



## RESEARCH PAPER

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## Taxonomic diversity of some selected plant families of Shishi Koh Valley, Chitral, Pakistan

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### Abstract

The current paper describes the taxonomic diversity of the four major families of the research area, Shishi Koh Valley, Chitral Pakistan. The families selected were Lamiaceae, Rosaceae, Apiaceae and Euphorbiaceae. A total of 29 plant species belonging to the 21 genera of 4 families were collected, described and classified from the research area. The results revealed that family Lamiaceae was represented by 6 (28.6%) genera and 10 (34.5%) species, Rosaceae with 7 (33.3%) genera and 8 (27.6%) species, Apiaceae with 6 (28.6%) genera and 7 (24.1%) species and Euphorbiaceae with 2 (9.5%) genera and 4 (13.8%) species. Family Lamiaceae was the dominant family with respect to number of species while family Rosaceae contributed the highest number of genera in the current taxonomic investigation.

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## Introduction

Taxonomic diversity of the plants deals with the varieties of plants distributed in the research area. Plants belonging to all ranks of taxonomic hierarchy are taken into account. Flora includes all the wild and cultivated plants of an area (Ali, 2008). Although being predominantly arid, Chitral is an area of great floristic variety (Stewart 1972, 1982). Flowering plants are the autotrophic organisms, most diverse and abundant on land. Reproduction through flowers and fruits is frequently pointed to be the main causes in the evolutionary success of these plants (Stebbins, 1974; Regal, 1977). However procedures of generally considered causal links among evolutionary success of angiosperm and its different modernizations remained mysterious (Crepet & Niklas, 2009). The decline in taxonomic expertise substantially compromises rigorous studies in all fields of biogeography or biodiversity, comprising invasion biology (Smith *et al.*, 2008a; Pyšek & Richardson, 2010). The Hindukush Himalaya is a glorious mountain range on the planet covering an area of 3500 km<sup>2</sup> in the South Asia which is one among the globally five floristically most important regions (Myers, 2001; Shinwari, 2010).

In the recent decades researchers have worked out the forest deterioration in Kashmir valley using satellite imagery and conventional methods (Shaheen and Shinwari, 2012). *Delphinium nordhagenii* endemic to Chitral has been placed under the category of critically endangered (Ali *et al.*, 2012). However such morphotypes should happen when complex inflorescence is formed through an aggregation mechanism (Stützel & Trovó, 2013). A lot of fragmented work related to vegetation structure, types, composition and ethnobotany has been done in the different parts of the district Kotli (Ajaib *et al.*, 2010; Ahmad *et al.*, 2012; Amjad *et al.*, 2013; Malik *et al.*, 2013), but a detailed floristic survey of the area is not conducted after Stewart, 1972. Thus species names standardization and reclassifications were not kept in mind which causes confusions related to proper, correct identification and placement of many taxa (Khan *et al.*, 2015). Many workers have investigated different areas of the Hindu Kush and

Himalayan regions to study its floristic diversity and to report any new records from the research areas they studied. In this regard the current research was designed to find out the diversity of the plants of Shishi Koh Valley because it is a remote and inaccessible area which has not been studied previously.

## Materials and methods

### *Location of the Research Area*

The research area lies in the largest district of Khyber Pakhtunkhwa, Chitral, covering 20% of the provincial landscape. Chitral is one among the recreational spots in the country with worldwide popularity being very much beautiful and attractive. In the great Hindukush range this hilly area lies to the extreme north of the country in the province Khyber Pakhtunkhwa.

Tehsil Drosh is present in the subdivision Chitral. Drosh is gateway to District Chitral on the Lawari route from Dir to Chitral. Drosh has a total population of 71276 people comprising 36854 males and 34422 females in 1.0706 to 1 ratio respectively.

### *Shishi Koh Valley*

Shishi Koh Valley is located to the north east of the Tehsil Drosh of District Chitral, Khyber Pakhtunkhwa. It is connected to Drosh at Azodam 3.1Km ahead the Drosh Bazaar. A link road at Azodam leads to the research area at 35° 35.255' N latitude and 71°48.466' E longitude at an orientation of 152°. Altitude at the start of the valley is 1447m (4341 feet). Administratively Shishi Koh Valley has a rank of Union Council in Tehsil Drosh. The valley is subdivided into 33 small and large villages which are present along the main and sub valleys. Total population of the valley is 14,925 (AKHS, 2014).

### *Field Visits and Plant Collections*

The research area was visited through several field trips during 2014-2016. Plants were collected from all the sites selected for research. The plants collected were placed in polythene bags during field work and were placed in blotting papers at the end of the day for the removal of moisture and subsequently placed in the plant pressers to avoid any shrinkage and wrinkling.

### Plant Processing

The completely dried plant specimens were mounted according to the procedure of Forman and Bridson (1989). The standard herbarium sheets were provided by Department of Botany, University of Peshawar.

### Plants Identification

The plants were identified and described in semi technical taxonomic language in the light of direct morphological observations with reference to the information available on Tropicos Project on the flora of Pakistan (Stewart, 1972; Ali & Qaiser, 1986; Ali, 2000; Ali, 2008) and other local floras available online or in print.

### Results and discussion

The research area showed great taxonomic diversity. In spite of the arid habitats at most of the research area, all the three major groups of spermatophytes are well represented in the research area. Spermatophytes in the research area are represented by gymnosperms and angiosperms including both

monocots and dicots. The research area showed great variation in the composition flora at different sites.

The diversity increased gradually along the valley and reached its top at Madak Lasht, the last village of the valley having the highest altitude i.e. 2800m. Similar diversity records have also been reported by Ali and Qaiser (1986) and Ali (2000 & 2008) for various regions of Pakistan.

The current research work reported a total of 29 plants belonging to the 19 genera of four (4) Major families of the research area, Shishi Koh Valley Chitral Pakistan. Family Lamiaceae contributed the largest number of species (10), followed by family Rosaceae (8), followed by family Apiaceae (7) and family Euphorbiaceae (4) as shown in Table 1.

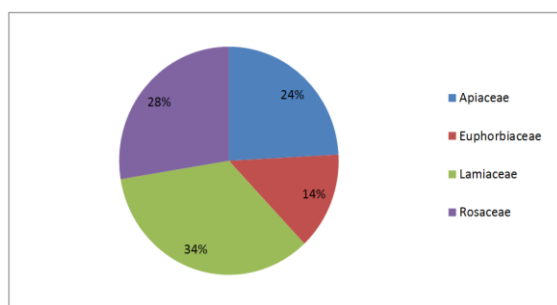
The results revealed that family Lamiaceae was represented by 6 genera and 10 species, Rosaceae with 7 genera and 8 species, Apiaceae with 6 genera and 7 species and Euphorbiaceae with 2 genera and 4 species (Table 1).

**Table 1.** Floristic list showing diversity of the selected plant families in the research area (Arrangement alphabetical).

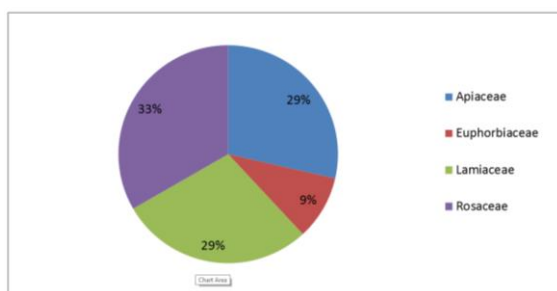
Families	Genera	Species and infra-specific categories
Apiaceae	<i>Apium</i> L.	<i>Apium leptophyllum</i> (Pers.) F. Muell. ex Benth.
	<i>Bunium</i> L.	<i>Bunium persicum</i> B. Fedtsch.
	<i>Bupleurum</i> L.	<i>Bupleurum subuniflorum</i> Boiss. & Heldr.
	<i>Pranaos</i> Lindl.	<i>Pranaos pabularia</i> Lindl.
	<i>Torilis</i> Adans.	<i>Torilis leptophylla</i> (L.) Rchb. f.
		<i>Torilis japonica</i> (Houtt.) DC.
	<i>Turgenia</i> Hoffm.	<i>Turgenia latifolia</i> (L.) Hoffm.
Euphorbiaceae	<i>Chrozophora</i> Neck. ex A. Juss.	<i>Chrozophora tinctoria</i> (L.) Raf.
		<i>Euphorbia prostrata</i> Aiton
	<i>Euphorbia</i> L.	<i>Euphorbia pepus</i> L.
		<i>Euphorbia hispida</i> Boiss.
Lamiaceae	<i>Clinopodium</i> L.	<i>Clinopodium vulgare</i> L.
	<i>Isodon</i> (Schrad. ex Benth.) Spach	<i>Isodon rugosus</i> (Wall. ex Benth.) Codd
	<i>Mentha</i> L.	<i>Mentha longifolia</i> (L.) L.
		<i>Mentha royleana</i> Benth.
		<i>Nepeta brachyantha</i> Rech. f. & Edelb.
	<i>Nepeta</i> L.	<i>Nepeta floccosa</i> Benth.
		<i>Nepeta laevigata</i> (D. Don) Hand.-Mazz
	<i>Origanum</i> L.	<i>Origanum vulgare</i> L.
Rosaceae	<i>Stachys</i> L.	<i>Stachys emodi</i> Hedge
		<i>Stachys floccosa</i> Benth.
	<i>Amygdalus</i> L.	<i>Amygdalus bucharica</i> Korsh.
	<i>Cotoneaster</i> Medik.	<i>Cotoneaster bacillaris</i> Wall. ex Lindl.

Families	Genera	Species and infra-specific categories
		<i>Cotoneaster nummularius</i> Fisch. & C.A. Mey
	<i>Crataegus</i> L.	<i>Crataegus ambigua</i> C.C.Mey. ex A.K.Becker
	<i>Fragaria</i> L.	<i>Fragaria nubicola</i> (Hook. f.) Lindl. ex Lacaita
	<i>Rosa</i> L.	<i>Rosa webbiana</i> Wall. ex Royle
	<i>Rubus</i> L.	<i>Rubus caesius</i> L.
	<i>Sorbaria</i> (Ser.) A.Braun	<i>Sorbaria tomentosa</i> (Lindl.) Rehder

Family Lamiaceae was represented by (34.5%) species, Rosaceae by (27.6%) species, Apiaceae by (24.1%) species, and family Euphorbiaceae by (13.8%) species (Fig. 1). With respect to number of genera family Lamiaceae was represented by (28.6%) genera, Rosaceae by (33.3%) genera, Apiaceae by (28.6%) genera, and family Euphorbiaceae by (9.5%) genera (Fig. 2).



**Fig. 1.** Graph showing the percentage representation of the species of the selected plant families in the research area.



**Fig. 2.** Graph showing the percentage representation of the genera of the selected plant families in the research area.

*Nepeta* L. was the dominant genus of the family Lamiaceae represented by three species followed by the two co-dominant genera i.e. *Mentha* L. and *Stachys* L. each represented by two species. Similar findings have been reported by Ahmad *et al.*, (2015) from Swat, Pakistan.

The dominant genus in the family Rosaceae was *Cotoneaster* Medik. represented by two species all the other genera were represented by a single species. Similarly the dominant genus in the family Apiaceae was *Torilis* Adans. with two species. The other genera of this family contributed a single species each. Of the two genera reported in the family Euphorbiaceae, *Euphorbia* L. was the dominant one represented by three species while the genus *Chrozophora* Neck. ex A. Juss. by a single species as shown in Table No.1.

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