

CONSERVATION ASSESSMENT OF PLANT RESOURCES OF CHAKESAR VALLEY, DISTRICT SHANGLA, KPK, PAKISTAN

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Abstract

Plant resource evaluation project was carried out to investigate conservation status of some important medicinal plants of Chakesar Valley, District Shangla. The valley is located in Sino Japanese region in the remote area of District Shangla, Pakistan. Conservation status of 127 plant species was evaluated through IUCN (1994-2001) criterion. Among these species 47 (37%) were endangered (E), 32 (25%) vulnerable (VU), 36 (28%) rare (R) and 12 (9%) species were infrequent (IF). The area had no nursery to grow the critically endangered species. The study confirmed that the area possessed great potential for cultivation and harvesting of economically important plant resources. It is been concluded that establishment of nurseries and botanical garden may be the best ex-situ conservation for sustainable utilization of plant resources of the area. While local community awareness and involvement to protect these national assets will be the best in-situ conservation measure.

Introduction

Biodiversity is abbreviated form of biological diversity and refers to living things on the earth. Plants are an important resource and have immense impact on ecosystem and have a vital role in socioeconomic conditions of the people. Plant diversity and ecological characteristics are important in term of land degradation and erosion (Ahmad *et al.*, 2010; Bocuket *et al.*, 2011). The vegetation was destroyed at foot hill and near to the mid hills and reflects anthropogenic characteristics which is still intact. Grazing and land utilization are considered most economical way of uses of rangeland vegetation (Bocuket *et al.*, 2010; Manzano *et al.*, 2000).

Shangla is located in Himalayan mountainous ranges and is a unique for its diverse flora (Fig. 1a,b). Non scientific and indiscriminate collection of medicinal plants in various parts of the area has led to the severe pressure on the availability of medicinal plants. It is difficult to know that how much medicinally important plants are threatened. According to IUCN threatened plant data base, about 32000 species of plants are threatened with extinction. This figure represent 13% of estimated 250, 000 of plants. According to Hamayun (2003), there are 92 threatened plant species in District Swat of which 28 species are endangered while 40 vulnerable and 24 are rare respectively.

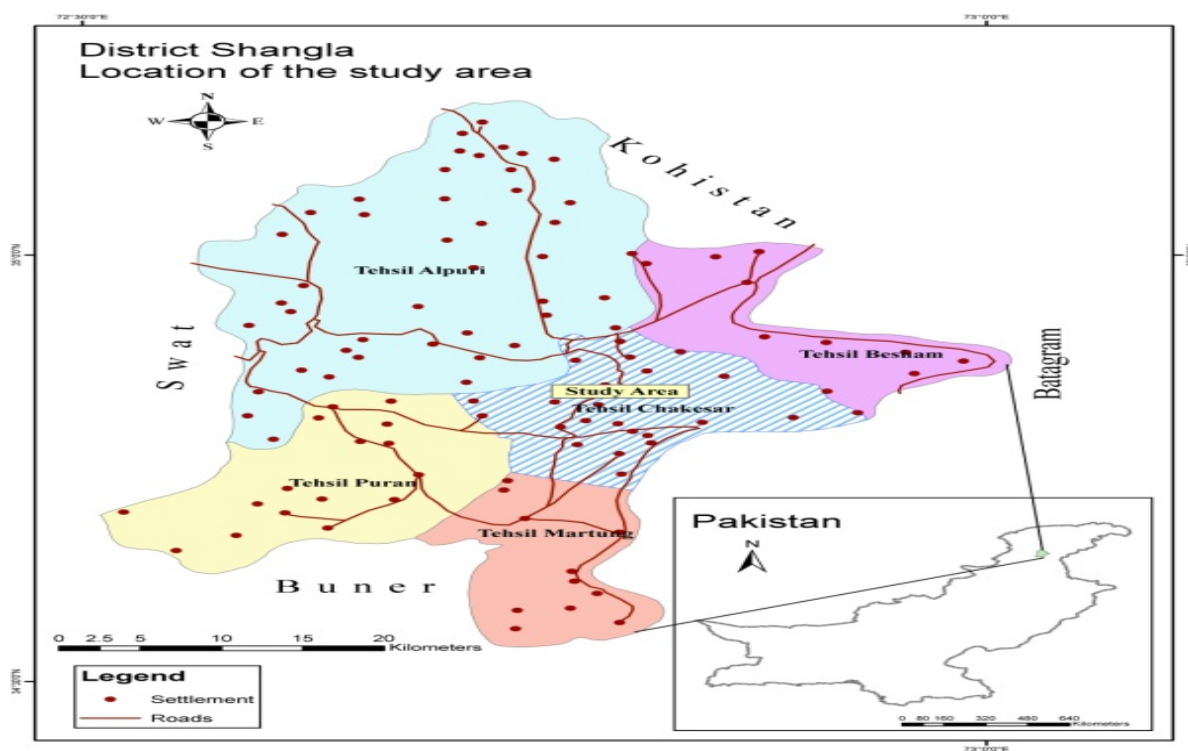


Fig. 1a. Location map of the studied sites.

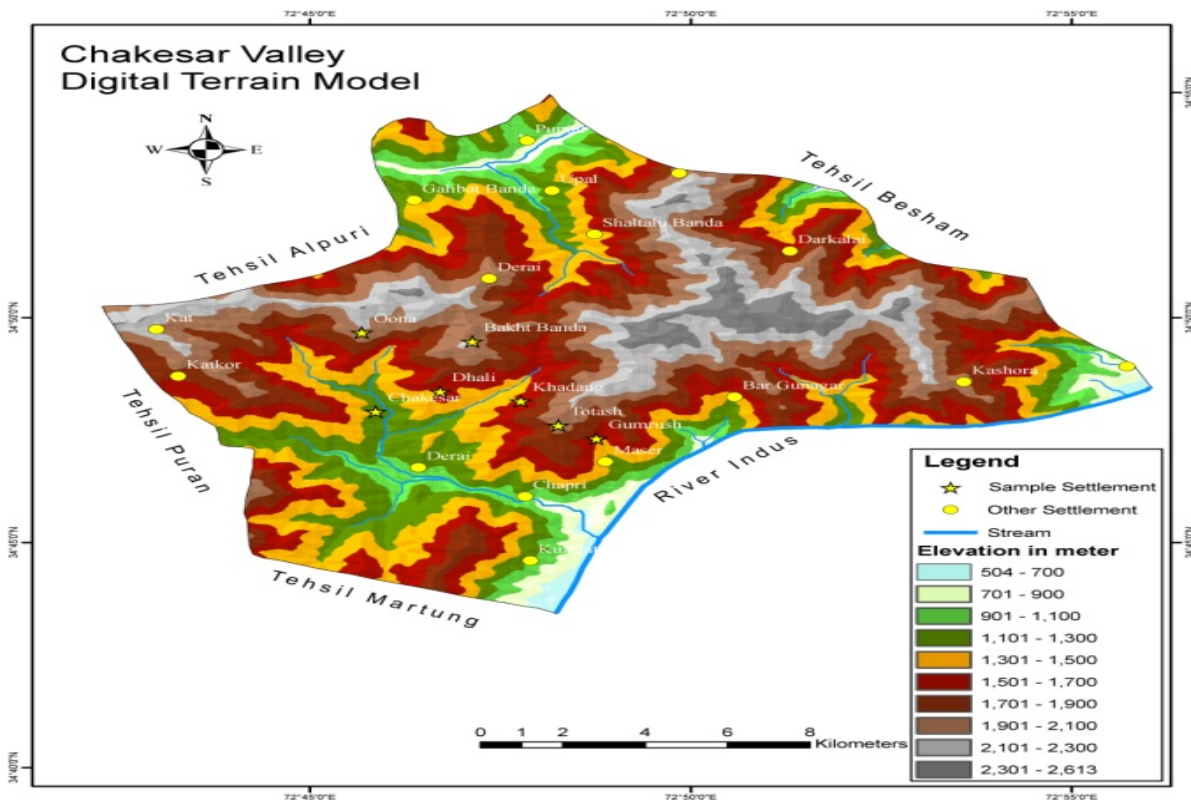


Fig. 1b. Location and Digital Terrain Model of the studied sites.

Materials and Methods

The research work was started in May, 2008 and continued up to January 2011. Different sites were selected for study of medicinally important plants were (Oona Hills, Gumrush Hills, Dhanakol Hills, Bakht Banda Hills and Dhali Hills). These sites ranged from subtropical to temperate moist forests.

The study was carried out in different three seasons of the year and observations were made through walks and interview of older people. Proforma were used to record plants availability Collection, Growth and Part used. Plants were collected in three seasons from 2007 -2010. The collected specimens were identified with the help of flora of Pakistan (Ali & Nasir, 1989-1993; Ali & Qaiser, 2000-2006). The determined voucher specimens were deposited in the Department of Botany, University of Peshawar. The vegetation structure was studied with significant species diversity of medicinal plants and conservation status of plants in the Himalayan region.

The status of commercially important indigenous species was determined, using criteria of Red Data Book of Anon., (2001). Total score of each species was calculated and relative importance of medicinal plants was categorized into endangered, vulnerable, rare, infrequent and dominant species (Anon., 2001).

Results and Discussion

Chakesar valley is located in Sino Japanes region and reaches to the basin of SaharoSindian region. The valley is unexplored in all aspects of plants and no work has been

done regarding plant conservation and restoration. It is inhabited and composed of a number of settlements. It is one of the exploited valleys of district Shangla and people of the area depend on plants for their own requirements. Forests are also a resource of their livelihood. They ruthlessly cut off the forests and also smuggle to the surrounding area and use it as a source of their revenue. They are illiterate and do not know the repercussion of such indiscriminate cutting i.e. why, floristic composition representing 127 most important medicinal plants of the area, in which 47 (37%) endangered species, 32 (25%) vulnerable, 36 (28%) rare and 12 (9%) species are infrequent. Some of the important endangered species included *Abiespindrow*, *Acer oblongum*, *Aesculusindica*, *Alnusnitida*, *Berberiskunawarensis*, *Celtisaustralis*, *Desmodiumelegans*, *Hedra helix*, *Hedranepalensis*, *Juglanregia*, *Olea ferruginea*, *Paeoniaemodi*, *Piceasmithiana*, *Pinusgerardiana*, *Pisticiaintegrima*, *Quercussemicarfifolia*, *Vibernumgrandiflorum* and *Woodfordiafruticosa* (Fig. 2). Ghazanfar & Osborne (2010) studied the conservation through restoration and investigated that site consists of mainly a few trees and shrubs that have tolerated grazing pressure and those that are unpalatable to camel and goats. No regeneration is visible around the trees and shrubs and significant fruiting has been recorded. These observations were similar to the research sites. No sapling was recorded and regeneration seems to be completely vanished. Only Dhali Hill has seedlings but this site is under extreme biotic interference that indicated immense pressure and disturbance in vegetation (Fig. 3). The conservation status shows that mostly trees are under severe pressure (Table 1).

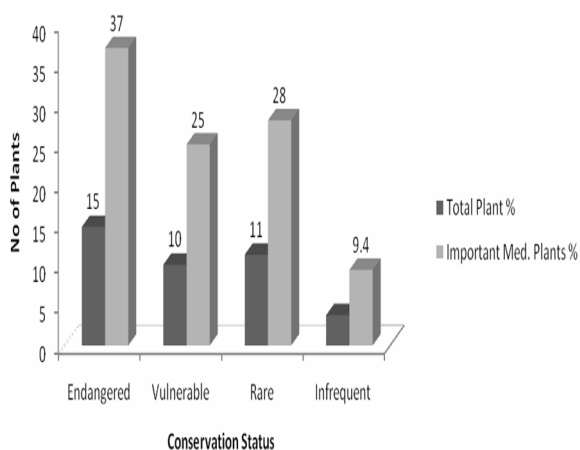


Fig. 2. Comparative percentage of conservation status of total plants and medicinally important plants.

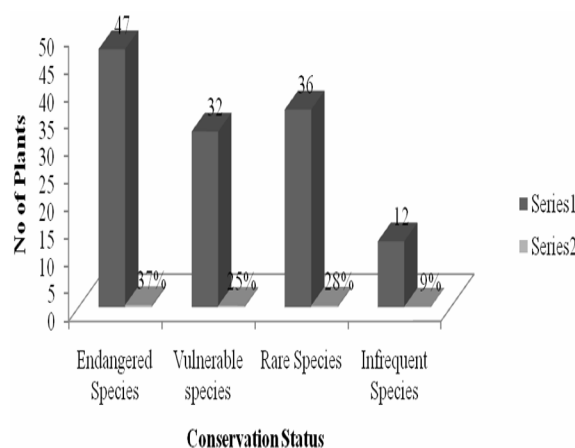


Fig. 3. Conservation status of medicinal plants of Chakesar, district Shangla.

Vulnerable species of the valley included *Abutilon indicum*, *Aconitum violate*, *Bergenia ciliate*, *Gerardiana palmate*, *Indigoferahetrantha*, *Morchellaesculenta*, *Podophylumodi*, *Rubusfruticosus*, *Rubussanctus*, *Salvia lanata*, *Salvia nubicola*, *Stachysseriaca*, *Thymus serphyllum*, *Valerianajacomontii* and *Viola serpens*. Hamayun *et al.*, (2006) assessed conservation status of plants and revealed that due to increased exploitation and unsustainable harvesting, 49% of medicinal plants are threatened. Similarly, Shaheen *et al.*, (2011) and Ahmad *et al.*, (2006) found that over the past few decades, the Himalayan forests have experienced unprecedented land use changes driven by rapid human population growth and intensifying anthropogenic activities, such as agriculture and expanding human settlements. It is known that people traditionally used fuel wood and this is the main cause of forests degradation. The intensive grazing and land leveling for agriculture also present the pathetic scene of the valley. Dependency on forests for fuelwood is causing severe deforestation in the Himalayas. Hamayun *et al.*, (2006) revealed that 17.61% plants of Gabral and Utror valley are threatened, 4.5% are endangered, and 5.68% vulnerable, 4.5% rare and 2.8% are near threatened.

The species become rare and included *Acoruscalamus*, *Arisaemaflavum*, *Artemisia scoparia*, *Artemisia vulgare*, *Clematis grata*, *Euphorbia wallichii*, *Geranium wallichianum*, *Gerberagossypina*, *Hypericum-perforatum*, *Inulagrantioides*, *Sauromatumvenosum*, *Saussoriaalbescens*, *Thalictrumpendunculatum* and *Urticadioica*. Bocuket *et al.*, (2009) identified 77 taxa are endemic to Turkey in which 56 taxa are in least concern, 9 in near threatened, 4 in vulnerable risk categories. Grazing and land use are generally considered to be the most economical way of utilizing range land vegetation. Abbas *et al.*, (2010) determined conservation status of *Cadabaheterotricha* according to Anon., 2001, Red datalist categories and criteria and classified it as endangered species. Haq (2011) studied conservation status of critically endangered species in the NandiarKhuwarr catchment area, Battagram.

The infrequent species comprised of *Artemisia japonica*, *Astragaluschlorostachys*, *Astragaluspyrrotrichus*, *Imaptiensbalsimine* and *Impatiens parviflora*.

Haq (2011) reported 37 taxa including 14 critically endangered and 23 endangered species. Loss of habitat, unplanned collection, deforestation, overgrazing and erosion, attack of pathogens and effects of introduced taxa were the major threats to the vegetation. Alam & Ali (2010) determined conservation status of 19 taxa according to IUCN Red list categories and criteria. It is stated that rate of plant extinction has reached to one species per day as a result of anthropogenic activities and it is considered 1000–10,000 time faster than that would occur naturally (Hilton-Taylor, 2000; Akeroyd, 2002). If the trend remains constant, 60,000 and 100,000 plant species may disappear in the near future (Akeroyd, 2002; Bramwell, 2002). Ali & Qaiser (2010) reported that *Gailloniachitralensis* Nazim is endemic to Chitral district and is classified as endangered species according to IUCN Red List categories and criteria 2001.

Conclusions and Recommendations

The study revealed that Chakesar valley had 51.4% medicinal plants, 27.3% fodder plants, 18.5% fuel species, 14.7% timber wood, 14.1% pot herbs and 19.8% were plants used as veterinary folk medicines. Based on IUCN criteria class seen that of the 127 most important medicinal plants 47 (37%) species were endangered, 32 (25%) vulnerable, 36 (28%) rare and 12 (9%) species are infrequent. The valley remained out of sight of Scientists so far. It is a remote and backward area and lack proper transport system. The biologists and geologists should devote more time to look at on. Regeneration capacity of woody tree species is very poor in most of the foot hill and some where even in mid of the hills. Government should distribute saplings each year among the villagers to plant them. It should have also to establish nurseries in the area to practice the propagation of high price and valued plants. Medicinal plants should be cultivated on large scale and it should be a source of income. Media should be used to save nature and its importance. Regeneration status of some medicinal plants is in poor condition of regeneration and these plants should be given priority for conservation.

Table 1. Status of commercially important indigenous medicinal plants of Chakesar, District Shangla, Pakistan.

No	Species	Availability			Collection			Growth			Part used				Total score	Status
		0	1	2	3	0	1	2	3	4	0	1	2	3		
1.	<i>Abies pindrow</i> Royle	0	-	-	-	0	-	-	-	-	-	-	-	-	1	Endangered
2.	<i>Abutilon indicum</i> Sweet.	-	1	-	-	-	1	-	-	-	-	-	-	3	6	Vulnerable
3.	<i>Acacia modesta</i> Wall.	-	1	-	-	0	-	-	-	-	0	-	-	-	1	Endangered
4.	<i>Acacia nilotica</i> (L.) Delile	-	1	-	-	0	-	-	-	-	0	-	-	-	1	Endangered
5.	<i>Acer oblongum</i> Wallich ex DC.	-	-	2	-	0	-	-	-	-	0	-	-	-	2	Endangered
6.	<i>Aconitum violaceum</i> Jacqu. Staff.	-	1	-	-	-	-	3	-	-	3	-	-	-	7	Vulnerable
7.	<i>Acorus calamus</i> Linn.	-	1	-	-	-	-	3	-	-	-	-	4	-	12	Rare
8.	<i>Aesculus indica</i> (Colebr. Ex Cambess.) Hook.	-	1	-	-	0	-	-	-	-	0	-	-	-	1	Endangered
9.	<i>Ailanthus altissima</i> (Miller) Swingle	-	-	-	3	0	-	-	-	-	3	-	0	-	6	Vulnerable
10.	<i>Ajuga bracteosa</i> Wallich ex Benth.	-	-	2	-	-	-	3	-	-	-	-	4	-	13	Infrequent
11.	<i>Ajuga parviflora</i> Benth.	-	-	2	-	-	-	3	-	-	-	-	4	-	13	Infrequent
12.	<i>Alnus nitida</i> (Spach) Endl.	-	1	-	-	0	-	-	-	-	0	-	-	-	1	Endangered
13.	<i>Alcea rosea</i> (Linn.) Cav.	-	1	-	-	-	-	3	-	-	3	-	0	-	7	Vulnerable
14.	<i>Andraehne cordifolia</i> (Dene.) Mull. Arg.	-	-	2	-	-	-	-	-	-	3	-	0	-	6	Vulnerable
15.	<i>Arisaema flavum</i> (Forsk.) Schott.	-	-	2	-	-	-	3	-	-	-	4	0	-	9	Rare
16.	<i>Arisaema jacquemontii</i> Blume	-	-	2	-	-	-	3	-	-	-	4	0	-	9	Rare
17.	<i>Arisaema utile</i> Hook. F. ex Schott.	-	-	2	-	-	-	3	-	-	-	4	0	-	9	Rare
18.	<i>Artemisia dubia</i> Wall.	-	-	2	-	-	-	3	-	-	-	4	0	-	9	Rare
19.	<i>Artemisia japonica</i> Thunb., Fl. Jap.	-	-	2	-	-	-	3	-	-	-	4	-	-	13	Infrequent
20.	<i>Artemisia santifolia</i>	-	-	2	-	-	-	3	-	-	-	4	-	-	13	Infrequent
21.	<i>Artemisia scotonema</i>	-	-	2	-	-	-	3	-	-	-	4	-	-	13	Infrequent
22.	<i>Artemisia scoparia</i> Waldst. & Kit.	-	1	-	-	-	-	3	-	-	-	4	-	-	12	Rare
23.	<i>Artemisia vulgaris</i> L.	-	1	-	-	-	-	3	-	-	-	4	-	-	12	Rare
24.	<i>Asparagus officinalis</i>	-	1	-	-	-	-	3	-	-	-	4	-	-	12	Rare
25.	<i>Astragalus chlorostachys</i> Lindl.	-	-	2	-	-	-	3	-	-	-	4	-	-	13	Infrequent
26.	<i>Astragalus pyrrhichus</i>	-	-	2	-	-	-	3	-	-	-	4	-	-	13	Infrequent
27.	<i>Berberis kunawarensis</i> Royle.	-	-	2	-	0	-	-	2	-	-	-	0	-	4	Endangered
28.	<i>Berberis lycium</i> Royle.	-	-	2	-	0	-	-	2	-	-	-	0	-	4	Endangered
29.	<i>Bergenia ciliata</i> (Haw) Sternb	-	1	-	-	-	-	2	-	-	-	3	-	-	6	Vulnerable
30.	<i>Celtis australis</i> Wild.	0	-	-	-	0	-	-	-	-	0	-	-	-	0	Endangered
31.	<i>Cichorium intybus</i> L.	-	1	-	-	-	-	3	-	-	-	3	-	-	10	Rare

Table 1. (Cont'd.).

No	Species	Availability					Collection					Growth					Part used					Total score	Status
		0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4		
32.	<i>Cirsium wallichi</i> DC.	-	-	2	-	-	-	-	-	3	-	-	-	-	3	-	-	-	-	3	-	11	Rare
33.	<i>Clematis grata</i> Wall.	-	1	-	-	-	-	-	-	3	-	-	-	-	3	-	-	-	2	-	-	9	Rare
34.	<i>Commelina bengalensis</i> L.	-	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	4	11	Rare
35.	<i>Cotoneaster nummularia</i> Fish & Mey	-	1	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	4	Endangered	
36.	<i>Cotoneaster nummularia</i> Fish & Mey	-	1	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	4	Endangered	
37.	<i>Cousinia thomsonii</i> C. B. Clarke	-	1	-	-	-	1	-	-	-	-	-	-	3	-	-	-	-	3	-	8	Vulnerable	
38.	<i>Crataegus oxyacantha</i> L.	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	-	3	Endangered	
39.	<i>Crotolaria juncea</i> L.	-	1	-	-	-	-	-	-	3	-	-	-	3	-	-	-	-	-	4	11	Rare	
40.	<i>Dalbergia sisso</i> Roxb.	-	1	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	1	Endangered	
41.	<i>Daphne oloides</i> Schreb.	-	1	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	4	Endangered	
42.	<i>Debregetia salisifolia</i> (D. Don) Renle.	-	1	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	-	3	Endangered	
43.	<i>Delphinium ajacis</i> Linn.	0	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-	10	Rare	
44.	<i>Delphinium demudatum</i> Wallich ex Hook. F.	0	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	4	11	Rare	
45.	<i>Desmodium elegans</i> DC.	-	1	-	-	-	-	-	-	3	0	-	-	2	-	-	-	-	-	-	4	Endangered	
46.	<i>Diospyros kaki</i> Linn.	-	1	-	-	-	-	-	-	3	0	-	-	-	-	-	-	-	3	-	7	Vulnerable	
47.	<i>Euphorbia wallichii</i> Hook. f.	0	-	-	-	-	-	-	-	3	0	-	-	-	-	-	-	-	-	4	10	Rare	
48.	<i>Ficus carica</i> Linn.	-	1	-	-	-	-	-	-	3	0	-	-	-	-	-	-	-	3	-	7	Vulnerable	
49.	<i>Ficus elastica</i> Roxb.	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-	10	Rare	
50.	<i>Ficus palmata</i> Forssk.	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-	10	Rare	
51.	<i>Ficus racemosa</i> Linn.	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	3	-	9	Rare	
52.	<i>Geranium rotundifolium</i> Linn.	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	2	-	-	10	Rare	
53.	<i>Geranium wallichianum</i> D. Don.	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	2	-	-	10	Rare	
54.	<i>Gerardiana palmata</i> (Forssk.) Gaud.	-	-	2	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	6	Vulnerable	
55.	<i>Gerbera gossypina</i> (Royle) Beauv.	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	4	10	Rare	
56.	<i>Geum elatum</i> L.	-	1	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	4	11	Rare	
58.	<i>Grewia optiva</i> Drum. Ex Burret.	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	Endangered	
59.	<i>Hedra helix</i> L.	-	1	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	2	Endangered	
60.	<i>Hedra nepalensis</i> K. Koch.	-	1	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	2	Endangered	
61.	<i>Hypericum perforatum</i> L.	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	3	10	Rare	
62.	<i>Imaptiens balsamifera</i> Linn.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	14	Infrequent	
63.	<i>Impatiens edgeworthii</i> Hk. F.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	14	Infrequent	

Table I. (Cont'd.).

No	Species	Availability			Collection			Growth				Part used				Total score	Status	
		0	1	2	3	0	1	2	3	4	0	1	2	3	4			
64.	<i>Impatiens gigantea</i> Egew.	-	-	2	-	-	-	3	-	-	-	-	-	-	-	4	13	Infrequent
65.	<i>Impatiens parviflora</i> DC.	-	-	2	-	-	-	3	-	-	-	-	-	-	-	4	13	Infrequent
66.	<i>Indigofera heterantha</i> Wall.	-	1	-	-	1	-	-	-	-	-	-	-	-	0	5	Vulnerable	
67.	<i>Inula granioides</i> Boiss.	-	1	-	-	-	-	3	-	-	-	-	-	-	3	10	Rare	
68.	<i>Ipomea palmata</i> Forssk.	-	-	2	-	1	-	-	-	-	-	-	-	-	4	10	Rare	
69.	<i>Ipomea purpurea</i> (Linn.) Roxb.	-	1	-	-	1	-	-	-	-	-	-	-	-	4	9	Rare	
70.	<i>Juglans regia</i> L.	0	-	-	-	0	-	-	-	0	-	-	-	-	1	1	Endangered	
71.	<i>Megacodon stylophorus</i> (C. B. Clarke)	-	1	-	-	-	-	3	-	-	-	-	-	-	4	12	Rare	
72.	<i>Melia azadirachta</i> Linn.	-	1	-	-	0	-	-	-	0	-	-	-	-	1	2	Endangered	
73.	<i>Monothecca bausifolia</i> (Fale) Dene ex. Engler	-	1	-	-	0	-	-	-	0	-	-	-	-	0	1	Endangered	
74.	<i>Morchella esculenta</i> Pers ex. Fr.	0	-	-	-	-	-	3	-	-	-	-	-	-	4	7	Vulnerable	
75.	<i>Morus alba</i> Linn.	-	-	2	-	0	-	-	-	-	1	-	-	-	2	5	Vulnerable	
76.	<i>Morus laevigata</i> Wall.	-	1	-	-	0	-	-	-	1	-	-	-	-	2	4	Endangered	
77.	<i>Morus nigra</i> L.	-	-	2	-	0	-	-	-	1	-	-	-	-	2	5	Vulnerable	
78.	<i>Myrtus communis</i> Linn.	-	-	2	-	0	-	-	-	-	1	-	-	-	2	7	Vulnerable	
79.	<i>Olea ferruginea</i> Royle.	-	1	-	-	0	-	-	-	0	-	-	-	-	0	1	Endangered	
80.	<i>Paeonia emodi</i> Wall. Ex Hkf.	0	-	-	-	1	-	-	-	0	-	-	-	-	0	1	Endangered	
81.	<i>Picea smithiana</i> (Wall.) Boiss.	0	-	-	-	0	-	-	-	0	-	-	-	-	0	0	Endangered	
82.	<i>Pinus gerardiana</i> Wall. ex Lamb.	-	1	-	-	0	-	-	-	0	-	-	-	-	0	1	Endangered	
83.	<i>Pinus roxburghii</i> Sargent.	-	-	2	-	0	-	-	-	0	-	-	-	-	0	2	Endangered	
84.	<i>Pinus wallichiana</i> A. B. Jackson.	-	1	-	-	0	-	-	-	0	-	-	-	-	0	1	Endangered	
85.	<i>Pistacia integrima</i> Stew ex. Brandis	0	-	-	-	0	-	-	-	0	-	-	-	-	0	0	Endangered	
86.	<i>Platanus orientalis</i> Linn.	0	-	-	-	0	-	-	-	0	-	-	-	-	0	0	Endangered	
87.	<i>Plectranthus rugosus</i> Wall. ex Benth.	-	1	-	-	-	-	2	-	-	-	-	-	-	0	6	Vulnerable	
88.	<i>Podophyllum emodi</i> Wall.	-	1	-	-	-	-	3	-	-	-	-	-	-	0	7	Vulnerable	
89.	<i>Pteridium equilinum</i> L.	-	1	-	-	-	-	3	-	-	-	-	-	-	3	8	Vulnerable	
90.	<i>Pteris vitata</i> L.	-	1	-	-	-	-	3	-	-	-	-	-	-	3	8	Vulnerable	
91.	<i>Punica granatum</i> L.	-	1	-	-	-	-	2	-	-	1	-	-	-	0	4	Endangered	
92.	<i>Pyrus communis</i> Linn.	-	-	2	-	-	-	2	-	-	1	-	-	-	2	7	Vulnerable	
93.	<i>Pyrus pashia</i> Ham.	-	-	2	-	-	-	2	-	-	1	-	-	-	2	7	Vulnerable	
94.	<i>Quercus baloot</i> Griff.,	-	-	2	-	0	-	-	-	0	-	-	-	-	0	2	Endangered	

Table I. (Cont'd.).

No	Species	Availability			Collection			Growth				Part used				Total score	Status				
		0	1	2	3	0	1	2	3	4	0	1	2	3	4						
95.	<i>Quercus dilatata</i> Lindl.	-	1	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	1	Endangered
96.	<i>Quercus incana</i> Roxb.	-	1	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	1	Endangered
97.	<i>Quercus lanata</i> Smith,	-	-	2	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	2	Endangered
98.	<i>Quercus semicarpifolia</i> Sm.	-	-	2	-	0	-	-	-	0	-	-	-	-	-	0	-	-	-	2	Endangered
99.	<i>Robinia pseudocacia</i> Linn.	-	1	-	-	0	-	-	-	0	-	-	3	-	-	0	-	-	-	4	Endangered
100.	<i>Rosa macrophylla</i> Lindl.	-	-	2	-	-	1	-	-	-	-	-	3	-	-	-	-	-	-	10	Rare
101.	<i>Rubus ellipticus</i> Smith.	-	-	2	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	9	Rare
102.	<i>Rubus foliolosus</i> D. Don	-	-	2	-	-	1	-	-	-	2	-	-	-	-	-	-	3	-	8	Vulnerable
103.	<i>Rubus fruticosus</i> L.	-	-	2	-	-	1	-	-	-	2	-	-	-	-	-	-	3	-	8	Vulnerable
104.	<i>Rubus sanctus</i> Schreb.	-	-	2	-	-	1	-	-	-	2	-	-	-	-	-	-	3	-	8	Vulnerable
105.	<i>Salix babylonica</i> L.	-	1	-	-	0	-	-	1	-	-	-	-	-	-	0	-	-	-	2	Endangered
106.	<i>Salix tetrasperma</i> Roxb. Pl. Corom.	-	-	2	-	0	-	-	1	-	-	-	-	-	-	0	-	-	-	3	Endangered
107.	<i>Salvia lanata</i> Roxb	-	1	-	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	8	Vulnerable
108.	<i>Salvia moerhoffiana</i> Wall.	-	1	-	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	12	Rare
109.	<i>Salvia rubicola</i> Wall.	-	1	-	-	-	-	-	-	3	-	-	4	0	-	-	-	-	-	8	Vulnerable
110.	<i>Sarcococca saligna</i> (D.Don) Muell.	-	-	2	-	-	1	-	-	-	-	-	4	0	-	-	-	-	-	4	Endangered
111.	<i>Sauromatium venosum</i> (Aiton) Kunth	-	1	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	-	10	Rare
112.	<i>Saussoria albescens</i> (DC) Sch. Bip.	-	1	-	-	-	-	-	-	3	-	-	4	-	-	-	-	3	-	11	Rare
113.	<i>Segetaria thea</i> (L.) Brongn.	0	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	0	Endangered
114.	<i>Spiraea Lindleyana</i> Wall.	0	-	-	-	0	-	2	-	-	1	-	-	-	-	0	-	-	-	3	Endangered
115.	<i>Stachys emodi</i> Hedge (S. I. Ali & Y. J. Nasir)	0	-	-	-	-	-	2	-	-	1	-	-	-	-	0	-	-	-	3	Endangered
116.	<i>Stachys seritaca</i> Wall. ex Benth.	0	-	-	-	-	-	2	-	-	1	-	-	-	-	0	-	-	-	3	Endangered
117.	<i>Thalictrum pendunculatum</i> Edgew.	0	-	-	-	-	-	-	-	-	1	-	-	-	-	0	-	-	3	6	Vulnerable
118.	<i>Thymus serpyllum</i> Benth.	0	-	-	-	-	-	-	-	3	-	-	4	-	-	-	-	-	3	10	Rare
119.	<i>Urtica dioica</i> Linn.	-	1	-	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	5	Vulnerable
120.	<i>Urtica hyperborea</i> L.	-	1	-	-	-	-	-	-	3	-	-	4	-	-	-	-	-	-	12	Rare
121.	<i>Valeriana</i> spp.	0	-	-	-	-	-	-	-	3	-	-	4	0	-	-	-	-	-	8	Vulnerable
122.	<i>Verbascum thapsis</i> L.	-	1	-	-	-	-	2	-	-	-	-	4	0	-	-	-	-	-	6	Vulnerable
123.	<i>Viburnum grandiflorum</i> Wall. Ex DC.	-	1	-	-	-	-	2	-	-	-	-	4	-	-	-	-	-	-	10	Rare
124.	<i>Viola biflora</i> L.	-	1	-	-	-	0	-	-	-	1	-	-	-	-	0	-	-	-	2	Endangered
125.	<i>Viola serpens</i> Wall. Ex Roxb.	-	1	-	-	-	-	-	-	3	-	-	4	0	-	-	-	-	-	8	Vulnerable
126.	<i>Woodfordia fruticosa</i> (L.) Kurz.	-	1	-	-	-	-	-	-	3	-	-	4	0	-	-	-	-	-	8	Vulnerable
127.	<i>Zanthoxylum armatum</i> DC.	-	1	-	-	-	-	-	-	3	0	-	-	-	-	0	-	-	-	4	Endangered

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