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Floristic Composition, Biological Spectrum and Distribution Pattern of Floral Biodiversity in Jalalabad Taisot Valley, Gilgit Baltistan

Original Article

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Jalalabad is a small village in Gilgit District in Pakistan, located around 20 km east of Gilgit city. Jalalabad village is one of the beautiful valleys located at 35°53.921 N latitude, 074°29.382 E longitude at an altitude of 1500. The present study was carried out from July-August 2021-2022 and was comprised of two main parts. The first part was floristic diversity, the second part was phytosociological studies. The collected specimens consist of (156) plant species that belonged to 119 genera and 49 families. The life forms of the collected species were 62 (72%) where Hemicryptophyte were dominant, 33 (22%) Therophytes, 14 (9%) Chaemophyte, 42 (27%) Phanerophyte and Geophytes were 4 (2%). The breakup of the habit categories shows that the herbs with 103 (66%) species were dominant to show the flora of the study area, followed by shrubs with 17 (10%) species which shows the flora of the study area. Subshrubs by 9 (6%) and trees 27 (22%) contained the flora of the study area. We studied three stands and in each stand, we placed twenty quadrate to recognize the dominant flora based on IVI. We recognized the dominant lifeform Hemicryptophytes and dominant taxa *Thaymus linearis* held at the highest value (64.259) based on IVI. The phytosociological studies provided all required information from each stand like dominant habit categories, dominant life forms, and dominant taxa in the study area.

Keywords: Life-form, Habit categories, Family, ecological zones, taxa

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CONFLICT OF INTEREST:
The authors of this paper declare no conflict of interest.

Author's Contribution.
Dr. Sajjad designed and performed the experiments and also helped in the mounting of plants for identification, and also helped out in the reviewing of the manuscript reading, till approval of the final version.

Project details. NiL

INTRODUCTION

Flora refers to the total number of plant species found in a given geographic region, as well as plant species that are unique to a geological period or ecosystem [1]. Plant taxonomists use checklists of floras to keep proper records about plants all around the world. [2]. Floristic checklists are the most helpful and important source of botanical knowledge for a certain location. [3]. Plant checklists are often the only source of botanical information for a certain location, and thus might be a good place to start for more in-depth research [4]. This checklist captures important information that can be used as a reference for future research. Floristic listing assists in species identification and nomenclature [5]. Good source flora work, which can be used to correctly identify all of our plants and use them in a scientific and systematic manner [6]. Floristic studies are taxonomic studies of a specific area's flora, or a large section of a given area's flora. Floristic knowledge of any location is essential for understanding the local ecology of any area while studying biodiversity [7]. Floristic diversity expresses the variety of flora found in a given geographic place, which provides a platform for the proper identification and sustainable utilization of plants [2]. Floristic diversity of a region refers to the number of species found within its borders, whether wild or cultivated and is an indicator of the region's flora and plant resources. Plant resources have an impact on activities such as agriculture, overgrazing, anthropogenic interaction, and natural disasters [8]. Biodiversity is defined as the variety and number of species, as well as their distribution patterns. Biodiversity research focuses on species diversity, which is one of the main goals and is utilized to assist ecosystems in a variety of ways [2]. Plant diversity, lifestyle, and dispersion are all influenced by altitude and precipitation (11).A floristic inventory is a good source of botanical data and a good place to start studying a specific geographic area in depth [4]. Inventorying is the process of creating a list or inventory of biodiversity, usually focusing on species diversity; monitoring, on the other hand, is the process of recording changes in biodiversity or the systematic collection of data over time and space with effective and rigorous documentation of change [9]. Floristic inventories, then, are the result of a taxonomic study of a major division of flora in a given area [10].

Floristic composition is a list of plants in a given area. Citations of herbarium specimens, as well as the locations or stations where each element is known to have occurred, are used to verify the inventory. Floristic composition reflects the diversity of vegetation in a given geographic place and provides a platform for plant species to be correctly identified and used in a long-term manner [11]**.** According to Blasi et al. [12], Life forms are based on bud's position in relation to overwintering techniques. Similar biological spectrum appearances in different parts of the world indicate similar vegetation as well as micro and macro climates that regulate the area [13]. The species were classified into life forms using Raunkiaer's system, which Mueller-Dombois & Ellenberg adapted (1974). The phanerophyte species were assigned to the woody component, while the non-phanerophyte species were assigned to the herbaceous component [14]. There are five major classes in his classification: phanerophytes, chamaephytes, hemicryptophytes, cryptophytes, and therophytes, which are organized according to higher protection of the renewing buds. Mueller-Dombois and Ellenberg (1974) adjusted Raunkiaer's classification to include plant traits in the favorable season [15].

According to Tanvir. M, et al. [15] Raunkiaer's life form classes are as follows:

I. Phanerophytes: A tall, woody, or herbaceous perennial with resting buds more than 25cm above soil levels, such as deciduous trees and shrubs. Megaphanerophytes, mesophanerophytes, microphanerophytes, and nanophanerophytes are all types of phanerophytes.
II. Chamaephytes: Low shrubs with perennating shoots or buds on the ground surface to approximately 25 cm above the surface, which can be covered by fallen leaves and snow.
III. Hemicryptophytes: perennating buds that grow near the ground's surface and are shielded by soil and leaves, such as grasses and rosette plants.
IV. Geophytes: perennial buds protected from freezing and drying by being buried in the ground on a bulb or rhizome.
V. Therophytes: Annuals that complete their life cycle from seed to seed in a single season and can survive adverse conditions as seeds.
VI. Helophytes are those plants that grow in wet soils. The resting bud is below ground in the wet soil.
VII. Hydrophytes grow in water and resting bud overwinters below the surface of the water often in the lake bed floor.
VIII. An epiphyte is a plant that grows on another plant, but does not derive water or nutrients from the association.

MATERIALS AND METHODS

Investigation site (Jalalabad)

Jalalabad is a small village in Gilgit District in Pakistan, located around 20 km east of the Gilgit city. Jalalabad village is one of the beautiful valleys located at 35°53.921 N latitude, 074°29.382 E longitude, and an altitude of 1500. The village has a population of 5,000 households and approximately 40,000 residents. Jalalabad village has two villages Taisot and Batkor. My study area is Taisot village. The Bagrote river is the source of irrigation. Jalalabad village has broad had rich biodiversity.

Taisot valley is one of the beautiful valleys located at 35°56.378 N latitude, 074°34.406 E longitude and an Altitude of 2100. This place is situated in 30 km east of Jalalabad village. In Taisot valley, people prefer to stay in the summer season. The biodiversity of Taisot valley is well, as are the snow-covered mountains pastures throughout the year and dense forest patches. Taisot valley have varying topography, and unique flora and fauna. The soil is very fertile. People grow different varieties of crops such as wheat, maize, potatoes as well as vegetables.

Main aim and objectives of the study were

- To prepare the florist inventory of the study area.
- To explore the biological spectrum of the flora in the study area.
- To identify the Habit categories of the flora in the study area.
- To Identify the dominant taxa within the floristic diversity of the study area.

Materials used for the Field survey

The material used for the field survey was Pencil, notebook, sassier, plastic bags, Inch tab, String, Steel Nail, newspaper, Thread, GPS, and Tags.

Specimen collection and identification:

The study was carried out from July - August. We collected important information about the floristic diversity, collected the plant specimens, and the Quadrate method was used for vegetation sampling. We studied three stands and in each stand of 20 quadrates,

collected the plant specimen with the help of tags, where each sampling point was separated by 50 m from the next. A field notebook was used to collect the data within fields. The collected specimens were properly pressed through newspaper and dried in the sheets. GPS was used to record the altitude of the study area. All these specimens were identified with the help of Flora of Pakistan and finally deposited in the Biological Science Department Herbarium room, Karakoram International University Gilgit, Pakistan [2].

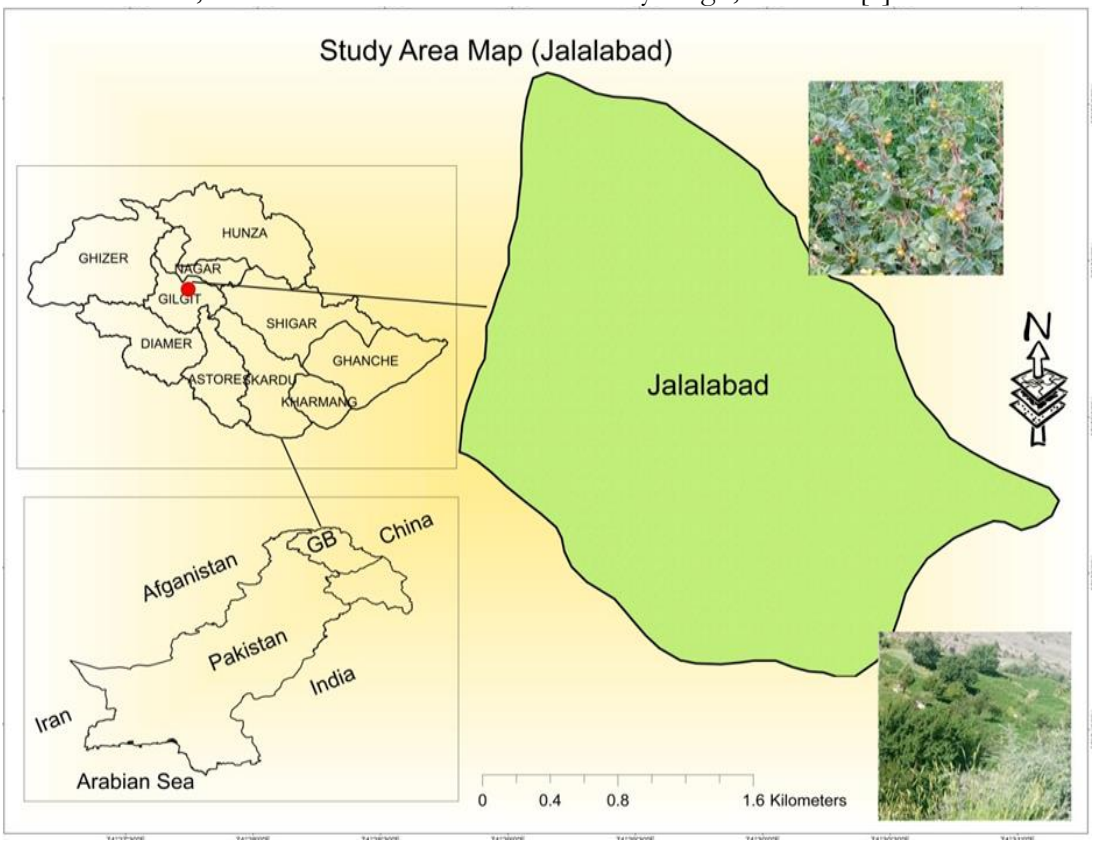
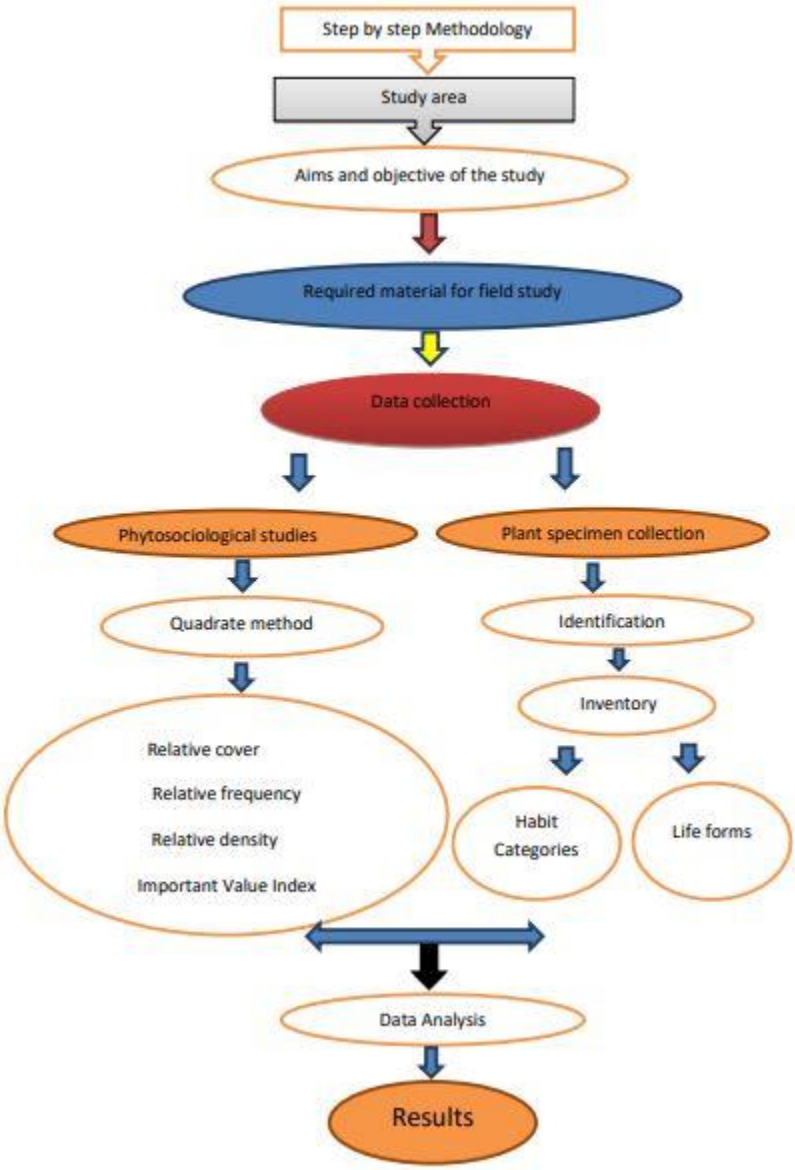


Figure 1: Map of the study area



Data analysis

Quadrate method

A quadrate method is important if we are studying vegetation structure in a particular habitat. Quadrate is a basic sampling unit of varying sizes and shape. American ecologists selected stands subjectively, but they used many quadrate randomly rather than a single large plot (like relieve method) for investigations. According to Daubenmire[16], any size of the quadrate can be used such that only one or two species may occur in all quadrats. We studied three stands and in each stand of 20 plots, collected the plant specimen with the help of tags, where each sampling point was separated by 50 m from the next. Quadrate method used randomly in the vegetation fields. A field notebook was used to collect the data within fields.

Phytosociological studies

Between the months of July and August 2021-22, a phytosociological survey was conducted in the Tasiot valley. The area was divided into three quadrates.

Density

Density will be calculated by using the formula followed by [17]

F1= Absolute frequency (it is the number of times that a certain value appears in the study)

Cover of a species= occupied area of the plant specie

Individuals of species= number of plants of the same specie

$$\textbf{Absolute density} = \frac{\text{Total no of all individuals of a species in all quadrate}}{\text{The total area of the sample plot}}$$

$$\textbf{Relative density} = \frac{\text{No of individual of a species} \times 100}{\text{Total no of all individual of a species}}$$

$$\textbf{Absolute Frequency} = \frac{\text{No of quadrate which species occur}}{\text{Total point taken}}$$

$$\textbf{Relative Frequency} = \frac{\text{F1 of a species} \times 100}{\text{Sum of F1 of all species}}$$

$$\textbf{Absolute cover} = \frac{\text{Total cover of a species}}{\text{Total no of plant of a species}}$$

$$\textbf{Relative Frequency} = \frac{\text{Total cover of all plants of a species} \times 100}{\text{Total cover of all plants of all species}}$$

IVI = Relative Density + Relaive Frequency + Relative Domince sa followed by [17].

Results

The observations from the study site are Gymnosperms as 7, Pteriodophyte 4, Angiosperm dicots 134, and Angiosperm monocots 11 (figure: 2). Floristic diversity based on taxonomy identified flora of the study area. The plants recorded consist of 156 families including 49 (31%) belonging to 119 (76%) genera and 156 (100%) species (figure: 3). Most of the 156 plants were herbs with number 103 (66%) which were dominant, 17 (10%) were shrubs, 9 (6%) were sub-shrubs and 27 (18%) were trees (figure: 4). In-depth investigation revealed that Hemicryptophytes were dominant with 62 (39%) species, phanerophytes 42 (27%), chamophytes 14 (9%), Therophytes 33 (22%), and Geophytes 4 (2%) as shown (figure: 5)

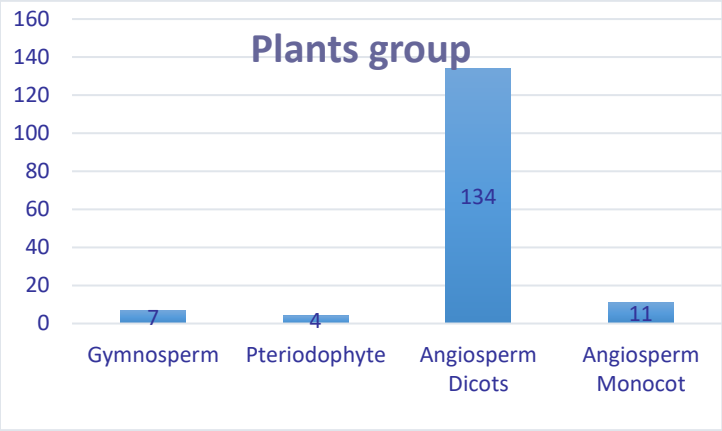


Figure 2: Plants groups in the study area

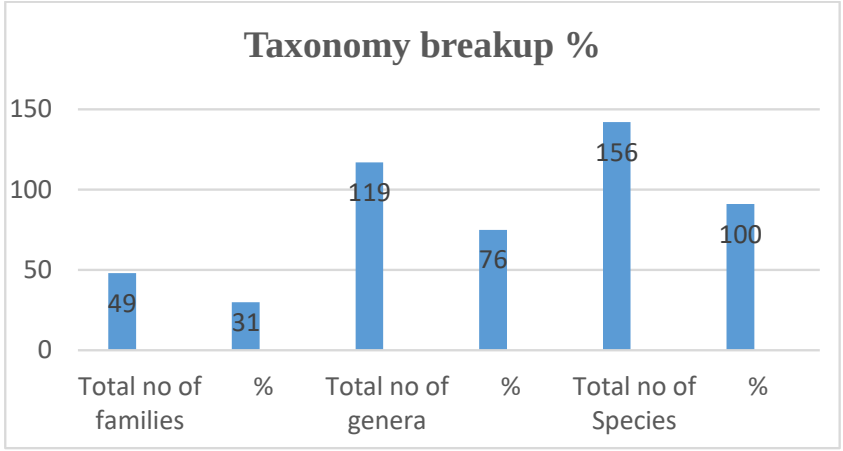


Figure 3: Taxonomy breakup with percentage.

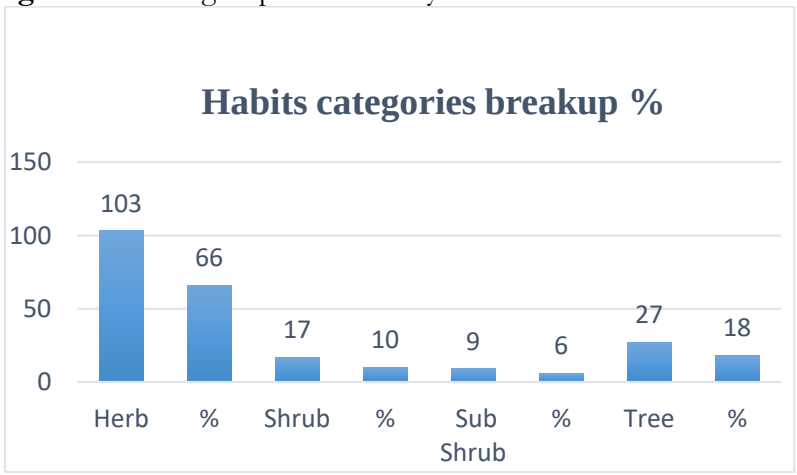


Figure 4: Habit categories breakup with percentage.

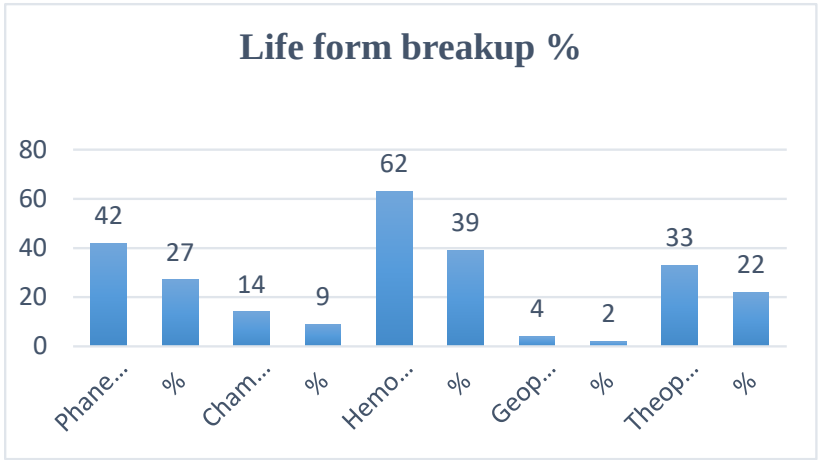


Figure 5: life form breakup with percentage.

Phytosociological studies

(Stand: one)

The plants recorded from stand one were 59 species as shown in (figure: 6). Most of the 59 plants were herbs 49 (83%), 7 (12%) were shrubs, 3 (6%) were trees (Fig:7). Based on life form breakup, Hemicryptophytes remained dominant with 43 (72%) species, phanerophytes 7 (12%), chamophytes 3 (5%), Therophytes 4 (6%), Geophytes 2 (3%) as shown in (figure: 8).

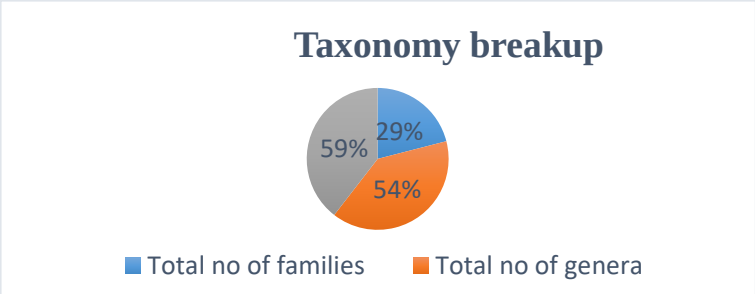


Figure 6: Taxonomy breakup with percentage in the stand 1.

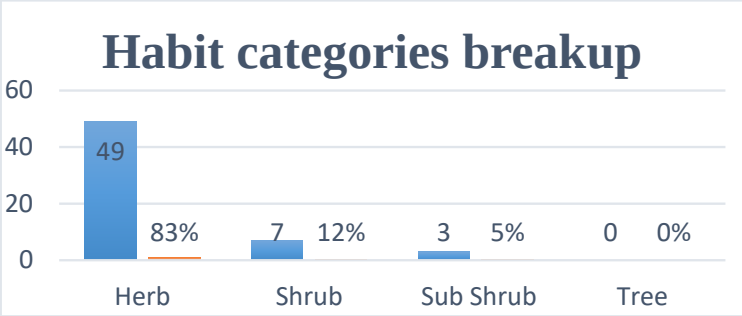


Figure 7: Habit categories breakup with percentage in the stand 1.

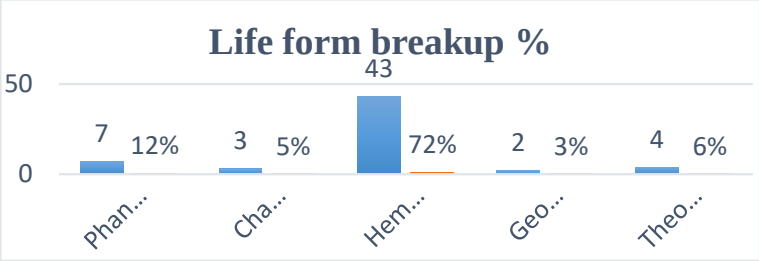


Figure 8: Life form breakup with percentage in the stand 1.

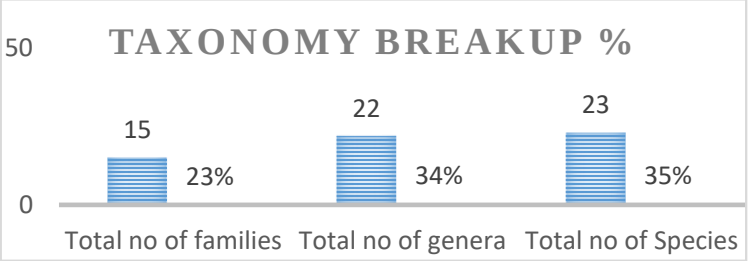


Figure 9: Taxonomy breakup with percentage in the stand 2

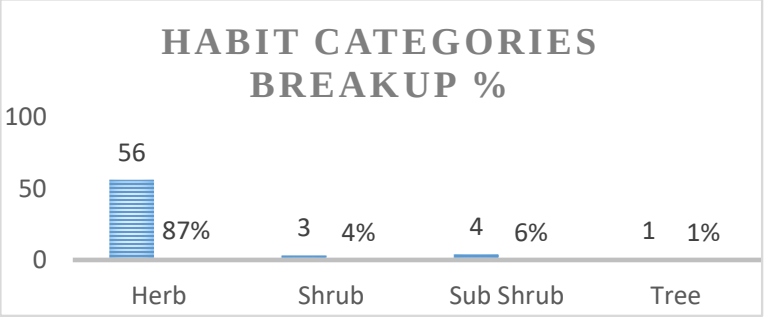


Figure 10: Habits categories breakup with the percentage in stand 2.

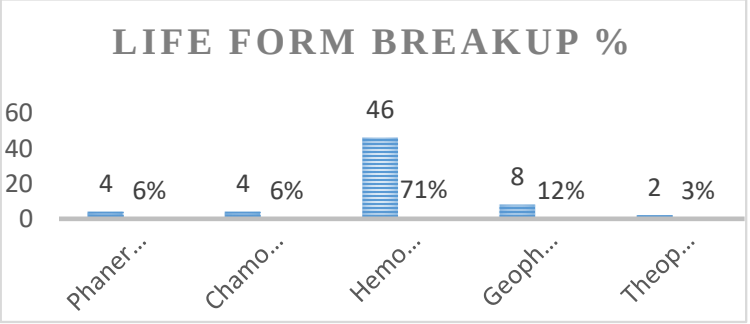


Figure 11: Life form breakup with the percentage in stand 2.

(Stand: two)

A total number of plants 64 were identified in the study site (figure 9). Most of the 64 plants were 56 (87%) herbs, 3 (4%) are shrubs, 4 (6%) were subshrub while 1 (1%) were trees (figure: 10). Based on life forms breakup, Hemicryptophytes remained dominant with 46 (71%) species, phanerophytes 4 (6%), chamophytes 4 (6%), Therophytes 2 (3%), Geophytes 8 (12%) as shown in (figure: 11).

(Stand: three)

A total of the plants 46 were found in study site (figure: 12). Most of the 46 plants were 21 (45%) herbs, 8 (17%) are shrubs, 12 (26%) are sub shrub while 5 (10%) were trees (figure: 13). Based on life forms breakup, Hemicryptophytes remained dominant with 21 (45%)

species, phanerophytes 13 (28%), chamophytes 12 (26%), Therophytes 0 (0%), Geophytes 0 (0%) as shown in (figure: 14).

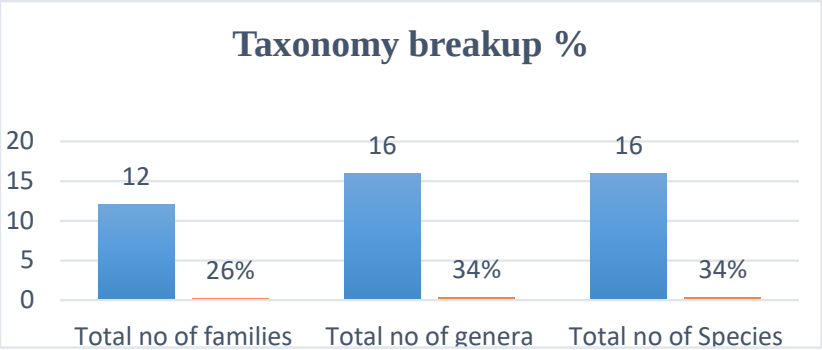


Figure 12: Taxonomy breakup with percentage in the stand 3.

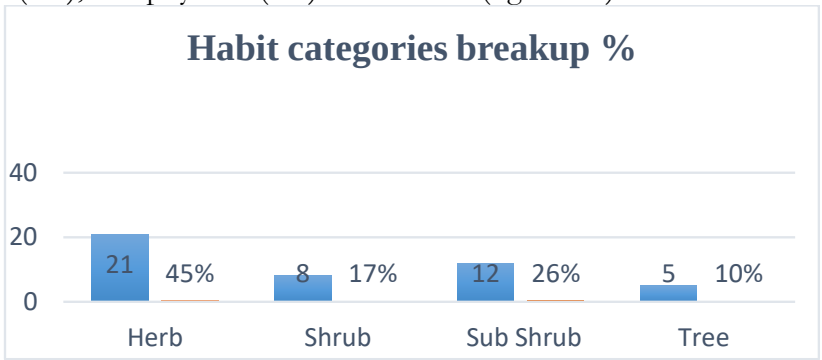


Figure 13: Habit categories breakup with percentage in the stand 3.

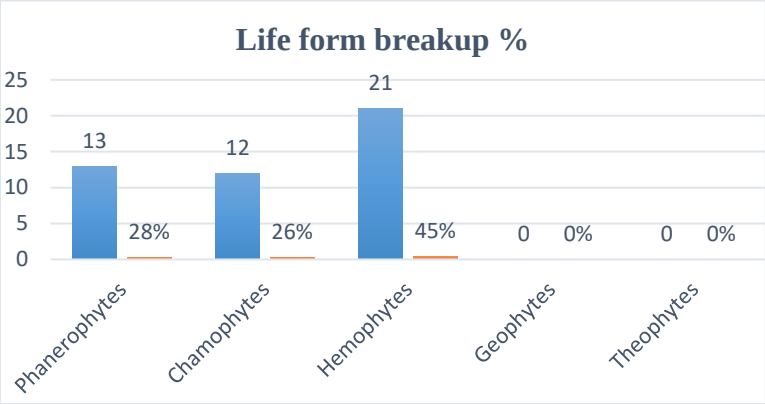


Figure 14: Life form breakup with percentage in the stand

Table 1: List of floristic diversity in selected valley of district Gilgit

S.no	Family name	species Name	Habitat	Habit	Lifeform	Locality	Altitude	Status	Remarks
	GYMNOSPERM a(Gnetophyte)								
1	Ephedraceae	*Ephedra gerariana* Wall	Dry	Shrub	Ch	Jalalabad	1566m	Abundant	Wild
2	Ephedraceae	*Ephedra intermedia* Schrenk & Meyer	Dry	Shrub	Ch	Jalalabad	1509m	Rare	Wild
				Gymnosperm (Coinfer)					
3	Cupressaceae	*Juniperus communis*	Dry	Tree	Ph	Taisot	2976m	Abundant	Wild
4	Cupresssaceae	*Juniperus excellsa* M.Bieb	Rocky	Tree	Ph	Taisot	2794m	Abundant	Wild
5	Cupresssaceae	*Thuja orientalis* L.	Dry	Tree	Ph	Jalalabad	1489m	Infrequent	Cultivated
6	Pinaceae	*Picea smithiana*(Wall.) Boiss, Fl.	Rocky	Tree	Ph	Taisot	2832M	Abundant	Wild
7	Pinaceae	*pinus wallichiana* A.B Jacksn	Rocky	Tree	Ph	Taisot	1479m	Rare	Cultivated
				Pteriodophyte					
8	Equisetaceae	*Equistem arvense* L	Moist	Herb	He	Taisot	2702	Abunndant	Wild
9	Equisetaceae	*Equisetum palustre* L	Moist	Herb	He	Jalalabad	1458m	Rare	Wild
10	pteridaceae	*Adiantum capillu veneris* L.	Moist	Herb	He	Jalalabad	1489m	Abundant	Wild
11	pteridaceae	*Adiatntum Pedatum* L	Moist	Herb	He	Jalalabad	1439m	Abundant	Wild
	Angiosperm (Dicots)								
12	Amaranthaceae	*Amaranthus retroflexus* L.	Dry	Herb	Th	Jalalabad	1462m	Abundant	Wild
13	Appiaceae	*Daucus carota* Linn.	Moist	Herb	Th	Taisot	2645m	Rare	Cultivated
14	Asclepiadaceae	*Cynanchum acutum* Linn.	Moist	Herb	He	Jalalabad	1437m	Rare	Wild
	Asteraceae	*Artemsia absinthium* L.	Dry	Herb	He	Tashout	2643m	Infrequent	Wild
	Asteraceae	*Artemsia Capillaris* thumb	Dry	Herb	He	Jalalabad	1453m	Rare	Wild
15	Asteraceae	*Artemisia maritima* L.	Sandy	Sub shrub	Ch	Taisot	2795m	Abundant	Wild
16	Asteraceae	*Artemisia rutifolia* Stephen ex Sprengel	Rocky	Sub shrub	Ch	Taisot	2763m	Abundant	Wild
17	Asteraceae	*Artemisia scoparia* Waldst. & Kit.	Sunny	Herb	He	Taisot	2633m	Rare	Wild
18	Asteraceae	*Artemisia sieversiana* Ehrh	Dry	Herb	Ch	Taisot	2632m	Abundant	Wild

19	Asteraceae	*Artemisians vulgaris* Linnaeus	Dry	Sub shrub	Ch	Taisot	2667m	Abundant	Wild
22	Asteraceae	*Carduus acanthoides* L.	Dry	Herb	He	Taisot	2333m	Rare	Wild
23	Asteraceae	*Carthamus tinctorius* L.	Moist	Herb	Th	Jalalabad	1453m	Rare	Cultivated
24	Asteraceae	*Cichorium intybus* Linnaeus	Moist	Herb	He	Taisot	2647m	Abundant	Wild
25	Asteraceae	*Conyza bonariensis* L.	Moist	Herb	He	Taisot	2315m	Abundant	Wild
26	Asteraceae	*Crepis flexuosa* (D.C) Benth	Sandy	Herb	He	Taisot	2648m	Rare	Wild
27	Asteraceae	*Echinops echinatus* Roxb.	Rocky	Herb	He	Taisot	2608m	Rare	Wild
28	Asteraceae	*Galinsoga parviflora* Cavanilles, Icon.	Moist	Tree	Ph	Taisot	2649m	Rare	Wild
29	Asteraceae	*Halianthus annus* L.	Dry	Herb	Th	Jalalabad	1430m	Infrequent	Cultivated
30	Asteraceae	*Heracleum umbellatum* L.	Moist	Herb	He	Taisot	2361m	Abundant	Wild
31	Asteraceae	*Lactuca sativa* L.	Moist	Herb	Th	Taisot	2615m	Infrequent	Cultivated
32	Asteraceae	*Saussurea simpsoniana* Field & Garden	Sandy	Herb	He	Taisot	2632m	Abundant	Wild
33	Asteraceae	*Sonchus asper* L.	Moist	Herb	Th	Taisot	2681M	Abundant	Wild
34	Asteraceae	*Taraxacum officinale* F. H. Wiggers	Shaddy	Herb	He	Taisot	2674m	Abundant	Wild
35	Berberidaceae	*Berberis chitria* Lindl	Stony	Shrub	Ph	Taisot	3291m	Infrequent	Wild
36	Betulaceae	*Betula utilis* D. Don	Channel	Tree	Ph	Jalalabad	1441m	Abundant	Wild
37	Boraginaceae	*Heliotropium dasycarpum* Ledeb.	Dry	Herb	He	Jalalabad	1456m	Rare	Wild
38	Boraginaceae	*Pseudomertensiia maltkioides var* YASIN J. NASIR	Dry	Herb	He	Taisot	3472m	Abundant	Wild
39	Brassicaceae	*Brassica juncea* Linn.	Moist	Herb	Th	Taisot	2631m	Abundant	Cultivated
40	Brassicaceae	*Brassica oleracea* Linn.	Moist	Herb	Th	Taisot	2633m	Infrequent	Cultivated
41	Brassicaceae	*Brassica rapa* Linn.	Moist	Herb	He	Taisot	2630m	Abundant	Cultivated
42	Brassicaceae	*Capsella bursa pastoris* L.	Moist	Herb	Th	Jalalabad	1447m	Rare	Cultivated
43	Brassicaceae	*Descurainia sophia* Linn Webb & Berth.	Dry	Herb	He	Jalalabad	2634m	Abundant	Wild
44	Brassicaceae	*Raphanus sativa* Linn.	Moist	Herb	Th	Taisot	2636m	Rare	Cultivated
45	Cannabaceae	*Cannabis Sativa* L.	Moist	Herb	Th	Jalalabad	1452m	Infrequent	Cultivated
46	Capparidaceae	*Capparis spinosa* L.	Rocky	Sub shrub	Ch	Jalalabad	1495m	Rare	Wild
47	Chenopodiaceae	*Chenopodium album* L.	Moist	Herb	He	Jalalabad	1436m	Abundant	Wild

48	Chenopodiaceae	*Chenopodium botyris* L.	Sandy	Herb	Th	Taisot	2734m	Abundant	Wild
49	Chenopodiaceae	*Spinacia oleracea* L.	Moist	Herb	Th	Jalalabad	1437m	Rare	Cultivated
50	Chenopodiaceae	*Suaeda heterophylla* (kar.kir) Bunge ex Boiss	Dry	Herb	Th	Taisot	2234m	Abundant	Wild
51	Convolvulaceae	*Convolvulus arvensis* Linn.	Rocky	Herb	He	Jalalabad	1434m	Abundant	Wild
52	Cucurbitaceae	*Cucumis melo* Linn.	Moist	Herb	Th	Jalalabad	1440m	Infrequent	Cultivated
53	Cucurbitaceae	*Cucumis sativa* L.	Moist	Herb	Th	Jalalabad	1437m	Rare	Cultivated
54	Cucurbitaceae	*Curcurbita maxima* Duch, ex Lam.	Moist	Herb	He	Jalalabad	1442m	Rare	Cultivated
55	Ebenaceae	*Piospyros Kaki* L.	Moist	Tree	Ph	Jalalabad	1463M	Infrequent	Cultivated
56	Elaeagnaceae	*Elaeagmus angustifolia* L.	Moist	Tree	Ph	Taisot	2681m	Abundant	Cultivated
57	Elaeagnaceae	*Hippophae rhamnoides* L.	Dry	Shrub	Ph	Taisot	2655m	Abundant	Wild
58	Elaeagnaceae	*Umbellata Thunb*	Dry	Tree	Ph	Jalalabad	1457m	Infrequent	Cultivated
59	Geraniaceae	*Geranium pratense* L.	Moist	Herb	He	Taisot	2655m	Abundant	Wild
60	Grossulariaceae	*Ribes alpestre* Decne	Rocky	Shrub	Ph	Taisot	2619m	Rare	Wild
61	Juglandaceae	*Juglense Regia* L.	Dry	Tree	Ph	Taisot	2637m	Abundant	Cultivated
62	Labiatae	*Dracocephalum nutans* L.	Dry	Herb	He	Jalalabad	1481m	Rare	Wild
63	Labiatae	*Mentha arvensis* L.	Moist	Herb	He	Jalalabad	1474m	Rare	Cultivated
64	Labiatae	*Mentha longifolia* L.	Channel	Herb	He	Taisot	2636m	Abundant	Wild
65	Labiatae	*Mentha royleana* Benth.	Channel	Herb	He	Taisot	2632m	Abundant	Wild
66	Labiatae	*Nepeta discolor* Boyle ex Benth.	Dry	Herb	He	Jalalabad	1431m	Rare	Wild
67	Labiatae	*Nepeta leucolaena* Benth.	Sandy	Herb	He	Taisot	2772M	Abundant	Wild
68	Labiatae	*Ocimum basilicum* L.	Moist	Herb	He	Jalalabad	1444m	Infrequent	Cultivated
69	Labiatae	*Prunella vulgaris* L	Channel	Herb	He	Taisot	2653m	Abundant	Wild
70	Labiatae	*Salvia nubicola* Wall Ex Sweet	Dry	Sub shrub	Ch	Taisot	2775m	Abundant	Wild
71	Labiatae	*Stachys tibelica* Vatke in Bot Zeitung.	Dry	Shrub	Ph	Taisot	2792m	Infrequent	Wild
72	Labiatae	*Thymus linearis* Benth.	Dry	Herb	He	Taisot	2791m	Abundant	Wild
73	Malvaceae	*Abelmoschus esculentus* Moench	Moist	Herb	Th	Jalalabad	1440m	Rare	Cultivated
74	Malvaceae	*Malva neglecta* Wall.	Dry	Herb	Th	Taisot	2643m	Infrequent	Wild
75	Malvaceae	*Malva sylvestris* L.	Moist	Herb	Th	Jalalabad	1455m	Rare	Cultivated

76	Moraceae	*Ficus carica* L.	Dry	Tree	Ph	Jalalabad	1457m	Rare	Cultivated
77	Moraceae	*Ficus carica Rupestris* (Hausskn. EX Boiss.)	Moist	Tree	Ph	Jalalabad	1465m	Abundant	Wild
78	Moraceae	*Morus alba* L.	Moist	Tree	Ph	Taisot	2608m	Abundant	Cultivated
79	Moraceae	*Morus nigra* L.	Dry	Tree	Ph	Jalalabad	1488m	Abundant	Cultivated
80	Oxalidaceae	*Oxalis corniculata* L.	Moist	Herb	He	Jalalabad	1461m	Abundant	Wild
81	Papilionaceae	*Clutea nepalensis* Sims.	Dry	Shrub	Ph	Taisot	2661m	Abundant	Wild
82	Papilionaceae	*Medicago sativa* linn	Dry	Herb	He	Taisot	2664m	Abundant	Wild
83	Papilionaceae	*Melilotus alba Desr.*	Dry	Herb	He	Taisot	2664m	Abundant	Wild
84	Papilionaceae	*Meliltotus offcinalis* L.	Sandy	Herb	Th	Taisot	2664m	Abundant	Wild
85	Papilionaceae	*Phaseolus vulgaris* Linn.	Moist	Herb	Th	Jalalabad	1439m	Rare	Cultivated
86	Papilionaceae	*Pisum sativum* Linn.	Moist	Herb	Th	Jalalabad	1437m	Rare	Cultivated
87	Papilionaceae	*Robinia pseudo-acacia* Linn.	Moist	Tree	Ph	Jalalabad	1438m	Abundant	Wild
88	Papilionaceae	*Sophora mollis* Royle	Dry	Shrub	Ph	Taisot	2365m	Rare	Wild
89	Papilionaceae	*Trifolium pratense* L	Dry	Herb	He	Taisot	2632m	Abundant	Wild
90	Papilionaceae	*Trifolium repense* L.	Moist	Herb	He	Taisot	2680m	Abundant	Wild
91	Papilionaceae	*Trigonella foencum-graecum* L.	Moist	Herb	Th	Jalalabad	1435m	Rare	Cultivated
92	Plantaginaceae	*Plantago lanceolata* Linn	Dry	Herb	He	Taisot	2789m	Abundant	Wild
93	plantaginaceae	*Plantago major* Linn.	Shaddy	Herb	He	Taisot	2642m	Abundant	Wild
94	Polygonaceae	*Fagopyrum esculentum* Moench/Meth	Moist	Herb	Th	Taisot	2616m	Abundant	Wild
95	Polygonaceae	*Oxyria digyna* L.	Rocky	Herb	He	Jalalabad	1435m	Rare	Wild
96	Polygonaceae	*Rumex dentatus* Linnaeus, Mantissa.	Dry	Herb	He	Taisot	2644m	Rare	Wild
97	Polygonaceae	*Rumex hastatus* D	Rocky	Herb	He	Taisot	2645m	Rare	Wild
98	Polygonaceae	*Rumex nepalensis* Spreng.	Dry	Sub shrub	Ch	Taisot	2798m	Rare	Wild
99	Punicaceae	*Punica granatum* Linn.	Dry	Shrub	Ph	Jalalabad	1448m	Abundant	Cultivated
100	Ranunculaceae	*Clematis orientalis* L.	Rocky	Shrub	Ph	Taisot	2643m	Rare	Wild
101	Ranunculaceae	*Rancunculus repens* L.	Channel	Herb	He	Taisot	2638m	Abundant	Wild
102	Rosaceae	*Fagaria nubicola* (Hook.f.) Lindl.ex	Rocky	Herb	He	Taisot	2643m	Abundant	Wild
103	Rosaceae	*Malus pumila* Mill.	Sunny	Tree	Ph	Taisot	2671m	Abundant	Cultivated

104	Rosaceae	*Potentilla desertorum Bunge in Ledeb.*	Moist	Herb	He	Taisot	2743m	Rare	Wild
105	Rosaceae	*Potentillia hololeuca* Boiss.ex Lehm.	Moist	Herb	He	Taisot	2647m	Rare	Wild
106	Rosaceae	*Prunus amygdalus* L.	Dry	Tree	Ph	Taisot	1436m	Rare	Cultivated
107	Rosaceae	*Prunus avium* L.	Dry	Tree	Ph	Taisot	2642m	Rare	Cultivated
108	Rosaceae	*Prunus persica* (L) Batch.	Moist	Tree	Ph	Taisot	1450m	Rare	Cultivated
109	Rosaceae	*Pyrus communis* L.	Moist	Tree	Ph	Taisot	2692m	Abundant	Cultivated
110	Rosaceae	*Rosa macrophylla* Lindl	Dry	Shrub	Ph	Taisot	2616m	Abundant	Wild
111	Rosaceae	*Rosa webbiana* Wall.ex Royle	Rocky	Shrub	Ph	Taisot	2633m	Abundant	Wild
112	Rosaceae	*Rubus irritans* Focke.	Sandy	Shrub	Ph	Jalalabad	1460m	Rare	Wild
113	Rubiaceae	*Galium boreale* L.	Moist	Herb	He	Jalalabad	1483m	Infrequent	Wild
114	Rubiaceae	*Gallium verum* L.	Moist	Herb	He	Jalalabad	1451m	Abundant	Wild
115	Rubiaceae	*Rubia cordifolia* L.	Moist	Herb	He	Taisot	2643M	Infrequent	Wild
116	Rutaceae	*Citrus limon* (Linn.) Burm.	Dry	Shrub	Ph	Jalalabad	1438m	Infrequent	Cultivated
117	Rutaceae	*Citrus sinensis* Linn.	Dry	Shrub	Ph	Jalalabad	1442m	Infrequent	Cultivated
118	Salicaceae	*Salix babylonica* L.	Moist	Tree	Ph	Jalalabad	1454m	Rare	Cultivated
119	Salicaceae	*Salix denticulate* Andersson	Moist	Tree	Ph	Jalalabad	1473m	Abundant	Wild
120	Salicaceae	*Salix iliensis* L.	Channel	Tree	Ph	Jalalabad	1477m	Abundant	Cultivated
121	Saxifragaceae	*Bergenia stracheyi* Hook & Thom	Moist	Herb	Ch	Jalalabad	1474m	Abundant	Wild
122	Scrophulariaceae	*Scrophularia decomposita Royle ex Benth*	Moist	Herb	He	Taisot	1446m	Bundant	Wild
123	Scrophulariaceae	*Scrophularia stewartii* Pennell.	Rockey	Herb	He	Taisot	3292m	Rare	Wild
124	Scrophulariaceae	*Verbusum thapsus* Linnaeus.	Rocky	Herb	He	Taisot	2766m	Rare	Wild
125	Solanaceae	*Capsicum annuum* L.	Moist	Herb	He	Jalalabad	1433m	Rare	Cultivated
126	Solanaceae	*capsicum frutescens* L.	Moist	Herb	Th	Jalalabad	1443m	Rare	Cultivated
127	Solanaceae	*lycopersicum esculantum* Miller, Gard.	Moist	Herb	Th	Taisot	2630m	Abundant	Cultivated
128	Solanaceae	*Solanum Lycopersicum* L.	Moist	Herb	Th	Jalalabad	1455m	Rare	Cultivated
129	Solanaceae	*solanum tuberosum* L.	Moist	Herb	Ch	Taisot	2634m	Abundant	Cultivated
130	Solananaceae	*Datura stramonium* L.	Dry	Herb	Ch	Jalalabad	1465m	Abundant	Wild
131	Solananaceae	*Solanum nirgum* L.	Moist	Herb	Th	Taisot	2655m	Rare	Wild
132	Tamaricaceae	*Myricaria germanica* L.	Dry	Shrub	Ph	Jalalabad	1439m	Abundant	Wild

133	Tamaricaceae	*Tamaricaria elegans* Royle.	Sandy	Shrub	Ph	Jalalabad	1459m	Abundant	Wild
134	Tamaricaceae	*Tamarindus indica* Linn.	Dry	Tree	Ph	Jalalabad	1437m	Abundant	Wild
135	Thymelaeaceae	*Dephane mucronata* Royle	Rocky	Sub Shrub	Ch	Taisot	2763m	Abundant	Wild
136	Umbellifare	*Apium graveolens* L.	Moist	Herb	He	Taisot	2655M	Abundant	Cultivated
137	Umbellifare	*Coriandrum sativum* L.	Moist	Herb	Th	Jalalabad	1427m	Rare	Cultivated
138	Umbellifare	*Daucus carota* Linn.	Moist	Herb	He	Jalalabad	1439m	Abundant	Cultivated
139	Umbellifare	*Foeniculum vulgare* Mill	Dry	Herb	He	Jalalabad	1438m	Rare	Cultivated
140	Umbellifare	*Heracleum candicans* Wall.	Moist	Herb	He	Taisot	2611m	Abundant	Wild
141	Utricaceae	*Utrica dioica* Linn.	Moist	Herb	Th	Jalalabad	2641M	Abundant	Wild
142	Vitaceae	*Vitis parvifolia* Roxb.	Moist	Tree	Ph	Jalalabad	1449m	Rare	Cultivated
143	Vitaceae	*Vitis vinifera* L.	Moist	Tree	Ph	Jalalabad	144m	Rare	Cultivated
144	Zygophylaceae	*Peganum harmals* Linn.	Sandy	Herb	Th	Jalalabad	1498m	Infrequent	Cultivated
145	Zygophylaceae	*Tribulus teriestris* L. R.Br.	Sandy	Herb	He	Jalalabad	1478m	Abundant	Wild
			Angiosperm (Monocots)						
146	Allieaceae	*Allium cepa* L.	Moist	Herb	Ge	Jalalabad	1438m	Rare	Cultivated
147	Allieaceae	*Allium sativa* L.	Moist	Herb	Ge	Jalalabad	1435m	Infrequent	Cultivated
148	Cyperaceae	*Cyperous rotundus* L	Wet	Herb	He	Jalalabad	1469m	Rare	Wild
149	Orchidaceae	*Dactylorhiza Hatagirea* (D. Don) Soo	Along channel	Herb	Ge	Taisot	2681m	Infrequent	Wild
150	Orchidaceae	*Epipiticis gigantean* Douglas ex Hooker	Along channel	Herb	Ge	Jalalabad	1456m	Abundant	Wild
151	Poaceae	*Hordium vulgaris* Linn.	Moist	Herb	Th	Jalalabad	1438m	Rare	Cultivated
152	Poaceae	*Saccharum officinarum* Linn	Dry	Herb	He	Jalalabad	1455m	Rare	Wild
153	Poaceae	*Setaria pumila* (Poir) Roem. & Schult.	Sunny	Herb	He	Taisot	2622m	Abundant	Wild
154	Poaceae	*Sorghum halepense* L.	Dry	Herb	He	Taisot	2639m	Abundant	Wild
155	Poaceae	*Triticum aestivum* Linn.	Moist	Herb	Th	Jalalabad	1440m	Abundant	Cultivated
156	Poaceae	*Zea may* Linn.	Moist	Herb	Th	Jalalabad	1450m	Abundant	Cultivated

Table 2: Dominant taxa of stand one on the basis of IVI

Dominant taxa of stand one						
S.no	Family name	Species name	C3	D3	F3	IVI
1	Asteraceae	*Echinops echinatus*	6.4	6.586	6.97	19.956
2	Papilionaceae	*Colutea nepalensis*	7.72	7.485	4.65	19.855
3	Papilionaceae	*Medicago sativa*	4.46	7.485	9.4	21.345

Table 3: Dominant taxa in stand two on the basis of IVI

Dominant taxa in stand two						
S.no	Family name	Species name	C3	F3	D3	IVI
1	Asteraceae	*Heracleum umbellatum*	6.223	11.111	10.187	27.521
2	Papilionaceae	*Milleotus alba*	37.725	14.814	16.299	37.725
3	Papilionaceae	*Trifolium pratense*	4.667	9.259	8.149	22.075

Table 4: Dominant taxa of stand three on the basis of IVI

Dominant taxa of stand three						
S.no	Family name	Species name	C3	F3	D3	IVI
1	Labiatae	*Thaymus linearis*	8.659	27.5	28.1	64.259
2	Scrophulariaceae	*Verbasum thapsus*	40.021	5	4.04	49.061
3	Thymelaeaceae	*Dephane mucronata*	5.039	15	14.044	34.083

Table 5: Dominant taxa in any three stands on the basis of IVI

s.no	Family name	Species name	IVI	Stands
1	Papilionaceae	*Medicago sativa*	21.345	1,2,3
2	Papilionaceae	*Milleotus alba*	37.725	1,2,3
3	Labiatae	*Thaymus linearis*	64.259	1,2,3

DISCUSSION

Present study was carried out during July - August 2021-2022 in Taisot valley Jalaabad. The current study yielded about 156 species with 119 genera which belonging to families 49. The life forms of the collected species were 62 (72%) Hemicryptophyte were dominant, 33 (22%) Therophytes, 14 (9%) Chaemophyte, and 42 (27%) Phanerophyte and Geophytes were 4 (2%). The breakup of the habit categories shows that the herbs were 103 species which were (66%) of the total habit categories were dominant habit category of the flora in the study area, followed by shrubs with 17 species were (10%) of flora in the study area. Subshrubs by 9 species which were (6%) and trees were 27 species (22%) of the flora in the study area (Table-1). For phytosociological studies we divided the study area into three stands and in each stand were placed twenty quadrate to recognized the dominant taxa on the basis of IVI. We recognized the dominant taxa and lifeform with the help of IVI. The Hemicryptophytes were dominant lifeform and dominant taxa were *Thaymus linearis* held highest value (64.259) in IVI. The phytosociological studies provided the all required information from each stands like dominant habit categories, dominant life form and dominant taxa in the study area. Qamar Abbas et al. [18] For the assessment of floristic diversity total 114 plant species were recorded at Maruk Nallah, out of which, 85 were herbs belonging to 34 families; 13 were shrubs belonging to 9 families; while 16 were trees belonging to 10 families. Results showed that, family Asteraceae was the most dominant family with 12 genera and 21 species while the genus Artemisia was the most dominant genera, with 6 species. %). Chawal et al., [19] conducted study plant species diversity along an altitudinal gradient of Bhabha valley in western Himalaya and reported 313 higher plant species belonging to 204 genera and 68 families were recorded. Abbas et al., [20] Conducted a research in Naltar valley and recorded 141 plant species belonging to 107 genera and 48 families. Tanveer and Muhammad., [15] **s**tudy Floristic Description of Flora and Ethnobotany of Samahni Valley (A.K.), Pakistan. It collected provides information about different local plants and their life form and leaf size spectra. 120 plant species recorded belonging to 46 families. Poaceae is the dominating with 14 members. Abbas et al. [20] conducted a research in Shigar valley, and the results revealed about 345 vascular plants distributed in 206 genera and 63 families with maximum species of flowering plants. Sharma et al. [21] Conducted a research in Sangla Valley of northwest Himalaya The study revealed 320 species belonging to 199 genera and 75 families. Asteraceae, Rosaceae, Apiaceae, and Ranunculaceae were dominant. Among genera, Artemisia followed by Polygonum, Saussurea, Berberis, and Thalictrum were dominant. Sujjad et al., [9] conducted a research on flora of Central Karakorum National Park and documented 200 plant species which belonged to 102 genera and 34 families. About 160 species were recorded from the Khunjerab National Park (KNP) which belong to 97 genera and 36 families. Noor et al., [22] Conducted a research in Astore valley, and the results showed that 26 plant species under 17 genera and 13 families were found to be used as folk medicine. Abbas et al. [18] conducted a research on floristic biodiversity and traditional uses of medicinal plants of Haramosh valley and recorded 85 medicinally important plants from the area which were used by the local and indigenous people. Shaheen et al. [23] conducted a research in Deosai Plateu to explore floristic diversity, endemism, phyto-sociological attributes and conservation status of flora of Deosai National Park, North Pakistan and documented 132 plants belonging to 41 families and 101 genera from the study area. Hemicryptophytes were recorded as the dominant life form followed by geophytes and Therophytes whereas Leptophylls and Nanophylls were dominant leaf spectra [24]. For the effective conservation measures and sustainable use of

biodiversity, it is inventorying is necessary. An extensive programme of inventorying aimed to estimating diversity of species and changes their number and understanding the role biodiversity in ecosystem function and a clear view of the geographical distribution of biodiversity would help in conservation effort. Inventorying of any group of organisms is not complete in pakistan [25].

Novelty Statement. This research study is entirely new for the study area. Which focuses the taxonomic breakup of the taxa, recognized dominant taxa habit categories and lifeforms of the flora.

CONCLUSION

Present study was carried out during July - August 2022 and identified taxa Jalalabad Taisot valley in district Gilgit. We record were the families, genera and species. We identified area dominant lifeform Hemicryptophytes and dominant taxa *Thaymus linearis* on the basis of IVI.

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