

First inventory survey of dominant families (*Asteraceae*, *Fabaceae*, *Rosaceae*, and *Lamiaceae*) of Lower Tanawal, Pakistan

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The present study is a first attempt to describe the dominant plant families of the flora of Lower Tanawal, Pakistan. It provides valuable information about the different plant species of dominant plant families of the area. The present work is based upon investigating four dominant families (*Asteraceae*, *Fabaceae*, *Rosaceae*, and *Lamiaceae*) of Lower Tanawal District Abbottabad, Pakistan. Many study visits were conducted during the year 2016-2018 for the documentation and collection of data. The present paper deals with the 88 species belonging to 64 genera of four dominant families in which *Asteraceae* was dominant with 25 species followed by *Fabaceae* 24 species *Rosaceae* with 20 species and *Lamiaceae* with 19 species.

Keywords: *Asteraceae*; Lower Tanawal; *Fabaceae*; *Rosaceae*; *Lamiaceae*

Introduction

The *Asteraceae* is derived from the word, Aster which means composite. *Asteraceae* family is also known as a sunflower family. This is the leading family of flowering plants with more than 24,000 species and 1600-1700 genera in the world (Funk et al., 2005). *Asteraceae* family plants can be found in annual, biennial, or perennial herbs under shrubs, shrubs, and few trees. *Asteraceae* are a diverse family, commonly found in the tropical forests and temperate regions. *Fabaceae* is also called as pea family. It is a diverse plant family with 770 genera and 19,500 species (Beech et al., 2017). It is the third-largest family of angiosperms after *Asteraceae* and *Orchidaceae* in the world. The family has economic importance because it provides protein and micronutrients for health and livelihoods.

Rosaceae is also called the rose family. It is a medium-sized family of flowering plants, having 4828 species and 91 genera (Christenhusz et al., 2016). The name is derived from the genus *Rosa*. The family *Rosaceae* includes herbs, shrubs, and trees (Watson et al., 1992). Several economically significant products come from the *Rosaceae*, including many edible fruits.

Lamiaceae. The *Lamiaceae* or Labiatae is a family of flowering plants commonly known as the mint family. Many of the plants of this family are aromatic. Many family species are extensively cultivated, not only for their aromatic qualities, but also for their easiness cultivation. The family has a worldwide distribution. The *Lamiaceae* contains about 236 genera (Harley et al., 2004) and contain 6,700 to 7,200 species (Heywood et al., 2007).

Lower Tanawal lies in District Abbottabad, KP, Pakistan. The boundary of Lower Tanawal starts from the village Paswal which is away from Abbottabad on the distance of 10 km and same road near the Soban Gali leads to adjunct areas of Union Council Chamhad and at the end its boundary attached with the District Haripur (Adeela et al., 2019). The earlier studies, on these plants' families have been made by different workers in Pakistan. Qaiser and Rubina (2002), Ahmad et al. (2012), Ishtiaq et al. (2012), Mahmood et al. (2011), and Shinwari (2010) describe indigenous knowledge of medicinal plants from northern areas of Pakistan regarding to these families.

Materials and Methods

The study area survey includes the study trips for the collection of different plants of dominant families of Lower Tanawal, Pakistan. It was carried out during 2016-2018. The random sampling method was used to explore the various species of dominant families like *Asteraceae*, *Fabaceae*, *Rosaceae*, and *Lamiaceae* from the study area. Several field trips were made during the monsoon, winter, and summer seasons. Plants were collected from a wide range of agricultural fields and forest areas. Data about plant species like Habitat, Habit, flowering and fruiting, and general distribution were written on field notebooks. After completing the plant collection from the study area, herbariums sheets of collected specimens were prepared (Jain, Rao, 1960). Preserved plant specimens were placed in Herbarium, Department of Botany, Hazara University, Mansehra, Pakistan. The plants were collected from the area and identified with the available literature, herbarium specimen,

and flora of Pakistan (Nasir and Ali, 1970-1989). Information was collected from the local community. During the visit to the study area, discussion and informal talks were conducted with the local people. The local population provided information about the local plants.

Results

Total 88 species belonging to 64 genera of four dominant families in which *Asteraceae* was most dominant with 25 species followed by *Fabaceae* 24 species and *Rosaceae* with 20 species and *Lamiaceae* with 19 species. The present investigation revealed that 25 species belonging to 21 genera of the family *Asteraceae* was documented in Lower Tanawal District Abbottabad, Pakistan (Table 1). During this research work, it was observed that *Anaphalis* (2), *Artemisia* (2), *Lactuca* (2), and *Sonchus* (2) are the dominant genus of the family *Asteraceae* consisting of two species each. The maximum flowering was recorded in March-April, and maximum fruiting was observed May to June in the plant of *Asteraceae* (Table 1).

The result showed that therophytes were the dominant life form in the *Asteraceae* family and mesophyll was dominant leaf size spectra (Figures 1 and 2). The result further indicated that 24 species and 17 genera belong to *Fabaceae*. *Desmodium* was the dominant genus of the family *Fabaceae* consisting of three species. The result showed that the herbaceous flora of the *Fabaceae* family was dominant with 12 species. The maximum flowering was documented in March-May, and maximum fruiting was observed in June-July in the plant species of *Fabaceae* (Table 2). The therophytes (8) are the dominant life form in the members of the *Fabaceae* family, and Nanophyll (8) is the dominant leaf size spectra (Figures 1 and 2). The result of the survey indicated that 20 species and 11 genera belong to *Rosaceae*. *Prunus*, *Pyrus*, *Rubus* were dominant genus consisting of three species each (Table 3). The results have shown that shrubs were dominant, with ten species belong to the *Rosaceae* family. The maximum flowering was observed in March-April, and maximum fruiting was observed in May-July (Table 3). The Nanophenrophytes (8) were the dominant life form in the members of the *Rosaceae* family, and mesophyll (8) was the dominant leaf size spectra of the *Rosaceae* family (Figs. 1 and 2).

It was revealed that a total of 19 species belonging to 15 genera of the family *Lamiaceae* was documented in Lower Tanawal District Abbottabad, Pakistan (Table 4). During this research work, it was perceived that *Calamintha* (2), *Mentha* (2), *Nepeta* (2), and *Salvia* (2) are a dominant genus of family *Lamiaceae* consisting of two species each. The results show that in the family *Lamiaceae*, herbaceous flora was dominant with 16 species and three plant species were shrubs (Table 4). The maximum flowering was recorded in March-April, and maximum fruiting was observed in May- July in the plant species of family *Lamiaceae* (Table 4). The result shows that therophytes were the dominant life form in the *Lamiaceae* family members, and microphyll was the dominant leaf size spectra of the *Lamiaceae* family (Figs 1 and 2). Hussain et al. (2015) also conducted a study on floristic diversity in Mastuj Valley, District Chitral, and Hindukush Range, Pakistan. They recognized 571 plant species belonging to 82 families. *Asteraceae* was the most dominant family with 91 species, and *Poaceae* was the second dominant family having 58 species. The next was *Fabaceae* with 38 species, *Lamiaceae* and *Rosaceae*, each with 26 species.

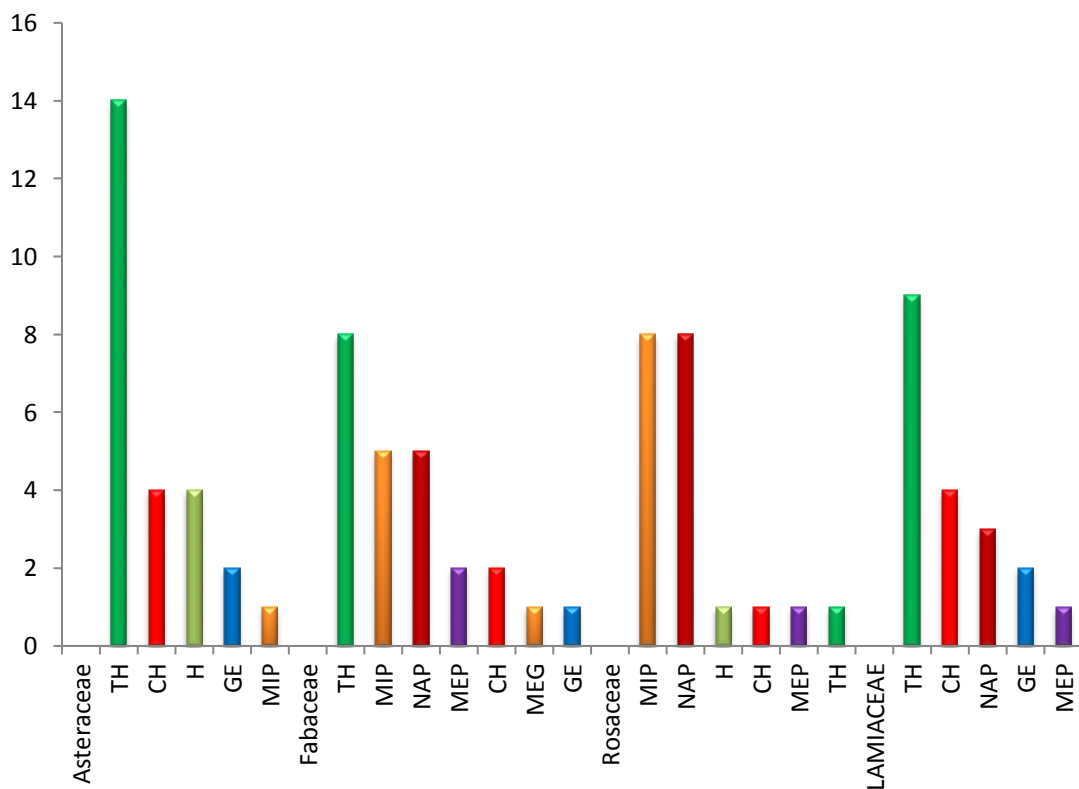


Fig. 1. Graphical representation of life form of dominant families of Lower Tanawal.

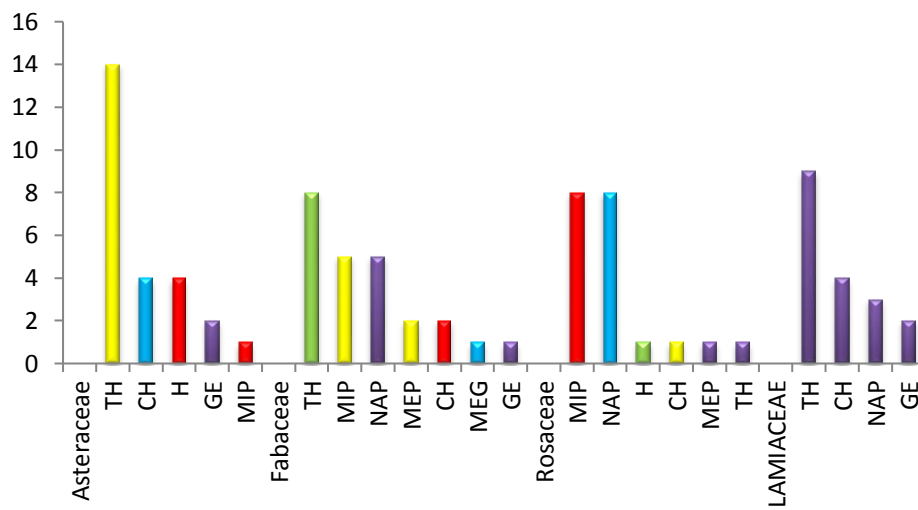


Fig. 2. Graphical representation of leaf spectra of dominant families of Lower Tanawal.

Discussion

This research study reveals that no such study has been conducted on dominant families of Lower Tanawal, Pakistan. The present data about dominant families of Lower Tanawal District Abbottabad, Pakistan, would be a good source for taxonomic data. There is a need to conduct a formal study on these plants' families and their medicinal utilities. The survey revealed that herbaceous flora of *Asteraceae* was dominant with 23 species while two plant species *Xanthium strumarium* L. *Echinops echinatus* Roxb were shrubs. *Parthenium hysterophorus* Linn. was the dominant species of family *Asteraceae* in the study area. *Parthenium hysterophorus* Linn is found along roadsides and becoming a horrible weed in the area. *Artemisia scorpioides* Kitam., *Biden pilosa* L., and *Xanthium strumarium* L. are used to treat constipation, diarrhea, and leprosy.

Table 1. List of plant species of family *Asteraceae* recorded from Lower Tanawal, Pakistan.

Plant name	Family	Habit	Flowering	Fruiting
<i>Anaphalis margaritacea</i> (L.) Benth. & Hook.f.	Asteraceae	Herb	Apr-June	July-Sep
<i>Anaphalis triplinervis</i> (Sims) Sims ex C.B. Clarke	Asteraceae	Herb	Apr-May	July-Aug
<i>Artemisia absinthium</i> L.	Asteraceae	Herb	Mar-Apr	May-June
<i>Artemisia scoparia</i> Waldst. & Kitam.	Asteraceae	Herb	Apr-May	June-July
<i>Biden pilosa</i> L.	Asteraceae	Herb	Mar-June	July-Aug
<i>Carduus nutans</i> L.	Asteraceae	Herb	Apr-May	June-Sep
<i>Carthamus oxyacantha</i> M. Bieb.	Asteraceae	Herb	Mar-Apr	May-June
<i>Cichorium intybus</i> L.	Asteraceae	Herb	Mar-Apr	May-June
<i>Cirsium falconeri</i> (Hook.f.) Petr.	Asteraceae	Herb	Mar-May	May-June
<i>Conyza canadensis</i> L.	Asteraceae	Herb	Mar-June	June-Sep
<i>Echinops echinatus</i> Roxb.	Asteraceae	Shrub	Mar-May	June-Aug
<i>Lactuca indica</i> L.	Asteraceae	Herb	Mar-Apr	Apr-May
<i>Lactuca serriola</i> L.	Asteraceae	Herb	May-June	June-July
<i>Launaea procumbens</i> (Roxb.) Ramayya & Rajagopal	Asteraceae	Herb	Mar-June	June-July
<i>Parthenium hysterophorus</i> L.	Asteraceae	Herb	Mar-Apr	May-June
<i>Pentanema vestitum</i> Wall. ex. DC.	Asteraceae	Herb	Mar-Apr	May-June
<i>Saussurea heteromalla</i> D. Don	Asteraceae	Herb	Mar-May	May-June
<i>Senecio aquaticus</i> Hill.	Asteraceae	Herb	Mar- June	June-July
<i>Sonchus oleracus</i> (L.) Hill	Asteraceae	Herb	Mar-Apr	Apr-July
<i>Sonchus asper</i> (L.) Hill	Asteraceae	Herb	Apr-May	June-July
<i>Tagetes minuta</i> L.	Asteraceae	Herb	Apr-May	June-July
<i>Taraxacum officinale</i> L.	Asteraceae	Herb	Mar-Apr	Apr-May
<i>Tricholepis angustifolia</i> DC.	Asteraceae	Herb	Mar-Apr	Apr-Aug
<i>Tridax procumbens</i> L.	Asteraceae	Herb	Mar-May	May-June
<i>Xanthium strumarium</i> L.	Asteraceae	Shrub	Mar-June	May-June

Indigofera heterantha Brandis was the most common species of the family *Fabaceae* in Lower Tanawal. *Duchesnea indica* (Jacks.) Focke and *Rubus ellipticus* Sm. were the most common species of family *Rosaceae* in Lower Tanawal. *Cydonia oblonga* Mill. was the rare tree species in the study area. *Mentha arvensis* L and *Salvia moorcroftiana* Wall. ex Benth. were the most common species of family *Lamiaceae* in the area of Lower Tanawal. Our findings are also agreed with Izhar et al. (2015), who conducted Taxonomic diversity and ethnobotanical characteristics of the family *Lamiaceae* of the area of Swat, Khyber Pakhtunkhwa, Pakistan. He reported 35 species belonging to 21 genera of family *Lamiaceae* from the Study area in which *Salvia* and *Nepeta* were found dominant genera.

Table 2. List of plant species of family Fabaceae recorded from Lower Tanawal, Pakistan.

Plant name	Family	Habit	Flowering	Fruiting
<i>Acacia nilotica</i> (L.) Delile	Fabaceae	Tree	Apr-May	June-July
<i>Acacia modesta</i> Wall.	Fabaceae	Tree	May-June	June-July
<i>Albizia lebbbeck</i> (L.) Benth.	Fabaceae	Tree	Mar-May	May-Sep
<i>Astragalus leucocephalus</i> Bunge	Fabaceae	Herb	Mar-May	June-July
<i>Bauhinia variegata</i> L.	Fabaceae	Tree	Mar-Apr	May-June
<i>Caesalpinia pulcherrima</i> (L.) Sw.	Fabaceae	Tree	Mar-Apr	Apr-June
<i>Crotalaria rotundifolia</i> J.F. Gimel	Fabaceae	Herb	Mar-Apr	Apr-June
<i>Delbergia sisso</i> Roxb.	Fabaceae	Tree	Mar-May	May-Aug
<i>Desmodium gangeticum</i> L.	Fabaceae	Shrub	Mar-May	June-July
<i>Desmodium elegans</i> DC.	Fabaceae	Shrub	Apr-May	June-July
<i>Desmodium tortuosum</i> (Sw.) DC.	Fabaceae	Shrub	Apr-May	June-July
<i>Indigofera linifolia</i> (L.F.) Retz.	Fabaceae	Shrub	Apr-May	May-June
<i>Indigofera heterantha</i> Brandis	Fabaceae	Herb	Mar-Apr	Apr-May
<i>Lathyrus aphaca</i> L.	Fabaceae	Herb	Apr-May	May-June
<i>Lespedeza juncea</i> (Linn. f)	Fabaceae	Herb	Mar-June	June-July
<i>Medicago polymorpha</i> L.	Fabaceae	Herb	Mar-June	June-July
<i>Medicago denticulata</i> Willd.	Fabaceae	Herb	Apr-May	May-June
<i>Melilotus indicus</i> (L.). All.	Fabaceae	Herb	Mar-May	May-July
<i>Rhynchosia tomentosa</i> (L.) Hook & Arn.	Fabaceae	Herb	Mar-May	May-July
<i>Robinia pseudoacacia</i> L.	Fabaceae	Tree	Mar-May	May-June
<i>Trifolium repens</i> L.	Fabaceae	Herb	Mar-Apr	May-Aug
<i>Vicia sativa</i> L.	Fabaceae	Herb	Mar-May	May-June
<i>Vicia hirsute</i> (L.) Gray.	Fabaceae	Herb	Mar-June	July-Sep
<i>Acacia mearnsii</i> De Wild.	Fabaceae	Tree	May-June	July-Aug

Table 3. List of plant species of family Rosaceae recorded from Lower Tanawal, Pakistan.

Plant name	Family	Habit	Flowering	Fruiting
<i>Cotoneaster melanocarpus</i> Fisch. ex A.Blytt	Rosaceae	Shrub	Apr-June	June-Sep
<i>Cotoneaster integerrimus</i> L.	Rosaceae	Shrub	Apr-May	May-July
<i>Cotoneaster nummularius</i> Fisch. & C.A.Mey.	Rosaceae	Shrub	Mar-Apr	May-June
<i>Cydonia oblonga</i> Mill.	Rosaceae	Tree	Mar-Apr	June-Aug
<i>Duchesnea indica</i> (Jacks.) Focke	Rosaceae	Herb	Mar-Apr	Apr-May
<i>Eriobotrya japonica</i> (Thunb.) Lin	Rosaceae	Tree	Mar-Apr	Apr-June
<i>Potentilla rivalis</i> Nutt. ex Torr. & A.Gray	Rosaceae	Herb	Mar-May	May-June
<i>Prunus domestica</i> L.	Rosaceae	Tree	Mar-Apr	Apr-July
<i>Prunus americana</i> Marsh	Rosaceae	Tree	Mar-Apr	Apr-July
<i>Prunus persica</i> (L.) Batsch.	Rosaceae	Tree	Mar-Apr	Apr-July
<i>Pyrus pashia</i> Buch.-Ham. ex D.Don	Rosaceae	Tree	Mar-Apr	May-July
<i>Pyrus communis</i> L.	Rosaceae	Tree	Mar-Apr	May-July
<i>Pyrus pyrifolia</i> (Burm.) Nak.	Rosaceae	Tree	Mar-Apr	May-July
<i>Rosa moschata</i> Herrm.	Rosaceae	Shrub	Mar-May	May-July
<i>Rosa brunonii</i> L.	Rosaceae	Shrub	Mar-Apr	May-June
<i>Rubus sanctus</i> Schreb	Rosaceae	Shrub	Mar-Apr	Apr-July
<i>Rubus fruticosus</i> Hook.f.	Rosaceae	Shrub	Mar-Apr	Apr-June
<i>Rubus ellipticus</i> Sm.	Rosaceae	Shrub	Mar-June	June-July
<i>Sorbaria tomentosa</i> (Lindl.) Rehder	Rosaceae	Shrub	Mar-May	June-Aug
<i>Spiraea vacciniifolia</i> D. Don	Rosaceae	Shrub	Mar-Apr	May-July

Table 4. List of plant species of family Lamiaceae recorded from Lower Tanawal, Pakistan.

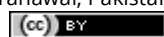
Plant name	Family	Habit	Flowering	Fruiting
<i>Ajuga bracteosa</i> Wall. ex Benth.	Lamiaceae	Herb	Mar-May	June-Aug
<i>Calamintha hydaspidis</i> (Falc. ex Benth.) Hedge	Lamiaceae	Herb	Mar-Apr	April-June
<i>Calamintha nepeta</i> L.	Lamiaceae	Herb	Mar-Apr	May-June
<i>Colebrookea oppositifolia</i> Sm.	Lamiaceae	Shrub	April-June	June-July
<i>Eremostachys superba</i> Royle ex Benth.	Lamiaceae	Herb	Mar-Apr	May-June
<i>Isodon rugosus</i> (Wall. ex Benth.) Codd	Lamiaceae	Shrub	Mar-Apr	Apr-May
<i>Lamium album</i> L.	Lamiaceae	Herb	Mar-May	May-July
<i>Marrubium vulgare</i> L.	Lamiaceae	Herb	Mar-May	June-July
<i>Mentha longifolia</i> (L.) Huds	Lamiaceae	Herb	Mar-Apr	Apr-July
<i>Mentha arvensis</i> L.	Lamiaceae	Herb	Mar-June	June-Sep
<i>Micromeria biflora</i> (Buch.-Ham. ex D. Don) Benth.	Lamiaceae	Herb	Apr-May	May-June
<i>Nepeta ciliaris</i> Benth.	Lamiaceae	Herb	Mar-Apr	Apr-May
<i>Nepeta cataria</i> L.	Lamiaceae	Herb	Mar-Apr	May-July
<i>Origanum vulgare</i> L.	Lamiaceae	Herb	April-May	June-July
<i>Otostegia limbata</i> (Benth.) Boiss.	Lamiaceae	Shrub	Mar-Apr	May-July
<i>Perilla frutescens</i> (L.) Britton.	Lamiaceae	Herb	Mar-May	June-July
<i>Salvia coccinea</i> Buc'hoz ex Etl.	Lamiaceae	Herb	Mar-Apr	Apr-June
<i>Salvia moorcroftiana</i> Wall. ex Benth.	Lamiaceae	Herb	Mar-May	May-July
<i>Stachys emodi</i> Hedge	Lamiaceae	Herb	April-May	May-July

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Plate No 1

Some pictures of plants of dominant families



Plate No 2

Some pictures of plants of dominant families preserved on herbarium sheets



Launaea procumbens (Roxb.) Ramayya & Rajagopal



Saussurea heteromalla D. Don



Pentanema vestitum Wall .ex. DC



Senecio aquaticus Hill.



Echinops echinatus Roxb



Lactuca indica L.



Micromeria biflora (Buch.- D.Don) Benth.



Lamium album L.



Desmodium gangeticum L.



Eremostachys superba Royle. ex. Benth



Salvia coccinea Buc'hoz ex Etl.



Stachys emodi Hedge.