TAXONOMIC EXPLORATION OF PHYTODIVERSITY OF HANGRAI, TEHSIL BALAKOT, DISTRICT MANSEHRA, KHYBER PAKHTUNKHWA, PAKISTAN

Danish Ali[1], *Dr. Abbas Hussain Shah*[2], *and Dr. Azhar Mehmood*[2]

[1] *Department of Botany, Hazara University, Mansehra, KPK, Pakistan.*

[2] *Department of Botany, GPGC Mandian Abbottabad*

Corresponding Author; danibotanist@gmail.com

ABSTRACT

The study area under investigation is located in one of the important floristically rich regions of northern Pakistan. A few surveys of Phyto diversity have been carried out. This is the first attempt to explore the flora taxonomically. The aim of present study was to provide a checklist of local flora of village Hangrai, tehsil Balakot of district Mansehra. The research area was extensively visited during flowering and fruiting seasons of plants during the summer of 2021 and 2022. Plants were collected from different location, voucher number were given to specimen and other relevant data pertaining to habit, habitat, families, scientific name, local names, life forms and phenology were recorded for each species. Mounted copies of each voucher specimen were deposited in Herbarium of Botany Department, Govt. Post Graduate College Mansehra. A total 189 plant species scattered in 75 families and 157 Genera were identified from the study area. Poaceae was found to be the most dominant family having 37 species, followed by Rosacea with 21 species and Asteraceae having 9 species. While the remaining families showed less than six species. Amongst 75 families, 68 were Angiosperms, 2 Gymnosperms, 2 Bryophytes and 3 were Pteridophyte families. This information pertaining to nomenclatural status, current presence of taxa, families, Genera, life forms, habit, habitat, locality and their Phenology will be a comprehensive base line for future exploration of the plant biodiversity.

Key words: **Flora, Tracheophytes, Hangrai, Balakot, Pakistan.**

1. Introduction

Hangrai is a village of tehsil Balakot, district Mansehra, K.P.K, Pakistan. It is located at 34.63° north and 73.36° east with the highest altitude of 12000 feet. It is bordered by Balakot on the northern side, River Kunhar on the southern side, Satbani on the western side and Chor Kohistan valley on the east side. According to classification of forest types [1], Hangrai area shows sub-tropical, moist, temperate, and sub-alpine zones. The most common species of Angiosperms found were *Datura alba, Aconitum heterophyllum, Alnus nitida, Bergenia ciliata, Berberus lyceum, Zanthoxylum aramatum* and *Buglossoides tenuiflora*, while the most common Gymnosperms are *Pinus wallichiana*, *Pinus roxburghii, Cedrus deodara and Picea smithiana*. The most important wild and cultivated fruits are *Ziziphus numularia, Phoenix dactylifera and Viburnum grandiflorum.* The key crops grown are *Allium cepa, Zea mays and Triticum aestivum*][1]. Flora refers to the complete plant species found in a particular locality.

It is different from vegetation, which denotes the population dispensation, size and relative greatness of plant species [2] Floristic innovative assist in percipient different ascribe of vegetation, soil and climatic factors. Stewart was the initial worker to make floristic list of North-West Pakistan. Floristic perusal of any granted place aid to evaluate the plants opulence and its vaguer value[2]Documentation of local plant species is very important to introduce specific floral species of the ordinary place, their occurance and in searching new species [3]. Pakistan has unique climatic zone, topography and bio-diversity, which are the main source of floristic vegetation [4]. Due to the existence of various topographic factors and microhabitat, the elected reading quarter has a strong probability for flourishing wealthy plant biodiversity. The current study was designed with the objective to explore and record floristic composition of the study area, because vegetation of adjoining areas was unexplored and has never been studied up to date. Globally, about 422000 plant species have been documented [5]. 6000 plant species have been documented from Pakistan [6]. In Pakistan worthier ministraction take place to infabricate floristic list as constructed by numerous workers for long, such as[4], [5], [7], [8],[11], [12],[14], [16], [21], [27], [31], [32].

Fig: 1 Map of study area

2. Materials and Methods

An at initial stage of research activity all available literature was carefully and thoroughly reviewed. As a result, preliminary information regarding localities, topography and other relevant materials were obtained. The study area involves deep valleys, high mountains, gentle to steep slopes and dissected small traces. The daily temperature ranges from 0°C to 32°C during summer and 1°C to 5°C in winter.

2.1 Collection of specimens

The collection of plant specimens was done using field notebook, pencil, plant presser, blotting Paper, Polythene Bags, Newspaper, knife, Gloves, Twig Cutter and Stick. Frequently field visits were carried out from 2018 to 2019 in flowering and fruiting seasons. Each specimen was given collection number with help of tags. Scientific name, Vernacular Name, Families, Habit, life span, Habitat and locality were labelled.

2.2 Plant preservation and identification

Plants were placed in newspaper for drying purposes and preserved along with stem, roots, leaves and flowers. The plants Specimen properly poisoned by using Mercuric Chloride and Absolute Alcohol. The poisoned Specimen was mounted on standard Herbarium sheet of

standard size (Standard size11.5 inches ×16.5 inches). Data noted in field note book and transferred to Herbarium slip which was posted on the right bottom side of Herbarium sheet. The Plants were identified with the help of local and regional flora [31]. Some pictures were selected from the photograph of the specimen taken in Research area. The identities of the plants were confirmed by comparing with specimen deposited in the herbarium of Botany Department GPGC Mansehra. Data obtained from extensive field work in Hangrai was used to prepare a complete floristic list of plant species along with families. All plants names were alphabatically arranged and are presented in the results. The voucher specimens were deposited in Herbarium of Botany Department, Govt. Postgraduate College, Mansehra, for accession number.

3. Results

The enumerating series of chief plants groups starts with Bryophytes, followed by Pteridophytes, Gymnosperms and Angiosperms. Within each of these plants groups, families, genera and species are arranged alphabetically in tabular form (Appendix 1). During floristic surveys a total of 189 plants species belonging to 157 Genera and 75 families were recorded. Pteridophytes were represented by 4 families (4%) such as Adiantaceae, Aspleniaceae, Cryptogrammaceae and Dryopteridaceae, 3 genera (1.91%) and 5 Species (2.64%) and Bryophytes were 2 genera, (1.27%) and 2 species (1.05). Gymnosperm likewise were represented by 3 families, (4%) that include Pinaceae, Ephedraceae and Cupressaceac, 4 genera (2.57) such as Cupressus, *Pinus Thuja* and *Cedrus* and 5 species (2.64) in the study area. The Angiosperms contributed maximum species represented by 66 families (88%), 148 genera (94.26%) and 177 species (93.65). Of them 2 families (2.66), 17 genera (10.82%] and 40species (21.16) belong to monocots whereas 64 families (85.33%) with 131 genera (83.43%) and 137 species (72.48) were dicots. Amongst 75 families, Poaceae was dominated by 37 species followed by Rosaceae 21, Asteraceae 9, Lamiaceae 6, Polygonaceae 6, Papilionaceae 4, Plantigenaceae 4, species, while Moraceae, Solanaceae, Cyperaceae, Nyctaginaceae, Brassicaceae, Caesalpianiaceae, Urticeceae,Planatoginaceae, Verbenaceae, Amaranthaceae, Adiantaceae, Rhamnaceae and Rutiaceae represented by 3 species per family. Planatoginaceae, Buddlejaceae, Euphorbiaceae, Apiaceae, Fabaceae, Ranunculaceae, Berberidaceae, Cryptogrammaceae, Apocynaceae, Violaceae, Oxalidaceae, Alliaceae, Reichenbachie, Scrophulariaceae, Vitaceae, Velerianaceae, Sapindaceae, Mimosaceae, Cupressaceae, Simarubaceae, Betulaceae, Borgeneaceae, Linaceae, Fagaceae, Arecacea, Platanaceae, Punicaceae, Primulaceae, Portulaceae, Paeoniaceae, Asclepiadaceae, Papaveraceae, Myrsinaceae, Apocynaceae, Myrsinaceae, Meliaceae, Convolvulaceae, Cannabinaceae, Anacardiaceae, Apocynaceae, Verbenaceae, Juglandaceae, Guttiferae, Bignoniaceae, Thymeleaceae, Ebenaceae, Morchellaceae, Polyporaceae, Phyllanthaceae, Polytrichaceae, Marchantiaceae and Funariaceae show one or two species each. Habit-wise analysis explains that herbs were dominant by 51%, shrubs 36%, fungi 2%, while the remaining 11% were trees. From the life-span point of view, annual were leading by 56%, species perennials 41%, while the remaining 3% were Biennial. In the study area, two flowering seasons were recorded. One from Feb to August and second from September to November. Similarly variation was observed in fruiting seasons. But mostly plants flowered from March to August. In the first spell, 172 plant species flowered including herbs, shrubs, trees and grasses. During the second flowering seasons, 17 plant species flowered such as trees, herbs and shrubs. Habit-wise analysis explains that herbs were dominant by 51%, shrubs 36%, fungi 2%, while the remaining

11% were trees. From the life-span point of view, annual were leading by 56%, species perennials 41%, while the remaining 3% were Biennial. As ecologically the study area comprises three zone, Sub tropical zone, moist temperate zone and Sub alpine zone. Majority of the plants species were reported from moist temperate zone as compare to sub-tropical and sub alpine zone in the study area.

Figure 2: Some photographs recorded plant species captured during field work in the study area
[A]*Impatiens bicolor* Royle. [B]*Phlomis spectalis* Benth [C] *Swertia chirata* Wall. [D] *Vigna vexillata* L. [E] *Hypericum perforatum* L. [F] *Digitalis purpurea* L. [G] P*rinsepia utilis* Royle [H] Meadows of Magra [I] Author during Collection.

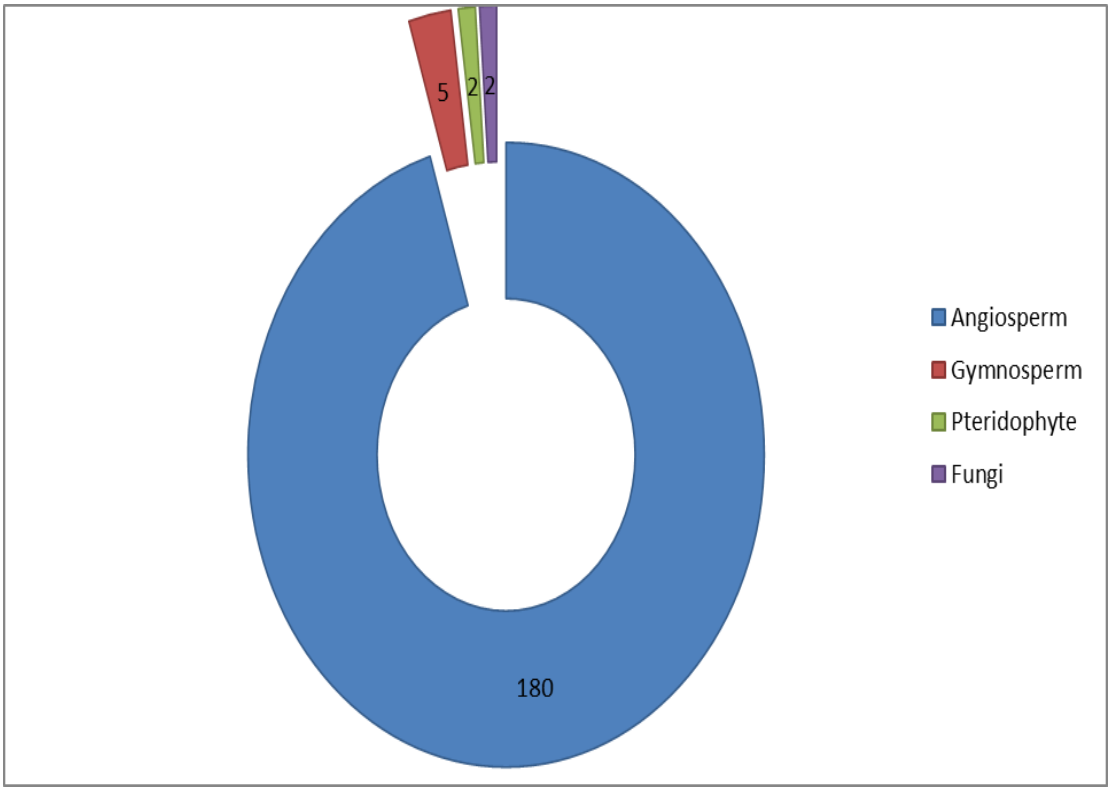

Figure 3. Growth form of species recorded from study area

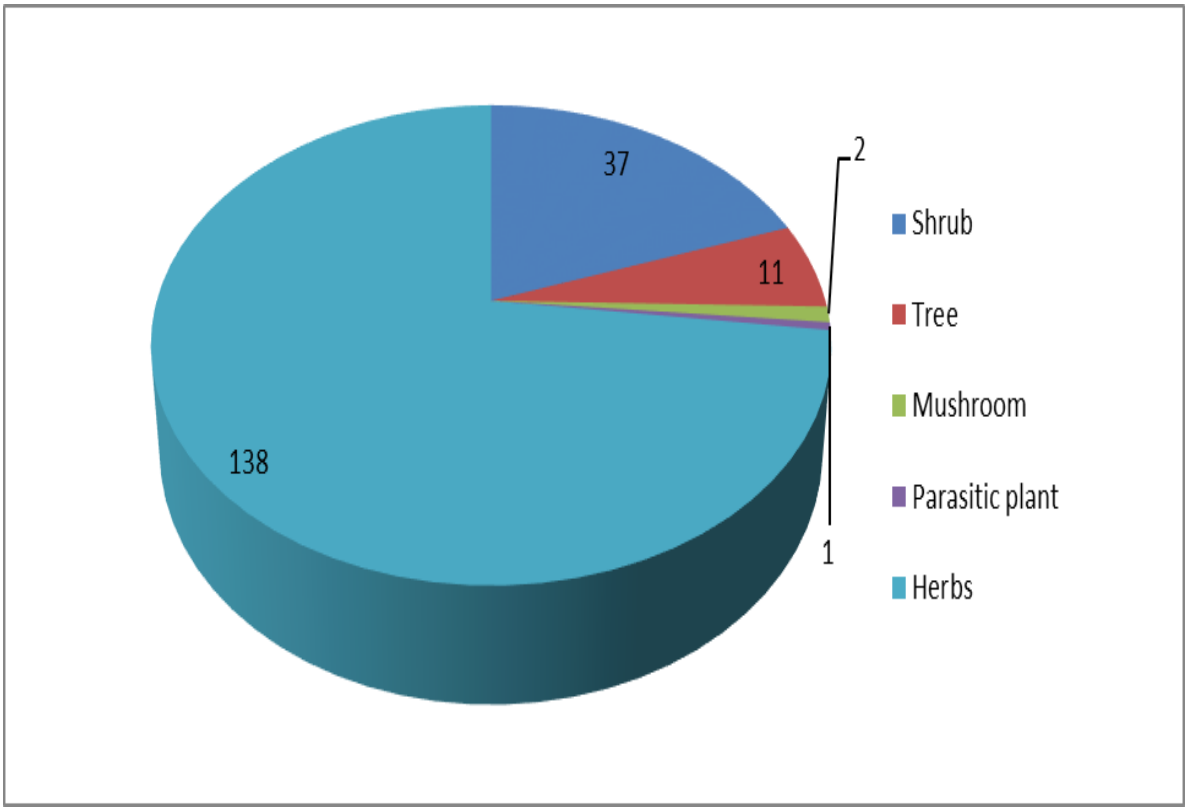

Figure 4: Division of the floral species recorded from the study area

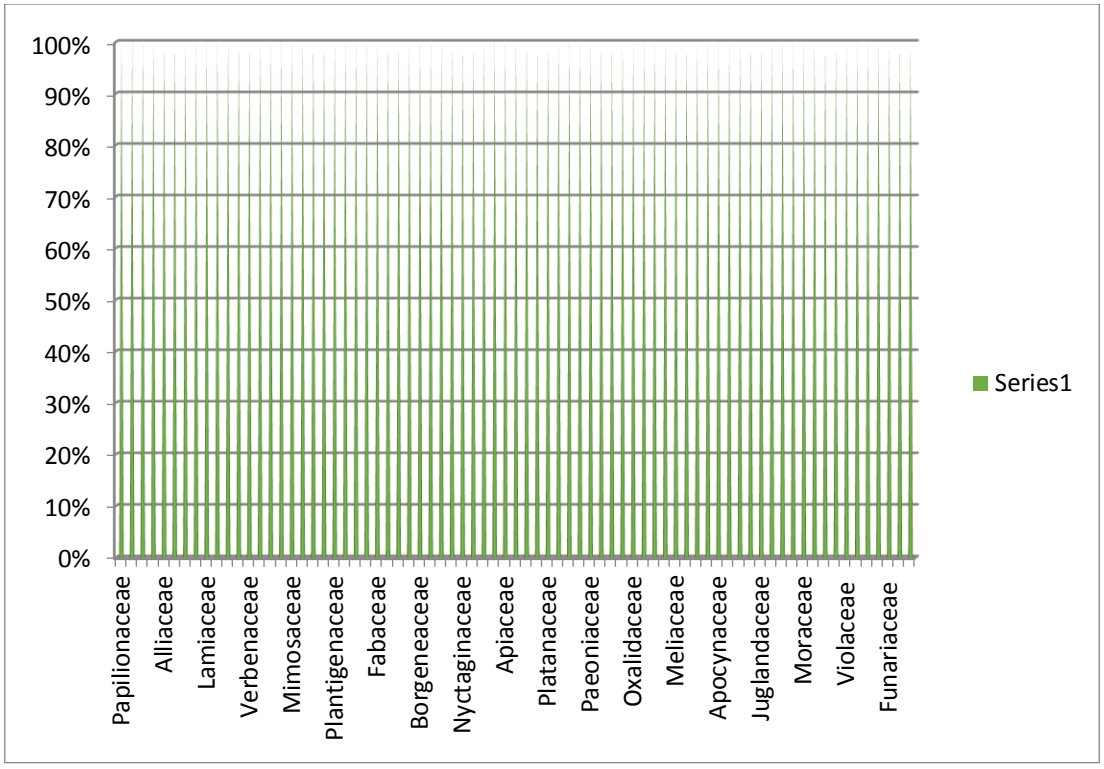

Figure 5: Families wise distribution of recorded species from the study area.

Table 1: First floristic checklist of Hangrai including Plant species, Genera, Families, Plant habitat, Habit, Life forms and Phenology

S. No.	Plant species	Local Name	Family name	Habit	Locality	Cultivated or wild	Division	Life span	Habitat	Flowering month
1	*Andrachne cardifolia*	Karukni	Phyllanthaceae	S	Tarangarra	Wild	D	A	Rocky mountain	
2	*Astragalus psilocentros* Fish	Nikki klhanti	Papilionaceae	H	Main hangrai	Wild	D	P	Hanrdy zones	June -August
3	*Arundo donax* L.	Narri	Poaceae	H	Main hangrai	Wild	M	A	Dampsoil either fresh or moderately saline	
4	*Allium cepa* L.	Piyaz	Alliaceae	H	Main hangrai	Cultivated	M	A	Cultivated beds	July-August
5	*Adiantum capillus-veneris* L.	Kokva	Adiantaceae	H	Main hangrai	Wild	Pt	A	On rock walls around waterfalls and moist and shady places	July-August
6	*Adiantum incisum* Forssk.	Kokva	Adiantaceae	H	Main hangrai	Wild	Pt	A	moist and shady places	July-August
7	*Amaranthus viridis* L.	Kanhar	Amaranthacea e	H	Nakka a	Cultivated	D	A	Found in pastures land and along road side	July-August
8	*Ajuga btactiosa* Wall. EX,Benth.	Manji boti	Lamiaceae.	H	Shaheed pani	Wild	D	A		March-december

9	*Aesculus indica* (Wall ex camb.) Hook.	Bana khor	Sapindaceae	T	Mahli	Wild	D	A	Moist and shady places	June-July
10	*Acacia modesta* Wall	Phulai	Mimosaceae	T	Batanga	Wild	D	A	Terrestrial	April-May
11	*Alternanthera pungens* (kunth)	Kindyara	Amaranthacea e	H	Main hangrai	Wild	D	P	Growing weed along road side	July-August
12	*Anaphalis margaritaceae* (L)Benth Hook.F.	Chahoo	Plantigenaceae	H	Manchi	Wild	D	P	A common weed growing on waste places	July-August
13	*Ailanthus altissima* (Mill) swingle	Derrava	Simarubaceae	T	Garan	Wild	D	P	Waste places	April-June
14	*Alnus nitida* Endl.	Sharolli	Betulaceae	T	Pataka	Wild	D	P	Open dry places near kunhar river	August – November
15	*Astragalus mollissimus* L.	Nikki khenthi	Fabaceae	H	Kunga	Wild	D	P	A common weed growing on waste places	July –august
16	*Bromus hordeaceus* L.	Kaha	Poaceae	H	Chokanna	Wild	M	A	It grows in waste areas and field grassy plains	October – january
17	*Bromus cruciformis* L.	Lama basa	Poaceae	H	Main hangrai	Wild	M	A	It grows in grassy fileds	Septembeer – october
18	*Bromus lanceolatus* Roth.	Lama basa	Poaceae	H	Pandher	Wild	M	A	Found in waste places	October-december

19	*Brassica compestris* Linn	Sarsoo	Brassicaceae	H	Main hangrai	Cultivated	D	A	Weed	March-Aprild
20	*Berberis lyceum* Royle	Sunbal	Berberidaceae	S	Tarrari	Wild	D	A	Rocky and exposed places	July-August
21	*Borago officinalis* L.	Mehdi boti	Borgeneaceae	H	Chalihan	Wild	D	A	On loamy soil	May-August
22	*Bergenia ciliate* (Haw) Sternb.	But peva	Saxifargaceae	H	Jabori	Wild	D	A	On moist rock	March-May
23	*Berberis kunawurensis* Royle.	Kala synmbal	Berberidaceae	S	Bella	Wild	D	A	Exposed rocky places	July-August
24	*Buxus wallichiana* Bill	Kutay lal	Buxaceae	S	Main hangrai	Wild	D	A	In moist hills	March-may
25	*Buddleja asiatica* Lour	Chiitta bota	Buddlejaceae	S	Ban bagar	Cultivated	D	A	It is planted in garden as ornamental	Feb-april
26	*Buddleja Crispa* Bth	Nathna	Buddlejaceae	S	Nalla	Wild	D	A	It grow on waste places	Janary-march
27	*Bougainvillea glabra* Choisy	Safedi jan	Nyctaginaceae	S	Tattar	Cultivated	D	A	Found on rocky soil	March-july
28	*Cymbopogon jwarancusa* (Jones) Schult	Budha grass	Poaceae	H	Jabba	Wild	M	A	Found under the story of pinus	October-december
29	Asplenium sp	Khabal	Aspleniaceae	H	Jabba	Wild	M	P	Found in loamy and fertile soil	June-october
30	*Cyperus alopecuroides* L.	Teray kona	Cyperaceae.	H	Main hangrai	Wild	M	P	Found in cultivated fields	May-july

31	*Cyperus difformis* L.	Ladies finger wala	Cyperaceae.	H	Jaba	Wild	M	P	It is weed of rice fields	July-August
32	*Chloris barbata* L.	Metha grass	Poaceae	H	Jaba	Wild	M	P	Found in costal sand	April-may
33	Cyperus laevigatus L.	Ladies finger wala	Cyperaceae.	H	Jugdaniya	Wild	M	P	Found in exposed soil	July-August
34	*Chenopodium album* L.	Bathwa	Chenopodiacea e	H	Main hangrai	Wild	D	P	Waste places	March-May
35	Conyza Canadensis L	Kutaylal	Asteraceae	H	Kalsi	Wild	D	A l	Moist waste places	July-August
36	*Chrysopogan aucheri* (Boiss.) Stapf.	Pelanda	Poaceae	H	Main garan	Wild	M	P	Dry soil	July- august
37	*Coriandrum sativum* L.	Dhanya	Apiaceae	H	Saver	Cultivated	D	A	Cultivated fields	April-June
38	*Canna indica* L.		Cannaceae	H	Kalasi	Cultivated	D	P	Growing as ornamental	July-August
39	*Capsella barsa-pastoris* Moench.	Gadariye wala	Brassicaceae	H	Kassi	Wild	D	B	Growing as weed on different places.	March-May
40	*Citrus Sinensis* (L.) Osbeck.	Nimo	Rustaceae	S	Main hangrai	Cultivated	D	P	Cultivated in garden	Marh-April

41	*Cedrus deodar* (Royl ex lamb) D.Don.	Dedar	Pinaceae	T	Meesaach	Wild	Gym	A	Moist places	April-July
42	*Cannabis sativa* L.	Bhang	Cannabinaceae	H	Chillha	Wild	D	A	Throughout waste places in hangrai	April-October
43	*Cichorium intybus* L.	Chandani boti	Asteraceae	H	Tangar	Wild	D	A	Common weeds	July-September
44	*Convolvulus arvensis* L.	Erli	Convolvulaceae	H	Tangar	Cultivated	D	P	Growing throughout the area in fields	February-March
45	*Capsicum annum* L.	Marachi	Solanaceae	H	Main hangrai	Cultivated	D	A	Cultivatedd in fileds	May-June
46	*Calotropis procera* Ail		Asclepiadaceae	S	Tanagr	Wild	D	P		April-June
47	*Caesalpinia decapitala* Alston	Lakii boti	Caesalpinaceae	S	Charri	Wild	D	B		
48	*Cotinus coggyria* Scop	Gunghair	Anacardiaceae	S	Charri	Wild	D	A		
49	*Carissa opaca* L	Gunghair	Apocynaceae	S	Khungra	Wild	D	A	Mostly grow in dry clay	April-June
50	*Caryopteris odorata* D. Don		Verbenaceae	S	Main hangrai	Wild	D	P	Grow in meadows on magra	Feb-April
51	*Cassia occidentalis* L.		Caesalpiniaceae	S	Kanari	Wild	D	A	Rarely fond heaps of dung in hangrai	March-June
52	*Cotoneaster bacillaris* Wall ex. Lindle	Gurday wali boti	Rosaceae Shrub	S	Manchi	Wild	D	A	Open dry places	Feb-June
53	*Cotoneaster microphylla* Wall ex. Lindle	Ratta chola	Rosaceae	S	Kunga	Wild	D	A	Open dry places	Feb-June
54	*Cotoneaster nummularia* Fish	Ratta chola	Rosaceae	S	Patika	Wild	D	P	Open dry places	Feb-June

55	*Cycus revolute*			S	Khenthiyan	Cultivated	Gym	A	Grow in school garden	
56	*Cestrum nocturnum* L.	Rat ki rani	Solanaceae	S	Main hangrai	Cultivated	D	P	Cultivated in the garden of mosque	March-July
57	*Campsis radicans* (L.) Seem	Marnoi	Bignoniaceae	S	Lower jabra	Wild	D	A		
58	*Colebrookea oppositifolia* Smith	Ratru boti	Labiatae	S	Jabra	Wild	D	A		
59	*Cotonus coggyria* Scope	Mamchai	Anacardiaceae	S	Kunga	Wild	D	A	Cultivated in school garden	July-August
60	*Debergeasia Salcifolia* (D.Don) Rendle	chenjal	Urticaceae	S	Neha 1	Wild	D	A	Grows on rocky places	July-August
61	*Dryopteris sp*	Tatora	Dryopteridaceae	S	Neha 1	Wild	D	A	Waste places	June-August
62	*Dodonaea viscosa* (L.) Jacq.	Sanatha	Sapindaceae	S	Biyari	Wild	D	A	Dry places	May-June
63	*Ducrosia anethifolia* (DC) Boiss.	Berral	Apiaceae	H	Main hangrai	Wild	D	P	Open sunny places	July-August
64	*Duchesnea indica* (Andr) Focke.	Mehva	Rosaceae	H	Nakka	Wild	D	P	Moist and shady places	April-June
65	*Daphne mucronata* Royle.	Kuttal lal	Thymeleaceae	H	Bagru	Wild	D	P	Moist places	March-May
66	*Diospyrus lotus* L.	Amlok kala	Ebenaceae	T	Bagru	Cultivated	D	P	Hills sides	June-August

67	*Echinochloa colona (*L.)Link	Grass	Poaceae.	H	Sacha jabori	Wild	M	A	Open sunny places	September-November
68	*Eleusine indica (*L.) Gaertn.	Grass	Poaceae.	H	Bekka	Wild	M	A	On rocky soil	September-November
69	*Eragrostis minor* Host Gram, Austr	Bassa	Poaceae	H	Main hangrai	Wild	M	A	Grow as weed in maize field	October-November
70	*Eragrostis major* Host Gram.	Bassa	Poaceae	H	Tamri	Wild	M	A	Grow as weed in maize field	October-November
71	*Erodium cicutarium* L.	Rattan jog	Geraniaceae	H	Tamri	Wild	D	P	Open dry places	July-August
72	*Eribotrya japonica* (Thunb.) Lindly	Loquat	Rosaceae	H	Sikiyan da katha	Cultivated	D	P	Cultivated in garden	April-June
73	*Euphorbia heliscopa* L.	Dodal	Euphorbiaceae	H	Muranu	Wild	D	A	Dry places in main hangrai	April-May
74	*Eranthemum pulchellum* Andrews	Kakora	Acanthaceae	S	Kanga wali gali	Wild	D	A	Moist places	April-July
75	*Ephedra gerardiana* Wall ex.		Ephedraceae	S	Main hangrai	Wild	Gym	A	Under story of pine	
76	*Ficus palmata* L.	Begar	Moraceae	T	Lower kaghan	Wild	D	P	Grows as fruit yielding garden	July-August

77	*Geranium ocellatum* Camb.	Rotan jog	Geraniaceae	T	Mom chahti	Wild	D	P	Moist and shady places	August-September
78	*Gerbera gossypina* (Royle) Beavuerd.	Chitta bota	Asteraceae	H	Mahandi	Wild	D	P	On moist places	October-November
79	*Hedra nepalensis* K. Koch	Berli	Araliaceae	S	Phagali	Wild	D	P	Mosit and shady places	Shady places
80	*Hypericum oblongifolium* Choisy	Mamanu	Guttiferae	S	Chitta batiya	Wild	D	P	Open sunny places	November-December
81	*Hedra helix* K. Koch	Berli	Araliaceae	S	Charotiyan	Wild	D	P	Mosit and shady places	Shady places
82	*Isodon rugosus* (Wall ex benth) Codd.	Chit boti	Lamiaceae	S	Charotiyan	Wild	D	P	On rocky places	May-July
83	*Indigofera heterantha* Wall ex brand	Khenti	Papilionaceae	S	Main hangrai	Wild	D	A	On rocky soil	June-August
84	*Juglans rejia* L.	Khor	Juglandaceae	T	\chota	Cultivated	D	P	Cultivated on loamy soil	March –April
85	*Justicia adhatoda* Linn.	Bekar	Acanthaceae	S		Wild	D	A	Grow on dry soil	February-April
86	*Jasminum nudiflorum* Lindl		Oleaceae	S	Main hangrai	Wild	D	A	Open sunny places under story A*cacia* sp	Feb-March
87	*Jasminum humile* L.		Oleaceae	S	Gul dhar	Wild	D	A	Open sunny places under story A*cacia* sp	Feb-March
88	*Juniperus communis* L		Cupressaceae	S	Nalli	Wild	G y m	P	Open rocky places	
89	*Justicia adhatoda* L.	Bikar	Acanthaceae	S	Gul dhar	Wild	D	A		

90	*Lespedeza hirta* (L.) Hornem.	Budhi khemthi	Acanthaceae	S	Main hangrai	Wild	D	A	Open sunny placse	March-May
91	*Lantana camara* L.	Kamri boti	Verbenaceae	S	Mom chati	Cultivated	D	P	Cultivaed in school garden	March-june
92	*Lstuca serriola* L.	Mard wala boti	Asteraceae	S	Batangi	Wild	D	A	On grasses places	Feb-March
93	*Mirabilis jalapa* L.	Chit dhodan	Nyctaginaceae	H	Sachha	Wild	D	A	Found on sandy soil	June-July
94	*Morus alba* L.	Toot	Moraceae	T	Hotar	Wild	D	P	Open places	April-July
95	*Morus nigra* L.	Kala toot	Moraceae	T	Hotar	Wild	D	P	Open dry places	June-July
96	*Malva neglecta* Wall	Sonchal	Malvaceae	H	Suynmballa	Wild	D	A	On hums rich soil	April-July
97	*Mentha spicata* L.	Podena	Lamiaceae	H	Katha garan	Cultivated	D	A	On rocky soil	June-July
98	*Mentha longifolia* L. Huds	Jangali podena	Lamiaceae	H	Main hangrai	Wild	D	A	Moist and shady places near kunhar river	April-July
99	*Melia azedarach* L.	Deraik	Meliaceae	T	Mian garan	Cultivated	D	A	Open sunny places	June-July
100	*Mallotus philippensis* (Lam.) Muess		Euphorbiaceae	S	Saver	Wild	D	P	Rarely found on white sand	Feb-april
101	*Myrsine africana* L.	Jangali khenthi	Myrsinaceae	S	Taray kanna	Wild	D	A	On sand soil	October-December
102	*Nerium oleander* L.		Apocynaceae	S	Katha reso	Cultivated	D	A	Cultived in home	August-November
103	*Onychium contigum* Wall ex Hope	Kokva	Cryptogrammaceae	H	Chakka	Wild	Pt	A	On shady places	

104	*Oxalis corniculata* L.	Khat khurla	Oxalidaceae	H	Main hangrai	Wild	D	P	Grows on humus	March-May
105	*Otostegia limbata (*Benth) Boiss	Koray	Labiatae	S	Patikka	Wild	D	A	Grows on sandy places	March-April
106	*Prunus domestica* L.	Ali bukhara	Rosaceae	T	Chokanna	Wild	D	A	Cultivated on the bank of maize field	Feb-April
107	*Polygonum polystachum* Wall ex Meissn	Tarubra	Polygonaceae	H	Khori ka medan	Wild	D	P	Grow on moist soil	March-August
108	*Podophyllum peltatum* L.	Sor gandha	Berberidaceae	H	Manchi	Wild	D	P	On rotting wood and humus rich soil	February-March
109	*Pinus roxburghii* Saragent	Cheer	Pinaceae	T	Tattar	Wild	Gym	A	Open sunny places in subtropical zone	July-September
110	*Papaver somniferum* L.	Posat	Papaveraceae	H	Tattar	Cultivated	D	P	Cultivated on the bank on allium field	January-March
111	*Polygonum avicular* L.	Tarubra	Polygonaceae	H	Main hangrai	Wild	D	A	Open sunny places	July-August
112	*Pinus wallichiana* A.B,Jackson.	Biyar	Pinaceae	T	Maranuu	Wild	Gym	P	Open sunny places	May-June

113	*Plantago magor* L.	Chamchap athar	Plantagonacea e	H	Khori ka medan	Wild	D	A	Weed in the field of maize	July-October
114	*Periploca aphylla* Dcne.	Donkey ki dum	Asclepiadacea e	S	Nalla	Wild	D	A	On rocky hills	July-August
115	*Prinsipia utilis* Royle	Nekka aloochi	Rosaceae	S	Nalla	Wild	D	A	On shady places	March-April
116	*Poa bulbosa* L.	Grass	Poaceae	H	Khori ka medan	Wild	M	P	Grow in the field of wheat	Jan-March
117	*Poa annua* L.	Grass	Poaceae	H	Khori ka medan	Wild	M	P	Grow on humus rich soil	Feb-June
118	*Panicum antidotale* Retz.	Grass	Poaceae	H	Main hangrai	Wild	M	A	Open sunny places	Sep-November
119	*Piptatherum miliaceum* (L.) Loss.	Grass	Poaceae	H	Khungaran	Wild	M	A	On shady places	August-October
120	*Piptatherum virescens* (Trin.) Biss.	Grass	Poaceae	H	Kunga	Wild	M	A	Open dry sunny places	August-October
121	*Paspalum paspaloides* (Minch.) Kims scribn.	Grassi wali boti	Poaceae	H	Bella sacha	Wild	M	A	Cultivated land	jully-September

122	*Pycerus flavidus* (Retz) T.Koyamo.journ.jap.	Beknai boti	Poaceae	H	Main hangrai	Wild	D	A	On road side	August-September
123	*Pennisetum orientale* L.C. Rich.	Tarrami sajlio	Poaceae	H	Mom chathi	Wild	D	A	Rarely found on sunny places	July-October
124	*Prunus armeniaca* L.		Rosaceae	T	Main garan	Cultivated	D	P	Cultivated on soil	February-March
125	*Prunus persica* (L) Batsch		Rosaceae	T	Rah wali mahli	Cultivated	D	P	Cultivated on soil	February
126	*Pyrus communis* L.	Batang	Rosaceae	T	Main hangrai	Cultivated	D	P	Cultivated	February
127	*Pyrus pashia* Ham. Ex D.Don	Batangi	Rosaceae	T	Barri mahli	Cultivated	D	P	Cultivated on open dry places	February
128	*Plantago lanceolata* L.	Chamchap atar	Plantaginaceae	H	Khori ka medan	Wild	D	A	Moist places	March-May
129	*Paeonia emodi* Wall. Ex Hk.	Mamaikh	Paeoniaceae	S	Mussa ka mussala	Wild	D	P	Shady places	June-August
130	*Psium sativum* L.		Paplionaceae	H	Main hangrai	Wild	D	A	Cultivated on soil	February-April
131	*Portulaca oleracea* L.		Portulaceae	H	Chitta bata	Wild	D	A	Maize field	July-September
132	*Primula denticulata* Sm.	Jogi badsha	Primulaceae	H	Khori ka medan	Wild	D	P	Moist places	May-June

133	*Punica granatum* L.	Anar	Punicaceae	T	Khori ka medan	Cultivated	D	A	On rocky soil	April-July
134	*Pologonum bistorta* L.	Tarubra	Polygonaceae	H	Khori ka medan	Wild	D	A	On moist places	July-september
135	*Potentilla norvegica* L.	Mehdi boti	Rosaceae	H	Rah wali mahli	Wild	D	A	Open arid places	Feb-April
136	*Platanus orientalis* L.	Kachnar	Platanaceae	H	Magra	Wild	D	P	Cultivated in home as ornamental purposes	June-July
137	*Phoenix dactylifera* L	Kajor	Arecaceae	S	Main hangrai	Cultivated	D	A	Cultivated in sunny places	April-July
138	*Phlaris minor*			H	Magra	Wild	M	A		
139	*Quercus baloot* Coriffth		Fagaceae	T	Khori ka medan	Cultivated	D	P	Open sunny places	May-July
140	*Rumex hastatus* D.Don	Khtimal	Polygonaceae	H	Khori ka medan	Wild	D	A	Sunny exposed area	April-July
141	*Robinia pseudoacecia* L.	Kekar	Fabaceae	T	Khori ka medan	Wild	D	P	On rocky places	March-May
142	*Ranunculus muricatus* L.	Butter cup	Ranunculaceae	H	Chamra	Wild	D	P	On the bank of river kunhar	April-June
143	*Rosa sp* L.	Gulab	Rosaceae	S	Main hangrai	Cultivated	D	P	Grow as ornamental plants in home garden	Feb-March
144	*Rheum australe* D.Don		Polygonaceae	H	Musa ka musalla	Wild	D	A	In shady places of moist temperate zone	Sep-November
145	*Ricinus* L.	Kashtrail	Euphorbiaceae	S	Main hangrai	Wild	D	P	Rarely found on loamy soil	
146	*Reinwardtia trigyra* (Roxb.) Planch	Sunmblu	Linaceae	S	Chota	Wild	D	P	Grow on sandy soil	May-August

147	*Ricinus communis* L.	Kashtrail	Euphorbiacae	S	Main hangrai	Cultivated	D	P	On sandy dry places	June-Auguston
148	*Rosa indica*		Rosaceae	S	Main hangrai	Cultivated	D	P	Fully exposed to the sun	March-July
149	*Rosa alba*		Rosaceae	S	Main hangrai	Cultivated	D	P	Grow as ornamental plants in home garden	March-July
150	*Rosa moschata* J. Herm			S	Nadi bangala	Cultivated	D	P	Grow as ornamental plants in home garden	March-July
151	*Rosa damascene*Miller.		Rosaceae	S	Main hangrai	Cultivated	D	P	Grow as ornamental plants in home garden	March-July
152	*Rubus ellipticus* Smith	P	Rosaceae	S	Kund bangalla	Wild	D	P	Open sunny places	July-August
153	*Rubus fruticosus* Hook	P	Rosaceae	S	Kund	Wild	D	P	Open sunny places	July-september
154	*Rubus niveus* Thanb-non Wall.	P	Rosaceae.	S	Naddi	Wild	D	P	On hilly places of shinu	March-June
155	*Raphanus sativus* L.		Brassiceae	H	Nalla	Cultivated	D	A	Cultivated in field	
156	*Rananculus laetus* Wall ex Hook F thoms		Ranunculaceae	H	Main hangrai	Wild	D	A	Bank of streams	Feb-Masrch
157	*Rubus Ulmifolius* Schoot.		Rosaceae	S	Kunga	Wild	D	P	O white rocks of mussa ka musala	March-June
158	*Silybum marianum* (L.) Scope.		Asteraceae	H	Chorra	Wild	D	A	Open arid places	Feb-April

159	*Segeretia thea* (Osbeck) M. C. Jhonston	Kandiyara	Rhamaceae	S	Main hangrai	Wild	D	A	On clay soil	April-July
160	*Senna tora* L		Caesalpianiaceae	S	Mom chatti 2	Wild	D	A	On dung of cattles	Non know in my arae
161	*Saccharum spontaneum* L		Poaceae	H	Mom chati one	Wild	M	P	Found on sandy area	April-August
162	*Spirea sp*		Rosaceae	S	Shah	Wild	D	A	Shady places	March-July
163	*Saccharum griffithii* Munro ex Boiss	Barru	Poaceae	H	Main hangrai	Wild	M	A	Found on sandy area	April-August
164	*Saccharum spontenum* L.	Barru	Poaceae	H	Shidal galli	Wild	M	P	On sandy area	April-August
165	*Setaria verticillata (*L.)P. Beauv.		Poaceae	H	Tarangarra	Wild	M	A	Near the filed of maize	June-July
166	*Stipa capensis* Thunb.		Poaceae	H	Batangi	Wild	M	A	Exposed sunny places	May-July
167	*Setaria verticillata.(* L.)P.Beauv.		Poaceae	H	Shaheed pani	Wild	M	A	Weeds of brassica filed	Jan-Aprl
168	*Stipa capensis* Thunb.	Selara	Poaceae	H	Nalla	Wild	M	A	Found in field of wheat	Sep-jan
169	*Tulip stellata* Koch.	Pangree	Liliaceae	H	Khat	Wild	D	A	Open sunny places	April-may
170	*Thuja orientalise* L.	Mor phank	Cupressaceae.	H	Taray kanna	Cultivated	D	P	Open sunny places	April-May

171	*Thymus richardii* Pers.	Chekhanboti	Lamiaceae	H	KhatMusalla		D	P	Moist places	June-July
172	*Traxicum officinale* Weber exx Wigger	Hand	Asteraceae	H	Tarangera	Plant is growing common throughout the area	D	A	Plant is growing common throughout the area	June-septeember
173	*Tagates minuta* L.	Satbarga	Asteraceae	H	Main hangrai	Wild	D	A	Waste places	June-August
174	*Tritum aestivum* L.	Kanrak	Poaceae	H	Main hangrai	Cultivated	M	A	Grows as weed in field	May-July
175	*Utrica dioca* L.	Keeri	Urticeceae	H	Sacha bela	Wild	D	A	Moist –places	May-July
176	*Vitex negundo* L.	Marvandi	Vervenaceae	H	Chokanna	Wild	D	A	Moist places	July-August
177	*Veronica persica* Poir.	3 patra	Planatoginaceae	H	Batanga	Wild	D	A	On rocky mountin	July-August
178	*Viola ocellata* Torr,ala. Gray	Benafsha		H	Patikka	Wild	D	A	A common weeds grows on waste places	March-May
179	*Valeriana jatamansi* (Jones ex runb) DC.	Mushak bala	Velerianaceae	H	Main hangrai	Wild	D	A	Under story of pinus species	March-May
180	*Verbena officinalis* L.	Mahro	Verbenaceae	H	Pandher	Wild	D	P	Moist places	May-July
181	*Vitis vinifera* L.	Dakh	Vitaceae	H	Saver	Cultivated	D	P	trails on other plants	March-May

182	*Verbascum thaspus* L.	Gaday kan	Scrophulariaceae	H	Ban bagar	Wild	D	P	Dry places	March-May
182	*Viacia sativa* L.		Fabaceae	H	Kunga	Wild	D	A	Common weed of wheat crop	December-march
184	Wulfeniopsis amheeritiana (Benth) D.Y.Hang		Reichenbachie	H	Taray kanna	Wild	D	A	A common weeds grows on waste places	July-august
185	Withania simnifera L.		Solanaceae	H	Synmballa	Wild	D	A	A common weeds grows on waste places	July –Augusr
186	*Xanthium strumarium* A.	Bandari boti	Asteraceae	S	Barri	Wild	D	P	Humus rich soil	May-july
187	*Zanthoxylum armatum* DC.	Timber	Rutiaceae	S	Main hangrai	Wild	D	P	Open dry places	April -June
188	*Ziziphus nummularia* Burn. F	Sajli	Rhamnaceae	S	Muranu	Wild	D	P	waterless places	April-june
189	*Ziziphus oxyphylla* Edgew	Sajli	Rhamnaceae	S	Jugdaniya	Wild	D	P	Parched soiol	April-june

Legend: H; Herbs, S; Shrubs, T; Trees, P; Perennial, B; Biennial, A; Annual;

4. Discussion

The main reflection of vegetation of any area is depicted in its floristic composition. The area was first time explored floristically and being part of the western Himalaya shows richness of species. The flora of the particular region is the sum total of the species within either related to cultivated or wild species. [25]. Floristic list is also representative of the view that species has its own ecological amplitude and interaction to the environment and to other species [13]. According to plant habit herbaceous growth habit with 138 species was the most dominant one. Our findings are congruent with many researchers of allied, neighbouring and national regions. [22],[24],[4],[5]. Largest families were Poaceae (37), Rosacea (21) and Asteraceae (9). [20] Also reported these families as dominant ones in their study areas such as Poaceae, Rosaceae and Asteraceae. Our findings are in agreement with a report of Stewart [31]. That these families were well represented in Pakistan, some other studies also indicated that these families were major families in the flora of Pakistan. [3] According to Marques 2004 phenological period and climate of the area are related to each other in term of temperature, day length and also rainfall. In present study seed were set down in cold season mostly in December and germinate in next spring seasons i.e. January and February, leaf flushing usually occurred in warm period i.e. in March and April, in rainy seasons i.e. in august flowering was at its peak and usually in September and October fruit maturation takes place. In our study area plants grows and goes up to flowering and fruiting stage in warm and wet seasons and shed seeds which gain cold treatment in winter seasons and then once again grows up in favourable seasons. Phenology is a periodic phenomenon in plants. At different altitude and growing seasons vegetation of any area shows different physiognomic conditions and each species shows different aspects such as flowering, disappearance and appearance. In the investigated area growing season started from March. In March-May few herbaceous and shrubby species started growth and few species were in flowering condition. Flowering reaches to its peak during May-August. In investigation area there were two flowering seasons. One from May to August and 2nd from September to November. Similarly, fruiting season also varies but mostly plants flowered from May to July. Our findings are congruent with the result of Shrestha [24], [23],[18]. Two flowering seasons were reported in Harbori range, Kalat [10]. According to marques 2004 phonological period and climate of the area are related to each other in term of temperature, day length and also rainfall. In present study seed were set down in cold season mostly in December and germinate in next spring seasons i.e. January and February, leaf flushing usually occurred in warm period i.e. in March and April, in rainy seasons i.e. in august flowering was at its peak and usually in September and October fruit maturation takes place. In our study area plants grows and goes up to flowering and fruiting stage in warm and wet seasons and shed seeds which gain cold treatment in winter seasons and then once again grows up in favourable seasons. The study area also comprises wild and exotic shrubs and trees such as *Nerium oleander, Hibiscus sp, Lagerstroemia indica,Melia azedarach and Ficus bengalensis. Different* crops grown in cultivated area which also having some weeds as *Stellaria media, Conyza canadensis, Solanum nigrum, Solanum americanum, Anagallis arvensis, Cirsium arvense and Melilotus oficinalis*. Similar results were shown by [30]. Most of the plants species in the investigation area were wilds. It is interesting that the majority of the wild's plants are medicinal, few species was edible ones, and many have ornamental values. In conclusion, Hangrai areas are very diverse and dynamic systems which contain wild and many locally

adapted crops. Hence these are particularly interesting conservation and management of plant resources.

5. Conclusion

The study was performed to explore and document the first floristic composition of union council Hangrai, Tehsil Balakot. It is concluded that the study area is rich with floristic diversity and the people also have valuable knowledge about plants. It is ensured that some plants could not be recorded and a long term study is needed to document the complete flora of this particular area. However, the present work will serve as an identification tool for plants of this specific area to researchers, students and plant loving people alike.

Conflicts of interest

The authors declare no conflict of interest.

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