosea</i> L.	-	-	+	-	-	-	-	-	+	-	-

Table 1. (Cont'd.).

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
246.	<i>Olea ferrugenea</i> Royle	+	-	+	+	+	-	-	-	-	-	-
247.	<i>Onopordum acanthium</i> L.	-	-	-	-	-	-	-	+	+	-	-
248.	<i>Ophipogon intermedius</i> Banddi. D. Don	-	-	+	-	-	-	-	-	-	-	-
249.	<i>Opuntia dilleni</i> Haw.	+	-	-	-	-	-	+	-	-	-	-
250.	<i>Origanum vulgare</i> L.	+	-	+	-	-	-	-	-	+	-	-
251.	<i>Otostegia limbata</i> (Benth.) Boiss.	+	-	-	+	-	-	+	-	-	-	-
252.	<i>Oxalis corniculata</i> L.	+	-	-	-	-	-	-	-	-	-	+
253.	<i>Paeonia emodi</i> Wall ex Hook. f.	+	-	-	-	-	-	-	-	-	-	-
254.	<i>Papaver rhoes</i> L.	-	-	+	-	-	-	-	+	+	-	-
255.	<i>Persicaria nepalensis</i> Meisn.	-	-	+	-	-	-	-	+	-	-	-
256.	<i>Persicaria stagnina</i> Buch-Ham.	+	+	+	-	-	-	-	+	+	-	-
257.	<i>Phalangium acuminatum</i> Boiss.	-	-	-	-	-	-	-	+	-	-	-
258.	<i>Phleum pratense</i> L.	-	-	+	-	-	-	-	-	-	-	-
259.	<i>Phlomis bracteosa</i> Royle .ex Benth.	-	-	+	-	-	-	-	-	-	-	-
260.	<i>Phlomis rotata</i> Royle .ex Benth.	-	-	+	-	-	-	-	-	-	-	-
261.	<i>Phragmites australis</i> (Cav.) Trin. ex steud.	-	-	+	+	-	+	+	-	-	-	-
262.	<i>Phragmites karka</i> (Retz.) Trin. ex Steud.	-	-	+	+	-	+	+	-	-	-	-
263.	<i>Physalis divaricata</i> D. Don	-	-	+	-	-	-	-	-	+	+	-
264.	<i>Picea smithiana</i> (Wall.) Boiss.	-	-	-	+	+	-	-	-	-	-	-
265.	<i>Picris hieraciodes</i> L.	-	-	+	-	-	-	-	+	-	-	-
266.	<i>Pinus roxburghii</i> Surgent	+	-	-	+	+	+	-	-	-	-	-
267.	<i>Pinus wallichiana</i> A. B. Jackson	-	-	-	+	+	+	-	-	-	-	-
268.	<i>Pistacea integerrima</i> J. L. Stewart	+	-	-	+	+	-	-	-	-	-	-
269.	<i>Plantago lanceolatum</i> L.	+	-	+	-	-	-	-	-	+	-	-
270.	<i>Plantago major</i> Aitch.	+	-	+	-	-	-	-	-	+	-	-
271.	<i>Platanus orientalis</i> L.	+	-	-	+	+	-	-	+	-	-	-
272.	<i>Pleurospermum brunonis</i> (DC.)clarke	-	-	+	-	-	-	-	-	+	-	-
273.	<i>Poa infirma</i> H. B. K.	-	-	+	-	-	-	-	-	+	-	-
274.	<i>Podophyllum emodi</i> Wall .ex Royle	+	-	-	-	-	-	-	-	-	-	-
275.	<i>Poligonatum verticilatum</i> (L.) All.	+	-	-	-	-	-	-	-	-	-	-
276.	<i>Polygonum plebejum</i> R. Br.	+	-	+	-	-	-	-	-	+	-	-
277.	<i>Populs ciliata</i> Wall.	+	-	+	+	+	+	-	-	-	-	-
278.	<i>Populus alba</i> L.	+	-	+	+	-	-	-	-	-	-	-
279.	<i>Populus nigra</i> L.	-	-	-	+	+	-	+	-	-	-	-
280.	<i>Portulaca oleracea</i> L.	+	-	-	-	-	-	-	-	-	-	+
281.	<i>Potentilla gerardiana</i> Lindl.	+	-	+	-	-	-	-	-	-	-	-
282.	<i>Potentilla nepalensis</i> Hook.f.	+	-	+	-	-	-	-	+	-	-	-
283.	<i>Potentilla sericophylla</i> Parker	-	-	+	+	-	+	-	-	-	-	-
284.	<i>Potentilla sundaica</i> (Blume) O. Kuntze	-	-	+	-	-	-	-	-	-	-	-
285.	<i>Primula denticulata</i> Smith	+	-	+	-	-	-	-	+	-	-	-
286.	<i>Prinsepia utilis</i> Royle	-	-	-	+	-	+	+	+	-	+	-
287.	<i>Prunella vulgaris</i> L.	-	-	+	-	-	-	-	-	-	-	-
288.	<i>Prunus arminiaca</i> Marsh.	+	-	+	+	-	-	-	-	-	+	-
289.	<i>Prunus domestica</i> L.	+	-	+	+	-	-	-	-	-	+	-
290.	<i>Prunus padus</i> Hook.f.	-	-	+	+	+	-	-	-	-	+	-
291.	<i>Prunus persica</i> L.	+	-	+	+	-	-	-	-	-	+	-
292.	<i>Pseudognaphalium hypolecum</i> (DC.)O. M.	-	-	+	-	-	-	-	+	-	-	-
293.	<i>Pseudognaphalium luteo album</i> (L.) O. M.	-	-	+	-	-	-	-	+	-	-	-

Table 1. (Cont'd.).

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
294.	<i>Psychrogeton andryaloides</i> (DC.) Novo.	-	-	+	-	-	-	-	-	-	-	-
295.	<i>Pteracanthus urticifolius</i> Bremek	-	-	+	-	-	-	-	-	+	-	-
296.	<i>Pteridium equilinum</i> (L.) Kuhn.	-	-	-	-	-	-	-	-	-	-	+
297.	<i>Pteris cretica</i> L.	+	-	-	-	-	-	-	-	-	-	-
298.	<i>Pteris longifolia</i> L.	-	-	+	-	-	-	-	-	-	-	-
299.	<i>Pulicaria dysentrica</i> L.	-	-	+	-	-	-	-	-	-	-	-
300.	<i>Punica granatum</i> L.	+	-	-	+	-	-	-	-	-	+	-
301.	<i>Pycneus flavidus</i> (Retz) T. Koyama	-	-	+	-	-	-	-	-	-	-	-
302.	<i>Pyrus communis</i> L.	+	-	+	+	-	-	-	-	-	+	-
303.	<i>Pyrus malus</i> L.	+	-	+	+	-	-	-	-	-	+	-
304.	<i>Pyrus pashia</i> L.	+	-	+	+	-	-	-	-	-	+	-
305.	<i>Quercus baloot</i> Griffith.	-	-	-	+	-	-	-	-	-	-	-
306.	<i>Quercus dilatata</i> Lindl ex Royle	+	-	+	+	-	-	-	-	-	-	-
307.	<i>Quercus glauca</i> Thunb.	-	-	+	+	-	-	-	-	-	-	-
308.	<i>Quercus incana</i> Roxb.	+	-	+	+	-	-	-	-	-	-	-
309.	<i>Quercus semicarpifolia</i> Smith	-	-	+	+	-	-	-	-	-	-	-
310.	<i>Ranunculus arvensis</i> L.	-	-	+	-	-	-	-	-	+	-	-
311.	<i>Ranunculus hirtellus</i> Royle	-	-	+	-	-	-	-	-	+	-	-
312.	<i>Ranunculus laetus</i> Wall .ex Hook .f.	-	-	+	-	-	-	-	-	+	-	-
313.	<i>Ranunculus palmatifidus</i> Hook.f.	-	-	+	-	-	-	-	-	-	-	-
314.	<i>Rhamnus virgata</i> Roxb.	-	-	-	+	-	-	-	-	-	-	-
315.	<i>Rheum australe</i> D. Don	+	-	-	-	-	-	-	-	-	-	-
316.	<i>Rhododendron arboreum</i> Smith	+	-	-	+	-	-	-	+	-	-	-
317.	<i>Rhus javanica</i> L.	+	-	-	+	-	-	-	-	-	+	-
318.	<i>Rhynchosia pseudocajan</i> Camb.	-	-	+	-	-	-	-	-	+	-	-
319.	<i>Ricinus communis</i> L.	+	+	-	-	-	-	+	-	-	-	-
320.	<i>Robinia pseudo acacia</i> L.	-	-	+	+	+	-	+	-	-	-	-
321.	<i>Rosa moschata</i> J. Herm.	+	-	-	+	-	-	+	+	-	-	-
322.	<i>Roscoea alpina</i> Royle	-	-	+	-	-	-	-	+	-	-	-
323.	<i>Rubia cordifolia</i> L.	-	-	+	-	-	-	-	-	+	-	-
324.	<i>Rubus ellipticus</i> Smith	-	-	-	+	-	-	+	-	-	+	-
325.	<i>Rubus fruticosus</i> Hook.f.	+	-	+	+	-	-	+	-	-	+	-
326.	<i>Rubus ulmifolius</i> Schott.	+	-	-	+	-	-	+	-	-	+	-
327.	<i>Rumex dentatus</i> L.	+	-	+	-	-	-	-	-	-	-	+
328.	<i>Rumex hastatus</i> D. Don	+	-	-	-	-	-	-	-	-	-	+
329.	<i>Rumex nepalensis</i> Spreng.	+	-	+	-	-	-	-	-	-	-	+
330.	<i>Sagerethia thea</i> Osbeck.	-	-	+	+	-	+	+	-	-	-	-
331.	<i>Salix acmophylla</i> Boiss.	-	-	-	+	-	-	-	-	-	-	-
332.	<i>Salix babilonica</i> L.	+	-	-	+	-	-	-	+	-	-	-
333.	<i>Salix calyculata</i> Hook.f.	-	-	+	+	-	+	-	-	-	-	-
334.	<i>Salix tetrasperma</i> Roxb.	-	-	-	+	+	-	-	-	-	-	-
335.	<i>Salvia lanata</i> Roxb.	+	-	+	-	-	-	-	+	-	-	-
336.	<i>Sapindus mukorossi</i> Gaertn.	+	-	-	+	+	-	-	-	-	-	-
337.	<i>Sarcococca saligna</i> (Don) Muell.	+	-	-	+	-	+	-	-	-	-	-
338.	<i>Saxifraga engleriana</i> Smith.	-	-	+	-	-	-	-	-	-	-	-
339.	<i>Scandix pecten-veneris</i> L.	-	-	+	-	-	-	-	-	-	-	+
340.	<i>Scutellaria chamaedrifolia</i> Hedge	-	-	+	-	-	-	-	-	-	-	-
341.	<i>Sedum ewersii</i> Ledeb.	-	-	-	-	-	-	-	+	-	-	-
342.	<i>Selaginella sanguinolenta</i> Spring.	-	-	-	-	-	-	-	-	-	-	-
343.	<i>Selinum vaginatum</i> (Edgew.) Clarke	-	-	-	-	-	-	-	-	+	-	-

Table 1. (Cont'd).

S. No	Botanical names	Use classes										
		A	B	C	D	E	F	G	H	I	J	K
392.	<i>Viola canescens</i> Wall .ex Roxb.	+	-	+	-	-	-	-	-	-	-	-
393.	<i>Vitex negundo</i> L.	+	-	-	+	-	+	-	+	-	-	-
394.	<i>Vitis Jacquemontii</i> Parker	-	-	+	-	-	-	-	-	-	+	-
395.	<i>Wikstroemia canescens</i> Maissner	-	-	+	+	-	+	-	-	-	-	-
396.	<i>Withania somnifera</i> (L.) Dunal	+	-	-	-	-	-	-	-	-	-	-
397.	<i>Woodfordia fruticosa</i> (L.) Kurz	-	-	-	+	-	+	-	+	-	-	-
398.	<i>Wulfenia amherstiana</i> Wall.ex Bth.	+	-	+	-	-	-	-	-	-	-	-
399.	<i>Xanthium stromarium</i> L.	+	-	-	-	-	-	-	-	+	-	-
400.	<i>Zanthoxylum armatum</i> DC.	+	-	-	+	-	-	+	-	-	+	-
401.	<i>Zizyphus oxyphylla</i> Edgew.	+	-	+	+	-	-	+	-	-	+	-
402.	<i>Zizyphus vulgare</i> Lam.	+	-	+	+	-	-	+	-	-	+	-

A: Medicinal plants, B: Poisonous plants, C: Fodder species, D: Fuel wood species, E: Timber yielding plants, F: Thatching / Sheltering plants, G: Fencing / Hedge plants, H: Ornamental, I: weeds, J: Plants yielding edible fruits and seeds, K: Vegetable and potherb species.

References

- Afzal, M., M. Shah, S. Sikandar and M. I. Shinwari. 2001. Ecological Zones of Pakistan. In: M. Afzal and S. A. Mufti (eds). *Natural History Research in Pakistan*. Pakistan Scientific and Technological Information Center, Islamabad.
- Ahmad, H. 2003. Cultivation and Sustainable Harvesting of Medicinal and Aromatic Plants through Community Involvement. Intern. Workshop on Conservation and Sustainable uses of Medicinal and Aromatic Plants in Pakistan. WWF- Pakistan.
- Ahmad, H. and M. Waseem, 2004. Conservation Status of some Medicinal Plants of the Salt Range. *Zonas Aridas* N° 8.
- Ahmad, H., M. Alam and F. Haq, 2010. Species Diversity and Conservation Status of the Diversity of Vascular Plants of Nandiar Khwar District Batagram, Pakistan. Workshop on International Symposium on Biology of Rare and Endemic Plant Species. (Biorare Symposium May 26 - 29, 2010, Fethiye-Mugla, Turkey).
- Alam, J. and S. I. Ali, 2009. Conservation Status of *Astragalus gilgitensis* Ali (Fabaceae): A Critically Endangered Species in the Gilgit District, Pakistan. – *Phyton* (Horn, Austria) 48: 211–223.
- Ali, H., and M. Qaiser. 2009. The Ethnobotany of Chitral valley, Pakistan with Particular reference to medicinal plants. *Pak. J. Bot.*, 41: 2009-2041, 2009.
- Ali, S. I. and M. Qaiser. 1992-2007. *Flora of Pakistan*. Nos. 194-208. Department of Botany, University of Karachi.
- Ali, S.I. and Y.J. Nasir. 1990-92. *Flora of Pakistan*. No. 191-193. Department of Botany, University of Karachi and National Herbarium, PARC, Islamabad.
- Bulut.Z., and H.Yilmaz 2010. the current situation of threatened endemic flora in Turkey: Kemaliye (Erzincan) CASE. *Pak. J. Bot.*, 42: 711-719, 2010.
- Hamayun, M. 2005. Studies on Ethnobotany, *Conservation and Plant Diversity of Utror and Garbal Valleys District Swat, Pakistan*. Ph.D. thesis Department of Plant Sciences, Quaid-I-Azam University, Islamabad, Pakistan
- Ibrar, M. 2003. Conservation of Indigenous Medicinal Plants and their Traditional Knowledge found in Moist Temperate Himalayas, Pakistan. Department of Biological Sciences/ Quaid-I-Azam University, Islamabad.
- Kilic. M. and O. S. Arslan 2010. *Turkey's Forests and Biodiversity*. Workshop on International Symposium on Biology of Rare and Endemic Plant Species. (Biorare Symposium) May 26-29, 2010, Fethiye-Mugla, Turkey

- Matlack, G. R. 1994. Plant species Migration in a Mixed-history Forest Landscape in Eastern North America. *Ecology* 75: 1491-1502.
- Meyer, W. B., and B. L. Turner. 1992. Human Population Growth and Global Land-use/ cover change. *Annual Rev. Ecol. Syst.* 23: 39 - 61.
- Motiekaityte, V. 2006. Conservation Diversity of Vascular Plants and their Communities *in situ*, applying the Conception of Ecosystem Pool. *Ekologija*, 2: 1-7.
- Nasir, E. and S.I. Ali. 1970-89. *Flora of Pakistan*. No. 1-190. National Herbarium, PARC, Islamabad and Department of Botany, University of Karachi, Pakistan.
- Pearson, S. M., M. G. Turner, R. H. Gardner and R. V. O'Neill. 1996. An Organism-based Perspective of Habitat Fragmentation. Pp. 77 - 95. *In: R. C. Szaro and D. W. Johnston (eds). Biodiversity in Managed Landscapes: Theory and Practice*. Oxford University Press.
- Qureshi, R., G. R. Bhatti. and R. A. Memon. 2010. Ethnomedicinal uses of Herbs from Northern part of Nara Desert, Pakistan. *Pak. J. Bot.*, 42: 839-851, 2010.
- Terborgh, J. 1992. Maintenance of Diversity in Tropical Forest. *Biotropica* 24:283-292.
- Walker, B. H. 1992. Biodiversity and Ecological Redundancy. *Conservation Biol.* 6:18-23.
- Walter, K. S. and Gillet H. J. (eds.) 1998. 1997 *IUCN Red list of Threatened Plants*. WorldConservation Monitoring Center.-IUCN-The World Conservation Union, Gland, Switzerland and Cambridge UK.