

WEEDS OF WHEAT IN NEPAL: A LITERATURE REVIEW

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ABSTRACT

This paper reviews publications dealing with weeds and/or their control in wheat (*Triticum aestivum* L.) in Nepal and enumerates 370 weed species of 210 genera in 54 families. This review shows that the Asteraceae (69 spp.), Poaceae (52 spp.), Leguminosae (25 spp.), Polygonaceae (19 spp.), Caryophyllaceae (18 spp.), Scrophulariaceae (17 spp.), Euphorbiaceae and Lamiaceae (14 spp. each), Brassicaceae and Cyperaceae (13 spp.), and Solanaceae (11 spp. each) were the dominant families, which accounted for 71.35% of the total weeds. This paper also documented 63 species reported as the principal or most common weeds and 4 species (*Chenopodium album*, *Cynodon dactylon*, *Phalaris minor*, *Polygonum plebeium*) as the most commonly reported weeds of wheat in Nepal in the papers reviewed. This paper also highlighted the fact that the researchers from the Tribhuvan University, Department of Plant Resources (then Department of Medicinal Plants/HMG) and Nepal Agricultural Research Council mentioned about the deposition of their herbarium specimens in the respective organizations. This paper also analyzed the publication media in which the reviewed papers appeared.

Key words: principal weeds, *Triticum aestivum*, weed flora, weed survey, wheat

INTRODUCTION

In Nepal, wheat (*Triticum aestivum* L.) is the principal winter crop with an annual production of 1746 thousand M. Tons in 2011 (www.indexmundi.com). The average yield of this crop is 1300 Kg/ha which is low in comparison to other countries. The low production of wheat may be associated with many factors; among them, weeds are one of the major problems. The weeds infesting the wheat crop reduce the crop yield upto 50 % in Nepal (Malla and Ranjit 1980, Ranjit 1982, Bhatta 1981, Shivakoti *et al.* 1977). To get maximum production, weeds of wheat should be managed properly. Since the weed management depends upon the type and intensity of weeds present in the crop fields, a sound knowledge on wheat weeds is necessary for determining economic control measures (Holm *et al.* 1977, Gupta 1984). With the same viewpoints, weeds of wheat fields from different parts of Nepal were reported (See references). However, these reports remain scattered up-to-date. This study was, therefore, undertaken to review the literature to prepare a list of species, determine the principal weed species and their distribution and herbarium specimen records mentioned in the papers dealing with weeds of wheat and their control in Nepal.

TRENDS IN WEED SURVEY IN WHEAT FIELDS

There are altogether 26 published papers on weeds and their control: 9 dealing with taxonomy and some aspects of weed flora, 8 with weed control on wheat and 2 with weed flora and their control. Numata, a Japanese ecologist published a paper on "methodology for the study of weed vegetation" giving examples of weeds of wheat of Nepal (Numata 1982). The studies on weeds and /or their control was initiated by Dr. O. P. Gupta in 1977 who worked as a visiting professor at the Institute of Agriculture and Animal Science, Tribhuvan University, Rampur,

Chitwan, Nepal for 2 years. In late 1970's the results of weed surveys in crop fields of Rampur (Gupta *et al.* 1977) and Kathmandu Valley (Rajbhandary and Ojha 1979) were reported. In 1980's, there were some works on weed flora of Jiri (Numata 1982), Kavre (Joshi and Gretzmacher 1999), Birganj (Dangol 1987), Rampur (Dangol *et al.* 1988, Shah *et al.* 2011ab), Kirtipur, Kathmandu (Chaudhary and Shrestha 1981), Khokana, Lalitpur (Sapkota *et al.* 2010) and Nepal (Regmi *et al.* 1986). Research works on weed control trials were also conducted in different Agricultural Research Stations of Nepal (Bhatta 1981, Malla and Ranjit 1980, Ranjit 81/82, 1982, 1983a, 1983b, Sthapit 1986). Mazek (1991) studied the weed vegetation of cultivated fields in Nepal. There are two reports that deal with weed and weed control aspect. The summary of the family, genera and species along with study locations mentioned in the papers reviewed is given in table 1.

Table 1. List of the number of family (F), genus (G) and species (S) and study areas of the wheat weeds reported by the authors in the papers reviewed.

SN	Authors #	F	G	S	Study area*	Remarks**
1.	Bhatta (1981)	3	6	4	Bhairahawa	<i>Trifolium, Vicia</i>
2.	Chaudhary (1979) ^c	36	83	108	Kathmandu valley	
3.	Chaudhary and Shrestha (1981)	4	4	5	Kirtipur	
4.	Dangol (1987) ⁱ	16	33	35	Birganj	
5.	Dangol (2000-2001) ⁱ	21	54	65	Inner Terai and Terai	
6.	Dangol <i>et al.</i> (1988) ⁱ	27	57	74	Rampur areas	
7.	Dangol and Chaudhary (1991)	16	23	30	Rampur	<i>Ixeris</i> , Unidentified genus
8.	Dangol (2001)	18	27	31	Rampur	
9.	Devkota (1983)	11	17	14		<i>Melilotus, Rumex, Vicia</i> ,
10.	Gupta <i>et al.</i> (1977) ^A	9	9	9	Rampur	
11.	Joshi and Gretzmacher (1999)	22	48	64	Kavre	
12.	Malla and Ranjit (1980)	5	6	4	Khumal	<i>Cyperus, Vicia</i> ,
13.	Manandhar (1978) ^N	19	86	122	Kathmandu valley	

14.	Mazek (1991)	31	82	113	Nepal	
15.	Numata (1982)	7	9	11	Jiri	<i>Polygonum</i>
16.	Rajbhandary and Ojha (1979)	20	34	39	Kathmandu valley	<i>Heliotropium</i>
17.	Ranjit (1981/82)	4	7	5	Khu, Bhw and Har	<i>Rumex, Trifolium</i>
18.	Ranjit (1983a)	7	14	15	Khumal	
19.	Ranjit (1983b)	6	11	8	Khu, Bhw and Har	<i>Alopecurus, Rumex, Trifolium</i>
20.	Ranjit (1999)	6	11	7		<i>Alopecurus, Gnaphalium, Polygonum</i>
21.	Ranjit (2003)	6	8	6		<i>Alopecurus, Rumex</i>
22.	Ranjit and Bhattarai (1988)	11	21	22	Nepal	
23.	Ranjit and Suwanketnikom (2003)	13	23	22	Khumal	<i>Bothriospermum, Lactuca, Mazus, Polygonum, Ranunculus</i>
24.	Ranjit <i>et al.</i> (2006)	20	48	43	Nepal	<i>Alopecurus, Alternanthera, Cyperus, Digitaria, Equisetum, Lactuca, Lindernia, Mazus, Polygonum, Rumex</i>
25.	Ranjit <i>et al.</i> (2009)	6	8	8	Khumal	
26.	Regmi <i>et al.</i> (1986)	31	71	96	Nepal	<i>Aster, Pratia, Impatiens, Mazus, Cerastium, Scrophularia</i>

27.	Sapkota <i>et al.</i> (2010)	18	38	44	Khokana	<i>Arenaria, Bidens, Clerodendrum, Convolvulus, Cynoglossum, Persicaria, Torenia, Vernonia</i>
28.	Shah <i>et al.</i> (2011a)	11	19	19	Rampur	<i>Erigeron, Vicia</i>
29.	Shah <i>et al.</i> (2011b)	11	19	19	Rampur	<i>Erigeron, Vicia</i>
30.	Sharma <i>et al.</i> (2010)	19	38	43	Manang	<i>Campanula, Cremanthodium</i>
31.	Shivakoti <i>et al.</i> (1977)	3	3	3	Rampur	
32.	Sthapit (1986)	5	5	5	LAC	
33.	Thapa (2003)	26	48	57	Pokhara	<i>Bothriochloa, Erigeron</i>
34.	Thapa and Kayastha (1996)	26	48	54	Pokhara	<i>Bothriochloa, Equisetum, Erigeron, Marchantia, Sonchus</i>

Author(s) name marked with letters deposited their herbarium collections in different institutions in Nepal,

A=Department of Agronomy, IAAS, Rampur, C=Central Department of Botany (Kirtipur), I=IAAS Herbarium (Rampur), and N=National Herbarium (Godawary),

* Khu, Bhw and Har=Khumal, Bhairahawa and Hardinath, LAC=Lumle Agriculture Centre.

** Identified upto genus level only

WEED DIVERSITY

In Nepal, 370 species of wheat weeds representing 54 families and 210 genera of vascular plants were listed (Appendix 1). There were 4 non-flowering plants and 330 flowering plants (293 flowering plant dicots and 73 flowering plant monocots) (Figure 1). Among the total families, 16 families include 5 or more species which accounted for 79.19% of the total weed species recorded. Two most dominant families were the Aseraceae and Poaceae which had 69 and 52 weed species, respectively. There were 22 families with 2 to 4 species and 16 families with 1 species each. In the papers reviewed, the best-represented genus was *Polygonum* (15 spp.) followed by *Euphorbia* and *Stellaria* (8 spp. each), *Eragrostis*, and *Solanum* (7 spp. each), *Vicia* (6 spp.), and *Lindernia* and *Veronica* (5 spp. each). There were 15 genera with 4 spp., 16 genera with 3 spp., and 30 genera with 2 spp. The rest 141 genera were represented with 1 sp. each in the weeds of wheat in Nepal.

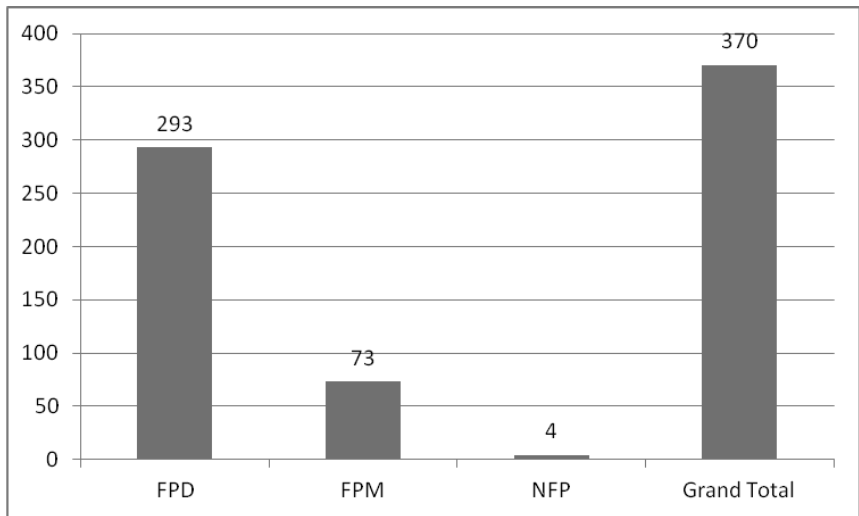


Figure 1. Floristic analysis of weed species of wheat in different groups (FPD= flowering plant dicot, FPM= flowering plants monocot, NFP= Non-flowering plants).

PRINCIPAL WEEDS AND THEIR DISTRIBUTION

Almost all authors of the reviewed papers mentioned some species as major/principal/ important weeds of wheat on the basis of visual estimation. However, Dangol *et al.* (1988) used summed dominance ratio {SDR= (relative density and relative frequency)/2} to calculate major/minor weeds. Numata (1982) also suggested such type of SDR expression for determining major weeds in farmlands. Mazek (1991) followed Braun-Blanquet method for estimating the cover value of weed species. Some authors used other ecological parameters for identifying dominant weeds (Dangol 2001, Ranjit *et al.* 2006, Sharma *et al.* 2010, Sapkota *et al.* 2010). The 63 weed species, which were reported as dominant/principal/abundant or major wheat weeds in the literature reviewed, are listed alphabetically in Table 2. Of the 63 major weeds, 53 were reported from hilly regions, 14 from the Inner Terai and 12 from Terai regions of Nepal. The species like *Chenopodium album* (Bethel), *Phalaris minor* (Ragat jhar), and *Cynodon dactylon* (Dubo), *Polygonum plebeium* (Sukuljhar) and *Vicia sativa* (Kutilkosha) were mentioned as major weeds for the three wheat growing regions of the country (table 2). Some of the weeds such as *Chenopodium album*, *Phalaris minor*, *Vicia sativa*, *Polygonum plebeium* (Sukule jhar) were the principal problem weeds of wheat in the Terai (Bhairahawa and Birganj) and hilly (Kathmandu Valley) regions of Nepal. Of the above three weeds, *Chenopodium album* and *Cynodon dactylon* were not reported as the major weeds of wheat in western hilly area (Sthapit 1986) and *Phalaris minor* in the central Inner Terai (Dangol *et al.*, 1988). Some of the weeds were locally important; for example *Cannabis sativa* (Ganja or Bhang) was reported as one of the most problematic weeds in wheat in the Kathmandu Valley.

Table 2. Alphabetical list of principal weeds reported in wheat of hills, inner Terai and Terai in Nepal.

SN	Principal species	Hills ¹	Inner Terai ²	Terai ³	SN	Principal species	Hills ¹	Inner Terai ²	Terai ³
1.	<i>Ageratum conyzoides</i>	K			33	<i>Lolium temulentum</i>			B
2.	<i>Ageratum houstonianum</i>		C		34	<i>Mazus japonicus</i>	K	C	
3.	<i>Alopecurus aequalis</i>	K			35	<i>Medicago denticulata</i>	P	C	R
4.	<i>Alopecurus nepalensis</i>	K			36	<i>Melilotus alba</i>			R
5.	<i>Alopecurus pratensis</i>	N			37	<i>Oxalis corniculata</i>	K	C	
6.	<i>Alternanthera sessilis</i>	K			38	<i>Oxalis latifolia</i>	K		
7.	<i>Anagallis arvensis</i>		C	B,R	39	<i>Paspalum distichum</i>	J		
8.	<i>Aeschynomene indica</i>	J			40	<i>Phalaris minor</i>	K,L,N,P	C	B,H,R
9.	<i>Bidens pilosa</i>	P			41	<i>Phleum alpinum</i>	M		
10.	<i>Bothriospermum tenellum</i>		C		42	<i>Phyla nodiflora</i>	K		
11.	<i>Cannabis sativa</i>	K			43	<i>Plantago major</i>	K		
12.	<i>Capsella bursa-pastoris</i>	K			44	<i>Polygonum aviculare</i>	K		
13.	<i>Carex nubigena</i>	J			45	<i>Polygonum capitatum</i>	L		
14.	<i>Centella asiatica</i>	P			46	<i>Polygonum hydropiper</i>	K,L,N		
15.	<i>Chenopodium album</i>	K,M,N,P	C	B,H,R	47	<i>Polygonum plebeium</i>	K,N,P	C	R
16.	<i>Convolvulus arvensis</i>	M			48	<i>Polygonum viscosum</i>	N		
17.	<i>Coronopus didymus</i>	K			49	<i>Polypogon fugax</i>	N		
18.	<i>Cynodon dactylon</i>	K,N,P	C	B,R	50	<i>Polypogon monspeliensis</i>			R
19.	<i>Cyperus cyperoides</i>	J			51	<i>Rorippa palustris</i>	K		
20.	<i>Cyperus rotundus</i>	P			52	<i>Rumex crispus</i>	K		
21.	<i>Digitaria adscendens</i>		C		53	<i>Rumex dentatus</i>			B,R
22.	<i>Digitaria sanguinalis</i>		C		54	<i>Senecio vulgaris</i>	K		
23.	<i>Drymaria cordata</i>	L			55	<i>Sennebiera pinnatifida</i>	K		
24.	<i>Eclipta prostrata</i>	L			56	<i>Solanum carolinense</i>	J		
25.	<i>Equisetum debile</i>	P		B	57	<i>Solanum nigrum</i>	J		
26.	<i>Euphorbia hirta</i>	K			58	<i>Soliva anthemifolia</i>	K		
27.	<i>Fumaria indica</i>	P			59	<i>Stellaria media</i>	K		
28.	<i>Galinsooga parviflora</i>	K,L			60	<i>Vicia angustifolia</i>	K	C	
29.	<i>Gnaphalium luteo-album</i>	P	C	B	61	<i>Vicia hirsuta</i>	K	C	
30.	<i>Hydrocotyle nepalensis</i>	K			62	<i>Vicia sativa</i>	K	C	R
31.	<i>Imperata cylindrica</i>	K			63	<i>Vicia tetrasperma</i>	K		
32.	<i>Lathyrus aphaca</i>		C	B,H,R					

¹Hills: J=Jiri; K=Kathmandu valley; L=Lumle Agricultural Centre; M=Manang; N=Naldung; P=Pokhara;

²Inner Terai: C=Chitwan (224 m),

³Terai: R=Rupandehi (Bhairahawa (109 m), Paklihawa, Chhotibansar); 6=Birganj (86 m);

7=Hardinath (100 m)] in which a particular species of weeds is present and M=Mangang *Chenopodium album* was the most commonly reported weed of wheat in Nepal which was listed in 31 papers out of 34 papers reviewed (table 3). *Cynodon dactylon*, *Phalaris minor* and *Polygonum plebeium* were the weeds mentioned in 28, 25, and 21 articles reviewed. *Cannabis sativa* and *Gnaphalium luteo-album* were listed in 18 papers and *Oxalis corniculata* was reported as weed in 15 literatures reviewed. One-hundred seventy-seven weeds were reported in only one literature (table 3). *Chenopodium album* and *Cynodon dactylon* were regarded as being the most important weeds in wheat in the world (Holm *et al.* 1977)

Table 3. The most commonly reported weeds of wheat in Nepal in the literature reviewed (total number of literature reviewed is 34).

SN	Species list	Total species	Total literature
1.	<i>Chenopodium album</i>	1	31
2.	<i>Cynodon dactylon</i>	1	28
3.	<i>Phalaris minor</i>	1	25
4.	<i>Polygonum plebeium</i>	1	21
5.	<i>Cannabis sativa</i> , <i>Gnaphalium luteo-album</i>	2	18
6.	<i>Oxalis corniculata</i>	1	15
7.	<i>Anagallis arvensis</i> , <i>Centella asiatica</i> , <i>Polygonum hydropiper</i> , <i>Solanum nigrum</i> , <i>Vicia hirsuta</i> , <i>Vicia sativa</i>	6	14
8.	<i>Avena fatua</i> , <i>Capsella bursa-pastoris</i> , <i>Lathyrus aphaca</i>	3	11
9.	<i>Alternanthera sessilis</i> , <i>Hydrocotyle rotundifolia</i> , <i>Mazus japonicus</i> , <i>Polypogon fugax</i> , <i>Vicia tetrasperma</i>	5	10
10.	<i>Ageratum conyzoides</i> , <i>Androsace rotundifolia</i> , <i>Breea arvensis</i> , <i>Cyperus rotundus</i> , <i>Fumaria parviflora</i> , <i>Rungia parviflora</i> , <i>Stellaria media</i>	7	9
11.	<i>Alopecurus aequalis</i> , <i>Cardamine sylvatica</i> , <i>Gnaphalium purpureum</i> , <i>Mazus surculosus</i> , <i>Medicago denticulata</i> , <i>Melilotus alba</i> , <i>Melilotus indica</i> , <i>Phyla nodiflora</i> , <i>Senebiera pinnatifida</i> , <i>Senecio vulgaris</i>	10	8
12.	<i>Ageratum houstonianum</i> , <i>Bidens pilosa</i> , <i>Blumea lacera</i> , <i>Convolvulus arvensis</i> , <i>Trifolium repens</i>	5	7
13.	<i>Amaranthus spinosus</i> , <i>Bothriospermum tenellum</i> , <i>Digitaria ciliaris</i> , <i>Eclipta prostrata</i> , <i>Emilia sonchifolia</i> , <i>Euphorbia hirta</i> , <i>Galinsoga parviflora</i> , <i>Ixeris polycephala</i> , <i>Medicago lupulina</i> , <i>Rumex dentatus</i> , <i>Spergula arvensis</i> , <i>Soliva anthemifolia</i> , <i>Sonchus arvensis</i> , <i>Sonchus asper</i> , <i>Xanthium strumarium</i>	15	6
14.	See Appendix 1	18	5

15.	See Appendix 1	17	4
16.	See Appendix 1	36	3
17.	See Appendix 1	64	2
18.	See Appendix 1	177	1

HERBARIUM RECORDS

The authors employed either in National Herbarium (Kathmandu) or in the academic institutions reported about the deposition of their weed collections (table 1). The herbarium specimens of weeds were housed in National Herbarium, Godawary (Manandhar 1978); IAAS Herbarium, Rampur (Dangol 1987, Dangol *et al.* 1988); Agronomy Department, IAAS, Rampur (Gupta *et al.* 1977); and Central Department of Botany, Kirtipur (Chaudhary 1979, Chaudhary and Shrestha 1981) and Weed Science Unit, Agronomy Division, NARC, Khumaltar, Lalitpur (Joshi and Gretzmacher 1999). Except the above-mentioned authors, the others did not mention in their papers whether they had prepared herbarium specimens or not.

PUBLICATION MEDIA

The authors of the papers on weed control, except Ranjit and Bhattarai (1988), who reported 22 common weeds of wheat for Nepal in Crop Weeds and Their Control) mentioned only few weed species from experimental plots of different locations of Nepal such as Khumaltar (Central midhill), Bhairahawa (western Terai), and Hardinath (central Terai). Their reports were published in "Krishi" (magazine in Nepalese language), "Wheat Research Reports", "Wheat Report", and "Wheat, Barley and Triticale Report", "Annual Reports", etc.

Researchers published their research findings related to weedflora, ecology and weed management in different scientific journals published from Nepal, India and other countries. The authors published their research articles in the "*J. Inst. Agric. Anim. Sci.*" (Gupta *et al.* 1977, Dangol, 1987, Dangol *et al.* 1988); "*J. Nat. Hist. Mus.*" (Chaudhary 1979, Chaudhary and Shrestha 1981), "*Nepalese J. Agric.*" (Rajbhandary and Ojha 1979); "*Bull. Bot. Surv. India*" (Manandhar 1978); "*Botanica Orientalis*" (Sapkota *et al.* 2010); "*Agriculture Development Journal*" (Shah *et al.* 2011a), "*International Research Journal of Applied and Basic Sciences*" (Shah *et al.* 2011b), "*Nepal Journal of Science and Technology*" (Joshi and Gretzmacher 1999) and "*Kasetsart J.*" (Ranjit and Suwanketnicom 2003). The article of Regmi *et al.* (1986) was published in the proceedings of winter crops workshop held at Rampur Agriculture Station, Chitwan. It is obvious from the papers (table 1) that most of the works were either conducted in the Kathmandu valley or in the Chitwan valley. The total number of weeds reported by Regmi *et al.* (1986) i.e. 96 spp. for Nepal is very few in compared to the number of weeds reported from the two valleys (Kathmandu: 122 spp. and Chitwan: 78 spp.). Some genera, which were not identified into species, are listed from the papers on weed control and some from the paper of Regmi *et al.* (1986).

CONCLUSION

It is evident from publications that weed survey works were mostly confined either to the Kathmandu Valley or to the Chitwan Valley, and were conducted more than 20 years ago in

the former valleys, there opens a scope of conducting systematic and ecological surveys of weed community in the wheat fields of Nepal in order to understand the succession of weed community in the wheat fields vegetation and prioritize the weed management researches. Such type of survey should lead to establish weed herbarium at least in the agricultural academic and research institutions, namely in the Institute of Agriculture and Animal Science/ Tribhuvan University, University of Agriculture and Forestry, Rampur, Chitwan and National Council of Agricultural Research, Khumaltar, Nepal. The herbarium records will aid in tracing the succession of weed communities in wheat in Nepal in future and aid as teaching and research materials for students, agriculturists, botanists and ecologists. Ecophysiological study on the principal weeds of wheat need to be studied with respect to important wheat varieties grown in Nepal so that their interaction principles could be understood and applied in the weed management in wheat.

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Appendix 1. Weeds reported to occur in wheat in Nepal.

(Families are arranged as per the Bentham and Hooker's classification system; species are arranged alphabetically in each family)

FAMILY NAME/Scientific names {Synonyms} "Nepali name"	Elevation ranges' (m)	References
Non-flowering Plants		
EQUISETACEAE		
<i>Equisetum arvense</i> L." Ankhle ghans"	2000-3800	Regmi <i>et al.</i> (1986), Joshi and Gretzmacher (1999)
<i>Equisetum debile</i> Roxb. ex Vaucher " Kurkure jhar"	200-2800	Dangol (1987), Dangol (2000-2001), Thapa (2003)
<i>Equisetum diffusum</i> D. Don " Ankhle ghans"	1000-2800	Regmi <i>et al.</i> (1986)
MARSILEACEAE		
<i>Marsilea crenata</i> Presl.	250-1000	Joshi and Gretzmacher (1999)
Flowering Plants: Dicots		
RANUNCULACEAE		
<i>Ranunculus diffusus</i> DC. "Nakuro, Nakkore jhar"	1500-4000	Chaudhary (1979), Regmi <i>et al.</i> (1986)
<i>Ranunculus sceleratus</i> L. "Nakuro"	200-1700	Chaudhary (1979), Mazek (1991), Dangol (2000-2001), Sapkota <i>et al.</i> (2010)
<i>Thalictrum foliolosum</i> DC. "Dampate"	1300-3400	Regmi <i>et al.</i> (1986)

BERBERIDACEAE			
<i>Berberis aristata</i> DC. "Chutro"	1500-3000		Regmi <i>et al.</i> (1986)
PAPAVERACEAE			
<i>Argemone mexicana</i> L. "Thakal, Satyanasi"	150-1400		Manandhar (1978), Devkota (1983), Regmi <i>et al.</i> (1986), Ranjit (1999), Ranjit <i>et al.</i> (2006)
<i>Hypocoum leptocarpum</i> Hook.f. & Thompson	3310- 4050		Sharma <i>et al.</i> (2010)
FUMARIACEAE			
<i>Fumaria parviflora</i> Wt. & Ait. { <i>F. indica</i> (Hausk.) Pugsley} "Jangali gazar jhar, Sounfe jhar"	200-2150		Devkota (1983), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003), Ranjit <i>et al.</i> (2006)
BALSAMINACEAE			
<i>Impatiens sulcata</i> Wall.	130-3900		Sharma <i>et al.</i> (2010)
BRASSICACEAE			
<i>Capsella bursa-pastoris</i> (L.) Medic. "Banchamsur"	400-4500		Chaudhary (1979), Rajbhandary and Ojha (1979), Ranjit (1983a, 1983b), Ranjit and Bhattarai (1988), Mazek (1991), Joshi and Gretzmacher (1999), Ranjit (1999), Ranjit and Sumaketnikom (2003), Ranjit <i>et al.</i> (2006), Sharma <i>et al.</i> (2010)
<i>Cardamine impatiens</i> L. "Chamsur"	1500-4000		Ranjit (1983a)

<i>Cardamine pretensis</i> L.	1400	Ranjit and Bhattarai (1988), Ranjit (1999), Ranjit and Sumaketnikom (2003), Ranjit <i>et al.</i> (2006),
<i>Cardamine sylvatica</i> Link { <i>C. hirsuta</i> L.} "Chamsure jhar"	100-4000	Chaudhary (1979), Rajbhandary and Ojha (1979), Ranjit (1983a.), Regmi <i>et al.</i> (1986), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Thapa (2003)
<i>Nasturtium indicum</i> DC. { <i>Rorippa indica</i> (L.) Hiern.} "Ban rayo"	100-2000	Regmi <i>et al.</i> (1986), Mazek (1991)
<i>Nasturtium officinale</i> R. Br. ex Ait. "Sim rayo"	1400-2100	Chaudhary (1979), Ranjit and Sumaketnikom (2003),
<i>Rorippa dubia</i> (Pers.) Hara "Mulajari"	1200-1600	Thapa and Kayastha (1996), Thapa (2003)
<i>Rorippa islandica</i> Oider	1300-1500	Chaudhary (1979)
<i>Rorippa palustris</i> (L.) Bess.	1300-1500	Ranjit (1999)
<i>Rorippa sinulata</i> Nutt. Hipch.	1400	Chaudhary (1979)
<i>Senebiera parviflora</i> ?	1400	Ranjit (1983a)
<i>Senebiera pinnatifida</i> DC. { <i>S. didyma</i> Pers., <i>Coronopsis didymus</i> (L.) Sm.} "Chamsure ghans"	1400	Chaudhary (1979), Rajbhandary and Ojha (1979), Malla and Ranjit (1980), Ranjit (1983b), Regmi <i>et al.</i> (1986), Ranjit (1999), Ranjit and Sumaketnikom (2003), Ranjit <i>et al.</i> (2006)
<i>Sinapis nigra</i> L.		Mazek (1991)
CAPPARACEAE		
<i>Cleome viscosa</i> L. "Bantori"	200-750	Dangol <i>et al.</i> (1988)

VIOLACEAE			
<i>Viola diffusa</i> Ging. ex DC.	1400-2000		Mazek (1991)
<i>Viola patrini</i> DC.			Chaudhary (1979)
<i>Viola pilosa</i> Blume			Sapkota <i>et al.</i> (2010)
<i>Viola serpens</i> Wall. { <i>V. canescens</i> Wall.}	1500-2400		Chaudhary (1979), Thapa and Kayastha (1996), Thapa (2003)
CARYOPHYLLACEAE			
<i>Arenaria glanduligera</i> Edgew. ex Edgew. & Hook. f.	1300-5100		Chaudhary (1979)
<i>Arenaria serpyllifolia</i> L.	900-2900		Chaudhary (1979)
<i>Cerastium glomeratum</i> Thuill. { <i>C. vulgatum</i> L.} "Vartri"	1500-3810		Manandhar (1978)
<i>Cerastium holosteoides</i> Fries	700		Mazek (1991), Joshi and Gretzmacher (1999)
<i>Drymaria cordata</i> (L.) Willd. { <i>D. diandra</i> (Bl.) Duke} "Abhizalo, Apizalo"	700-2500		Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Sthapit (1986), Ranjit <i>et al.</i> (2006)
<i>Lepyroclis glandulosa</i> (Benth. ex G. Don) Ohba	1300 1700		Manandhar (1978)
<i>Polycarpon prostratum</i> (Forssk.) Aschers.	200-1400		Mazek (1991), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Shah <i>et al.</i> (2011ab)
<i>Saponaria vaccaria</i> L. { <i>Vaccaria pyramidata</i> Medic.} "Sabuni jhar"	Up to 1500		Regmi <i>et al.</i> (1986)

<i>Silene conoidea</i> L.	1200-3300	Mazek (1991)
<i>Spergula arvensis</i> L. "Jyayau jhar, Syal jhar"	900-1500	Rajbhandary and Ojha (1979), Ranjrit (1983a), Regmi <i>et al.</i> (1986), Ranjrit and Bhattarai (1988), Ranjrit (1999), Sapkota <i>et al.</i> (2010)
<i>Stellaria alsine</i> Grimm.	1400-4500	Mazek (1991), Ranjrit and Sumaketnikom (2003)
<i>Stellaria aquatica</i> (L.) Scop.	1400	Mazek (1991), Joshi and Gretzmacher (1999), Ranjrit and Sumaketnikom (2003)
<i>Stellaria documbens</i> Edgew.	3200-4000	Sharma <i>et al.</i> (2010)
<i>Stellaria himalayensis</i> Majumdar { <i>S. latifolia</i> (Benth. ex Royle) Edgew. Hook. f.}	2600-3400	Manandhar (1978)
<i>Stellaria patens</i> D. Don { <i>S. longissima</i> Wall.}	1300-4000	Chaudhary (1979), Mazek (1991)
<i>Stellaria media</i> (L.) Vill. "Kukhure"	1000-2600	Chaudhary (1979), Regmi <i>et al.</i> (1986), Ranjrit (1999), Ranjrit (2003), Ranjrit and Sumaketnikom (2003), Ranjrit <i>et al.</i> (2006), Ranjrit <i>et al.</i> (2009), Sapkota <i>et al.</i> (2010), Sharma <i>et al.</i> (2010)
<i>Stellaria nepalensis</i> Majumdar & Vartak	700-2200	Mazek (1991)
<i>Stellaria uliginosa</i> Murr.	1400-1700	Joshi and Gretzmacher (1999)
PORTULACACEAE		
<i>Portulaca oleracea</i> L.	200-1500	Manandhar (1978), Chaudhary (1979)
HYPERICACEAE		

Appendix 1 Contd ...

<i>Hypericum japonicum</i> Thunb. ex Murray "Urelo jhar"	150-2600	Chaudhary (1979), Rajbhanday and Ojha (1979), Regmi <i>et al.</i> (1986)
<i>Sarothra laxa</i> (Bl.) Kimura	150-2600	Joshi and Gretzmacher (1999)
MALVACEAE		
<i>Malva verticillata</i> L.	2100-3500	Sharma <i>et al.</i> (2010)
<i>Sida cordifolia</i> L.	500-1100	Mazek (1991)
<i>Sida rhombifolia</i> L. "Barena"	100-1900	Manandhar (1978), Sapkota <i>et al.</i> (2010)
STERCULIACEAE		
<i>Melochia corchorifolia</i> L. "Patuwa jhar"	200-1300	Regmi <i>et al.</i> (1986)
TILIACEAE		
<i>Grewia sapida</i> Roxb. { <i>G. pumila</i> Ham. ex D. Don}	250	Dangol <i>et al.</i> (1988)
GERANIACEAE		
<i>Geranium nepalense</i> Sw.	1500-4000	Chaudhary (1979), Rajbhanday and Ojha (1979), Mazek (1991)
<i>Geranium polyalthes</i> Edgew. & Hook.f.	2400-2500	Sharma <i>et al.</i> (2010)
<i>Geranium pratense</i> L.	2200-3500	Sharma <i>et al.</i> (2010)
OXALIDACEAE		

<i>Oxalis corniculata</i> L. "Chari amilo"	200-2900	Gupta <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Dangol (2000-2001), Ranjit and Sumaketnikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2006), Shah <i>et al.</i> (2011ab)
<i>Oxalis corymbosa</i> L. "Thulo chariamilo"	1200-1800	Thapa and Kayastha (1996), Thapa (2003)
<i>Oxalis latifolia</i> HBK "Chari amilo"	250-1600	Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Ranjit (1999)
RHAMNACEAE		
<i>Zizyphus jujuba</i> L. "Bayer"	200-1200	Thapa and Kayastha (1996)
LINACEAE		
<i>Linum usitissimum</i> Lamk. "Alas"	150-3800	Thapa and Kayastha (1996), Thapa (2003)
LEGUMINOSAE		
<i>Aeschynomene indica</i> L.	200-1300	Numata (1982)
<i>Argyolobium roseum</i> (Cambass) Jaub. & Spach	1900-3200	Sharma <i>et al.</i> (2010)
<i>Cassia tora</i> L. "Tapre jhar"	200-1300	Dangol <i>et al.</i> (1988)
<i>Crotalaria juncea</i> L.	250	Dangol <i>et al.</i> (1988)
<i>Indigofera linifolia</i> (L.f.) Retz.	300-1300	Sapkota <i>et al.</i> (2010)

Appendix 1 Contd ...

<i>Lathyrus aphaca</i> L. "Banmatar, Pitpir, Jangalimatar, Jangali kheshar, Jangali kerau"	200-1200	Manandhar (1978), Chaudhary (1979), Devkota (1983), Ranjit (1983b), Regmi <i>et al.</i> (1986), Dangol (1987), Ranjit and Bhattarai (1988), Mazek (1991), Ranjit (1999), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)
<i>Lathyrus sativus</i> L.	200-1500	Sapkota <i>et al.</i> (2010)
<i>Lens culinaris</i> Medik.	150-1000	Sharma <i>et al.</i> (2010)
<i>Lotus corniculatus</i> L. "Badami jhar, Pyauli Charidana gera"	1500-3900	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986)
<i>Medicago denticulata</i> Willd. { <i>M. polymorpha</i> L.} "Sankhe pyauli"	200-400	Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003), Ranjit <i>et al.</i> (2006)
<i>Medicago falcata</i> L. "Bhiren"	2700-4000	Regmi <i>et al.</i> (1986)
<i>Medicago lupulina</i> L. "Pahenlo jhuppe pyauli"	100-4000	Chaudhary (1979), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Dangol (2000-2001), Sharma <i>et al.</i> (2010)
<i>Medicago sativa</i> L.	2900	Sharma <i>et al.</i> (2010)
<i>Meililotus alba</i> Medic. "Methi jhar"	200-1000	Manandhar (1978), Bhatta (1981), Ranjit (1982, 1983b), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol (2000-2001)
<i>Meililotus indica</i> Mill. { <i>M. parviflora</i> Desf.} "Methi jhar"	200-3600	Rajbhandary and Ojha (1979), Ranjit (1983a), Regmi <i>et al.</i> (1986), Dangol (1987), Ranjit and Bhattarai (1988), Ranjit (1999), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)

<i>Parochletus communis</i> Buch.-Ham. ex D. Don "Nilopyauli"	900-4000	Regmi <i>et al.</i> (1986)
<i>Trifolium pratense</i> L	1300-2500	Manandhar (1978)
<i>Trifolium repens</i> L. "Beuli, Pyauli"	1300-2500	Chaudhary (1979), Rajbhandary and Ojha (1979), Ranjit (1983a), Regmi <i>et al.</i> (1986), Ranjit (1999), Ranjit and Sumaketnikom (2003), Sapkota <i>et al.</i> (2010)
<i>Trigonella emodi</i> Benth.	1800-1900	Sharma <i>et al.</i> (2010)
<i>Vicia angustifolia</i> L.	200-4000	Manandhar (1978), Mazek (1991), Joshi and Gretzmacher (1999)
<i>Vicia hirsuta</i> (L.) S. F. Gray "Ankara, Jhuse ankati, Kutlikosa"	200-2700	Manandhar (1978), Rajbhandary and Ojha (1979), Chaudhary and Shrestha (1981), Ranjit (1982, 1983a), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit and Sumaketnikom (2003), Ranjit <i>et al.</i> (2006)
<i>Vicia parviflora</i> "Sano kutlikosa"		Regmi <i>et al.</i> (1986)
<i>Vicia rigidula</i> Royle	250	Dangol <i>et al.</i> (1988)
<i>Vicia sativa</i> L. "Kutlikosa"	200-2700	Chaudhary (1979), Rajbhandary and Ojha (1979), Chaudhary and Shrestha (1981), Ranjit (1983a, 1983b), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988) Mazek (1991), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)

<i>Vicia tetrasperma</i> Moench. "Sano kutilkosa"	200-2700	Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Dangol (1987), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Dangol (2000-2001), Thapa (2003)
ROSACEAE		
<i>Duchesnea indica</i> Focke { <i>Fragaria indica</i> Andrs.} "Pahelo phul, Bhuikaphal"	1000-2500	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Mazek (1991)
<i>Duchesnea nubicola</i> Lindl.	1600-4000	Mazek (1991)
<i>Fragaria rubiginosa</i> Laciata { <i>F. vesca</i> L.} "Bhuikaphal"	1000-2500	Chaudhary (1979)
<i>Potentilla kleiniana</i> Wight.	1000-2200	Chaudhary (1979), Mazek (1991)
<i>Potentilla supina</i> L. "Bajradanti"	200-1400	Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999),
LYTHRACEAE		
<i>Ammannia rotundifolia</i> Lam.	250-2300	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Mazek (1991),
<i>Rotala rotundifolia</i> (Roxb.) Koehne	250-2300	Joshi and Gretzmacher (1999)
ONAGRACEAE		
<i>Ludwigia perennis</i> L. "L'wang jhar"	200-1400	Dangol <i>et al.</i> (1988)
<i>Oenothera rosea</i> L 'he'rit. ex Ait.	1100-2500	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Mazek (1991)

MOLLUGINACEAE				
<i>Mollugo hirta</i> Thunb.	1600-3200		Regmi <i>et al.</i> (1986)	
APIACEAE				
<i>Centella asiatica</i> (L.) Urb. "Ghod tapre"	200-2100		Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Thapa (2003), Joshi and Gretzmacher (1999), Ranjit <i>et al.</i> (2006), Sapkota <i>et al.</i> (2010), Shah <i>et al.</i> (2011ab)	
<i>Hydrocotyle nepalensis</i> Hook.	1000-2900		Ranjit (1999)	
<i>Hydrocotyle rotundifolia</i> Roxb. ex DC. { <i>H. sibthorpioides</i> Lam.} "Ghod tapre"	200-2500		Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Dangol (2000-2001), Thapa (2003), Shah <i>et al.</i> (2011ab)	
<i>Oenanthe javanica</i> (Bl.) DC. { <i>O. stolonifera</i> Wall. ex. DC.}	200-1500		Regmi <i>et al.</i> (1986)	
RUBIACEAE				
<i>Galium hirtiflorum</i> Req. ex DC.	1200-2200		Sharma <i>et al.</i> (2010)	
<i>Oldenlandia aspera</i> DC.	250		Gupta <i>et al.</i> (1977)	
<i>Oldenlandia corymbosa</i> L.	200-2400		Manandhar (1978)	
<i>Oldenlandia diffusa</i> (Willd.) Roxb. "Majithe jhar"	200-1000		Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991)	

<i>Oldenlandia gracilis</i> Wall. "Majithe jhar"	250	Dangol <i>et al.</i> (1988)
VALERIANACEAE		
<i>Valeriana jatamassi</i> Jones { <i>V. wallichii</i> DC.} "Sugandhawala"	1500-3500	Chaudhary (1979)
ASTERACEAE		
<i>Ageratum conyzoides</i> L. "Ganemane ghans"	200-2000	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1988), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Thapa (2003), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)
<i>Ageratum houstonianum</i> Mill. "Nilo gandhe"	200-1400	Manandhar (1978), Regmi <i>et al.</i> (1988), Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994), Dangol (2000-2001), Shah <i>et al.</i> (2011ab),
<i>Anaphalis adnata</i> Wall. ex DC. "Bukephul"	800-3200	Manandhar (1978)
<i>Anaphalis contorta</i> (D.Don) Hook. f.	1700-5180	Manandhar (1978)
<i>Anaphalis triplinervis</i> (Sims) C. B. Clarke	1800-3300	Manandhar (1978)
<i>Artemisia biennis</i> Willd.	3700-4400	Sharma <i>et al.</i> (2010)
<i>Artemisia gmelinii</i> Weber ex Stechm	2800-4300	Sharma <i>et al.</i> (2010)
<i>Artemisia vulgaris</i> L.	300-2400	Joshi and Gretzmacher (1999), Ranjit <i>et al.</i> (2006)
<i>Bidens bipinnata</i> L. "Kuro"	900-2300	Manandhar (1978)
<i>Bidens formosa</i> (Bonato) Sch.-Bip.		Sharma <i>et al.</i> (2010)

<i>Bidens pilosa</i> L. "Kuro"	700-2400	Manandhar (1978), Chaudhary (1979), Dangol et al. (1988), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Thapa (2003), Ranjit et al. (2006)
<i>Blumea lacera</i> (Burm. f.) DC.	150-350	Chaudhary (1979), Rajbhandary and Ojha (1979), Dangol (1987), Mazek (1991), Thapa and Kayastha (1996), Thapa (2003), Sapkota et al. (2010)
<i>Blumea laciniata</i> (Roxb.) DC.	300-1100	Dangol (2000-2001)
<i>Breea arvensis</i> (L.) Less. { <i>Cirsium arvense</i> (L.) Scop., <i>Cnicus arvensis</i> Hoffm.} "Gaidakanda, Sungurkanda"	200-1100	Rajbhandary and Ojha (1979), Devkota (1983), Regmi et al. (1986), Dangol et al. (1988), Ranjit and Bhattarai (1988), Mazek (1991), Ranjit (1999), Dangol (2000-2001), Ranjit et al. (2006)
<i>Caesulia axillaris</i> Roxb. "Thukjhar"	150-1500	Dangol (1987), Dangol et al. (1988), Dangol (2000-2001)
<i>Centipeda minima</i> (L.) A. Br. et Aschers.	200-1600	Dangol (1987), Mazek (1991)
<i>Cirsium falconeri</i> (Hook. f.) Petrak.	3000-4300	Sharma et al. (2010)
<i>Cirsium verutum</i> (D. Don) Spreng. { <i>C. argyracanthum</i> DC., <i>Cnicus argyracanthus</i> (L.) C. B. Clarke}	750-3550	Manandhar (1978), Chaudhary (1979)
<i>Cirsium wallichii</i> DC. { <i>Cnicus argyracanthus</i> (L.) C. B. Clarke} "Kande thakal"	1300-2200	Manandhar (1978), Chaudhary (1979)
<i>Conyza canadensis</i> (L.) Cronq.	700-1200	Joshi and Gretzmacher (1999)

Appendix 1 Contd ...

<i>Conyza japonica</i> (Thunb.) Less. ex DC.	600-2600	Manandhar (1978), Rajbhandary and Ojha (1979), Dangol <i>et al.</i> (1988), Mazek (1991)
<i>Conyza stricta</i> Willd.	600-2000	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Sapkota <i>et al.</i> (2010)
<i>Cotula hemisphaerica</i> (Roxb.) Wall. ex C. B. Clarke "Galphule"	420-1800	Regmi <i>et al.</i> (1986), Mazek (1991), Joshi and Gretzmacher (1999)
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore. "Bakhare ghans"	400-1900	Manandhar (1978), Chaudhary (1979), Joshi and Gretzmacher (1999), Thapa and Kayastha (1996), Thapa (2003)
<i>Cyathocline lyrata</i> Cass. { <i>C. purpurea</i> (Buch.-Ham. ex D. Don) O. Kuntze} "Galphule"	600-1800	Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991)
<i>Dichrocephala benthamii</i> C. B. Clarke "Chhiuki jhar"	600-2500	Dangol (1987), Sapkota <i>et al.</i> (2010)
<i>Dichrocephala chrysanthemifolia</i> (Blume) DC. "Hachhuinkar jhar"	1300-2500	Chaudhary (1979)
<i>Dichrocephala gracilis</i> DC.	250-2600	Mazek (1991), Dangol (2000-2001)
<i>Dichrocephala integrifolia</i> (L. f.) O. Kuntze { <i>D. latifolia</i> DC.} "Chhiuki jhar"	800-3000	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Dangol (2000-2001)
<i>Eclipta prostrata</i> (L.) L. { <i>E. alba</i> (L.) Hassk.} "Bhringraj"	200-1500	Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Joshi and Gretzmacher (1999), Dangol (2000-2001), Sapkota <i>et al.</i> (2010)
<i>Emilia sonchifolia</i> (L.) DC. "Mulapate jhar"	500-1700	Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Thapa (2003), Sapkota <i>et al.</i> (2010)

<i>Erigeron floribundus</i> (HBK) Schultz-Bip. { <i>E. bonariensis</i> L.}	200-2400	Manandhar (1978), Chaudhary (1979)
<i>Erigeron multicaulis</i> Wall. ex DC.	600-2600	Manandhar (1978)
<i>Eupatorium adenophorum</i> Spreng. { <i>E. glandulosum</i> HBK} "Banmara"	850-2400	Manandhar (1978), Chaudhary (1979), Mazek (1991), Joshi and Gretzmacher (1999)
<i>Galinsoga parviflora</i> Cav. "Chitalange ghans, Anikale jhar"	250-3000	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Sthapit (1986), Joshi and Gretzmacher (1999), Ranjit <i>et al.</i> (2006)
<i>Galinsoga quadrifolia</i> Ruiz & Pavon { <i>G. ciliata</i> (Raf) Blake} "Chitalange jhar"	250-3000	Regmi <i>et al.</i> (1986), Mazek (1991), Joshi and Gretzmacher (1999)
<i>Gnaphalium indicum</i> L. { <i>G. polycaulon</i> Pers.} "Bokephul"	200-1400	Regmi <i>et al.</i> (1986), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Dangol (2000-2001)
<i>Gnaphalium luteo-album</i> L. { <i>G. affine</i> D. Don.} "Bokephul"	200-3700	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Numata (1982), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Ranjit (1999), Joshi and Gretzmacher (1999), Dangol (2000-2001), Ranjit and Sumaketnikom (2003), Thapa (2003), Sapkota <i>et al.</i> (2010)
<i>Gnaphalium purpureum</i> L. "Husure"	200-1400	Manandhar (1978), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol and Chaudhary (1994), Dangol (2000-2001), Shah <i>et al.</i> (2011ab)
<i>Grangea maderaspatana</i> (L.) Poir. "Gobre jhar"	150-1500	Manandhar (1978), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991), Joshi and Gretzmacher (1999)

<i>Gynura nepalensis</i> DC.	250-2000	Sharma <i>et al.</i> (2010)
<i>Hemisepta lyrata</i> Burge	200-1400	Mazek (1991), Shah <i>et al.</i> (2011ab)
<i>Ixeris polycephala</i> Cass. { <i>Lactuca polycephala</i> (Cass.) C.B. Clarke}	200-1800	Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Thapa (2003), Shah <i>et al.</i> (2011ab)
<i>Lactuca dissecta</i> D. Don.	500-3100	Mazek (1991)
<i>Lactuca graciliiflora</i> DC.	2000-3700	Chaudhary (1979)
<i>Launaea aspleniifolia</i> (Willd.) Hook. f.	100-2000	Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol (2000-2001)
<i>Launaea polycephala</i> Benth.	1400	Chaudhary (1979)
<i>Launaea procumbens</i> (Roxb.) Ramaya and Rajagopal "Bankobi"	250-1200	Dangol <i>et al.</i> (1988)
<i>Parthenium hysterophorus</i> L.	200-1500	Mazek (1991)
<i>Picris hieracioides</i> L. "Ban dudhi"	1800-3810	Manandhar (1978)
<i>Pulcaria dysenterica</i> (L.) Gaertn.	200-2000	Mazek (1991)
<i>Senecio chrysanthemoides</i> DC.	1400-4000	Chaudhary (1979), Thapa and Kayastha (1996), Thapa (2003)
<i>Senecio orientalis</i> L. "Dudheghans"	1400	Manandhar (1978)
<i>Senecio ramosus</i> Wall.	2500-4100	Mazek (1991)
<i>Senecio vulgaris</i> L. "Gajari jhar"	700-1400	Chaudhary (1979), Joshi and Gretzmacher (1999), Ranjit (1999), Ranjit (2003), Ranjit and Sumaknetnikom (2003), Ranjit <i>et al.</i> (2006), Shah <i>et al.</i> (2011ab)

Appendix 1 Contd ...

<i>Soliva anthemifolia</i> (Juss.) R. Br. ex Less.	200-1400	Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit and Sumaketikom (2003), Ranjit <i>et al.</i> (2006), Ranjit <i>et al.</i> (2009)
<i>Sonchus arvensis</i> L. "Kasnisag"	250-3550	Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991), Thapa (2003)
<i>Sonchus asper</i> (L.) Hill	250-3600	Chaudhary (1979), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol (2000-2001), Thapa (2003), Sharma <i>et al.</i> (2010)
<i>Sonchus brachyotus</i> DC.	1330-1500	Manandhar (1978)
<i>Sonchus oleraceus</i> L.	2300-3550	Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Dangol (2000-2001)
<i>Sphaeranthus indicus</i> L.	200-800	Dangol (1987), Mazek (1991), Dangol (2000-2001)
<i>Spilanthes acmella</i> (L.) Murr. "Lato ghans"	200-2300	Manandhar (1978), Mazek (1991)
<i>Taraxacum officinale</i> Weber	1500-4000	Manandhar (1978), Chaudhary (1979), Sharma <i>et al.</i> (2010)
<i>Tridax procumbens</i> L. "Husure jhar, Ramne jhar"	100-1500	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Sapkota <i>et al.</i> (2010)
<i>Vernonia cinerea</i> (L.) Less. { <i>Conyza cinerea</i> L.} "Jhurjhure, Salidaya"	100-2300	Manandhar (1978), Regmi <i>et al.</i> (1986), Sapkota <i>et al.</i> (2010)
<i>Vicoa indica</i> (Willd.) DC. { <i>V. auriculata</i> Cass.} "Pahelo jhurjhure"	250	Regmi <i>et al.</i> (1986)

Appendix 1 Contd ...

<i>Xanthium strumarium</i> L. "Kuchkuche, Bhende kuro"	100-2500	Manandhar (1978), Devkota (1983), Regmi <i>et al.</i> (1986), Mazek (1991), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)
<i>Youngia japonica</i> (L.) DC. { <i>Crepis japonica</i> (L.) Benth.} "Chaulane"	230-4000	Manandhar (1978), Chaudhary (1979)
CAMPANULACEAE		
<i>Campanula benthamii</i> Wall. ex Kitamura { <i>C. canescens</i> Wall., <i>wallichii</i> Babu}	200-1400	Chaudhary (1979), Mazek (1991)
<i>Campanula pallida</i> Wall. { <i>C. colorata</i> Wall.} "Nepali bikh"	1000-4500	Chaudhary (1979), Dangol (1987), Mazek (1991), Thapa and Kayastha (1996), Thapa (2003)
<i>Wahlenbergia marginata</i> (Thumb.) A. DC. "Niilo tika"	200-1400	Dangol <i>et al.</i> (1988), Mazek (1991), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Dangol (2000-2001)
LOBELIACEAE		
<i>Lobelia chinensis</i> Lour.	1300-1500	Chaudhary (1979), Thapa and Kayastha (1996), Thapa (2003)
<i>Pratia nummularia</i> (Lam.) A. Br. et Aschers. "Niilo ghodetapre"	1000-2400	Regmi <i>et al.</i> (1986), Mazek (1991)
PLUMBAGINACEAE		
<i>Plumbago zeylanica</i> L. "Chitu"	100-1300	Manandhar (1978)
PRIMULACEAE		

<i>Anagallis arvensis</i> L. "Armalo, Krishnanil"	200-2700	Gupta <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Ranjit and Bhattarai (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit and Sumaketnikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2006)
<i>Androsace rotundifolia</i> Hard W. { <i>A. saxifragaefolia</i> Bunge, <i>Primula umbellata</i> (Lour.) Benth.}	200-1500	Devkota (1983), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol (2000-2001)
GENTIANACEAE		
<i>Centaurium centauroioides</i> (Roxb.) R. Rao & Hemandri	600	Mazek (1991)
<i>Gentiana capitata</i> Buch.-Ham. ex D. Don. "Hansko phul"	1000-4500	Chaudhary (1979)
BORAGINACEAE		
<i>Bothriospermum tenellum</i> Fisch.	200-1500	Chaudhary (1979), Mazek (1991), Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003)
<i>Cynoglossum zeylanicum</i> Thunb. { <i>C. furcatum</i> Wall.ex Roxb.} "Kanike kuro"	200-4100	Chaudhary (1979), Sharma <i>et al.</i> (2010)
<i>Heliotropium indicum</i> L. "Hanthi sunde"	100-250	Regmi <i>et al.</i> (1986)

<i>Heliotropium ovalifolium</i> Forssk.	250	Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994)
<i>Lindelofia longiflora</i> (Benth.) Baill.	3300-4600	Sharma <i>et al.</i> (2010)
CONVOLVULACEAE		
<i>Convolvulus arvensis</i> L. "Hirankhuri"	181-4100	Chaudhary (1979), Rajbhandary and Ojha (1979), Devkota (1983), Regmi <i>et al.</i> (1986), Ranjit and Bhattarai (1988), Ranjit <i>et al.</i> (2006), Sharma <i>et al.</i> (2010)
<i>Evolvumus nummularius</i> (L.) L.	150-910	Dangol (2000-2001)
<i>Ipomoea purpurea</i> (L.) Roth	910-2400	Sapkota <i>et al.</i> (2010)
SOLANACEAE		
<i>Datura stramonium</i> L. "Seto dhaturu"	200-2200	Chaudhary (1979), Thapa and Kayastha (1996), Thapa (2003)
<i>Nicotiana tabacum</i> L. "Surti"	100-1400	Chaudhary (1979)
<i>Petunia axillaris</i> (Lam.) Britton Stern. et Poggenp.	2500	Dangol <i>et al.</i> (1988)
<i>Physalis divaricata</i> D. Don. { <i>P. minima</i> L.} "Rasbari"	150-600	Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991)
<i>Solanum aculeatissimum</i> Jacq. "Kantakarī"	250-1650	Chaudhary (1979)
<i>Solanum carolinense</i> L.	2000	Numata (1982)
<i>Solanum indicum</i> L. "Bihī, Nilobhī"	250-2425	Manandhar (1978)

<i>Solanum nigrum</i> L. " Jangali bihi"	200-2900	Gupta <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Devkota (1983), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Numata (1982), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Dangol (2000-2001), Thapa (2003), Ranjit <i>et al.</i> (2006)
<i>Solanum pseudo-capsicum</i> L.	1400-2300	Manandhar (1978)
<i>Solanum surattense</i> Burn. f. { <i>S. xanthocarpum</i> Schard. & Wendl.} "Nilokantkari"	200-900	Regmi <i>et al.</i> (1986), Thapa and Kayastha (1996), Thapa (2003)
<i>Solanum torvum</i> Sw. "Banbihi"	250-2300	Manandhar (1978)
SCROPHULARIACEAE		
<i>Euphrasia himalayica</i> Wettst.	3200-4200	Sharma <i>et al.</i> (2010)
<i>Lindenbergia indica</i> (L.) Vatke { <i>L. utricraefolia</i> Lehm.}	300-2600	Manandhar (1978)
<i>Lindernia anagallis</i> (Burm.f.) Pennell { <i>Vandellia anagallis</i> (Burm.) Yamazaki}	200-1400	Chaudhary (1979), Dangol <i>et al.</i> (1988), Dangol (2000-2001)
<i>Lindernia antipoda</i> (L.) Alston	200-2300	Dangol and Chaudhary (1994)
<i>Lindernia ciliata</i> (Colsm.) Pennell { <i>Vandellia ciliata</i> (Colsm.) Yamazaki} "Sanokani"	200-1500	Manandhar (1978), Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994)
<i>Lindernia crustacea</i> (L.) F. Muell. { <i>Vandellia crustacea</i> (L.) Benth.}	250-1800	Mazek (1991)

Appendix 1 Contd ...

<i>Lindernia procumbens</i> (Krock.) Borbas { <i>Vandellia erecta</i> Benth.}	200-2400	Mazek (1991)
<i>Mazus japonicus</i> (Thunb.) O. Kuntze { <i>M. rugosus</i> Lour.} "Baghmukhe jhar"	200-1600	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Numata (1982), Mazek (1991), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Thapa and Kayastha (1996), Thapa (2003)
<i>Mazus surculosus</i> D. Don. { <i>M. pumilus</i> (Burm.f.) van Steenis} "Ramne jhar"	900-3000	Manandhar (1978), Chaudhary (1979), Mazek (1991), Thapa and Kayastha (1996), Thapa (2003), Sapkota <i>et al.</i> (2010), Shah <i>et al.</i> (2011ab)
<i>Mecardonia procumbens</i> (Mill.) Small	200-1350	Joshi and Gretzmacher (1999)
<i>Mimulus nepalensis</i> Benth.	1100-2300	Mazek (1991)
<i>Scoparia dulcis</i> L. "Chini jhar"	100-1200	Dangol (2000-2001)
<i>Veronica agrestis</i> L.		Chaudhary (1979)
<i>Veronica anagallis-aquatica</i> L.	200-4700	Mazek (1991)
<i>Veronica biloba</i> L.	2300-4200	Sharma <i>et al.</i> (2010)
<i>Veronica javanica</i> Bl.	1200-2600	Manandhar (1978), Joshi and Gretzmacher (1999)
<i>Veronica persica</i> Poir. "Sanoghatterphul"	1300-1500	Regmi <i>et al.</i> (1986)
ACANTHACEAE		
<i>Dicliptera bupleuroides</i> Nees	500-2000	Manandhar (1978)
<i>Hygrophila auriculata</i> (Schum.) Heine { <i>H. spinosa</i> T. Anders.} "Talmakhana"	200-700	Regmi <i>et al.</i> (1986), Dangol (2000-2001)

<i>Justicia procumbens</i> L. { <i>J. simplex</i> (D. Don) Yamazaki}	200-2500	Manandhar (1978), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003)
<i>Peristrophe speciosa</i> Nees	1500-2100	Manandhar (1978)
<i>Rungia parviflora</i> (Retz.) Nees "Ukushenjhar"	200-2000	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003)
VERBENACEAE		
<i>Phyla nodiflora</i> (L.) Greene {= <i>Lippia nodiflora</i> (L.) Rich. ex Mich.} "Kokana, Kurkur"	200-1400	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Dangol (2000-2001), Thapa (2003)
<i>Verbena officinalis</i> L.	900-2400	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986)
LAMIACEAE		
<i>Ajuga macrosperma</i> Wall. ex Benth.	750-1500	Dangol (2000-2001)
<i>Clinopodium umbrosum</i> (M.-Bieb.) C. Koch	180-3400	Manandhar (1978), Mazek (1991)
<i>Craniotome furcata</i> (Link) O. Kuntze { <i>C. versicolor</i> Reicherb.} "Bosi jhar"	1000-2400	Manandhar (1978).
<i>Eisholtzia ciliata</i> Thunb.) Hyland.		Sharma <i>et al.</i> (2010)
<i>Eisholtzia densa</i> Benth.	2400-4600	Sharma <i>et al.</i> (2010)
<i>Eisholtzia eriostachya</i> Benth.	3400	Thapa and Kayastha (1996), Thapa (2003)

Appendix 1 Contd ...

<i>Eisholtzia stacyides</i> (Link) O. Kuntze { <i>E. incisa</i> Benth.}	1200-1800	Chaudhary (1979)
<i>Lamium amplexicaule</i> L.	1500-4500	Ranjit et al. (2006), Sharma et al. (2010)
<i>Leucas cephalotes</i> (Roth) Spreng. "Gumpate"	150-2400	Gupta et al. (1977), Dangol et al. (1988)
<i>Leucas indica</i> (L.) R. Br. ex Vatke { <i>L. lavandulifolia</i> J.E. Smith., <i>L. linifolia</i> Spreng.} "Gumpate"	70-1000	Regmi et al. (1986)
<i>Leucas plukenetii</i> (Roth) Spreng. { <i>L. aspera</i> (Willd.) Link} "Gumpate"	250	Regmi et al. (1986), Dangol (1987), Dangol (2000-2001), Ranjit et al. (2006)
<i>Leucas zeylanca</i> R. Br. "Gumpate"		Regmi et al. (1986)
<i>Mentha arvensis</i> L.	1200-2000	Mazek (1991)
<i>Salvia plebeia</i> R. Br.	170-1100	Dangol (2000-2001), Shah et al. (2011ab)
PLANTAGINACEAE		
<i>Plantago erosa</i> Wall.	900-4100	Sapkota et al. (2010), Sharma et al. (2010)
<i>Plantago lanceolata</i> L. "Isabgol"	1700	Chaudhary (1979)
<i>Plantago major</i> L. "Isabgol"	900-4100	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Ranjit (1999)
AMARANTHACEAE		
<i>Alternanthera philoxeroides</i> (L.) DC.	1350	Ranjit and Sumaketnikom (2003)

<i>Alternanthera sessilis</i> (L.) DC. "Bhiringi jhar, Jibrepateljhar"	200-2000	Manandhar (1978), Chaudhary (1979), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Dangol (2000-2001), Thapa (2003), Shah <i>et al.</i> (2011ab)
<i>Amaranthus hybridus</i> L. "Lunde jhar"	1500-1700	Thapa and Kayastha (1996), Thapa (2003)
<i>Amaranthus lividus</i> L. { <i>A. blitum</i> L.} "Ban lunde"	200-2700	Chaudhary (1979), Mazek (1991)
<i>Amaranthus spinosus</i> L. "Ban lunde"	150-2133	Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Mazek (1991), Thapa and Kayastha (1996), Thapa (2003)
<i>Amaranthus viridis</i> L. "Lunde"	150-1300	Dangol <i>et al.</i> (1988), Ranjit <i>et al.</i> (2006)
<i>Celosia argentea</i> L. "Seto chaude"	150-1600	Regmi <i>et al.</i> (1986), Mazek (1991)
<i>Digera arvensis</i> Forssk.	200-300	Regmi <i>et al.</i> (1986)
<i>Gomphrena decumbens</i> Jacq. "Makhamali jhar"	150-200	Regmi <i>et al.</i> (1986)
CHENOPODIACEAE		

<i>Chenopodium album</i> L. "Bethe"	200-4000	Gupta <i>et al.</i> (1977), Shivakoti <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Malla and Ranjit (1978), Bhatta (1981), Chaudhary and Shrestha (1981), Ranjit (1982, 1983a, 1983b), Devkota (1983), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit (2003), Ranjit and Sumaknetrikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2006), Ranjit <i>et al.</i> (2009), Sapkota <i>et al.</i> (2010), Sharma <i>et al.</i> (2010), Shah <i>et al.</i> (2011ab)
<i>Chenopodium ambrosioides</i> L. "Rato bethe"	1300-3000	Manandhar (1978), Mazek (1991), Ranjit and Sumaknetrikom (2003)
<i>Chenopodium botrys</i> L. "Ganaune bethe"	3400-4000	Regmi <i>et al.</i> (1986), Sharma <i>et al.</i> (2010)
<i>Chenopodium murale</i> L. "Kalo bethe"	1300-1500	Manandhar (1978), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Dangol (2000-2001)
POLYGONACEAE		
<i>Polygonum amplexicaule</i> D. Don. "Ratnyaula jhar"	1200-2000	Regmi <i>et al.</i> (1986)
<i>Polygonum aviculare</i> L.	3500-4200	Ranjit (1999)
<i>Polygonum barbatum</i> L. { <i>Persicaria barbata</i> (L.) Hara}	200-1100	Mazek (1991), Dangol and Chaudhary (1994), Dangol (2000-2001),

Appendix 1 Contd ...

<i>Polygonum capitatum</i> Buch.-Ham. ex D. Don. { <i>Persicaria capitata</i> (Buch.-Ham. ex D. Don.) H. Gross} "Ratnyaule jhar"	600-2400	Manandhar (1978), Numata (1982), Regmi <i>et al.</i> (1986), Sthapit (1986), Ranjit <i>et al.</i> (2006)
<i>Polygonum chinense</i> L.	1200-2900	Joshi and Gretzmacher (1999)
<i>Polygonum hydropiper</i> L. { <i>Persicaria hydropiper</i> (L.) Spach} "Pire jhar, Sim jhar"	700-2300	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Sthapit (1986), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Ranjit (2003), Thapa (2003), Ranjit <i>et al.</i> (2006), Ranjit <i>et al.</i> (2009), Sapkota <i>et al.</i> (2010)
<i>Polygonum lanigerum</i> R. Br.	200	Joshi and Gretzmacher (1999)
<i>Polygonum lapathifolium</i> L.	250	Mazek (1991)
<i>Polygonum minus</i> Hods.	600-2500	Mazek (1991)
<i>Polygonum mite</i> Schrank	1300-1500	Mazek (1991), Joshi and Gretzmacher (1999)
<i>Polygonum nepalense</i> Meisn. { <i>Persicaria nepalensis</i> (Meisn.) H. Gross.}	1200-4100	Mazek (1991), Thapa and Kayastha (1996), Thapa (2003), Sharma <i>et al.</i> (2010)
<i>Polygonum perfoliatum</i> L.	900-1400	Mazek (1991)

<i>Polygonum plebeium</i> R. Br. "Sukul jhar, Masinopire jhar"	200-2500	Gupta <i>et al.</i> (1977), Shivakoti <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Numata (1982), Devkota (1983), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Thapa (2003), Ranjit <i>et al.</i> (2006), Sapkota <i>et al.</i> (2010), Shah <i>et al.</i> (2011ab)
<i>Polygonum posumbu</i> Buch.-Ham. ex D. Don. "Setopire jhar"	200-2000	Manandhar (1978), Joshi and Gretzmacher (1999)
<i>Polygonum viscosum</i> Buch.-Ham. ex D. Don. "Pire jhar"	750-1800	Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Joshi and Gretzmacher (1999), Ranjit (1999)
<i>Rumex crispus</i> L.	1400	Ranjit and Bhattarai (1988), Ranjit (1999), Ranjit and Sumaketnikom (2003), Ranjit (2003), Ranjit <i>et al.</i> (2009)
<i>Rumex dentatus</i> L. { <i>R. obtusifolius</i> L.} "Halhale, Banpalungo"	200-1400	Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Dangol (2000-2001), Shah <i>et al.</i> (2011ab)
<i>Rumex hastatus</i> D. Don. "Halhale"	1100-2600	Regmi <i>et al.</i> (1986)
<i>Rumex nepalensis</i> Spreng. "Halhale"	1200-4200	Manandhar (1978), Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991), Sharma <i>et al.</i> (2010)
EUPHORBIACEAE		
<i>Chrozophora prostrata</i> Dalz. "Pannapati"	80-200	Regmi <i>et al.</i> (1986)

Appendix 1 Contd ...

<i>Chrozophora rottleri</i> (Geis.) A. Juss. "Suryahart"	80-200	Regmi <i>et al.</i> (1986)
<i>Croton bonplandianus</i> Baill. { <i>C. sparsiflorus</i> Morong} "Mirchaiya ghans"	100-400	Regmi <i>et al.</i> (1986), Dangol (2000-2001)
<i>Euphorbia cyparissias</i> L. "Dudhe jhar"	200-1500	Regmi <i>et al.</i> (1986)
<i>Euphorbia dracunculoides</i> Lam. "Dudhe jhar"	181-1500	Regmi <i>et al.</i> (1986)
<i>Euphorbia helioscopia</i> L. "Dudhe jhar"	up to 3000	Dangol (1987)
<i>Euphorbia heterophylla</i> L. { <i>E. geniculata</i> Ort.} "Dudhe jhar"	250-1600	Manandhar (1978), Dangol <i>et al.</i> (1988)
<i>Euphorbia hirta</i> L. { <i>E. pilulifera</i> L.} "Dudhe jhar/Rato maslahare"	150-1500	Manandhar (1978), Chaudhary (1979), Dangol <i>et al.</i> (1988), Mazek (1991), Dangol (2000-2001), Thapa (2003)
<i>Euphorbia microphylla</i> Heyne ex Roth. "Masino dudhe"		Regmi <i>et al.</i> (1986)
<i>Euphorbia parviflora</i> L. "Masino dudhe"	150-400	Dangol <i>et al.</i> (1988), Dangol (2000-2001)
<i>Euphorbia prostrata</i> Ait. "Kanike ghans"	200-1400	Manandhar (1978), Chaudhary (1979), Mazek (1991)
<i>Phyllanthus glaucas</i> Wall. ex Muell.-Arg. { <i>P. flueggeiformis</i> Muell.-Arg.}	250-2100	Dangol <i>et al.</i> (1988)
<i>Phyllanthus niruri</i> L. "Amala jhar"	250-1600	Manandhar (1978), Regmi <i>et al.</i> (1986), Thapa (2003)

Appendix 1 Contd ...

<i>Phyllanthus urinaria</i> L. "Amala jhar"	200-1700	Manandhar (1978)
URTICACEAE		
<i>Gonostegia hirta</i> (Bl.) Miq. "Maslahare"	500-2400	Manandhar (1978)
<i>Pouzolzia zeylanica</i> (L.) Benn. & Brown "Chiple jhar"	200-2400	Manandhar (1978), Dangol <i>et al.</i> (1988)
CANNABACEAE		
<i>Cannabis sativa</i> L. "Bhang, Ganja"	200-3600	Manandhar (1978), Chaudhary (1979), Rajbhandary and Ojha (1979), Chaudhary and Shrestha (1981), Ranjit and Bhattarai (1988), Ranjit (1993a, 1983b), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Thapa (2003), Ranjit (2003), Ranjit <i>et al.</i> (2006), Ranjit <i>et al.</i> (2009), Sapkota <i>et al.</i> (2010)
Flowering Plants: Monocots		
ARACEAE		
<i>Arisaema jacquemontii</i> Blume	2700-4000	Sharma <i>et al.</i> (2010)
COMMELINACEAE		
<i>Commelina benghalensis</i> L. "Bankane"	200-2700	Chaudhary (1979), Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996)
<i>Commelina diffusa</i> Burm. f.	200-2500	Mazek (1991)
<i>Murdannia nudiflora</i> (L.) Brenan	200-1500	Manandhar (1978)

JUNCACEAE			
<i>Juncus bufonius</i> L.	1100-3600		Mazek (1991), Joshi and Gretzmacher (1999)
<i>Juncus concinnus</i> D. Don.	2100-5200		Chaudhary (1979), Sapkota <i>et al.</i> (2010)
<i>Juncus prismato-carpus</i> R. Br.	200-1600		Mazek (1991), Joshi and Gretzmacher (1999)
LILIACEAE			
<i>Asphodelus tenuifolius</i> Cav. "Ban pyaj"	200-300		Regmi <i>et al.</i> (1986)
CYPERACEAE			
<i>Bulbostylis capillaris</i> Kunth	150-1300		Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999)
<i>Bulbostylis densa</i> (Wall. ex Rottb.) Hand.-Mazz.	1500-3500		Mazek (1991)
<i>Carex nubigena</i> D. Don.	1500-4000		Numata (1982)
<i>Cyperus aristatus</i> Rottb.	200-2700		Manandhar (1978)
<i>Cyperus cyperoides</i> (L.) O. Kuntz.	250-2000		Numata (1982)
<i>Cyperus difformis</i> L. "Mothe"	100-2700		Chaudhary (1979), Sapkota <i>et al.</i> (2010)
<i>Cyperus rotundus</i> L. "Kasur mothe"	181-2400		Gupta <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Devkota (1983), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Thapa (2003)
<i>Eleocharis pellucida</i> Presl.	200-2300		Mazek (1991), Joshi and Gretzmacher (1999)
<i>Fimbristylis aestivalis</i> (Retz.) Vahl	250-2000		Mazek (1991), Joshi and Gretzmacher (1999)

Appendix 1 Contd ...

<i>Fimbristylis littoralis</i> Gaudich.	100-2000	Ranjit <i>et al.</i> (2006)
<i>Fimbristylis squarrosa</i> Vahl "Mothe"	200-1500	Dangol (1987), Joshi and Gretzmacher (1999)
<i>Kyllingia brevifolia</i> Tottb. {= <i>Cyperus brevifolius</i> (Rottb.) Hassk.} "Mothe"	100-2300	Manandhar (1978), Chaudhary (1979), Sapkota <i>et al.</i> (2010)
<i>Kyllinga monocephala</i> Rottb. { <i>Cyperus kyllingia</i> Endle}	200-1200	Dangol (1987)
POACEAE		
<i>Agrostis pilosula</i> Trin.	2000-4600	Sharma <i>et al.</i> (2010)
<i>Alopecurus aequalis</i> Sobol.	2300-2900	Manandhar (1978), Rajbhandary and Ojha (1979), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit and Sumaketnikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2009)
<i>Alopecurus geniculatus</i> L.	1700	Mazek (1991)
<i>Alopecurus nepalensis</i> Trin. ex Steud. "Ragate"	1400	Chaudhary (1979)
<i>Alopecurus pratensis</i> L.	1400	Ranjit (1983a), Ranjit (1999)
<i>Arthraxon lancifolius</i> (Trin.) Hochst.	900-1800	Manandhar (1978)
<i>Avena fatua</i> L. "Jangali jai"	2100-3700	Rajbhandary and Ojha (1979), Devkota (1983), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Dangol (2000-2001), Ranjit <i>et al.</i> (2006), Sapkota <i>et al.</i> (2010), Sharma <i>et al.</i> (2010)
<i>Brachiaria ramosa</i> (L.) Stapf.	200-1800	Mazek (1991)

<i>Chloris barbata</i> Swartz		Regmi <i>et al.</i> (1986)
<i>Chrysopogon aciculatus</i> (Retz.) Trin. { <i>Raphis aciculatus</i> (Retz.) Honda}	150-1700	Mazek (1991)
<i>Cynodon dactylon</i> (L.) Pers. "Dubo"	100-3400	Gupta <i>et al.</i> (1977), Shivakoti <i>et al.</i> (1977), Manandhar (1978), Chaudhary (1979), Malla and Ranjit (1980), Bhatta (1981), Ranjit (1982, 1983a), Devkota (1983), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Regmi and Bhattacharai (1988), Mazek (1991), Dangol and Chaudhary (1994), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit and Sumakethikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2006), Sapkota <i>et al.</i> (2010), Shah <i>et al.</i> (2011ab)
<i>Cyrtococcum patens</i> (L.) A. Camus { <i>Panicum patens</i> L.}	1300-1500	Chaudhary (1979)
<i>Dactyloctenium aegyptium</i> (L.) P. Beauv. "Tauke jhar"	200-900	Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Thapa (2003), Ranjit <i>et al.</i> (2006)
<i>Dichanthium annulatum</i> (Forssk.) Stapf.	150-1100	Regmi <i>et al.</i> (1986), Dangol (2000-2001)
<i>Digitaria ciliaris</i> (Retz.) Koel. { <i>D. adscendens</i> (Kunth) Henr.} "Chitri banso"	200-1500	Chaudhary (1979), Dangol (1987), Dangol and Chaudhary (1994), Ranjit (1999), Dangol (2000-2001), Ranjit <i>et al.</i> (2006)
<i>Digitaria longifolia</i> (Retz.) Pers.	200-1100	Mazek (1991)
<i>Digitaria sanguinalis</i> (L.) Scop.	150-2240	Mazek (1991), Shah <i>et al.</i> (2011ab)
<i>Digitaria violascense</i> Link	1200-1800	Mazek (1991)

Appendix 1 Contd ...

<i>Echinochloa colona</i> L. "Sama"	200-2400	Thapa and Kayastha (1996)
<i>Echinochloa crus-galli</i> (L.) P. Beauv. "Sama banso"	200-2400	Dangol (2000-2001)
<i>Eleusine indica</i> (L.) Gaertn. "Kodejhar"	200-2600	Manandhar (1978), Ranjit <i>et al.</i> (2006)
<i>Eragrostis atrovirens</i> (Desf. Trin. ex Steud. "Tauke jhar"	200-1800	Manandhar (1978), Mazek (1991)
<i>Eragrostis gangetica</i> (Roxb.) Steud.	250	Dangol (1987)
<i>Eragrostis japonica</i> (Thunb.) Trin. "Ranki"	200-1700	Manandhar (1987), Mazek (1991)
<i>Eragrostis nigra</i> Nees ex Steud.	900-3000	Chaudhary (1979), Regmi <i>et al.</i> (1986)
<i>Eragrostis nutans</i> (Retz.) Nees ex Steud. { <i>E. stenophylla</i> Hochst}	700-2000	Chaudhary (1979)
<i>Eragrostis tenella</i> (L.) P. Beauv. ex Roem. et Schult. "Dule ghans"	200-1500	Chaudhary (1979), Regmi <i>et al.</i> (1986), Mazek (1991)
<i>Eragrostis unioloides</i> (Retz.) Nees ex Steud.	200-2200	Manandhar (1987), Mazek (1991)
<i>Eulaliopsis binata</i> (Retz.) C. E. Hubbard "Banki jhar"	150-2600	Manandhar (1978)
<i>Hemarthria compressa</i> (L.f.) R. Br.	200-1400	Dangol and Chaudhary (1994), Joshi and Gretzmacher (1999), Dangol (2000-2001)
<i>Imperata cylindrica</i> (L.) P. Beauv. "Siru"	200-2000	Dangol (1987), Thapa and Kayastha (1996), Thapa (2003)
<i>Ischaemum rugosum</i> Salisb.	200-1500	Thapa (2003)

<i>Lolium temulentum</i> L.	900-1500	Dangol (1987), Mazek (1991), Joshi and Gretzmacher (1999)
<i>Paspalum distichum</i> L.	200-2000	Numata (1982), Thapa (2003)
<i>Paspalum scrobiculatum</i> L. "Mane jhar"	200-2200	Dangol (2000-2001)
<i>Pennisetum flaccidum</i> Griseb.	1700-4300	Sharma <i>et al.</i> (2010)
<i>Phalaris minor</i> Retz. "Ragate jhar"	200-1500	Manandhar (1978), Rajbhandary and Ojha (1979), Malla and Ranjit (1980), Bhatta (1981), Chaudhary and Shrestha (1981), Numata (1982), Ranjit (1982, 1983a, 1983b), Devkota (1983), Regmi <i>et al.</i> (1986), Sthapit (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Mazek (1991), Thapa and Kayastha (1996), Joshi and Gretzmacher (1999), Ranjit (1999), Dangol (2000-2001), Ranjit (2003), Ranjit and Sumaktenikom (2003), Thapa (2003), Ranjit <i>et al.</i> (2006), Ranjit <i>et al.</i> (2009)
<i>Phleum alpinum</i> L.		Sharma <i>et al.</i> (2010)
<i>Poa annua</i> L. "Pode ghans"	1300-3950	Regmi <i>et al.</i> (1986), Mazek (1991), Ranjit <i>et al.</i> (2006), Sapkota <i>et al.</i> (2010), Sharma <i>et al.</i> (2010)
<i>Pogonatherum paniceum</i> (Lam.) Hack. "Muse khari"	900-3200	Manandhar (1978)
<i>Polypogon fugax</i> Ness ex Steud. { <i>P. littoralis</i> Sm.} "Chhaya ghans"	1500-3680	Manandhar (1978), Rajbhandary and Ojha (1979), Regmi <i>et al.</i> (1986), Dangol (1987), Dangol <i>et al.</i> (1988), Ranjit and Bhattarai (1988), Mazek (1991), Joshi and Gretzmacher (1999), Ranjit (1999), Ranjit <i>et al.</i> (2006)

Appendix 1 Contd ...

<i>Polypogon monspeliensis</i> (L.) Desf. "Puchhre jhar"	200-1500	Manandhar (1978), Chaudhary (1979), Mazek (1991), Joshi and Gretzmacher (1999), Dangol (2000-2001)
<i>Saccharum spontaneum</i> L. "Kans"	200-1700	Dangol <i>et al.</i> (1988), Thapa and Kayastha (1996), Thapa (2003)
<i>Sacciolepis indica</i> (L.) A. Chase	200-2100	Manandhar (1978), Sapkota <i>et al.</i> (2010)
<i>Sacciolepis myosuroides</i> (R. Br.) A. Camus	500-1500	Mazek (1991)
<i>Setaria geniculata</i> (Lam.) P. Beauv. "Kagune jhar"	700-2200	Regmi <i>et al.</i> (1986)
<i>Setaria pallide-fusca</i> (Schum.) Stapf. & C. E. Hubbard "Bale banso"	100-2550	Manandhar (1978), Regmi <i>et al.</i> (1986), Dangol <i>et al.</i> (1988), Dangol and Chaudhary (1994)
<i>Setaria tomentosa</i> (Roxb.) Kunth	200-1800	Manandhar (1978), Mazek (1991)
<i>Sporobolus diander</i> (Retz.) P. Beauv.	100-1400	Manandhar (1978)
<i>Sporobolus fertilis</i> (Steud.) W. D. Clayton { <i>S. indicus</i> R. Br.} "Bandar ghans"	1000-2400	Manandhar (1978), Chaudhary (1979), Sapkota <i>et al.</i> (2010)
<i>Tripogon filiformis</i> Nees ex Steud.	900-2700	Manandhar (1978)
<i>Tripogon trifidus</i> Munro ex Stapf.	1200-2100	Manandhar (1978)

¹= based on Dangol (1998), Hara and William (1982), Hara *et al.* 1978, 1979

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