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Supplementary material

Anthropogenic fire, vegetation structure and ethnobotanical uses in an alpine shrubland of Nepal's Himalaya

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Table S1: List of species recorded from burned and unburned habitat patches in Lauribina Hill, Langtang National Park, Nepal, their elevation range, palatability, ethnobotanical use and chorotype.

Scientific name and family	Habitat[1]	Elevation range[2]	Palatability for herbivores[3]	Major ethnobotanical use[4]	Chorotype[5]
Agrostis pilosula Trin. (Poaceae)	BR+UB	2000-4600	P	-	IN
Aletris pauciflora (Klotzsch) Hand.-Mazz. (Nartheciaceae)	BR+UB	2500-4900	D	Medicine: aerial parts in lung and liver disorders [2,3].	PH
Anaphalis nepalensis var. *monocephala* (DC.) Hand.-Mazz. (Asteraceae)	BR+UB	4100-5500	N	Medicine: aerial parts in fever, indigestion, inner bleeding and swellings [4]. Other: dried plant used as fire catcher [1].	PH
Anemone demissa Hook.f. & Thomson (Ranunculaceae)	UB	2700-5000	N	Medicine: whole plant applied to blisters and wart [2].	PH
Anemone rupestris Wall. ex Hook.f. & Thomson (Ranunculaceae)	BR+UB	3500-5000	P	-	PH
Anemone smithiana Lauener & Panigrahi (Ranunculaceae)	BR+UB	3000-4500	-	-	PH
Arenaria bryophylla Fernald (Caryophyllaceae)	BR	4200-5900	N	Medicine: whole plant to control inflammation/pain of kidney and burning sensation of bladder/urine tract [5].	PH
Athyrium wallichianum Ching (Athyriaceae)	BR+UB	3500-4800	U	Food: young fronds are boiled and cooked as vegetable [1]. Medicine: fronds and rhizomes in swellings and uterine bleeding [4].	PH
Astragalus donianus DC. (Fabaceae)	BR	2900-4500	P	Medicine: plant in lung disease and menstrual disorder [4].	HE

Scientific name and family	Habitat[1]	Elevation range[2]	Palatability for herbivores[3]	Major ethnobotanical use[4]	Chorotype[5]
Bistorta macrophylla (D. Don) Soják (Polygonaceae)	BR+UB	2700-5000	U	Medicine: roots and seeds in diarrhea [1,3,4].	PH
Bistorta vaccinifolia (Wall. ex Meisn.) Greene	BR+UB	3000-4500	U	Medicine: roots in fever [3].	HE
Boschniakia himalaica Hook.f. & Thomson (Orobanchaceae)	BR+UB	2900-4400	N	Medicine: stem base in indigestion and constipation [3,4]; root paste in cuts and wounds [6].	EA
Caltha palustris var. *himalaica* Tamura (Ranunculaceae)	BR+UB	2000-4200	U	Medicine: whole plant in coughs and urinary disorders [4].	HE
Cassiope fastigiata (Wall.) D. Don (Ericaceae)	BR+UB	2800-5000	U	Medicine: whole plant in cough, indigestion, arthritis and urinary disorders [4,7]. Religious: dried aerial parts mixed with leaves of *Rhododendron anthopogon* is burnt as incense [1,4,7].	HE
Chesneya nubigena (D. Don) Ali (Fabaceae)	BR+UB	3600-5300	U	Food: seeds eaten fresh [3].	PH
Corydalis juncea Wall. (Papaveraceae)	BR+UB	2500-4400	U	-	HE
Cremanthodium reniforme (DC.) Benth. (Asteraceae)	BR+UB	3000-4600	U	-	PH
Delphinium himalayae Munz (Ranunculaceae)	BR+UB	3000-4500	T	Medicine: root tubers in cough, fever, liver and 'bile' disorders and wounds [4,6,7]. The plant is poisonous.	NE
Epilobium wallichianum Hausskn. (Onagraceae)	BR	1700-4100	U	Medicine: whole plant in lung problems, cough, mouth sores and as cooling agent [4].	PH
Eritrichium sp. (Boraginaceae)	UB		N	-	-
Euphorbia stracheyi Boiss. (Euphorbiaceae)	BR+UB	2000-5000	U	Medicine: roots in diarrhea and other gastro-intestinal ailments [3,4,7].	PH
Gentiana depressa D. Don (Gentianaceae)	BR	2900-4500	U	Medicine: plant juice in cough and cold [3].	HE

Scientific name and family	Habitat[1]	Elevation range[2]	Palatability for herbivores[3]	Major ethnobotanical use[4]	Chorotype[5]
Gentiana ornata (D. Don) Wall. ex Griseb. (Gentianaceae)	BR+UB	3300-5500	U	-	HE
Geranium donianum Sweet (Geraniaceae)	UB	3200-4800	U	Medicine: roots in fever, bile disorders, cough, intestinal disorders, joint pain and headache [2,4,8,9].	PH
Geum elatum Wall. ex Hook.f. (Rosaceae)	BR+UB	2900-4500	P	Medicine: roots, shoots and leaves in stomach disorders, dysentery, diarrhea, wounds, and nervous system disorders [2,3,4].	PH
Heracleum nepalense D. Don (Apiaceae)	BR	1800-4000	P	Medicine: seeds as appetite stimulant, and in cough, body pain, diarrhea, dysentery, headache and faint; roots in swellings and diarrhea. Food/fodder: fruits and seeds as spice, and whole plant as winter fodder [1,2,3,4,7,10].	PH
Juncus thomsonii Buchenau (Juncaceae)	BR	2700-5200	U	-	CA
Kobresia nepalensis (Nees) Kük. (Cyperaceae)	BR+UB	2900-5700	P	-	PH
Kobresia pygmaea (C.B. Clarke) C.B. Clarke (Cyperaceae)	BR+UB	3100-5600	P	-	EA
Kobresia sp. (Cyperaceae)	BR+UB		P	-	-
Ligusticum sp. (Apiaceae)	BR+UB		-	-	-
Lloydia flavonutans H. Hara (Liliaceae)	BR+UB	3800-5000	U	-	HE
Lloydia serotina (L.) Rchb. (Liliaceae)	BR	3500-5000	P	Medicine: whole plant to treat eye diseases, liver and gall bladder problems, internal injuries of the chest region [2].	HO
Maianthemum purpureum (Wall.) LaFrankie (Asparagaceae)	BR	2600-4200	P	Medicine: rhizomes as tonic [4]. Food: young leaves and tender shoots cooked as vegetable [1,4].	PH

Scientific name and family	Habitat[1]	Elevation range[2]	Palatability for herbivores[3]	Major ethnobotanical use[4]	Chorotype[5]
Nardostachys jatamansi (D. Don) DC. (Caprifoliaceae)	BR	3200-5000	N	Medicine: rhizomes in wounds, cough and cold, fever, spleen disease, intestinal parasites, eye disease, nervous system disorders and stomach disorders [1,4,8]. Religious: rhizomes burnt as incense [1,4,8].	PH
Neopicrorhiza scrophulariiflora (Pennell) D.Y. Hong (Plantaginaceae)	BR+UB	3500-4800	N	Medicine: rhizome in headache, heart diseases, blood poisoning, fever, cold and cough, sore throat, jaundice, and liver and blood disorders [1,2,4,8,10].	PH
Oxygraphis polypetala (Raf.) Hook.f. & Thomson (Ranunculaceae)	BR+UB	2200-5000	P	-	HE
Pedicularis elwesii Hook. f. (Orobanchaceae)	BR	3200-4800	U	-	PH
Pedicularis rhinanthoides Schrenk (Orobanchaceae)	BR+UB	3000-4900	U	-	EA
Pleurospermum apiolens C.B. Clarke (Apiaceae)	BR+UB	3600-4700	N	-	HE
Poa sp. (Poaceae)	BR		P	-	-
Ponerorchis chusua (D. Don) Soó (Orchidaceae)	BR+UB	2400-4900	P	Medicine: tubers in diarrhea, dysentery, fevers, cuts and wounds, and as tonic [1,2,4].	EA
Potentilla coriandrifolia G. Don (Rosaceae)	BR+UB	3900-5600	U	-	PH
Potentilla fruticosa var. *arbuscula* (D. Don) Maxim. (Rosaceae)	BR+UB	2600-4600	N	Medicine: whole plant in indigestion, stomach trouble and lung disorders [2,4]. Religious: leaves burnt as incense [4].	PH
Potentilla peduncularis D. Don (Rosaceae)	BR+UB	3000-4800	N	Medicine: roots in dysentery and profuse menstruation [2,3].	PH
Primula obliqua W.W. Sm. (Primulaceae)	BR+UB	3500-4600	N	-	HE
Primula primulina (Spreng.) H. Hara (Primulaceae)	BR+UB	3400-5000	U	-	HE

Scientific name and family	**Habitat[1]**	**Elevation range[2]**	**Palatability for herbivores[3]**	**Major ethnobotanical use[4]**	**Chorotype[5]**
Primula sikkimensis Hook. (Primulaceae)	BR+UB	2900-4800	N	Medicine: flowers in fever, intestinal problem and diarrhea [4,8].	PH
Primula stuartii Wall. (Primulaceae)	BR+UB	3500-4600	N	-	HE
Rheum acuminatum Hook. f. & Thomson (Polygonaceae)	BR	3300-4200	U	Medicine: rootstock, leaves and young parts to treat body pain [1,2,10]. Food: petioles are pickled [1].	PH
Rhodiola bupleuroides (Wall. ex Hook. f. & Thomson) S.H. Fu (Crassulaceae)	BR+UB	2000-5700	N	Medicine: rhizomes in fever [1,4].	PH
Rhodiola himalensis (D. Don) S.H. Fu (Crassulaceae)	BR+UB	3700-4600	N	Medicine: rhizomes in urinary and lung disorders, cough and cold, poisoning, arthritis and fever [1,2,4,8].	PH
Rhododendron anthopogon D. Don (Ericaceae)	BR+UB	3300–5100	N	Medicine: leaves and flowers in stomach, liver and lung disorders, cough, sore throat, gastritis, indigestion and skin diseases [1,2,3,4,8]. Religious: leaves and flowers are burnt as incense [1,4,8].	HE
Rhododendron campanulatum D. Don (Ericaceae)	BR+UB	2800-4400	N	Medicine: leaves and flowers in cold, cough, fever, skin diseases [2,4,7]. Other: fuel wood [1].	HE
Rhododendron lepidotum Wall. ex G. Don (Ericaceae)	BR+UB	2100-4700	N	Medicine: leaves and flowers in back pain and cold, bile, lung and blood disorders [2,3,4,8]. Religious: leaves are burnt as incense [1,4].	PH
Rhododendron setosum D. Don (Ericaceae)	BR+UB	3700-5600	N	Food: dried petals as a substitute of tea [1,3]. Religious: leaves are burnt as incense [1,4].	HE
Roscoea alpina Royle (Zingiberaceae)	UB	2400-3600	U	Medicine: rhizomes in cuts and wounds [4]; flowers in urinary disorders and tuberculosis [2].	HE
Rubus nepalensis (Hook. f.) Kuntze (Rosaceae)	BR	1800-3500	P	Food: ripe fruits edible [1,3].	HE

Scientific name and family	**Habitat[1]**	**Elevation range[2]**	**Palatability for herbivores[3]**	**Major ethnobotanical use[4]**	**Chorotype[5]**
Salix calyculata Hook. f. ex Andersson (Salicaceae)	BR+UB	3600-4500	N	Medicine: barks and flowers in skin diseases, menstrual disorder and joint pain [4]; leaves and bark in fever [4].	HE
Salix lindleyana Wall. ex Andersson (Salicaceae)	BR+UB	3400-5000	U	Medicine: whole plant in bleeding [4]; leaves decoction in fever [2].	PH
Saussurea eriostemon Wall. ex C.B. Clarke (Asteraceae)	BR+UB	32000-4900	U	Medicine: whole plant in heart diseases and gynecological disorders [4].	HE
Saxifraga brachypoda D. Don (Saxifragaceae)	BR+UB	3300-5000	U	-	PH
Saxifraga parnassifolia D. Don (Saxifragaceae)	BR+UB	1900-4900	U	Medicine: leaves and flowers in bile disorders, fever and indigestion [4].	HE
Sibbaldia cuneata Schouw ex Kunze (Rosaceae)	BR+UB	3400-4500	U	-	CA
Sorbus microphylla (Wall. ex Hook.f.) Wenz. (Rosaceae)	UB	3000-4500	P	Fodder/fuel: important fodder and fuel wood species at high altitude [1,3].	PH
Thalictrum alpinum L. (Ranunculaceae)	BR+UB	2800--5300	U	Medicine: root decoction as tonic, purgative, diuretic, stimulant, used for dyspepsia and convalescence [2].	HO
Thalictrum cultratum Wall. (Ranunculaceae)	UB	2400-4200	U	Medicine: leaves, flowers and roots in fever, diarrhea and skin diseases [2].	PH
Viola biflora L. (Violaceae)	UB	2100-4500	U	Medicine: whole plant in cough, wounds, dysentery, bronchitis, fractured bones and bile disorders [2,4,8].	HO
Poa sp. (Poaceae)	BR	-	P	-	

[1]Habitat: BR - burned; UB – unburned.

[2]Elevation range of the species follows Press *et al*. (2000) and Zheng-yi and Raven (1994-2013).

[3]Palatability: P - preferred, D - desirable, U - consumed but undesirable, N - not consumable, T – toxic (palatability for each species presented here is based on the interviews with herders and local people).

[4]Major ethnobotanical uses: the use presented in the table are based on [1] present study through interviews with herders and local people; [2] Quattrocchi (2012); [3] Manandhar (2002); [4] Ghimire *et al*. (2001); [5] Chandra and Rawat (2015); [6] Prasai (2007); [7] Ghimire *et al*. (2008); [8] Lama *et al.* (2001); [9] Pandey (2006); and [10] Ghimire and Nepal (2007).

[5]Chorotype: CA - Central Asiatic, EA - Eastern Asiatic, HE - Himalayan endemic, HO - Holarctic, IN - Indian, NE - Nepal endemic, PH - Pan-Himalayan. Chorotype determination is based on species geographical distribution as detailed in Press *et al*. (2000) and Wu *et al.* (1994).

Table S2: Supporting references

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