



## RESEARCH PAPER

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## Diversity and ecological characteristics of family papilionaceae at district nowshera, Khyber Pakhtunkhwa, Pakistan

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### Abstract

The result conclude that total of 33 species belong to 21 genera of family *Papilionaceae* were identified from the research area. The members of this family were found in abundance that why infective amount of species were identified, 4 species belong to genus *Medicago*, 3 species from *Vicia*, *Phaseolus* and *Lathyrus*. 2 species from *Trifolium*, *Melilotus*, and *Astragalus* respectively. Once species from *Pisum*, *Parkinsonia*, *Cicer*, *Dalbergia*, *Crotolaria*, *Alhagi*, *Arachus*, *Cyamopsis*, *Cajanus*, *Glycine*, *Lotus*, *Lens*, *Pongamia*, and *Sophora*. The main purpose of the study is to explore, documents and identified the maximum number of the species of family *Papilionaceae* in the studied in research area, on the base of certain conclusion and survey we also know about the members of this family under different conditions. 7 (21.2 %) species were found in autumn, 12 (36.3 %) species were found in winter, 19 (57.5 %) species in spring and 16 (48.4 %) in summer respectively. In different habitat its percentage were 14 (42.4 %) species occure on dry. 8 species (24.2 %) were on wet land and 11 species (33.3 %) were cultivated. The main adjective was led on wild species. Life form classes indicated 75.5% therophytes followed by 12% nanophanerophytes, 6% chaemophytes and 3% by hemicryptophytes and Microphanerophytes. The leaf size spectra shows that Leptophyll with 51.5% were dominant followed by the Nanophyll with 48.4 %.The wild species were *Dalbergia sisoo*, *Lathyrus aphaca*, *Lathyrus sativus*, *Medicago asceronianna* *Medicago minima*, *Medicago polymorpha*. Along with the cultivated species were also collected this cultivated species were having economic importance species are (*Pisum sativum*, *Trifolium alxndrianum*, *Trifoleum repenes* and specie of *Phaseolus*).

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### Introduction

Papilionaceae a family of dicotyledonous plants closely related to the family Leguminosae (Gundersen 1950). The plants are often considered to be a subfamily of the Leguminosae. Of the many cosmopolitan species, trees and arboreal lianas are widespread in tropical regions and throughout the southern hemisphere; species growing in temperate regions primarily include herbs, subshrubs, and shrubs. The flowers are papilionaceous. The fruit is usually a typical bean. Many species of Papilionaceae are commercially valuable. The Papilionaceae have an essentially worldwide distribution, being found everywhere except Antarctica and the highaltitudnal arctic regions (Ali and Nasir 1995-2008). The trees are often found in tropical regions, while the herbaceous plants and shrubs (Cowen 1952) are predominant in extra tropical regions. Their ability to fix atmospheric nitrogen reduces fertilizer costs for farmers and gardeners who grow legumes, and means that legumes can be used in a crop rotation to replenish soil that has been depleted of nitrogen. Legume seeds and foliage have comparatively higher protein content than non-legume materials (Chikowo *et al* 2007), due to the additional nitrogen that legumes receive through the process. The aim of present study is to delineate the present status and ecological characteristics of family Papilionaceae under the climatic conditions at District Nowshera.

**Material and methods**

*Collection of Specimens*

The area was surveyed throughout the year from time to time in order to collect plant specimens belonging to the family Papilionaceae. It provides an opportunity to make maximum plant collection and field observations during the blooming and fruiting stages. So, therefore frequent field trips were arranged in different seasons of the year, especially in spring season because most of the

species appears in this season. Nine sites were selected which had different environmental conditions and were regularly visited in four different seasons during 2013. Most of the species were collected in months of March, April and May (Hulten E. 1968), (Guardia *et al* 2004). The standard herbarium sheet is used for the plants. The sites were Azakhel, Misre Banda, Akora Khattak, Nizampur, Mangloot Wild Life Park, Cherat, Bahadur Baba and Pirsabak area. The collected species were identified and named through the available literature (Ali and Nasir 1995-2008) and Flora of Pakistan (Pavlista and Baltensperger 2007).

*Preservation of Specimens*

These species were dried and preserved using naphthalene and mounted on a standard herbarium sheets and were submitted to Herbarium. Voucher numbers were allotted and deposited in the herbarium of Botany Department, Islamia College University, Peshawar. The life form and leaf form of the species were determined.

**Results and discussion**

District Nowshera has an interesting location of Bio diversity. This survey was undertaken with an aim to explore and identified and to documents the members of family *Papilionaceae*, and further it would be a good draft to survey, the conservation and sustainable utilization of plants resources of areas. so in the light of recorded data 33 species belong to 21 genera of the family were collected from deferent sites of the area, this species were include both the wild and cultivated species (Table 1). 4 species belong to genus *Medicago*, 3 species from *Vicia*, *Phaseolus* and *Lathyrus*. 2 species from *Trifolium*, *Melilotus*, and *Astragalus* respectively and one specie from each of the remaining genera were belonged (Table 1).

**Table 1.** Diversity and Ecological characteristics of family Papilionaceae of District Nowshera, Khyber Pakhtunkhwa, Pakistan.

S.No	Specie Name	Family	Habitat	A	W	S	Sm	Life Form	Leaf Size	Lamina
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1	<i>Alhagi maurorum</i> Medic.	Papilionaceae	D	-	-	-	+	H	L	S
2	<i>Astragalus amherstianus</i> Royle ex Benth	Papilionaceae	D	-	-	+	-	Ch	L	Com
3	<i>Astragalus tribuloides</i> Delile	Papilionaceae	D	+	-	-	-	Ch	L	Com
4	<i>Arachis Hypogea</i> L.	Papilionaceae	C	+	+	-	-	Th	L	Com
5	<i>Cicer arietinum</i> L.	Papilionaceae	C	-	-	+	-	Th	L	Com
6	<i>Crotolaria burhia</i> Buch.-Ham. ex Benth.	Papilionaceae	D	-	-	-	+	Np	L	S
7	<i>Cyamopsis tetragonoloba</i> (L.) Taubert	Papilionaceae	D	-	-	-	+	Th	N	Com
8	<i>Cajanus cajan</i> (L.) Huth	Papilionaceae	C	-	+	-	-	Th	L	Com
9	<i>Dalbergia sissoo</i> Roxb.	Papilionaceae	W&D	+	+	+	+	Mp	N	Com
10	<i>Glycine max</i> (L.) Merr	Papilionaceae	C	-	-	-	+	Th	N	Com
11	<i>Lathyrus aphaca</i> L.	Papilionaceae	W	+	-	-	-	Th	N	Com
12	<i>Lathyrus sativus</i> L.	Papilionaceae	W	-	-	+	-	Th	N	Com
13	<i>Lathyrus odoratus</i> L.	Papilionaceae	C	-	+	-	-	Th	L	Com
14	<i>Lotus corniculatus</i> L	Papilionaceae	W	-	-	+	+	Th	L	Com
15	<i>Lens culinaris</i> Medik.	Papilionaceae	C	-	-	-	+	Th	L	Com
16	<i>Medicago aschersonianna</i> Urb.	Papilionaceae	W	-	-	+	-	Th	N	Com
17	<i>Medicago laciniata</i> (L.) Mill.	Papilionaceae	D	-	-	+	-	Th	N	Com
18	<i>Medicago minima</i> (L.) Grufb	Papilionaceae	W	-	-	+	-	Th	N	Com
19	<i>Medicago polymorpha</i> L.	Papilionaceae	W	-	-	+	-	Th	N	Com
20	<i>Melilotus alba</i> Desr.	Papilionaceae	D	-	-	+	+	Th	L	S
21	<i>Melilotus indica</i> (L.) All.	Papilionaceae	D	-	+	+	-	Th	N	S
22	<i>Parkinsonia aculeata</i> L.	Papilionaceae	D	+	+	+	+	Np	N	Com
23	<i>Pisum sativum</i> L.	Papilionaceae	C	-	+	-	-	Th	L	Com
24	<i>Phaseolus mungo</i> L.	Papilionaceae	C	-	-	-	+	Th	L	Com
25	<i>Phaseolus aureus</i> Zuccagni.	Papilionaceae	C	-	-	-	+	Th	L	Com
26	<i>Phaseolus lunatus</i> L.	Papilionaceae	C	-	-	-	+	Th	L	Com
27	<i>Pongamia pinnata</i> Adans.	Papilionaceae	D	+	+	+	+	Np	L	Com
28	<i>Sophora mollis</i> (Royle) Baker	Papilionaceae	D	+	+	+	+	Np	L	Com
29	<i>Trifolium alexandrianum</i> L.	Papilionaceae	C	-	+	+	-	Th	N	Com
30	<i>Trifolium repens</i> L.	Papilionaceae	C	-	+	+	-	Th	N	Com
31	<i>Vicia faba</i> L.	Papilionaceae	D	-	+	+	-	Th	N	Com
32	<i>Vicia sativa</i> L.	Papilionaceae	W	-	-	+	+	Th	N	Com
33	<i>Vicia tetrasperma</i> (L.) Schreber.	Papilionaceae	D	-	-	+	+	Th	N	Com

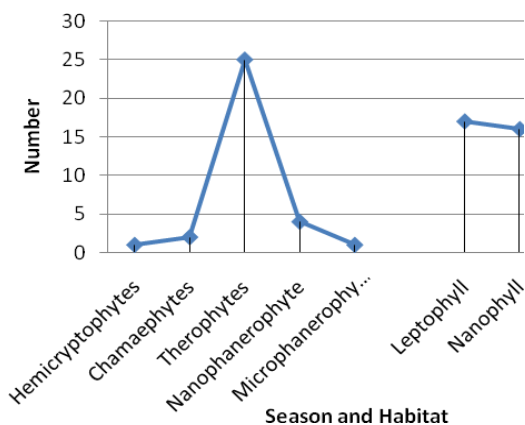
**Key:** D = Dry; W = Wet; C = Cultivated; A = Autumn; S = spring; W = Winter; Sm = Summer; Th = Therophyte; H = Hemicryptophyte; Ch = Chamaephyte; Np = Nanophanerophyte; Mp = Microphanerophyte; L = Leptophyll; N = Nanophyll; S = Simple; Com = Compound.

The one and important goal of the survey is to know about the importance of such species present in that area. This family includes several species of considerable economic importance as vegetable crop and edible source as well as oil source (González-Pérez *et al* 2009). All the importance features which are discussed above the economic importance of this family in local use and industrial use. Papilionaceae is

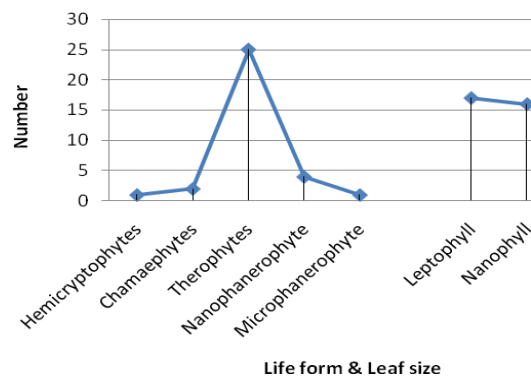
an importance family of plant kingdom. In order to explore the species of the family Papilionaceae, the taxonomy and ecology were considered. The taxonomic notes were written on each plant and ecological parameters such as Habitat (Dry Habitat made 42.4 %, wet Habitat 24.2 % and cultivated constituted 33.3%), Life form ( Table 1). Therophytes dominated with 75.5 % followed by 12%

Nanophanerophytes, 6% chaemophytes and 3% by hemicryptophytes and Microphanerophyte) (Table 1). The leaf form, Leptophyll (51.5%) was followed by the Nanophyll with 48.4 %. Studies investigating the life form of this family in protected region, the plant collected from the region are taken into consideration for the study of this family. So we know different life form under different habitat such as in dry and hilly area.

Most of the Flora of this district are exotic so the plant collected from the research area are mostly non palatable. It has been proposed that invasive species are often less palatable or batter able to compete for bio mass loss herbivory than related noninvasive growing in the same area (Simberloff D. 1996). Among the tree species belong to this family are only 3 were reported that is *Pongamia*, *Dalbergia* and *Parkinsonia*, the later species may be as herbs and shrubs. Phenological study was also taken on above survey most of the species of this family may be cultivated are on ornamental or generally bloom in spring season in research area. Mostly the cultivated and ornamental of this species have beautiful colour of their flower which attract insect for pollination. A study has claimed that the flower and bloom in particular time of year are much like to be particular colour to batter attract pollinating insects. Beside the above ecological parameter the lamina shape of the species was also noted in the research area. 4 species (12.1%) are with simple lamina and 29 species (87.8 %) having the compound lamina (Table 1).



Graph I.



Graph II.

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