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Research Paper

Floristic Inventory of Tracheophytes from Abbottabad Hazara Region, North Pakistan

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Abstract

The present study was aimed to explore the floristic composition of Tracheophytes growing in the Abbottabad region, North Pakistan. Field visits were carried out from November 2021 till June 2022. During that period, Tracheophytes were collected, and field observations were recorded, like habit, habitat, life form, elevation and distribution in different localities within study area. Collected specimens were poisoned, preserved, identified, and deposited in herbarium. Analysis of data revealed that 243 plant species distributed in 198 genera and 77 families were reported from the study area. 226 plant species of Angiosperms belonging to 65 families, 3 species of Gymnosperms belonging to 3 families, and 14 species of Pteridophytes belonging to 9 families were recorded from the research area. Perennials were dominated by 172 species. Annuals were 65 species, while 7 species were Biennial. Based on the habit, vegetation was dominated by herbs as 127 (52 %) species, followed by trees 51 (20.9%), shrubs 42 (17.2%) and climbers 9 (3.6%). Among 77 families, Asteraceae was the dominant family, represented by 17 plant species, followed by Leguminosae with 16 species, Lamiaceae with 15 species, and Rosaceae with 13 species, Poaceae with 12 species, while Apiaceae and Brassicaceae were represented by 10 species each. Other families were represented by less than 9 species each from the study area. The study showed that although the area is rich in biodiversity, it is still unexplored. The present study will be helpful in future investigations in the area.

1. Introduction

Tracheophytes meaning “tracheid bearing plants”, refers to the water-conducting cells in these plants. They form a large and diverse group of land plants and include 300,000 accepted known species, (Christenhusz & Byng, 2016). These plants have lignified tissues, the Xylem for conducting water and minerals throughout the plant. Tracheophytes are divided into three main categories, Pteridophytes, Gymnosperms and Angiosperms. Pteridophytes are the

spore- producing plants. Gymnosperms are the plants that produce seeds but no flowers, while Angiosperms are the flowering seed plants (Malik, 2009). Cavalier-Smith (1998) treated Tracheophytes as phylum or division for the first time in published history. Two of the characteristics defined by him in Latin phrase "*facies diploida xylem et phloem instructa*" (diploid phase with xylem and phloem).

The flora of Pakistan is comprehensive inventory of plants of Pakistan. About 47 botanists have contributed to the Flora of Pakistan. The ethnobotnical data of total 26 plant species of Vascular Plants belonging to 24 families was collected from the local people of the Ayubia National Park (Gilani et al., 2001). From Siran Valley, Mansehra 80 plant species belong to 49 families were reported, which are used as medicinal plants for different ailments. Many regions have recently been introduced in floristic term (Shah & Khan, 2006). From District Haripur 211 species belonging to 170 genera of 66 families of Vascular Plants have been described during the year 2004-08. A survey was conducted for exploring the useful medicinal plants of Abbottabad (Fazal et al., 2010). From Upper Tanawal, Mansehra, 308 species belonging to 243 genera of 92 families of Vascular Plants have been described. Asteraceae and Leguminosae were the most dominant families that contribute 26 species each (Farooq, 2018).

The Study Area is a union council of Abbottabad District in province of Khyber Pakhtunkhwa Pakistan (Anonymous, 2018). It is included in tehsil Lower Tanawal of district Abbottabad, located at 34.1727° and 34.10216° North and 73.0761° and 73.4341° East, at an elevation of 5921 feet above sea level. It is located 30 km from city of Abbottabad. The people living in the Pind Kargu Khan are known as Kargwal.

The area is rich in Floristic diversity but was still unexplored. According to literature review, no previous study was carried out on the floristic diversity of the study area. As no floristic study has been conducted on the Tracheophytes of the area, yet. Therefore, this region was selected for the exploration of floristic composition of the area and provide a list of different life forms of Tracheophytes growing in various localities of the study area.

2. Methodology

Initially, available literature was thoroughly reviewed. Field visits were conducted from October 2021 till June 2022. Surveys were arranged after 15 to 20 days to investigate winter flora as well as summer plants of the area. Field visits were conducted to collect plants from different localities of the study area. The material required for plant collection included cutter, digger, presser, GPS, newspaper, notebook and tag etc. Field observation of every plant as vernacular name, habit, habitat, associated plants, flower colour, flowering season, lifeform, elevation and their distribution in different localities of study area were recorded. Plants specimens were carefully pressed, dried, preserved mounted on Herbarium sheets. Each specimen was identified through available literature (Nasir & Ali, 1970-1995). The specimens were deposited in the herbarium, Department of Botany, Govt Girls Post Graduate College No. 1, Abbottabad.



Figure 1. Map of the study area in Abbottabad District, North

3. Results

Total 243 plants were collected from different localities of the area. These plants belonged to 198 genera and 77 families. Out of 243 plant, 226 species were belonging to Angiosperms, 3 plant species of Gymnosperms and 14 plant species belonging to Pteridophytes. Out of 77 families, 65 were Angiosperms, 3 Gymnosperms and remaining 9 families were Pteridophytes. The life-form analysis revealed a clear dominance of perennial plants (70.5%), while annual and biennial species constituted 26.6% and 2.9%, respectively (Figure 2). Regarding growth forms, herbs were the most abundant category (52.0%), followed by trees (21.3%), shrubs (17.2%), ferns (5.7%), and climbers (3.7%) (Figure 3). Information regarding family, botanical name, vernacular name, habit, flowering season, locality, elevation and date of collection of the plant species are provided in Tables on following pages, along with some graphical representations.

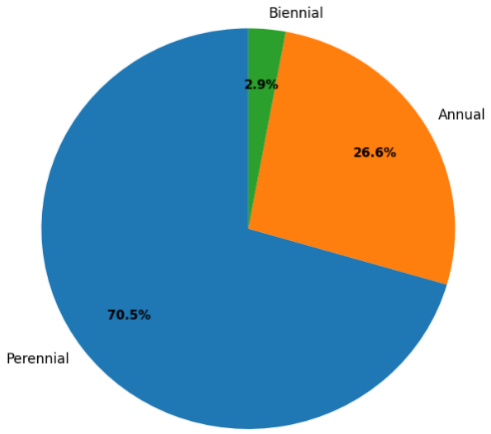


Figure 2. Graphical Representation of Life Form of Tracheophytes reported from study area

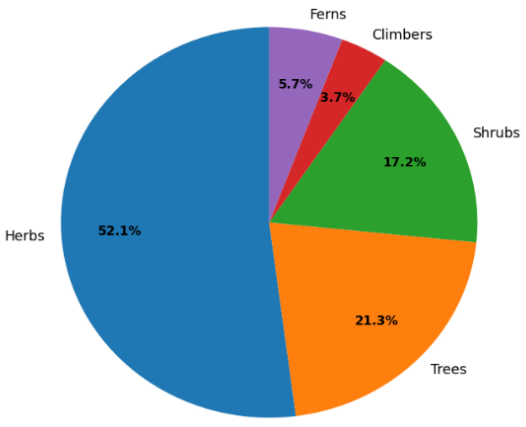


Figure 3. Graphical Representation of different Habits of Tracheophytes collected from study area

Table 1. Detailed floristic Inventory of plants collected from different localities of Pind Kargu Khan, District Abbottabad

{H (herb), S (shrub), T (tree), Hb (habit), C (climber), F (fern), Ht (height of stem), F.S. (flowering season), ft (feet), m (meter), cm (centimeter), Vern. Name (vernacular name)}

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
1.	Acanthaceae	*Dicliptera bupleuroides* Nees		H	2-3 ft	Pink/ purple	July-oct	Bandi	19-11-21	3380 ft
2.		*Justica adhatoda* L.	Bhakair	S	3m	White	Feb- Aug	Tandhara	19-11-21	2945 ft
3.		*Ruellia tuberosa* L.		H	1-2 ft	Purple	June-oct	Chajiyan	05-03-22	4320 ft
4.		*Ruellia brittoniana* E. Leonard		H	3-4 inch	Purple	March-Sep	Chajiyan	10-04-22	4290 ft
5.	Acoraceae	*Acorus calamus* L.		H	60-70cm	Green yellow	March-april	Siran	10-04-22	1220 ft
6.	Adoxaceae	*Viburnum cotinifolium* D. Don		S	9 ft	White	March-April	Gehli	10-04-22	2462 ft
7.	Amaranthaceae	*Alternanthera pungens* Kunth.	Saryali	H	1-2 ft	Pale	May-June	Haal	30-05-22	5782 ft
8.		*Amaranthus spinosus* L.	Ganhar	H	6-8 ft	Green	March-June	Bagariyan	21-05-22	4674 ft
9.		*Amaranthus retroflexus* L.		H	1-6 ft	Pink	July-Sep	Khalora	11-12-21	4350 ft
10.		*Amaranthus viridis* L.	Rati ganhar	H	2-3 ft	Green	May-Sep	Tandhara	10-4-22	2234 ft
11.		*Dysphania ambrosioides* L.		H	5 ft	Green	July-Oct	Haal	11-12-21	5876 ft
12.	Amaryllidaceae	*Allium lusitanicum* Lam.	Thoom	H	1 ft	Pink	April	Saran	10-04-22	3933 ft
13.		*Narcissus tazetta* L.	Chulundri phul	H	30-60cm	White	April- june	Haal	11-12-21	5990 ft
14.	Anacardiaceae	*Cotinus coggyria* Scop.		S	5-7m	Green yellow	June-july	Khalora	11-12-21	4309 ft
15.		*Lannea coromandelica* (Houtt.) Merr.		T	25 m	Green	March-April	Bachah	11-12-21	4784 ft
16.		*Mangifera indica* L.	Aam	T	50-60 ft	Pale yellow	May	Pohar	10-04-22	1762 ft
17.		*Pistacia chinensis* Bunge	Kangar	T	9 meter	Green yellow	Mar-May	Khanda khoo	07-05-22	4542 ft
18.		*Schinus terebinthifolius* Raddi	Kaali march	S	3-7m	White	Sep- Nov	Gali	05-03-22	4621 ft
19.	Apiaceae	*Anethum graveolens* L.	Soya	H	2-3 ft	Yellow	April-July	Gali	05-03-22	4585 ft
20.		*Carum copticum* L.	Jawern	H	1-2 ft	White	Aug-July	Saran	21-05-22	4200 ft
21.		*Coriandrum sativum* L.	Taania	H	20 inches	White	June-July	Saran	10-04-22	3950 ft
22.		*Conium maculatum* Linn.		H	1-2 ft	White	June-Aug	Bachah	11-12-21	4820 ft
23.		*Foeniculum vulgare* Mill.	Sounf	H	3-5 inch	Yellow	Aug-Oct	Saran	19-11-21	3890 ft
24.		*Trachydium roylei* Lindl.		H	1-3 ft	White	April-May	Quterah	7-05-22	4127 ft
25.		*Pimpinella diversifolia* L.		H	2-3 ft	White	March-sep	Kangrora	10-04-22	3570 ft
26.		*Pimpinella stewartii* Nasir	Tanrpakhi	H	1 m	White	March-May	Kandhal	21-05-22	5840 ft
27.		*Scandix pecten-veneris* L.	Neela	H	1.5 ft	White	April-june	Barkot	05-03-22	5235 ft
28.		*Torilis nodosa* (L.) Gaertn.		H	15-40 cm	White	April-june	Kotdehri	10-04-22	1925 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
29.	Apocynaceae	*Calotropis procera* (Aiton) Dryand.		S	6-15 ft	White	Sep-Feb	Pohar	10-04-22	1205 ft
30.		*Carissa opaca* Stapf ex Hanies	Granda	S	4 m	White	April-June	Basala	10-04-22	3025 ft
31.		*Nerium oleander* L.	Kaneer	S	7-20 ft	White	April-oct	Pohar	10-04-22	1079 ft
32.		*Vincetoxicum hirundinaria* Medik.		H	2-6 ft	Purple	June-Sep	Kangrora	10-04-22	3620 ft
33.	Araliaceae	*Hedera helix* L.	Karaik	C	66-100 inch	Pale yellow	July-Nov	Khalora	11-12-21	4580 ft
34.	Asparagaceae	*Agava americana* L.	Jangli kurwa	H	3-4 ft	Green	March-April	Badhyal	05-03-22	4925 ft
35.		*Asparagus capitatus* L.		C	5-15 ft	Yellow	Aug-sep	Khandha khoo	19-11-21	4377 ft
36.		*Hyacinthus orientalis* L.		H	1 ft	Blue Purple	March-April	Khalora	10-4-22	4691 ft
37.		*Notholirion thomsonianum* (D. Don) Stapf	Piyazri	H	6-12 ft	Voilet-blue	March-May	Karry	07-05-22	4893 ft
38.	Aspleniaceae	*Asplenium adiantum nigrum* L.		F	1ft	-	-	Bagariyan	05-03-22	4640 ft
39.		*Asplenium monanthes* L.		F	1 ft	-	-	Bagariyan	21-05-22	4680 ft
40.	Asteraceae	*Artemisia vulgaris* L.	Chao	H	1 ft	Yellowish brown	July-oct	Tandhara	05-03-22	2105 ft
41.		*Calendula arvensis* M.Bieb.		H	1 ft	Yellow	March-April	Badhyal	05-03-22	4985 ft
42		*Centaurea calcitrapa* L.	Kandher	H	1-6 ft	Purple	July-Sep	Khalora	11-12-21	4531 ft
43.		*Cirsium falconeri* (Hook.f.) Petr.		H	6 ft	Yellow	March-July	Tandhara	05-03-22	2285 ft
44.		*Conyza bonariensis* (L.) Cronquist		H	1-5 ft	Yellow	July-oct	Tandhara	10-4-22	2267 ft
45.		*Cosmos caudatus* Kunth		H	1m	Pink	June-nov	Jabri	19-11-21	3798 ft
46.		*Eclipta prostrata* (L.) L.		H	3 ft	White	July-Oct	Chajiyan	07-05-22	4419 ft
47.		*Galinsoga parviflora* Cav.		H	3 ft	Golden yellow	June-Oct	Saran	21-05-22	3719 ft
48.		*Gnaphaliun thomsonii* Hook. F.		H	2-10”	Brown to yellow	June -Sep	Basala	18-2-22	3180 ft
49.		*Lapsana communis* L.		H	2-5 ft	Yellow	June-Sep	Khanda khoo	30-03-22	4325 ft
50.		*Parthenium hysterophorus* L.	Chena buti	H	1m	White	Oct-March	Sando gali	05-03-22	4913 ft
51.		*Pluchea wallichiana* DC.		S	2.5 m	White	Feb-Aug	Jabri	5-3-22	3690 ft
52.		*Sigesbeckia orientalis* L.		H	1.5 ft	Yellow	Sep- oct	Jabri	19-11-21	3656 ft
53.		*Sochus asper* (L.)Hill	Dodak	H	2-4 ft	Yellow	July-oct	Bagariyan	05-03-22	4660 ft
54.		*Tagetes minuta* L.	Saryala	S	2m	Yellow-orange	Oct	Barkot	11-12-21	5220 ft
55.		*Taraxacum officinale* F.H.Wigg.	Shesh hind	H	1 ft	Yellow-orange	May-june	Chajiyan	05-03-22	4380 ft
56.		*Xanthium strumarium* L.	Kandy	H	6-7 ft	Green	Aug	Haal	11-12-21	4960 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
57.	Asphodelaceae	*Hemerocellis lilioasphadelus* L.		H	2-4 ft	Yellow	June	Thathai	07-05-22	1735 ft
58.	Athyriaceaea	*Athyrium filix-femina* (L.) Roth		F	2-5 ft	-	-	Bachah khurd	11-12-21	4567 ft
59.	Berberidaceae	*Berberis lycium* Royle	Sumblu	S	13ft	Yellow	May	Sando gali	07-05-22	5120 ft
60.	Brassicaceae	*Arabidopsis thaliana* (L.)Heynh.		H	2-3ft	White	March	Kot Dheri	10-04-22	2245 ft
61.		*Brassica rapa* L.	Saryan	H	1 ft	Yellow	June-july	Bagariyan	30-03-22	4507 ft
62.		*Capsella bursa - pastoris* (L.)Medik.		H	45cm	Yellow	April-Sep	Gehli	07-03-22	2690 ft
63.		*Cardamine flexuosa* With.		H	30cm	White	June-Sep	Rakran	05-03-22	4197 ft
64		*Caradamine impatiens* L.		H	2 ft	White	May-July	Kot Dehri	10-04-22	2298 ft
65		*Chorispora tenella* (Pall.)DC.		H	1 ft	Pink	March-May	Tandhara	10-04-22	2541 ft
66.		*Nasturtium officinale* R.Br.	Tara mera	H	1ft	White	April-july	Siran	10-04-22	1601 ft
67.		*Neslia paniculata* L. Desv.		H	1m	Yellow	May-June	Bandi	07-05-22	3330
68.		*Raphanus sativus* L.	Muli	H	4-8inches	White	April-june	Saran	30-03-22	4125 ft
69.		*Sisymbrium officinale* (L.) Scop.		S	1-2.5 ft	Yellow	May-Oct	Sando gali	05-03-22	5271 ft
70		*Thlaspi arvense* L.		H	1-2 ft	White	May-July	Lakhala	10-04-22	2543 ft
71.	Boraginaceae	*Trichodesma indicum* (L.) R. Br.	Handoli	H	1m	Blue	Jan-July	Khalora	11-12-21	4185 ft
72.	Cannabaceae	*Cannabis sativa* L.	Paang	H	8ft	White	April-Sep	Sando gali	07-05-22	5379 ft
73.	Caprifolaceae	*Lonicera japonica* Thunb.		C	15-30ft	Yellow	April-July	Kot Dehri	10-4-22	2317 ft
74.	Caryophyllaceae	*Silene conoidea* L.	Kandali	H	20-40cm	Pink	June	Lakhala	10-04-22	2479 ft
75.		*Stellaria media* (L.)Vill.		H	11 inches	White	June-Sep	Basala	05-03-22	3632 ft
76.	Convolvulaceae	*Evolvulus alsinoides* (L.)L.		H	1 ft	Purple	July-Aug	Karry	07-05-22	3721 ft
77.		*Convolvulus arvensis* L.	Allar	C	2-3m	White	Aug-March	Pohar	10-04-22	1162 ft
78	Crassulaceae	*Bryophyllum* x *houghtonii* (D.B.Ward)		S	3 ft	Red	March	Sando gali	05-03-22	5441 ft
79		*Sedum trullipetalum* Hook.f. & Thomson	Khali buti	H	1-2 ft	Yellow	June-Aug	Sando gali	07-05-22	5451 ft
80		*Sedum dendroideum* Moc. & Sesse ex DC.		S	2 m	Yellow	Feb-June	Bachah	10-04-22	4932 ft
81.	Cucurbitaceae	*Bryonia aspera* Stev. ex Ledeb.		C	1-3 ft	Pale Yellow	June-July	Sando gali	21-05-22	5290 ft
82.		*Cucurbita moschata* Duchesne	Kadra	C	15 ft	Yellow	July-Sep	Karry	5-03-22	3637 ft
83.	Cupressaceae	*Cupressus sempervirens* L.	Saroa	T	98 ft	Green	March-may	Quterah	05-03-22	3281 ft
84.	Cycadaceae	*Cycas revoluta* Thunb.		T	4 m	-	-	Kandhal	21-05-22	5384 ft
85.	Cyperaceae	*Carex divulsa* Stokes		H	2 ft	Brown	March-April	Tandhara	07-05-22	2289 ft
86.		*Cyperus niveus* Retz.	Tara kaa	H	9-27 cm	Snow White	April-june	Saran	21-05-22	4215 ft
87..		*Cyperus rotundus* L.	Jaba kaa	H	3 ft	Brown	March-July	Kandhal	21-05-22	5472 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
88.	Dennstaedtiaceae	*Pteridium aquilinum* Kuhn.	Chapa	F	2-4 ft	-	-	Basala	19-11-21	3279 ft
89.	Dryopteridaceae	*Dryopteris filix- mass* (L.) Schott.		F	2-3 ft	-	-	Chajiyan	21-05-22	4419 ft
90.		*Dryopteris-intermedia* (Muhl. Ex Willd)		F	1 ft	-	-	Bacha khurd	11-12-21	4758 ft
91..	Ebenaceae	*Diospyros lotus* L.	Amlok	T	60 ft	Yellow	March-Aug.	Bagariyan	10-04-22	4389 ft
92	Ericaceae	*Gaultheria trichophylla* Royle		S	2-3 ft	Pink	March-july	Khalora	11-12-21	4374 ft
93.	Euphorbiaceae	*Euphorbia helioscopia* L.		H	1 ft	Yellow	March-July	Sando Gali	05-03-22	5259 ft
94.		*Euphorbia hirta* L.		H	5-6 ft	Red	May-July	Lakhala	21-05-22	2406 ft
95.		*Mallotus philippensis* (Lam.) Mull.	Kamela	T	25m	Red	March-April	Kangrora	19-11-21	3733 ft
96.		*Ricinus communis* L.	Arnd	S	40 ft	Green	Nov-March	Karry	19-11-21	4387 ft
97.	Geraniaceae	*Geranium lucidum* L.	Phul naqshai	H	3-4 cm	Pink	May	Bacha khurd	11-12-21	4596 ft
98.		*Geranium molle* L.		H	1 ft	Pink	Aug-Sep	Badhayal	19-11-21	5021 ft
99.		*Geranium ocellatum* Camb.		H	3-4 ft	Pink	June-Aug	Gandah	10-04-22	3237 ft
100.		*Geranium rotundifolium* L.		H	1 ft	Pink	June-Oct	Jabri	10-04-22	3782 ft
101.		*Geranium pusillum* L.		H	6 ft	Pink	April- July	Karry	19-11-21	4428 ft
102.	Hypericaceae	*Hypericum oblongifolium* Choisy.		S	3-5 ft	Yellow	June	Khalora	10-04-22	4520 ft
103.	Juglandacaea	*Juglans regia* L.	Khorh	T	40-60 ft	Yellow	June	Saran	21-05-22	3990 ft
104.	Juncaceae	*Juncus maritimus* Lam.	Chanja kaa	H	3 ft	Brown	May-June	Kandhal	11-12-22	5523 ft
105.	Lamiaceae	*Ajuga parviflora* Benth.		H	4-12 inch	Purple	April	Saran	21-05-22	4120 ft
106.		*Colebrookea oppositifolia* Sm.	Kimela	S	8 ft	Greenish white	Jan-April	Lakhala	19-11-21	3106 ft
107.		*Hyptis suaveolens* (L.) Poit.		H	3 ft	Purple	Jan-Dec	Khanda khoo	11-12-21	4296 ft
108.		*Marrubium vulgare* L.	Bazori boti	H	1 ft	Purple	April-June	BachahKhurd	11-12-21	4673 ft
109.		*Melissa officinalis* L.		H	3 ft	White	June-Sep	Bacha Khurd	10-04-22	4857 ft
110.		*Mentha arvensis* L.	Kala pudna	H	3-18 ft	Purple	July-Sep	Saran	10-04-22	3980 ft
111.		*Mentha longifolia* (L.) L.	Cheeta pudna	H	2 ft	White	July-Aug	Saran	10-04-22	3766 ft
112.		*Nepta cataria* L.		H	1 ft	White	July-Sep	Gehli	07-05-22	2390 ft
113.		*Ocimum basilicum* L.	Niazbo	H	1-2 ft	Pink	May-July	Bagariyan	21-05-22	4231 ft
114.		*Rydingia limbata* (Benth.) Scheen & V.A. Albert	Papoe	S	3-5 ft	Yellow	March-June	Karry	10-4-22	4559 ft
115.		*Sideritis montana* L.		H	1 ft	White	March-june	Kandhara	7-5-22	5480 ft
116.		*Stachys parviflora* K. Koch.		H	2 ft	Purplish white	March-june	Bachah	10-04-22	4797 ft
117.		*Thymus linearis* Benth.		H	5 inch	Purple	March-june	Haal	10-04-22	5793 ft

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118.		*Micromeria biflora* L.		S	1 ft	White	June-Aug	Barkot	10-04-22	4797 ft
119..		*Vitex negundo* L.	Marvanni	T	40 ft	Purplish white	Jun-July	Kandhal	21-05-22	5212 ft
120.	Leguminosae	*Acacia senegal* (Linn.) Willd.		T	10 m	Yellow	April-July	Saram	21-05-22	
121.		*Acacia modesta* Wall.	Phullae	T	13-22 ft	White	April-May	Thathai	10-04-22	1990 ft
122.		*Acacia nilotica* (L.) Delile	Kekar	T	23 ft	Yellow	March-June	Bandi	19-11-21	3414 ft
123.		*Amorpha fruticosa* L.	Kekar	S	16-20 ft	Purple	April-June	Khanda khoo	11-12-21	4459 ft
124.		*Bauhina variegata* L.	Kulari	T	39 ft	Pink/ white	April	Khanda khoo	10-04-22	4480 ft
125.		*Butea monosperma* (Lam.) Taub.	Taak	T	30-40 ft	Orange red	May	Basala	10-04-22	3457 ft
126.		*Laburnum anagyroides* Medicus		S	3-8 ft	Yellow	March-July	Tandhara	10-4-22	2280 ft
127.		*Indigofera heterantha* Brandis	Jangli keekar	S	9-8 ft	Purple	June	Bandi	21-05-22	3315 ft
128.		*Indigofera tinctoria* L.		S	6 ft	Pink	Nov-March	Bandi	10-04-22	3331 ft
129.		*Lathyrus aphaca* L.	Khukhar	H	3 ft	Yellow	June-Aug	Basala	05-03-22	3386 ft
130.		*Leucaena leucocephala* (Lam.)de Wit	Kacha kekar	T	30 ft	White	Whole Year	Bandi	10-04-22	3352 ft
131.		*Lotus corniculatus* L.	Makree	H	4-6 inch	Yellow	April-May	Badhayal	5-3-22	4902 ft
132.		*Medicago polymorpha* L.		H	2 inch	Yellow	April-Aug	Sando gali	07-05-22	5337 ft
133.		*Melilotus indica* (L.) All.	Senji	T	3 ft	Yellow	Jan-March	Tandhara	10-04-22	2932 ft
134.		*Vicia sativa* L.		H	3 ft	Purple	May-Sep	Basala	05-03-22	3390 ft
135.		*Vicia hirsuta* Dumort.	Rabara	H	1 ft	White	April-june	Basala	05-03-22	3447 ft
136.	Linaceae	*Reinwardtia indica*	Peeli bilri	H	10 inches	Yellow	May-June	Chajiyan	05-03-22	4491 ft
137.	Liliaceae	*Gagea elegans* Wall. ex D. Don	Khal toa	H	1-6 ft	Yellow	March-May	Haal	05-03-22	5120 ft
138.		*Tulipa clusiana* DC.	Ghantal	H	1 ft	Pinkish white	April	Rakran	05-03-22	4231 ft
139.	Lythraceae	*Punica granatum* L.	Durna	T	2-5 m	Red	May-July	Khandan khoo	10-04-22	4460 ft
140.		*Woodfordia fruticosa* (L.) Kurz		S	16 ft	Red	March-April	Khandha khoo	11-12-21	4390 ft
141.	Malvaceae	*Malvastrum coromandelianum* (L.) Garcke	Bhaikree	S	3 ft	Yellow	June	Lakhala	10-04-22	2567 ft
142.		*Malva sylvestris* L.	Sonchal	H	2-4 ft	White	June-Sep	Basala	05-03-22	3761 ft
143.	Marsileaceae	*Marsilea minuta* L.		F	1 ft	-	-	Bachah	11-12-21	4810 ff
144.	Meliaceae	*Melia azedarach* L.	Darek	T	50 ft	Light purple	Mar-May	Karry	30-03-22	4447 ft
145.	Moraceae	*Broussonetia papyrifera* (L.) L' Her.	Jangli tut	T	50 ft	Pale-Green	March-May	Dannah	05-03-22	3220 ft
146.		*Ficus benghalensis* L.	Barr	T	100 ft	Red	April-June	Bandi	19-11-21	3379 ft
147.		*Ficus carica* L.	Kali Phaag	T	20 ft	Green	June-Sep	Karry	10-04-22	4397 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
148.		*Ficus palmata* Forrsk.	Phaag	T	30 ft	Greenish white	June-Sep	Bagariyan	05-03-22	4614 ft
149.		*Ficus racemosa* L.	Romal	T	39 ft	Greenish-white	March-Nov	Karry	30-03-22	4590 ft
150.		*Ficus virens* Dryand.		S	9-16 ft	Green	March-April	Tandhara	11-12-21	2079 ff
151.		*Morus alba* L.	Cheeta tut	T	29-49 ft	White	May	Gali	21-05-22	4099 ft
152.		*Morus macroura* Miq.	Laylan	T	10 m	Yellow- white	April-May	Quterah	07-05-22	2297 ft
153.		*Morus nigra* L.	Kala tut	T	30-40 ft	White	May-june	Quterah	07-05-22	3350 ft
154.	Musaceae	*Musa paradisiaca* Linn.		T	9 m	Pink	July	Bandi	21-05-22	3857 ft
155.	Myrtaceae	*Eucalyptus globulus* Labill.	Gondh	T	153 ft	Whitish	Nov-April	Rakran	18-02-22	4130 ft
156.		*Eucalyptus alba* Reinw. ex Blume	Cheeti gondh	T	75 ft	White	Sep-Jan	Gali	21-05-22	4237 ft
157.		*Myrtus communis* L.	Jangli lachi	S	5 ft	White	April	Saran	21-5-22	3910 ft
158.		*Psidium guajava* L.	Amrud	T	33 ft	White	Oct-Nov	Jabri	21-05-22	3567 ft
159.	Oleaceae	*Jasminum sambac* (L.) Aiton	Motiya	S	1-9 ft	White	March-June	Saran	21-05-22	3832 ft
160.		*Ligustrum lucidum* Aiton.	Lakastrum	T	33 ft	White	April-july	Chathah	07-05-22	2190 ft
161.		*Olea ferruginea* Royle	Kau	T	30 ft	White	Jume-July	Khanda khoo	11-12-21	4379 ft
162.		*Osmanthus fragrans* Lour.		T	15 ft	Yellow- white	April-May	Chathah	30-3-22	2120 ft
163.	Onagraceae	*Oenothera rosea* L' Her. Ex Aiton		H	1 ft	Rose-purple	April-Aug	Karry	05-07-22	4780 ft
164.	Oxalidaceae	*Oxalis corniculata* L.	Khat kharla	H	2-8 inch	Yellow	June -Sep	Bachah	10-04-22	4518 ft
165.		*Oxalis latifolia* Kunth		H	1 ft	Pink	May-June	Bacha Khurd	11-12-21	4767 ft
166.	Papaveraceae	*Papaver somniferum* L.	Poshat	H	1-2 ft	Purple	April	Tandhara	07-05-22	2309 ft
167.	Pinaceae	*Pinus roxburghii* Sargent	Cheer	T	180 ft	-	-	Sando gali	19-11-21	4996 ft
168.	Plantaginaceae	*Linaria dalmatica* (L.) Mill.		H	1-2 ft	Yellow	May-Sep	Khalora	10-04-22	4706 ft
169.		*Plantago lanceolata* L.		H	1 ft	White	June -Oct	Badhyal	05-03-22	5245 ft
170.		*Veronica anagallis-aquatica* L.		H	1 ft	Purple	June-Sep	Gehli	07-05-22	2734 ft
171.		*Veronica persica* Poir.	Bazori buti	H	2-8 inch	Voilet	Feb-April	Basala	05-03-22	3697 ft
172.	Plumbaginaceae	*Plumbago zeylanica* L.		S	6 ft	White	Dec-March	Saran	07-05-22	3765 ft
173.	Poaceae	*Arundo donax* L.	Nari	H	20 ft	White	May-Aug	Saran	21-05-22	3857 ft
174.		*Avena fatua* L.	Kanrhal	H	1 ft	Yellow	June-Sep	Tandhara	10-04-22	2386 ft
175.		*Bothriochloa pertusa* Linn.	Lilurka	H	3-12 ft	Yellow	May	Kandhal	21-5-22	5583 ft
176.		*Melanocenchris jacquemontii* Jaub. & Spach		H	2 ft	Purple	Aug-Sep	Tandhara	07-5-22	2380 ft
177.		*Echinochloa colona* (L.) Link.		H	2-3 ft	Red	June-Sep	Khanda khoo	07-05-22	4373 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
178.		*Eleusine indica* L.	Munda kaa	H	1-2 ft	Green	July-Aug	Gandah	10-04-22	2930 ft
179.		*Eulaliopsis binata* (Retz.) C.E	Babarh kaa	H	3 ft	Brown	April-July	Kandhal	21-05-22	5632 ft
180.		*Hyparrhenia hirta* L.		H	3 ft	Pale brown	Sep-June	Kandhal	11-12-21	6103 ft
181.		*Melica persica* Kunth	Burbura kaa	H	2 ft	White	May	Tandhara	07-05-22	2285 ft
182.		*Poa annua* L.	Khabal	H	2-8”	Yellow	June-Oct	Gehli	05-03-22	2678 ft
183.		*Sorghum halepense* (L.) Pers.	Chatah	H	8 ft	Whitish	May	Chattah	30-03-22	2089 ft
184.		*Triticum aestivum* L.	Karank	H	4 ft	Green yellow	May-July	Tandhara	10-04-22	2206 ft
185.	Polygalaceae	*Polygala abyssinica* R.		H	1 ft	Purplish	March-Sep	Khalora	10-04-22	4861 ft
186.	Polygonaceae	*Persicaria lapathifolia* (L.) Delarbre	Lundra	H	2-6 ft	White	July-Sep	Chajiyan	21-05-22	4012 ft
187.		*Rumex hastatus* D. Don.	Kithamal	H	3 ft	Pink	March-Nov	Chajiyan	10-04-22	3910 ft
188.		*Rumex crispellus* Rech.	Ratta gnhar	H	2-5 ft	Creamy-yellow	June-July	Bagariyan	11-12-21	4787 ft
189.		*Rumex acetosa* L.		H	3 ft	Yellow	May-Sep	Bandi	19-11-21	3402 ft
190.	Polypodiaceae	*Polypodium vulgare* L.		F	20 “	-	-	Bagariyan	05-03-22	4808 ft
191.	Primulaceae	*Lysimachia vulgaris* L.	Liluri	H	2-4 ft	Yellow	March-June	Khalora	19-11-21	4589 ft
192.	Pteridaceae	*Adiantum capillus-veneris* L.	Kapkpai	F	2 ft	-	-	Basala	05-03-22	3205 ft
193.		*Adiantum pedatum* L.		F	1-2 ft	-	-	Bachah khurd	11-12-22	4856 ft
194.		*Pteris cretica* L.		F	1-2 ft	-	-	Bandi	19-11-21	3345 ft
195.	Ranunculaceae	*Clematis montana* Buch.	Hrandi	C	100 ft	White	July	Khanda khoo	11-12-21	4410 ft
196.		*Delphinium vestitum* Wall. ex. Royle		H	4-6 ft	Blue violet	June-Aug	Siran	10-04-22	1109 ft
197.		*Ranunculus muricatus* L.		H	1-2 ft	Yellow	March-June	Sando gali	07-05-22	4986 ft
198.		*Ranunculus repens* L.	Kand bheri	H	3 ft	Yellow	June-May	Bachah	07-05-22	4619 ft
199.	Rhamnaceae	*Berchemia edgeworthii* Lawson		S	10 ft	Pale green	May-Sep	Khalora utla	11-12-22	4627 ft
200.		*Rhamnus purpurea* Edgew.		S	6 ft	White	Feb - April	Khalora	10-04-22	4685 ft
201.		*Zizyphus jujuba* Mill.	Sinjli	T	40 ft	Yellow	Feb-April	Khanda khoo	21-05-22	4640 ft
202.		*Zizyphus nummularia* (Burn. F.) Wight & Arn.	Jangli Ber	T	40 ft	Yellow	Feb-April	Saran	07-05-22	3884 ft
203.		*Zizyphus oxyphylla* Edgew.	Pthni	T	15 ft	Yellowish green	April- May	Bandi	18-02-22	3463 ft
204.	Rosaceae	*Duchesnea indica* (Andrews) Focke	Mewa	H	1-2 ft	Yellow	April-Aug	Khalora	11-12-22	4467 ft
205.		*Eriobotrya japonica* (Thunb.) Lindl.	Lukath	T	20-30 ft	White	Nov-March	Bachah	18-02-22	4504 ft
206.		*Malus baccata* (L.) Borkh.	Saib	T	23 ft	White	March-April	Karry	30-03-22	4532 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
207.		*Prunus armeniaca* L.	Khurmani	T	20-30 ft	White	April	Quterah	05-03-22	3492 ft
208.		*Prunus bokharensis*	Alu Bokhara	T	16-19 ft	White	Feb	Karry	30-03-22	4670 ft
209.		*Prunus domestica* Royale ex C.	Lucha	T	20 ft	White	April-May	Basala	05-03-22	4115 ft
210.		*Prunus dulcis* (Mill.) D. A. Webb	Jangli badam	T	30 ft	White	March-Aug	Khalora	11-12-21	4411 ft
211.		*Prunus persica* (L.) Stokes	Zarcha	T	12-15 ft	Pink	April-May	Saran	10-04-22	3789 ft
212.		*Pyrus communis* L.	Batang	T	25 ft	White	March-April	Khanda khoo	10-04-22	4565 ft
213.		*Pyrus pashia* Bunch.	Batangi	T	29 ft	White	Feb-April	Saran	30-03-22	3856 ft
214.		*Rosa canina* L.	Gulab	S	3-16 ft	Pink	March-July	Haal	05-03-22	5261 ft
215.		*Rosa multiflora* (Thunb.)	Phulwari	S	15 ft	White	June	Basala	19-11-21	3785 ft
216.		*Rubus ellipticus* Sm.	Gorash	S	14 ft	White	Feb-April	Sando gali	05-03-22	4880 ft
217.	Rubiaceae	*Himalrandia tetrasperma* (Roxb.) Yamazaki	Khukhri	S	13 ft	White	May-June	Khanda Khoo	11-12-21	4395 ft
218.	Rutaceae	*Citrus aurantifolia* (Christm) Swingle		T	16 ft	White	April-Sep	Bandi	19-11-22	3498 ft
219..		*Citrus limon* (L.) Osbeck	Lemu	S	9 ft	Purplish white	Feb-March	Karry	30-3-22	4286 ft
220.		*Zanthoxylum armatum* DC.	Timbar	S	11 ft	Green yellow	April-May	Bandi	18-02-22	3484 ft
221.	Salicaceae	*Populus nigra* L.	Shafada	T	50-80 ft	Green	April-May	Danah	07-05-22	2947 ft
222	Sapindaceae	*Dodonaea viscosa* (L.) Jacq.	Bansthra	S	12-16 ft	Yellow-White	April-june	Lakhala	10-04-22	2538 ft
223.		*Sapindus mukorossi* Gaertn.	Ritha	T	80 ft	White	May-Aug	Bandi	18-02-22	3414 ft
224.	Scrophulariaceae	*Verbascum thapsus* L.	Gidar tambaco	H	6 ft	Yellow	May-June	Gehli	07-05-22	2711 ft
225.	Simaroubaceae	*Alianthus altissimus* Mill. Swingle	Dhraba	T	49 ft	Yellow-green	April-July	Pohar	10-04-22	1251 ft
226.	Solanaceae	*Capsicum annum* L.	Ratti march	H	3 ft	White	April-july	Haal	21-05-22	5625 ft
227.		*Solanum nigrum* L.	Kachimach	H	1.5 ft	White	July-Sep	Karry	19-11-21	4467 ft
228.		*Solanum melongena* L.	Bangharn	H	1-3 ft	Purple	April-Oct	Haal	21-05-22	5676 ft
229.		*Solanum pseudocapsicum* L.	Chena march	S	11 ft	White	June-july	Haal barkot	30-5-22	5692 ft
230.		*Solanum surattense* Burm.	Gola kandhair	H	2 ft	Purple	Nov-May	Khanda khoo	11-12-21	4285 ft
231.	Selaginellaceae	***Selaginella reticulata*** (Hook. & Grev.) Spring.		F	6 inch	-	-	Bandi	19-11-21	3388 ft
232.	Thelypteridaceae	*Chirstella dentata* (Forssk.) Brownsey & Jermy		F	2-3 ft	-	-	Bandi	18-02-22	3380 ft
233.		*Phegopteris connectilis* (Michaux) Watt	Habsa buti	F	1 ft	-	-	Karry	21-05-22	4350 ft
234.	Thymelaeaceae	*Daphne mucronata* Royle	Kuttelal	S	4-6 ft	White pink	May-Sep	Saran	30-03-22	3712 ft

S. No	Family Name	Botanical Names	Vern. Names	Hb	Ht	Flower Color	F.S	Locality	Date	Altitude
235.	Tiliaceae	*Grewia oppositifolia* Roxb. Ex DC.	Taamar	T	45 ft	Yellow-white	March-May	Karry	21-05-22	4296 ft
236.	Urticaceae	*Debregeasia salicifolia* (D.Don) Rendle	Chenjli	T	35 ft	Green-Yellow	March-July	Bachah	21-05-22	4882 ft
237.	Vitaceae	*Parthenocissus quinquefolia* (L.) Planch.	Blri	C	70-100 ft	Greenish	March-April	Khanda khoo	11-12-21	4450 ft
238.		*Vitis parvifolia* Roxb.	Kali dakh	C	49 ft	White	May-July	Gehli	07-05-22	2670 ft
239.	Violaceae	*Viola odorata* L.	Phul banaqsha	H	6-10 inch	Dark blue	March-April	Bandi	10-04-22	3377 ft
240.		*Viola reichenbachiana* Jord. Ex. boreau		H	4-6 inch	Purple	Jan-May	Rakran	21-05-22	4092 ft
241.	Verbenaceae	*Lantana camara* L.	Panch phuli	S	1-6 ft	White pink	May-July	Bachah	21-05-22	4692 ft
242.		*Verbena officinalis* L.		H	1 ft	Pink	July-Sep	Pohar	10-04-22	1958 ft
243.		*Verbena tenuisecta* Briq.	Phul khukoe	H	1 ft	Purple	May-July	Siran	10-04-22	1709 ft

Note: H (herb), S (shrub), T (tree), Hb (habit), C (climber), F (fern), Ht (height of stem), F.S. (flowering season), ft (feet), m (meter), cm (centimeter), Vern. Name (vernacular name)

4. Discussion

This study was conducted for documentation of Tracheophytes. Previously a survey was conducted to give the complete checklist of Flora of Datta Village, District Mansehra. Total 115 plants of Tracheophytes were collected from different localities of the study area. These plants included about 101 genera and 44 families. Among these families, 38 Angiosperms, 2 Gymnosperms and 2 Pteridophytes were found. Asteraceae with 15 species was the largest family followed by Poaceae with 13 spp. (Saeed et al., 2018). An ethno-botanical survey was carried out to collect information regarding the various uses, especially the medicinal plants in Sarban hills. Total of 16 plant species of Vascular Plants were recorded belonging to 13 families of Angiosperms. Out of these 9 herbs, 4 trees and 3 shrubs were calculated. According to field observations, *Dodonea viscosa*, *Taraxacum officinales, Mellotis Philipensis, Solanum xanthocarpum* and *Capsella bursa-pastoris* were the major species present in the area (Ijaz et al., 2015). The Flora of Bara Gali District Abbottabad comprises of a total of 50 plant species belonging to 33 families. Asteraceae with 6 number of species was the dominant family. Habitat of the Flora dominated by 35 herbs followed by 10 shrubs and 5 trees (Bibi et al., 2021).

Extensive review of literature revealed that there is no record of floristic checklist from current study area revealing the fact that this area was unexplored for its biodiversity. Keeping this in view present study was conducted to explore and document the Tracheophytes of the study area. A total of 243 Tracheophytes were collected from the study area, belonging to 77 families out of which 65 represents Angiosperms while 3 were Gymnosperms and 9 families belongs to Pteridophytes. The related work on the floristic compositions in the district Abbottabad and neighbors revealed the rich biodiversity of the Hazara. As the area is rich in biodiversity, further surveys are needed to document plants of the area. Bryophytes are not explored from the area yet. Awareness programs must be started for local inhabitants of the area regarding the importance of medicinal plants. Reforestation of area wih local species is need of time. Proper monitoring is needed for forest protection.

Conclusion

Floristic Inventory revealed 243 plant species distributed in 198 genera and 77 families, including 226 plant species of Angiosperms (65 families), 3 species of Gymnosperms (3 families) and 14 species of Pteridophytes (9 families) recorded from the study area. Perennials were dominated by 172 species (70.5%), Annuals were 65 species (26.6%) while 7 species (2.9%) were Biennial. Based on the habit of the plants, vegetation was dominated by herbs as 127 (52 %) species, followed by shrubs 42 species (17.2%), climbers 9 species (3.6%), trees 51 species (20%), ferns 14 species (5.7%). Asteraceae was dominant family represented by 17 plant species, followed by Leguminosae

(16 species), Lamiaceae (15 species), Rosaceae (13 species), Poaceae (12 species), Apiaceae and Brassicaceae (10 species each), while, other families were represented by less than 9 species each.

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