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Original Article

Inventory and Altitudinal Distribution of Plant Biodiversity Along the Nalter Expressway in Nalter Valley Gilgit Baltistan

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The present study was conducted in 2020-2021 to record the inventory and altitudinal distributions of plants and biodiversity in Nalter valley. The study area is situated at 36 N and 74 E, with 27,206 ha area in the Karakoram highlands. It is 40km away from Gilgit city. The purpose was to explore the natural floral inventory, life-form structure, and the biological spectrum of the plant biodiversity. This study recorded 126 species belonging to 106 genera and 48 families. The life forms of the collected species were 40 Hemicryptophytes (H), 8 Therophytes, 50 Chaemephyte, and geophytes 3 species, and 25 phanerophytes. While the habit categories of the recorded flora were analyzed with the help of Theophrastus classification. The categories of the recorded flora were 88 herbs, 113 shrubs,9 subshrubs, and 18 trees which contribute to the flora of the study area. The phytosociological studies were also carried out to recognize the dominant taxa, habit category, and the dominant life form in the study area. For this study, we divided the study area into three stands. In each stand, we placed 20 quartets to recognize the dominant taxa based on IVI. The phytosociological studies provided the required information from each stand like dominant habit categories, life forms, and dominant taxa along the Nalter expressway.

Keywords: Biological Spectrum, Phytosociological Study, Life Form, Quartets, Stand.

Acknowledgment. First of all, I would to like thank Allah Almighty who is the source of strength that enabled me to accomplish this work. Secondly, I would to like thank my thesis supervisor, Dr. Sujjad Haider, for his sincere effort in the form of guidance, cooperation, and encouragement that make this task possible. Special thanks to my family and Masum Haider M.Phil. A scholar who supported me a lot during my thesis work. I would like to thank my parents for their support and love.

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Introduction

Inventories of plant taxa have been the subject of studies for many years, especially in cities and their surrounding regions, and serve as the basis for numerous applications, such as local biodiversity assessments, landscape planning, or studies of the dynamics of plant distribution [1]. The floristic structure is a stock of plants of a distinct and indicated region [2]. A plant cloth inventory system is designed to provide management with information for making managerial selections regarding production, income, and call for traits. By preserving a modern, up-to-date plant cloth stock, problems bobbing up from overselling or leaving plant life unsold can be minimized. Knowledge of plant inventory can offer the basis for making plans for work schedules, area necessities, and materials needed. Inventory facts are needed for making plans for production, calculating the manufacturing cost, and developing pricing strategies. Cultural practices and their effect on stock turns may also be evaluated. Comprehending spatial styles in biodiversity and the causal factors are fundamental to developing sound conservation and management strategies [3]. Altitude is an important element in habitat diversity because it offers modifications to the availability of resources [4]. Many researchers have explored altitudinal biodiversity patterns of plant life and clarified that altitude is significant in regulating species richness patterns. Altitude plays a far stronger position in maintaining big-scale species richness [5]. In mountain areas, altitude is an important gradient due to large environmental changes across an exceptionally short geographical variety [6]. For instance, altitude drives drastic changes in abiotic elements, such as water, temperature, soil and area [4] with the latitude and altitude increasing, perennial herbs tend to broaden properly as the better variety and higher altitude, whilst herbs tended to thrive at the center range and reduce altitude [7]. Variations within the range and altitude in mountainous regions result in modifications in the temperature, humidity, temperature, and illumination that affect the plant species composition and network. The adjustments in environmental factors alongside the altitudinal gradients had been one hundred times faster than the ones along the latitudinal gradient. Components of environmental gradients affect plant life and their structure directly or indirectly [8]. It is the variety of life on earth, in all its forms and all its interactions. Pakistan has a variety of flora and fauna in particular because of super versions in its temperature, rainfall, and altitude [9]. One of the most important challenges going through ecologists and biogeographers is to apprehend patterns of spatial and temporal variations in species richness and variety [10]. Latitudinal gradients in specie richness and range, and the species–region relationships are the most discussed topics [11]. The richness and variety of patterns on elevation gradients are, however, little understood, and feature has been documented [12]. It includes all genes, species, and ecosystems and the ecological procedure from which they're aside. The concept pertains to all lifestyles in the world [13]; Ecosystem range refers to the variety of plant, animal, and microbial l groups and the ecological tactics that lead to function, inclusive of their interplay with the non-living environmental additives example.g., forests, mountains, wetlands, rivers, meadows, deserts and so forth. Some ecosystems are very complicated and host a massive range of species. Tropical rain forests and others like cold deserts had less biodiversity, however, each is equally essential. Biodiversity is our natural wealth. The habitat of Plants provides structure, refuge, and food as well as contributes to the general biodiversity. Climate is a conspicuous issue regulating species distribution and richness in lots of regions [14]. Global styles of species tiers and richness are made of many interacting factors which include environmental conditions, opposition, geographical region, and historic/evolutionary improvement [13].

Gilgit Baltistan is wealthy in biological diversity. This is due to the intense altitudinal variations and related adjustments in weather and soil conditions, growing and placing vertical zones in herbal plant life[15]. The area of (GB) is enriched vicinity where the biodiversity of the vicinity has been the only provider for its population for hundreds of years.

According to Rankin there are five classes of the life-form system

I. Phanerophytes: A tall, woody, or herbaceous perennial with resting buds more than 25cm above soil levels, such as deciduous trees and shrubs. Megaphanerophytes, macrophanerophytes, and nanophanerophytes are types of phanerophytes.

II. Chamaephytes: The shrubs with perennating shoots on the ground surface to 25 cm above the surface, which can be covered by fallen leaves and snow.

III. Hemicryptophytes: The 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: Those plants that complete their life cycle in a single season.

Life is found in the form of a key that can be used to identify a wide variety of plant life forms found in various climatic zones. The key in the new system distinguishes the five life forms, Raunkiaer and it is expanded to accommodate a total of 23 life forms. When all of the community's higher plants are classified into life forms and the ratios are expressed in percentages, a biological spectrum is created [16].

Methodology

Study area

The Northern areas of Pakistan currently referred to as Gilgit– Baltistan are widely recognized for their biodiversity due to diverse weather. These areas are located at the junction of 3 super mountainous degrees i.e., Karakoram, Himalaya, & Hindukush [17]. Most parts of the Northern areas lie in the watershed of Karakoram, Himalayas, and Hindukush Mountain ranges. The region is surrounded by snow-covered mountains with deep gorges and a slim valley [18].

The Naltar Valley is situated at 36 N and 74 E protecting a complete region of 27,206 ha situated in the Karakoram highlands [17]. It is 40km away from Gilgit [19]. The altitude range of the valley is from 1700 to 5000m (above sea level) ending in the glacier and Nalter pass. The valley contains quite a several habitats from the perpetual snow quarter to alpine grassy meadows and pastures, pockets of wooden area, stony and rocky vertical cliffs[20]. This valley is protected by snow peaks and glacial lakes. The winter is generally very harsh and the temperature falls to -18C that receieve an annual rainfall of 254-400mm. The climate of the valley is dry and characterized by intense and prolonged. [21].

Materials used for the Field survey

The equipment used during the field survey was a plastic bag, Field notebook, Pencil, Inch tap, Nail, String, Mobile, and Altimeter.

Specimen collection and identification:

During the field survey, and dried. The dried specimens were mounted on the Herbarium sheets. [10]. The collected data was comprsed of plant distribution pattern, composition, altitudinal aspect, and topography.

Phytosociological studies

During sampliz, the study area was divided into three zones and each zone contained twenty quadrats. The shapes of quadrats was a Square of 2 x 2 m. the following attributes have

been considerd: Relative Frequency (RF), Relative Density (RD), Relative Cover (RC), and significance Value Index (IVI) RC+RD+RF. Life- form categories of Raunkiaer's systemwere adopted[14].

Data analysis

Density

Flora dendity may be calculated using the formula as [22]

$$\text{Absolute density} = \frac{\text{Total no of all individuals of specie in all}}{\text{The total area of the sample plot}} \times 100$$

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

$$\text{Absolute Cover} = \frac{\text{Total cover of a species}}{\text{Total No of plants of all species}} \times 100$$

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

Result

The current study yielded 127 plant species followed by 107 genera with 48 families. The current inventory was comprised of 6 gymnosperm species belonging to 6 genera followed by 5 families. Angiosperm dicots were 111 species with 92 genera followed by 43 families, and angiosperm monocots were 7 species followed by 7 genera with 2 families. While Pteridophytes were 3 species with 2 genera and 2 families. The habit categories of the recorded flora were recognized as herb, shrub, subshrub, and tree. The dominant habit category in the study area were herbs 87 (68.25%), shrubs 12 (9.52%), sub shrub 10 (7.93%) and trees 18 (14.28%) in number (Figure: 2). While the lifeform of recorded flora was identified with the help of Raunkiaer classification system. Based on this classification, the dominant lifeform in the study area was Hemicryptophytes with 40 (31.74%) species, phanerophytes 25 (19.85%), Chamaephytes 51 (40.1%), Therophytes 8 (6.34%), Geophytes 3 (2.38%) (Figure: 1)

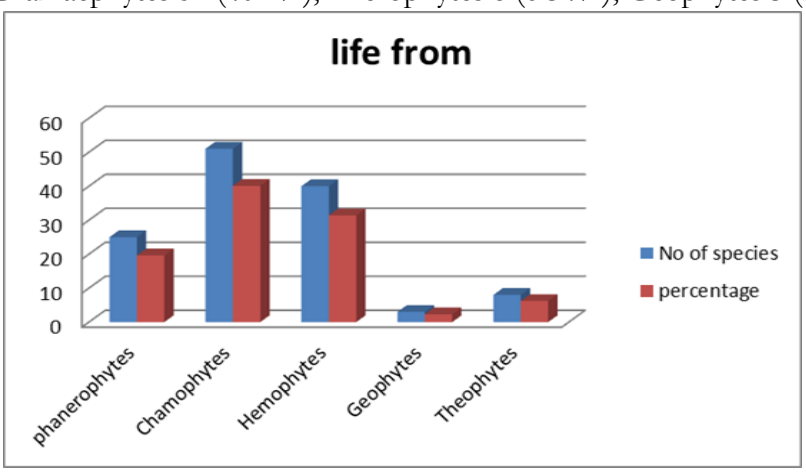

Figure. 1 Breakup of Life forms of the flora

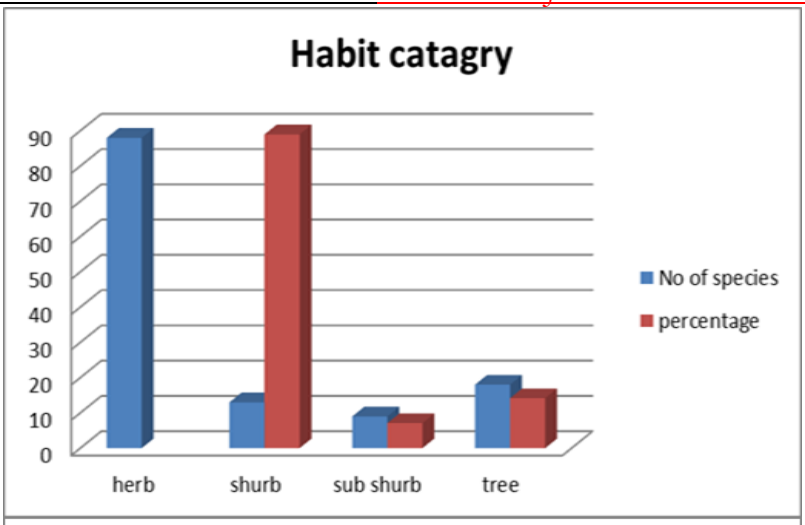

Figure.2 Habit categories of flora

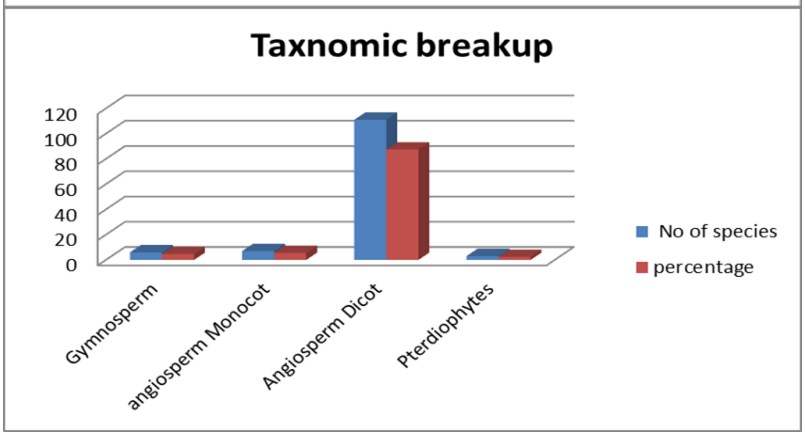

Figure.3 Taxonomic breakup of Plant

Stand 1

Phytosociological studies.

The plants recorded in stand one were species Genera [12] and families as shown in (Figure 4). Based on life forms in stand 1 phanerophytes[3] Chamophytes[10] Hemophytes[9] Geophytes[1] as shown (Figure 5) According to the collected data habit category in stand herbs [15] subshrub [6] shrub [2] and tree.. (Figure6). In stand 1 based on IVI value (*Define Mucronata)* has the highest value as shown in (Table.1).

Table 1. Stand 1 dominant taxa on the basis of IVI value

S.no	Family Name	Species_Name	F3	D3	C3	IVI
1	Fabaceae	Robiniapseudoacacia	8.82	6.32	13.62	28.76
2	Lamiaceae	Stachy tibetace	8.82	12.65	4.19	25.66
3	Thymelaeace	Defane Mucronata	8.82	6.32	18.86	34

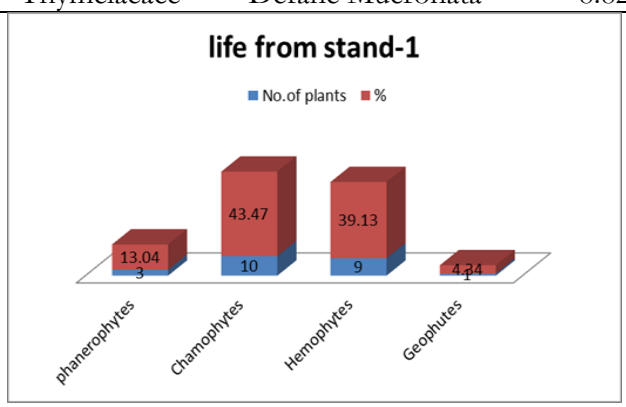

Figure.no.4 Life form breakup with the percentage in stand 1

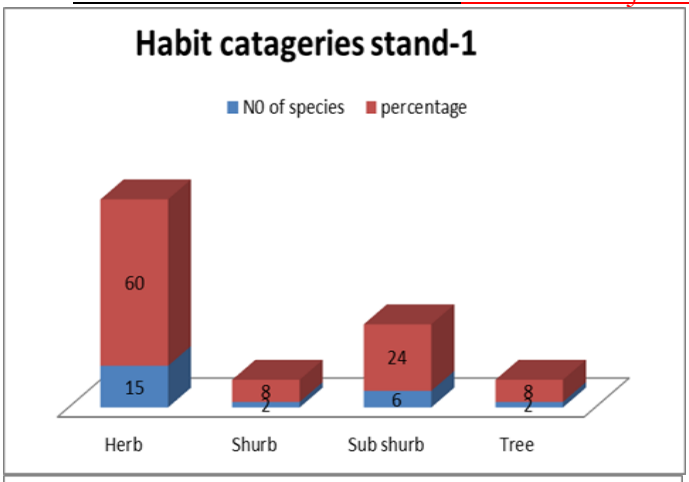

Figure 5: Habit categories breakup with the percentage in stand 1.

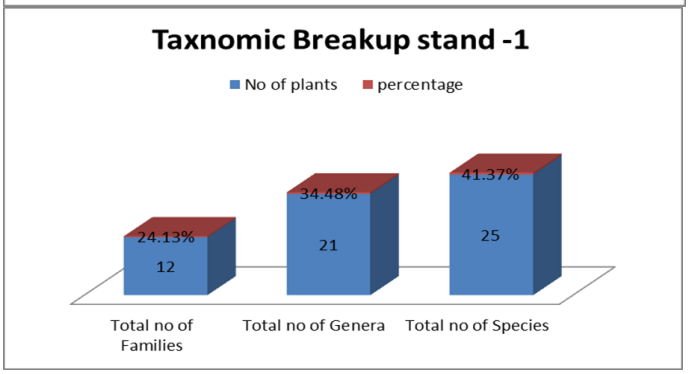

Figure 6: Taxonomy breakup with the percentage in stand 1.

Stand 2

In stand 2, there were 33 plant species belonging to families found in Nalter valley. The detail is given in (Figure 8). Most of the plants are herbs 15(60%) -sub-shrub, 6 (8%) are shrubs, 2 (8%) are subshrubs and 1 (1%) tree. The detail is given in (Figure 7). Based on life form breakup, Hemicryptophytes are dominant with 15 (46.87%) species, phanerophytes 5(15.62%), charophytes 12 (12%). The detail is given in (Figure 7). In stand 2 based on IVI value (Defane Mucronata) has highest vaule as show in (Table No.2)

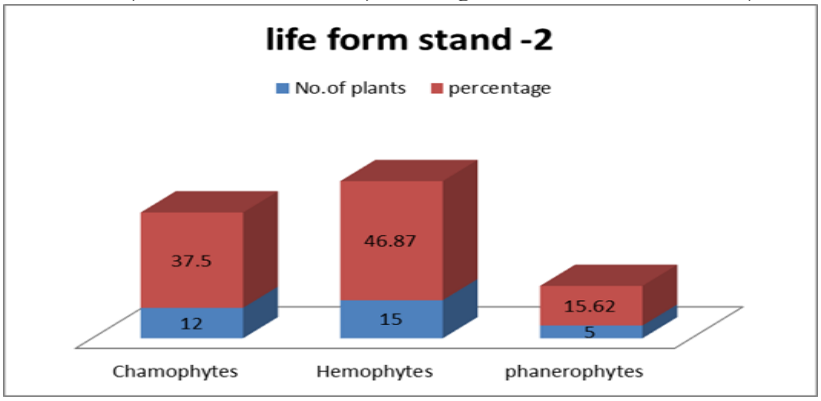

Figure 7: Life form break up with percentage in the stand 2

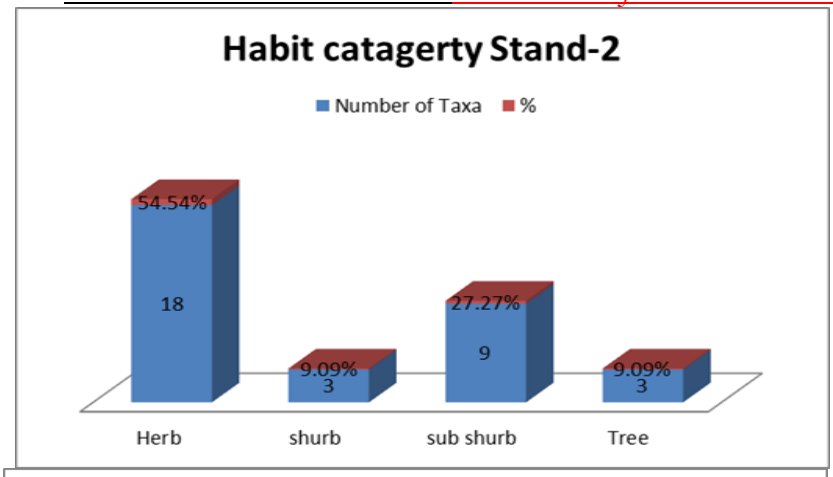

Figure 8 Habits categories breakup with the percentage in the stand 2

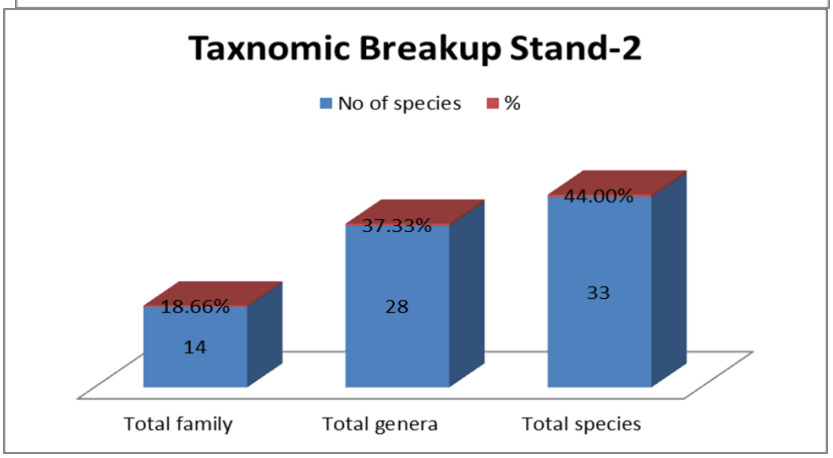

Figure 9: Taxonomy breakup with the percentage in the stand 2

Table 2. Stand 2 dominant taxa on the basis of IVI value

S.No	Family Name	Species_Name	F3	D3	C3	IVI
1	Thymelaeace	Dephane Mucrolata	13.33	10.3	13.14	36.77
2	Asteraceae	Prunus Avium	10	12.37	6.17	28.54
3	Asteraceae	Artimisa Seversiana	13.33	5.15	12.57	31.05

Stand 3

According to the inventorying and altitudinal distribution of plant biodiversity based on life form in stand 2 Phanerophytes, Chamophytes and Hemophytes are given in(Figure 10). according to The collected data habit category in stand herbs(81.25%),subshrub (9.37%), shrub (3.12%)and tree (6.25%). the habitat was showed the geographical representation of the area in stand 3, (Figure 11). Details are given in (Figure 12). In the last stand based on IVI, value (Pinus Roxburgh) has the highest value as shown in (Table.3)

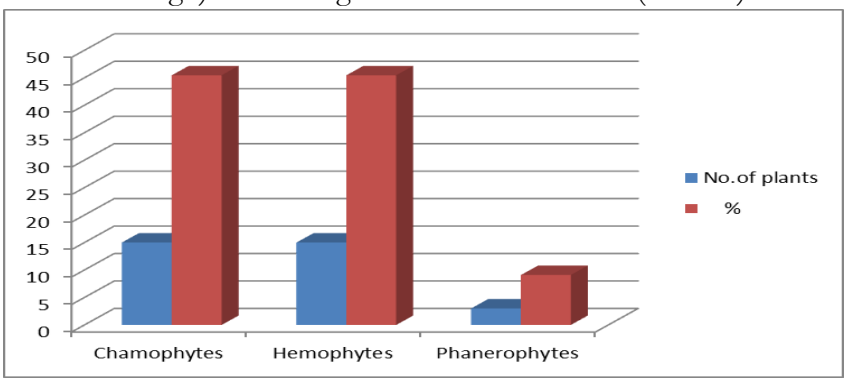

Figure. 10: Life form breakup with the percentage in the stand 3

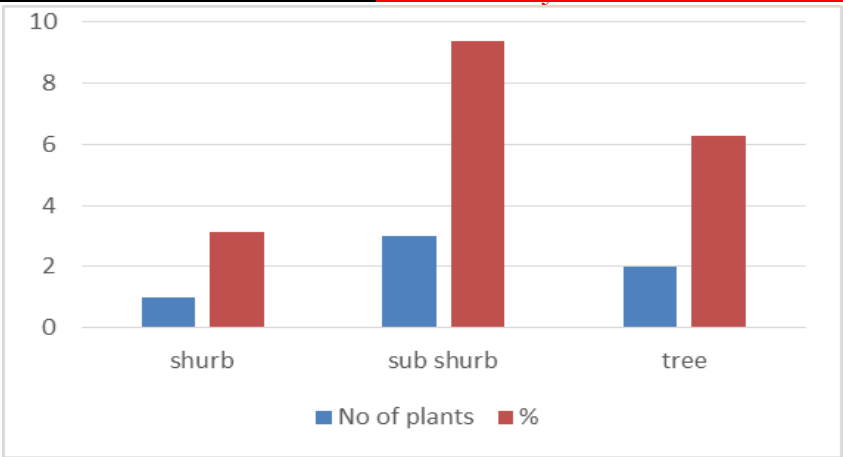

Figure. 11: Taxonomy breakup with the percentage in stand 3

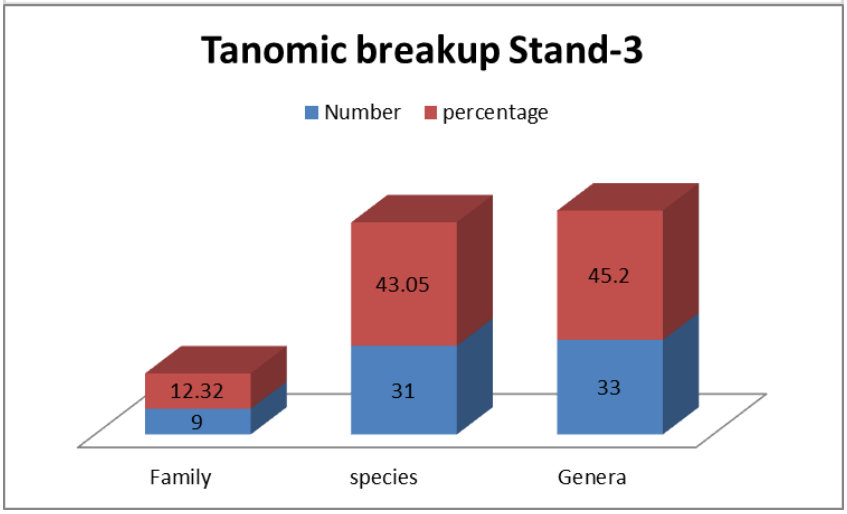

Figure 12: Taxonomy breakup with the percentage in stand 3

Table 3. Dominant taxa on the basis of IVI value Stand 3

Family name	Species_Name	F3	D3	C3	IVI
Pinaceae	Pinus Roxburghi	6.2	4.16	12.86	23.22
Pinaceae	Pinus smithiana(Wall)Lindl	6.2	5	10.61	21.81
Cupressaceae	Juniperous	6.2	4.16	9.96	20.23

Comparison IVI of stands 1, 2 and 3

Stand 1			Stand 2			Stand 3		
Family Name	**Species_Name**	**IVI**	**Family Name**	**Species_Name**	**IVI**	**Family name**	**Species_Name**	**IVI**
Fabaceae	*Robinia pseudoacicia*	28.76	Thymelaeace	*Dephane Mucrolata*	36.77	Pinaceae	*Pinus Roxburghi*	23.22
Lamiaceae	*Stachy tibetace*	25.66	Asteraceae	*Prunus Avium*	28.54	Pinaceae	*Pinus smithiana(Wall)Lindl*	21.81
Thymelaeace	*Defane Mucronata*	34	Asteraceae	*Artimisa Seversiana*	31.05	Cupressaceae	*Juniperous L.*	20.23

Altitude Distribution Pattern

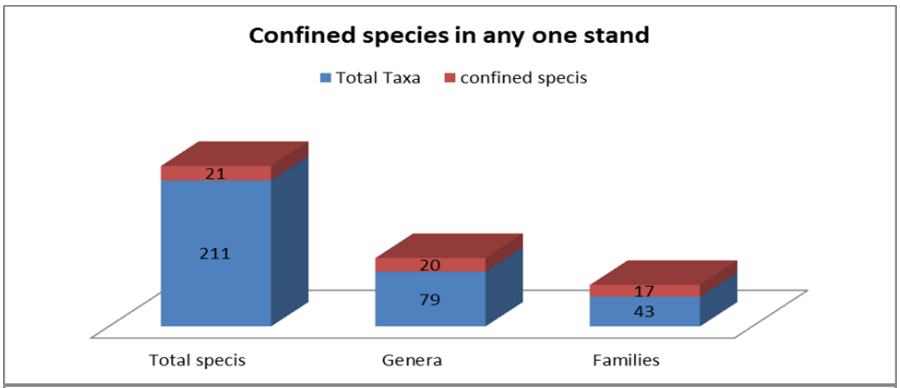

Figure. 13 Confined species in stand 1

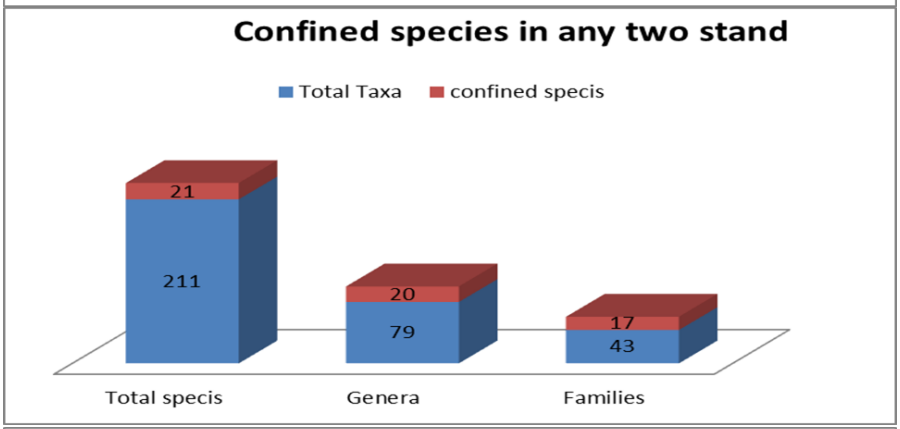

Figure. No 14 Confined species in stand 2

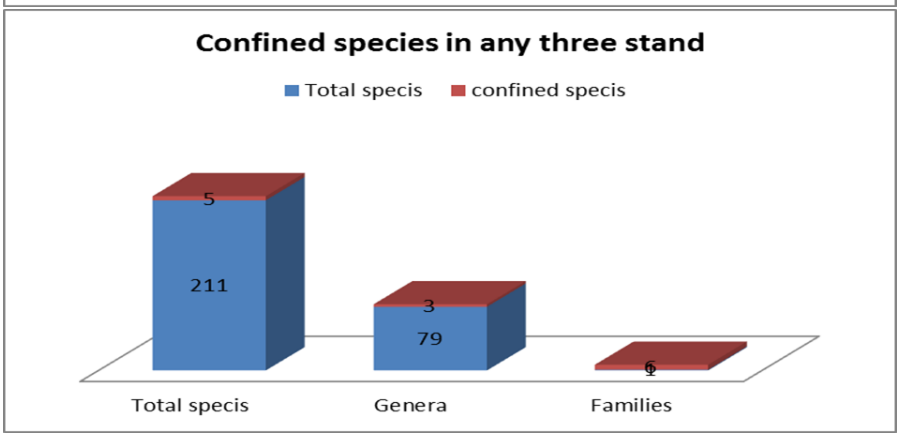

Figure. No.15 Confined species in stand 3

	Gymnosperm						
Family Name	Specie Name	Habitat	Habit	Life Form	Altitude	Status	Remark
Caryophyllaceae	*Blysmus rufus*(Huds).Link	Along river bank	Herb	He	2100m	Common	Wild
Cucurbitaceae	*Benincasa hispida(*Thumb.)Cong	Fertile soil	Herb	Th	2000m	Farequent	Cultitvated
Cupressaceae	*Thuja orientalis* L	Dry	Tree	Ph	2400m	Abundant	Wild
Pinaceae	*Pinus willichiana* A.B.Jacks	Forest	Tree	Ph	3000m	Abudant	Wild
Pinaceae	*Pinus smithiana*(Wall)Lindl	Forest	Tree	Ph	2600m	Farequent	Wild
Salicaceae	*Salix wallichiana* Anderson	Wet soil	Tree	Ph	2000m	Farequent	Cultitvated
		Angiosperm Dicot		.			
Amaranthaceae	*Chenopodium korshinskyi(*Litv)Minku	Rocky slope	Herb	Ch	2500m	Common	Wild
Amaranthaceae	*Chenpodium caudatum*Jacq	Roadside,fields	Herb	He	2000m	Common	Wild
Amaranthaceae	*Amaranthus retroflexus* L	Dry	Herb	Th	2300m	Abundant	Wild
Apiaceae	*Carum carvi* L	Moist meadows	Herb	Ch	2400m	Rare	Wild
Asteraceae	*Artemisia biennis* Willd.	Sandy clay	Herb	Ch	1900m	Common	Wild
Asteraceae	*Artemisia sieversiana* Ehrh	Sandy clay,Moist	Herb	He	2500m	Abundant	Wild
Asteraceae	*Artemisia vulgaris* Linnaeus	Dry	Sub shurb	He	2100m	Abundant	Wild
Asteraceae	*Atremisia maritima* L	Sandy clay	Sub shurb	Ch	2500m	Abundant	Wild
Asteraceae	*Atremisia scoparia* Waldst.kit	Sandy clay	Herb	Ch	2100m	Frequent	Wild
Asteraceae	*Artemisia moorcroftiana* Wall. ex DC	Humid soils	Shurb	Ch	2000m	Frequent	Wild
Asteraceae	*Aster altaicus* wild	Forest edges	Herb	Ch	3100m	Abundant	Wild
Asteraceae	*Carthamus tinctorius* L	Field	Herb	Th	2300m	Abundant	Cultitvated
Asteraceae	*Chrysanthemum coronarium* L	Dry	Sub shurb	Ch	2200m	Farequent	Wild
Asteraceae	*Cichoriume*L	Dry	Herb	Ch	2700M	Farequent	Wild
Asteraceae	*Conyza aurita* L.F	Dry	Herb	He	3100m	Rare	Wild
Asteraceae	*Cousinia cylindracea*	On Rocks	Herb	He	1900m	Abundant	Wild
Asteraceae	*Crepis foetida*	Grass land	Herb	He	2300m	Farequent	Wild
Asteraceae	*Erigeron acris L*	Grass land	Herb	He	3100m	Abundant	Wild
Asteraceae	*Erigeron canadensis* L.	Grass land	Herb	He	2400m	Abundant	Wild
Asteraceae	*Artemisia japonica* Schmidt	Sandy clay	Herb	He	2300m	Abundant	Wild
Asteraceae	*Ligularia thomsonii* (C.B. Clarke) Pojark.	Grossy slope	Herb	He	3500m	Abundant	Wild

Asteraceae	*Sonchus asper* L	Grass land	Herb	He	2200m	Abundant	Wild
Asteraceae	*Taraxacum officinale* F.H.wiggers	Grass land	Herb	He	1900m	Abundant	Wild
Asteraceae	*Ajania fruticulosa* (Ledeb.)Poljakov	Moist gorges	Sub shurb	Ch	2500m	Farequent	Wild
Asteraceae	*Anaphalis stoliczkai* C.B. Clarke		Herb	Ch	2600m	Farequent	Wild
Asteraceae	*Sonchus arvensis L.*	Grass land	Herb	Ch	2300m	Farequent	Wild
Betulaceae	*Betula utilis* var.jacquemontii(Spach)H.J.P.Winkl	Forest	Tree	ph	3500	Infrequent	Wild
Berberidaceae	*Podophyllum emodi* Wall. ex Hook. f. & Thomson	Alpine zones	Herb	Ch	4000m	Farequent	Wild
Boraginaceae	*Trichodesma indicum* (L.) Lehm.	Grossy slope	Herb	Ch	3400m	Farequent	Wild
Brassicaceae	*Brassica oleracea L.*	Moist	Herb	Ph	2000m	Abundant	Cultitvated
Brassicaceae	*Brassica rapa* L.	Moist	Herb	Ch	2000m	Abundant	Cultitvated
Brassicaceae	*Descurainia sophia*(L.)Webb ex Prantl	Dry	Herb	He	2100m	Abundant	Wild
Brassicaceae	*Raphanus sativus* L	Moist	Herb	Ge	2000m	Abundant	Cultitvated
Cannabaceae	*Cannabis sativa* L.	Moist	Herb	He	1900m	Rare	Cultitvated
Cannabaceae	*Celtis australis*L.		Tree	Th	2000m	Rare	Cultitvated
Caprifolliaceae	*Cephalaria syricaca* L	Open forest	Sub shurb	Ch	2500m	Rare	Wild
Caryophyllaceae	*Silene gonosperma (*Rohrb.)Bocquet	Plane area	Herb	He	2300m	Farequent	Wild
Chenopodiaceae	*Chenopodium album* L	Froest	Herb	Ch	2300m	Common	Wild
Chenopodiaceae	*Chenopodium botrys* L	Dry	Herb	He	1900m	Common	Wild
Chenopodiaceae	*Chenopodium foliosum* (Moench)	Dry	Herb	He	2000	Rare	Wild
Chenopodiaceae	*Chenopodium karoi* (Murr).Allen	Dry	Herb	He	2600	Abundant	Wild
Convolvulaceae	*Cnvolvulus arvensis*L	Weed in fields	Herb	He	2000m	Common	Wild
Cucurbitaceae	*Cucumis sativuls* L	Fertile soil	Herb	Th	2000m	Infrequent	Cultitvated
Cupressaceae	*Juniperus squamata* Lamb.	Dry	Tree	Ph	2600	Common	Wild
Elaeagnaceae	*Elaeagnus angustiflia* L	Plane area	Tree	Ph	2100m	Infrequent	Cultitvated
Elaeagnaceae	*Hippophae tibetana* schltdl	On Rocks	Sub Shurb	Ph	1900m	Abundant	Wild
Ephedraceae	*Ephedra intermedia*Schrenk ex C.A.Mey.	Rocky or sandy	Shurb	Ph	1900m	Abundant	Wild
Fabaceae	*Cicer vulgaris*	Dry	Sub shurb	Ch	2300m	Rare	Wild
Fabaceae	*Cicer microphyllum* Royle ex Benth.	Dry soil	Herb	Ch	2800m	Farequent	Wild

Fabaceae	*Medicago sativa* L	Slighty dry side	Herb	Ch	2000m	Abundant	Wild
Fabaceae	*Pisum sativum* L	Moist	Herb	Ch	2000m	Farequent	Cultitvated
Fabaceae	*Melilotus albus*	Pasture,Road side	Sub shurb	Ch	2200m	Farequent	Wild
Fabaceae	*Colutea arborescens* var.nepalensis	Dry	Shurb	Ph	2100m	Farequent	Wild
Fabaceae	*Spohora mollis*	Dry	Shurb	Ph	1900m	Abundant	Wild
Fabaceae	*Astragallus rhizannthus*	Dry land	Herb	He	2500m	Rare	Wild
Gentianaceae	*Comastoma falcatum*(Turz).ex.Kir	Alpine meadows	Herb	He	3100m	Farequent	Wild
Gentianaceae	*Swertia cordata (Wall. ex G. Don) C.B. Clarke.*	Moist	Herb	He	2400m	Infrequent	Wild
Geraniaceae	*Geranium pratense L*	Clay,sandy soil	Herb	He	2700m	Abudant	Wild
Grossulariaceae	*Ribes alpestre*Wall.ex.Decne	River bank	Shurb	Ch	2600m	Infrequent	Wild
Juncaceae	*Juncus spicatus* L	On Rocks	Herb	Ch	2900m	Abudant	Wild
Lamiaceae	*Eisholtizia densa* benth	grass land	Herb	Ch	2500m	Farequent	Wild
Lamiaceae	*Perovskia abrotanoides* Kar	Roadside,fields	Herb	Ch	2400m	Abudant	Wild
Lamiaceae	*Isodon rugosus*(Schard.ex.Benth.)	Scrub,Savannah	Sub shurb	He	2500m	Farequent	Wild
Lamiaceae	*Thymus linearis* L	On Rocks	Herb	Ch	2700m	Abudant	Wild
Lamiaceae	*Stachys sylvatica* L.	Moist place	Herb	Ch	2100m	Farequent	Wild
Menyanthaceae	*Menyanthes trifoliata* L.	Marshy meadows	Herb	Ch	3300m	Farequent	Wild
Malvaceae	*Malva verticillata var. verticillata*	Meadows,Fields	Herb	Ch	2000m	Abudant	Wild
Moraceae	*Morus alba* var.serrata(Roxb).	Plane area	Tree	Ph	2000m	Farequent	Cultitvated
Moraceae	*Ficus carica* L	dry area	Tree	Ph	2000m	Farequent	Wild
Onagraceae	*Epilobium latifollium* L.	Along river bank	Herb	He	2200m	Infrequent	Wild
Orchidaceae	*Orchis umbrosa Kar. & Kir*	Along river bank	Herb	He	2100m	Farequent	Wild
Papilionaceae	*Trifolium pratense* L	Grassy areas	Herb	Ch	2300m	Abundant	Wild
Plantaginaceae	*Plantago gentianoides* var.Laxa	Along road side	Herb	Ch	2000m	Abudant	Wild
Plumbaginaceae	*Acantholimon Boiss*	Dry slopes	Sub shurb	Ch	2600m	Abudant	Wild
Polygonaceae	*Persicaria hydropiper* (L.) Delarbre	Ditches	herb	Ch	2300m	Farequent	Wild
Polygonaceae	*Rumex dentatus*L	Moist area	Herb	He	2900m	Farequent	Wild
Polygonaceae	*Rumex hastatus*D.Don	Dry slopes	Herb	He	2900m	Abudant	Wild
Ranunculaceae	*Clemantis orientalis* L	Rocky slope	Shurb	Ch	2300m	Frequent	Wild

Ranunculaceae	*Delphinium brunonianum* Royle	Stony mountain slop	Herb	He	2900m	Frequent	Wild
Ranunculaceae	*Rancunculus repens*L	Meadows, Ditches	Herb	He	1900m	Abudant	Wild
Rosaceae	*Fragaria vesca* L	Meadows,	Herb	He	2800m	Abudant	Wild
Rosaceae	*Malus pumila*	plane area	Tree	Ph	2200m	Frequent	Cultitvated
Rosaceae	*Prunus amygdaledus* L	plane area	Tree	Ph	2200m	Frequent	Cultitvated
Rosaceae	*Prunus armenica*	plane area	Tree	Ph	2200m	Frequent	Cultitvated
Rosaceae	*Prunus avium*	plane area	Tree	Ph	2200m	Frequent	Cultitvated
Rosaceae	*Prunus communis*L	plane area	Tree	Ph	2200m	Rare	Cultitvated
Rosaceae	*Rosa microphylla*	Sunny	Shurb	Ch	2100m	Frequent	Wild
Rosaceae	*Rosa wibbiane*	plane area	Shurb	Ch	2100m	Rare	Wild
Rosaceae	*Prunus persica.*	plane area	Tree	Ph	2200m	Frequent	Cultitvated
Rosaceae	*Potentilla desertorum* Bunge.	Grass land	Herb	ch	2100m	Abudant	Wild
Rosaceae	*Sorbus* kashmiri.	Froest	Tree	Ph	2800m	Rare	Wild
Rubiaceae	*Galium verum* L	Grassy areas	Herb	Ch	2800m	Frequent	Wild
Salicaceae	*Populus nigral*	Plane area	Tree	Ph	2400m	Farequent	Wild
Salicaceae	*Salix alba* L	Plane area	Tree	Ph	2100m	Farequent	Cultitvated
Saxifragaceae	*Bergenia ciliata* fo. ligulata Yeo	Forest	Herb	Ch	2700m	Abudant	Wild
Scrophulariaceae	Orobanche cernua var.hansii (A.Kern).		Herb	Ch	1900m	Abudant	Wild
Scrophulariaceae	*Scrophularia* stewartii Pennell	On Rocks	Herb	Ch	2900m	Frequent	Wild
Scrophulariaceae	*Verbascum thapsus* L	Sandy soil	Herb	He	2600m	Farequent	Wild
Solanaceae	*Capsicum annuum*.L	Field	Herb	Th	2000m	Farequent	Cultitvated
Solanaceae	*Datura stramonium* var .tatula(L)Torr	Pasture,wast areas	Herb	Ch	1900m	Abudant	Wild
Solanaceae	*Solanum nigrum* var.nigrum	Field	Herb	Ch	2300m	Rare	Wild
Solanaceae	*Solanum tuberosum* L	Moist	Herb	Ch	2000m	Rare	Cultitvated
Tamaricaceae	*Myricaria germanica* L	River bank	Herb	Ch	1700m	Abudant	Wild
Tamaricaceae	*Tamarix rasmosissima* Ledbed	Along irrigation datches	Shurb	Ph	2400m	Abudant	Wild
Thymelaeace	*Daphne mucronata* Royle	Grass land	Shurb	Ph	2100m	Abudant	Wild
Umbelliferae	*Cuminum cyminum* L	Moist	Herb	Ch	2400m	Farequent	Wild
Umbelliferae	*Coriandrum sativum L*	Field	Herb	Th	2000m	Abudant	Cultitvated
Umbelliferae	*Daucus carota* L.	Grass land	Herb	Ge	2000m	Abudant	wild
Umbelliferae	*Pleurospermum stylosum* C.B. Clarke	Amonf rocks	Herb	ch	2600m	Farequent	wild
Urticaceae	*Urtica dioica* L.	Moist side,streams	Herb	Ch	2100m	Abudant	wild

Vitaceae	*Vitis alba* L	Fertile loam	Shurb	Ch	2000m	Infrequent	Cultitvated
Zygophyllaceae	*Peganum harmala* L	Saline soil,Semi desert	Shurb	Ch	1900m	Rare	Wild
Angiosperm Monocot							
Alliaceae	*Allium cepa* L	Moist	Herb	Ge	2000m	Abundant	Cultitvated
Poaceae	*Saccharum officinarum* Steud	Sand,clay,slit	Herb	He	1900m	Abudant	Wild
Poaceae	*Poa alpina* L	Rocky shore	Herb	He	2700m	Abudant	Wild
Poaceae	*Imperta cylindrica* (L)Raeusch	Grassy areas	Herb	He	2000m	Abudant	Wild
Poaceae	*Sorghum halepense* L	Wet land,Ditches	Herb	He	2500m	Abudant	Wild
Poaceae	*Setaria viridis* (L)P.Beauv.	Fallow fields,pasture	Herb	He	2100m	Abudant	Wild
Poaceae	*Triticum* L	Fertile soil	Herb	Th	2000m	Abudant	Cultitvated
Orchedaceae	*Dactylorhiza hatagirea*	channal	Herb	He	1900m	Rare	wild
		Pteridophytes					
Equisetaceae	*Equistem arvense* L	Moist soil	Herb	He	2000m	Abundant	Wild
Equisetaceae	*Equistem paluster L*	Moist soil	Herb	He	2100m	Abundant	Wild
Pteridaceae	*Adenantium pedatum* L	Moist soil	Herb	He	2200m	Farequent	Wild

Discussion

The study area is divided into two villages (Nalter payment and Walter Bala). During the study, 127 plant species, and 107 genera belonged to 48 families. Conducted research in Naltar valley and recorded 141 plant species belonging to 107 genera and 48 families. The families belong to different divisions i.e. Gymnosperm, Angiosperm, and pteridophytes. Gymnosperm contains 5 genera and 5 families, Angiosperm dicot 111 genera belonging to 43 families while Angiosperm Monocot 7 genera belonging to 2 families and Pteridophytes have 2 genera and 2 families**.** [24] Quit similar results are also recorded that 124 plant species belonging to 58 different families. Gymnosperm contains 23 families 33 genera and 83 species. A study was carried out in Sangla Valley where 9 trees, 5 shrubs, and 1 herb are recorded. Another research the flora of Central Karakorum National Park and documented 200 plant species that belonged to 102 genera and 34 families. About 160 species were recorded from the Khunjerab National Park (KNP) which belongs to 97 genera and 36 families [23]. While Angiosperm is further divided into dicots and monocots. The Monocots contain families and species. About the inventorying and altitude distributions of plants according to my study identified that the species are 126 and 86 herbs (68.25%) shrubs 12 (9.52%),10(7.93%) -sub-shrubs, and 18(14.28)% trees.`

The families ranging from 1st to 5th position were: Compositae, Asteraceae, Poaceae, Brassicaceae, Boraginaceae, and Cyperaceousin which the Composite is the largest family. The family Compositae has wide due to their adaptation and acropetal seed dispersal. The life form shows the physical appearance of the plant, which results in different forms of life in a specific area. With the help of life form categories plants are divided into different life forms i.e. Therophytes, Phanerophytes, Cryptophytes, and Hemicryptophytes. Therophytic in desert, phanerophytes in tropical, and hemicryptophyte in the temperate zone.According to life form ,Cham0phytes are the dominant with 50(39.68) plants phanerophytes 25 (19.84)Hemicryptophytes 40(31.74)therophytes 8(6.34) and Geophytes are 3(2.38).The life form of the current study compared with the Raunkiare spectrum shows phanerophytes (46%), Champhytes (9%)Hemicryptophytes (26%), and Therophytes (13%. Conducted research in Deosai Plateau to explore phytosociological attributes and conservation status of flora of Deosai National Park, North Pakistan, and documented 132 plants belonging to 41 families and 101 Hemicryptophytes were recorded as the dominant life form followed by geophytes and Therophytes whereas Leptophylls and Nanophylls were dominant leaf spectra[25].

According to biological spectrum study order, there are three stands e.g stand 1, stand 2, and stand 3 and each stand has unique flora. In stand one total of 59 species and families 17 (29%) belonging to 32 (54%) genera and 32 (54%) species found in Jalalabad valley. Most of the 59 plants are 49 (83%) herbs, 7 (12%) are shrubs, 3 (5%) are subshrubs while trees are not found. Based on life forms, Hemicryptophytes are dominant with 43 species (72%), phanerophytes 7 (12%), charophytes 3 (5%), Therophytes 4 (6%), and Geophytes 2 (3%). In stand two total of the plants 64 and families to 15 (23%) belonging to 22 (34%) genera and 23 (35%) species. Most of the 64 plants are 56 (87%) herbs, 3 (4%) are shrubs, 4 (6%) are subshrubs and 1 (1%) are trees. Based on life forms breakup, Hemicryptophytes are dominant with 46 (71%) species, phanerophytes 4 (6%), charophytes 4 (6%), Therophytes 2 (3%), Geophytes 8 (12%). In stand three total of the plants 46 and families to 12 (26%) belonging to 16 (34%) genera and 16 (34%) species. Most of the 46 plants are 21 (45%) herbs, 8 (17%) are shrubs, 12 (26%) are subshrubs and 5 (10%) are trees.

In samplings utilizing the quadrat method, the study area is divided into three zones and each zone contains twenty quadrats. The shapes of quadrats in a Square of 2 x 2 m were taken in each zone. The distribution of plant groups and the pattern of species range were studied alongside an altitudinal gradient in the northwestern Red Sea place. An overall of 58 stands had been studied, the usage of ten quadrats (10 m × 10 m) in each stand. The category of vegetation the use of the Two-Way Indicator Species Analysis (TWINSPAN) diagnosed 5 groups representing one-of-a-kind altitudinal levels (28)

Novelty of Study

(This is the first-study, which has been conducted in the study area, it focuses on the inventorying and altitudinal distribution of plant biodiversity along the nalter expressway in nalter valley Gilgit).

Conclusion

The Nalter valley contains quite some habitat from the perpetual snow quarter to alpine grassy meadows and pastures, pockets of wooded area, and stony and rocky vertical cliffs. This is a lovely valley protected by snow peaks and glaciers and lakes on the altitude range. There has a great diversity of plants in the valley.

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