



A fraction of angiosperms of Tehsil Banda Daud Shah district Karak Pakistan

Musharaf Khan^{*1}, Abdur Rehman², Shahana Musharaf³

¹Department of Botany, University of Peshawar, Pakistan

²Department of Botany, Government Post Graduate College Bannu, Pakistan

³Department of Chemistry, Government Girls Degree College S. Malton, Mardan, Pakistan

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Abstract

The Flora of Banda Daud Shah is interesting because of the presence of both hills and plains in the area. The hills in most part of the area seem to be barren but many are rich in grasses, *Rhazia stricta*, *Dodonaea viscosa* etc. The most important Agriculture crop is the wheat which is not so abundant, and mostly rain dependent. The fodder crops like *Trifolium* and *Sorghum vulgare* is also not common but *Arachis hypogea* is very common. The weed like *Cirsium arvense*, *Asphodelus tenuifolius*, *Medicago liciniata*, *Papaver* spp. and *Silene conoidea* are very common in wheat crop. Among the Xerophyts, *Zizyphus* spp. *Calotropis procera*, *Acacia* spp. etc, are common in the area. Total 24 monocot and 131 dicot species have been described in the area belonging to 54 families and 25 orders. The dominant families are Poaceae and Papilionaceae with 16 species, followed by Compositae with 13 species, Amaranthaceae, Cruciferae, Labiatae with 7 species each. The species and families have been arranged in the list according to Engler's system of classification with modifications followed at Jafri's Flora of Karachi.

*Corresponding Author: Musharaf Khan ✉ k.musharaf@gmail.com

Introduction

Since very long time many attempts have been made by different workers in searching out Flora of our dear homeland, Pakistan. The work of both Pakistani and Foreign Taxonomists is fundamental approach. Different workers have worked in different parts of Pakistan even when it was part of United India. Karak and chiefly the area under discussion are mostly unexplored and very few records are found. Hooker (1872-1907) has worked on the Flora of British India. Chughtai and Yousaf (1976) have worked on the vegetation of Kohat under the Title "The Ecology of native vegetation of Kohat" NWFP. Imperial Gazetteer of India, NWFP. (1979) has also pointed out some plant species from Kohat District. Khan (1993) has worked on the Flora of Tehsil Karak. Khan (2007) has work on ethnobotany of Tehsil Karak and Khan et al., (2011), studied the ethnobotany of halophyte of Tehsil Karak.

The Banda Daud Shah is situated at 32° 47' to 32° 48' North and 70° 30' to 70° 40' East. The area is bounded by District Hangu on the North West, District Kohat on the North East, Tehsil Karak on the South, and Tribal area Adjoining Bannu District on the South West. (Fig 1) Physiography of the area is uneven and can be divided into mountainous area, the plain and the small hillocks. The soil is generally clayey or sandy. The fertile loamy soil is very rarely found. Although the hills are very dry, but it is a fact that it contains precious minerals like salt, gypsum and gas etc. The salt quarries are mostly at Jatta Ismail Khel and Bahader Khel, where the hills present great amount of exposed rocks salt. There is shortage of drinking water, so the people bring water from remote area (Figure 2). The Rainfall is scanty in the area. In the year 2002, 300 to 400 mm of rainfall per annum recorded on district level (Table 1). The area is very hot in summer and very cold in winter. In the year 2002 the mean maximum temperature was 42°C, in the month of the June, where as the mean minimum temperature was as low as 4°C, in the month of December and January, recorded on district level (Table 1) (Khan 2003).

The climate and weathers are also influenced by wind. In summer the wind direction is variable. In July wind comes from Eastern side, carrying clouds and rainfall with them. In hottest months especially June. Whirl winds are developed on the plain area at after noon due to local heating and convectional uprising. Sometimes strong, dry and hot winds with huge dust enter the area from different sides. Most of the winter season is calm but at approach of February high velocity winds blow in the area. In winter season breeze from Hangu side also blows down the area for weeks together, making the winter even colder. Due to much interest in the field of plant taxonomy the area of Tehsil Banda Daud Shah was selected, so as to evaluate and documentise its flora to same extant.

Materials and Methods

Collection of the plants

The study was conducted by frequently surveying in winter, spring and summer during 2002 to 2003. Plants species were collected, preferably in duplicate or triplicate form. They were pressed, dried, preserved and mounted on herbarium sheets for identification.

Identification

Plants were identified with the help of available literature (Stewart, 1972; Nasir and Ali, 1971 to 1995) and voucher specimens have been deposited in herbarium, Department of Botany, Government Post Graduate College Bannu, Khyber Pakhton Khawa, Pakistan.

Description and illustration

The various identified taxa were checked from useful necessary literature. Their floral and other characteristic studied, using lenses etc. The description and illustration of various taxa presented over here are in accordance with the well-authenticated literature.

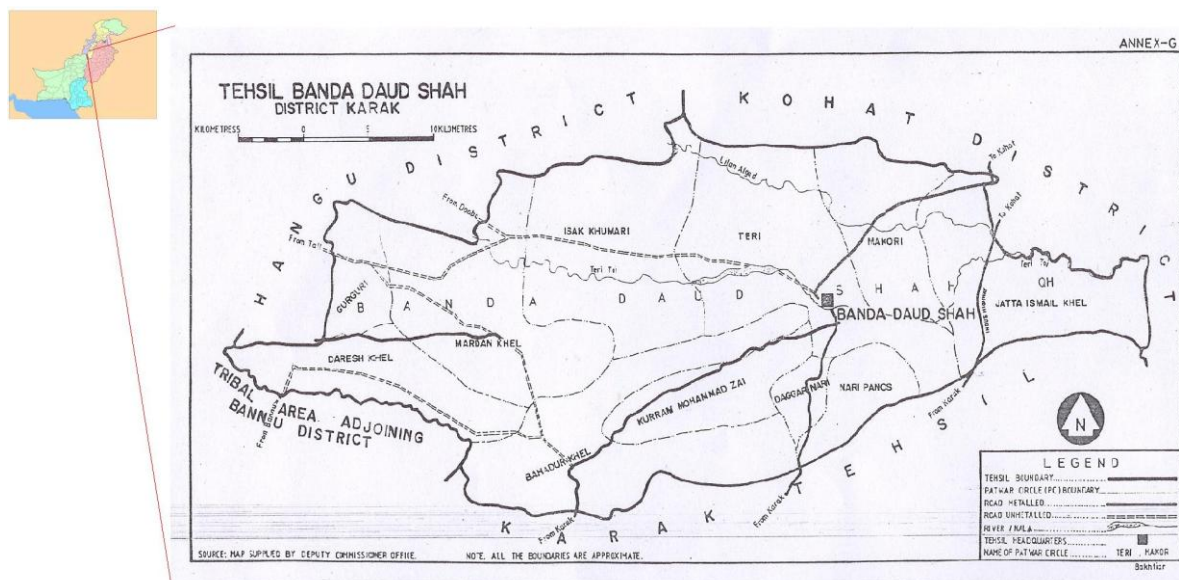


Fig. 1. Map of Tehsil Banda Daud Shah.

Table 1. Climatic data of District Karak for the year 2002.

Months	Temperature (C°)				Rainfall (mm)	Relative humidity (%)		Soil temperature (C°) Average	Wind speed (Km Per Hour)
	Mean maximum	Highest recorded	Mean minimum	Lowest recorded		5 A.M	5 P.M		
January	21.7	24	3.7	1	3	71	31.4	5.8	2.9
February	21.9	27	6.9	1	45.4	75.4	35.3	7.9	3.1
March	28	35	13.4	8	11.8	75	30	14.6	3.3
April	34.5	41	19.7	12	15	56.6	27.5	20.4	9.9
May	40.7	45	25	19	18.4	48.4	24.2	26.4	5.9
June	39.7	46	26.6	17	96	67.3	34.7	29.4	6.5
July	39.9	44	26.8	19	107.4	73.6	33.5	30.2	5.0
August	37.4	42.5	28.5	21	64.8	78.8	47.8	31.3	5.4
September	34.5	37	22.3	17	74.3	79	37.8	26.6	4.7
October	32.53	37.5	18.11	15	12	73.63	30.48	22.0	3.3
November	24.6	30	10.9	6	1.8	66.5	30.4	14.9	2.7
December	21.4	26	6.8	2	18	68.1	33.7	11.2	3.2

Result

We have documented the 155 species belonging to 54 families and 25 orders. The dominant families are Poaceae and Papilionaceae with 16 species, followed by Compositae with 13 species, Amaranthaceae, Cruciferae, Labiatae with 7 species each. Solanaceae

with 6 species, Boraginaceae with 5 species, Chenopodiaceae, Euphorbiaceae and Linaceae with 4 species, Capparidaceae, Caryophyllaceae, Convolvulaceae, Malvaceae, Polygonaceae, Umbelliferae and Zygophyllaceae with 3 species, Acanthaceae, Asclepiadaceae,

Cesalpiniaceae, Fumariaceae, Mimosaceae, Nyctaginaceae, Orobanchaceae, Oxalidaceae, plantaginaceae, Rhamnaceae, Scrophulariaceae, Palmae, Papaveraceae, Pedaliaceae, Primulaceae, Typhaceae and Verbenaceae with 2 species, Punicaceae, Rosaceae, Salvadoraceae, Sapindaceae, Aizoaceae, Apocynaceae, Araceae, Celastraceae, Sapotaceae, Tamaricaceae, Tiliaceae and Violaceae with single species. (Table 2-3)

Cucurbitaceae, Cyperaceae, Geraniaceae, Menispermaceae, Moraceae, Myrtaceae,

Key to the classes

- 1. Seed with one cotyledon.....Monocotyledoneae.
- 1. Seed with two cotyledons.....Dicotyledoneae.

Class Monocotyledoneae

Order Pandanales

Family Typhaceae

Typha L.

Key to the Species

- 1: Leaves narrow *T latifolia*
- 1: Leaves comparatively broad..... *T angustata*

Order Glumiflorae

Family Gramineae

Key to the Sub-families

- 1: Spikelets 1-many flowered, joined above the glumes; rachilla produced beyond the fertile florets.....Pooideae.
- 1: Spikelets 2 flowered, upper bisexual, lower male or neuter; jointed below the glumes; rachilla not produced beyond the upper florets.....Panicoideae.

Sub- family Panicoideae.

Key to the Genera

- 1: Female spike very much thick. Floret unisexual..... Zea.
- 1: Inflorescence not so.
 - 2: Lower glumes usually very small. Spikelets usually all fertile.
 - 3: Spikelets not surrounded by bristles or hairs Echinochloa.
 - 3:Spikelets surrounded by bristles or hairs.
 - 4: Bristles united at the base.....Cenchrus.
 - 4: Bristles free at the base Pennisetum.
 - 2: Lower glumes longer than the second or lemmas, spikelets usually not so.
 - 5: Racems simpl, spike like or digitate Dichanthium.

5: Racems in much branched panicles.

6: Racems supported by a boat shaped spathe, roots aromatic Cymbopogon.

6: Racems and root not so.

7: Panicle densely silky..... Saccharum.

7: Panicle not silky..... Sorghum.

Sub Family Pooideae

Key to the Genera

1: Flowers in digitate spikelets..... Cynodon.

1: Flowers not as above.

2: Flowers in loose panicles.

3: Rachilla or lemmas with long silky hairs.....Phragmites.

3: Silky hairs absent.

4: Spikelets with 1 floret..... Aristida.

4: Spikelets with more than 1 floretes.

5: Spikelets closed. Lemma 3-nerved..... Eragrostis.

5: Spikelets open. Lemma more nerved..... Avena.

2: Inflorescence rather contracted.

6: panicles much elongated, narrowly pyramidal and drooping at the apex.....Desmostachya.

6: Inflorescence spike of spikelets.

7: Lemma 5-nerved, spikelets 3 at each node, falling together at maturity.....Hordeum.

7: Lemma 5-9-nerved, spikelets not so arranged.....Triticum.

Family Cyperaceae

Cyperus L.

Stem erect, leafy only near the base. Spikelets in globose or umbellate heads or spikes, compressed.

A Cyperus species was collected from wet places. Leaves radical. Umbells compound.

Order Principes.

Family Palmae.

Phoenix dactylifera L.

Stem unbranched, upto 30m high. Fruit one seeded berry, sweet, edible, redish or yellowish brown.

Order Spathiflorae

Family Araceae

Arisaema Mart.

Herbs, found in moist wood lands or stony places in the open. Leaf compound. Dioecious.

An *Arisaema* species was collected from Banda Dawood Shah.

Order Liliflorae

Family Liliaceae

Key to the Genera

1. Cladodes present.....Asparagus.
1. Cladodes absent.
 2. Leaves large,fleshy.....Aloe.
 2. Leaves linear,fistular.....Asphodelus.

Class Dicotyledoneae

Order Urticales

Family Moraceae

Morus alba L.

A medium sized deciduous tree. Leaves very variable in shape and size. Flowers greenish. Fruit white or nearly black when ripe.

Order Polygonales

Family Polygonaceae

Key to the Genera

1. Perianth segments 5. Stamens 5-8.....Polygonum.
1. Perianth segments 6, in two whorls of 3 each.Stamens 6.....Rumex.

Order Centrospermae

Key to the Families

- 1 Inflorescence usually dense and congested spike (simple or compound).
 2. Mostly fleshy plant of saline habitate; bracts not scarious. Filaments free..... Chenopodiaceae.
 2. Habit apparently not fleshy. Bracts and perianth searious. Filaments usually connate bellow..... Amaranthaceae .

1: Inflorescence solitary, clustered, whorled or cymose.

3: Ovary 1-celled, 1-ovuled..... Nyctaginaceae.

3: Ovary 1-several celled, many ovuled on each placentum.

4: Capsule 2-many celled. Staminodes often many, petaliod; placentation usually axile. Petals o, the apparent petals in some are staminodes.....Aizoaceae.

4: Capsule basically 1-celled.Staminodes absent. Placentation usually free central. Petals mostly present and showy..... Caryophyllaceae.

Family Chenopodiaceae

Key to the Genera

1: Leaves sessile or subsessile, plant covered with wooly hairsKochia.

1: Leaves comparatively large, flat, distinctly petiolateChenopodium.

Chenopodium L.

White mealy herbs. Leaves usually lobed .Flowers minute, in small clusters, collected in spiked penicles.

Fruit membranous.

Key to the species

1: Leaves broad, plants nearly glabrous.....*C . murale*.

1: Leaves comparatively narrow, plant more or less mealy.....*C. album*.

Family Amaranthaceae

Key to the Genera

1. Leaves alternate.

2. Ovary 2-many ovulate.....Celosia

2. Ovary 1-ovulate.

3. Flower unisexual (calyx inconspicuous)..... Amaranthus.

3. Flower bisexual. Bracts and calyx pinkish..... Digera,

1. Leaves fascicled, opposite (or some time alternate).

4. Densely tomentose. Leaves mostly fascicled.....Aerva.

4. Plant not densely tomentose. Leaves opposite.

- 5. Anthers 2 celled at maturity.
- 6. Flowers all perfect, spicateAchyranthes.
- 6. Flower clustered..... Pupalia.
- 5. Anther 1-celled at maturity..... Alternanthera.

Family Nyctaginaceae

Boerhaavia diffusa L.

Perennial, prostrate or ascending, diffused herbs. Leaves in unequal pair, more or less ovate, petiolate, upper surface greenish, lower often silvery white. Flower minute, pinkish, in simple umbel or cluster.

Family Aizoaceae

Trianthema portulacastrum L.

Syn: *T. monogyna* L.

Annual, prostrate, some what succulent herbs. Leaves unequal, obliquely opposite. Flowers axillary, sessile, closely sheathed by the base of the petiole.

Family Caryophyllaceae

Key to the Genera

- 1. Calyx gamosepalous.....Silene.
- 1. Calyx of free sepals Spargula.

Order Ranales

Family Menispermaceae

Cocculus pendulus (Forst) Diels.

A scandent shrub. Leaves oblong or ovate – oblong Flowers minute, male in axillary clusters and female axillary solitary (rarely two). Drupe reddish but black when dried.

Order Rhoeadales

Key to the families

- 1. Flowers irregular(zygomorphic). Leaves much divided. Fruit very small.....Fumariaceae.

1. Flowers regular (rarely zygomorphic in capparidaceae). Leaves simple or palmately compound (some time much divided in papaveraceae) 2.sepals and petals soon falling. Stamens generally numerous in several whorls. Flowers mostly solitary terminal. (plants usually with coloured juice. Capsule usually dehiscent apically).....Papaveraceae.

2.Sepals and petals usually 4,not falling soon. Stamens usually 6, rarely 4 or many, in 1-2 whorls (Fruit mostly dehiscent vertically by 2 valves).

3. Stamens characteristically 2,short and 4 inner long (tetradynamous).fruit usually partitioned by a false septum (usually without a gynophore).....Cruciferae.

3.Stamens equal or subequal (but not tetradynamous). Fruit 1-celled, without the septum (usually with the gynophore).....Capparidaceae.

Family Papaveraceae

A papaver species was collected as a weed of wheat crop from Terri. Leaves pinnatifid- pinnatisect. Capsule not spiny.

An other species was also collected as a weed of wheat crop from Terri. Leaves pinnatisect. Capsule spiny.

Family Fumariaceae

Key to the Genera

1. Fruit nut.....Fumaria.

1. Fruit capsule..... Hypecoum.

Family Capparidaceae

Key to the Genera

1. Fruit berry Capparis.

1. Fruit capsule Cleome.

Capparis (Tourn) L.

Shrubs or trees, with stipular thorns. Leaves simple petiolate. Flowers showy, torus short. Gynophore present. Fruit berry. Seed embeded in pulp.

Key to the Species

1. Leaves present on both young and old shoots. Flowers whitish.....*C. spinosa*.

1. Leaves present only on very young shoots. Flowers in corymbose racemes, red.

..... *C. aphylla*.

Family Cruciferae

Key to the Genera

1. Fruit silicula.

2. Pod dehiscent Lepidium

2. Pod indehiscent.

3. Stem leaves undivided Neslia

3. Stem leaves divided Coronopus.

1. Fruit siliqua.

4. Fruit broad, beaked.

5. Fruit dehiscent Eruca

5. Fruit indehiscent Raphanus

4. Fruit long narrow.

6. Fruit much flattend Farsetia.

6. Fruit cylindrical Malcolmia.

Order Rosales

Key for the Families

1: Ovaries 2 or more free or fused, inferior or superior. Fruit simple or aggregate but never a legume. Stamens mostly inserted on the calyx.....Rosaceae.

1:Ovary 1,1-carpellary.Fruit mostly a legume. Stamens not inserted on the calyx.

2: Flowers regular, small, corolla, valvate, often united into a 4-5 lobed CupMimosaceae.

2: Flowers usually irregular. Corolla imbricate.

3: Petals and stamens usually subequal free petals 5, posterior one innermost and largest.....Caesalpiaceae.

3: Corolla papilionaceous.The posterior petal outer most and largest.....Papilionaceae.

Family Rosaceae

A Cotoneaster species was collected from hills in Banda Dawood Shah. Leaves short stalked, oblong. Fruit scarlet.

Family Mimosaceae

Acacia Willd.

Shrubs or trees. Leaves bipinnate or phyllodial, stipules modified into spines. Flowers small, in globose heads or spikes. Pod oblong or linear, mostly compressed, many seeded.

Key to the Species

- 1. Flowers in globose head..... *A . nilotica*.
- 1. Flowers in spikes.....*A . modesta*.

Family Caesalpiniaceae

Key to the Genera

- 1. Leaves pinnate Cassia.
- 1. Leaves bipinnate..... Parkinsonia.

Family Papilionaceae.

Key to the Genera

- 1. Leaflets alternate Dalbergia.
- 1. Leaflets not alternate.
 - 2. Pod developing below the soil.....Arachis.
 - 2. Pod not developing below the soil.
 - 3. Spines present.
 - 4. Leaf rachis modified into spineAstragalus.
 - 4. Axillary shoot modified into spine..... Alhagi.
 - 3. Spines absent.
 - 5. Leaves pinnate.
 - 6. Fruit inflatedCicer.
 - 6. Fruit not inflated.

- 7. Leaves simple or imparipinnate, tendrils absent..... Indigofera.
- 7. Leaves pinnate tendrils present..... Vicia.
- 5. Leaves trifoliate.
 - 8. Fruit coiled, usually bristly. Some time scythe shape Medicago.
 - 8. Fruit otherwise.
 - 9. Plant much slender in habit, weak Domasia.
 - 9. Plant not slender in habit.
 - 10. Pod very much small.
 - 11. Inflorescence axis elongated..... Melilotus.
 - 11. Inflorescence axis short and head like Trifolium.
 - 10. Pod long, not so small.
 - 12. Pod curved and sickle shape..... Trigonella.
 - 12. Pod not curved and sickle shape.
 - 13. Pod subglobos Crotalaria.
 - 13. Pod flattened..... Vigna.

Order Geraniales

Key to the Families

- 1. Flowers unisexual, with or without the 1-whorl of perianth. Capsule usually with 3, 1-seeded cocci. Plant milkyEuphorbiaceae.
- 1. Flowers usually bisexual with both calyx and corolla. Plant without a milky juice. Fruit not as above.
 - 2. Leaves simple and entire. Seldom toothed or compound.
 - 3. Sepals, petals and stamens 4-5 each..... Linaceae.
 - 3. Calyx and corolla usually unequal each. Stamens basically 10 Polygalaceae.
 - 2. Leaves mostly compound.
 - 4. Plants mostly woody. Leaves mostly oppositeZygophyllaceae.
 - 4. Plant mostly herbaceous.

5. Leaves palmately 3-foliolate. Fruit shortly beaked..... Oxalidaceae.

5. Leaves not as above. Fruit long beaked..... Geraniaceae.

Family Oxalidaceae

Oxalis corniculata L.

Creeping or procumbent. Leaves 3-foliolate. Flowers yellow, on 2-manyfid peduncle. Capsule sub cylindrical, many seeded.

Family Geraniaceae

Erodium malacoides Willd.

Annual, stem erect or diffused, branched. Leaves ovate. Flower 3-many on a peduncle. Petals lilac. Fruit with long beak.

Family Linaceae

A *Linum* species was collected in vegetative condition from Banda Dawood Shah.

Family Zygophyllaceae

Key to the Genera

1. Fruit winged or spinous, some time only tuberculate. Seed non endospermic..... Tribulus.

1. Fruit neither winged nor spinous. Seed endospermic.

2. Flowers large white Peganum.

2. Flowers usually small, rose colour Fagonia.

Family Polygalaceae

A *Polygala* species was collected from Khuram. Flowers in axillary or extra axillary, very short few-flowered racemes, white.

Family Euphorbiaceae

Key to the Genera

1. Inflorescences cyathium Euphorbia.

1. Inflorescences other wise Chrozophora.

Euphorbia L.

Herbs or shrubs with milky juice. Inflorescence cyathium. Fruit capsule.

Key to the Species

- 1. Prostrate herb.....*E. prostrata*.
- 1. Erect herb.....*E. helioscopia*.

Order Sapindales

Key to the Families

- 1. Petals not appendaged. Ovary not typically 3-celled, 3-lobed.
 - 2. Annular disk prominent present. Leaves usually alternat.....Celastraceae.
 - 2. Annular disk absent. Leaves opposite.....Salvadoraceae.
- 1. Petals scale or gland appendaged. Ovary typically 3-celled and 3-lob-.....Sapindaceae.

Family Celastraceae

Gymnosporia royleana Wall.

Syn: *Celastrus royleana* Wall.

Small tree, spiny. Leaves obovate, petiole very short, leaves thick. Fruit nearly rounded.

Family Salvadoraceae

Salvadora oleoides Decne.

Shrub or small tree. Leaves linear or ovate-lanceolate. Flowers greenish, white, sessile, about 2mm across. Drup small yellow.

Family Sapindaceae.

Dodonaea viscosa L.

An evergreen shrub, branches erect, young parts more or less viscid with a yellow resinous exudation. Leaves alternate, simple, oblanceolate, entire. Flowers greenish-yellow. Fruit membranous capsule, 2-4 valved, each valve broadly winged at the back.

Order Rhamnales

Family Rhamnaceae

Key to species

- 1. Shrub. Drupe small *Z. Nummularia*.
- 1. Medium sized tree. Drupe comparatively large *Z. Mauritiana*.

Order Malvales

Key to the Families

- 1: Stamens markedly monadelphous, anthers 1-celled. Flowers usually large and showy (mostly solitary axillary). Epicalyx usually present.....Malvaceae.
- 1: Stamens free, connate at the base, sometimes 5-adelphous, anthers 2-celled. Epicalyx absentTiliaceae.

Family Tiliaceae

Corchorus trilocularis L.

Annual, erect or sub erect. Leaves ovate-oblong to oblong lanceolate, crenate –serrate, the two basal serrations usually produced into a thin linear hair like process. Capsule 5-7.5 cm long, usually 3 angles.

Family Malvaceae

Key to the Genera

- 1: Stigma capitate. Flower yellow (or red) Malvastrum.
- 1: Stigma linear. Flower white or pinkishMalva.

Malva L.

Herbs. Leaves lobed. Flowers in axillary tufts, bracteoles 3, free staminal tube bearing anther to the top. Ovary many celled.

Key to the species

- 1: Bracteole linear *M. parviflora*.
- 1: Bracteole lanceolate *M. neglecta*.

Malvastrum . A. Gray.

Herbs or under shrubs . Flower axillary or terminal , bracteoles 3. Carpels 5 or more , stigma capitate.

Malvastrum coromandelianum (L) Garcke.

Syn: *M. tricuspidatum* (Ait) A.Gray.

Undr shrub, erect or ascending, coarsely hairy. Leaves ovate, oblong – lanceolate, toothed , petiolate. Flowers yellow .

Order Parietales

Key to the Families

- 1. Annual or perennials. Leaves distinct, branches normal.Violaceae.
- 1. Small trees or large shrubs. Leaves minute or absent. Branches green(Phyllocladous)..... Tamaricaceae.

Family Tamaricaceae

Tamarix aphylla (L.) . Karst .

A small or medium size tree, branches slender . Leaves reduced to short sheaths, with free minute teeth. Flowers pink, in spikate arrangement, monoecious or bisexual. Stamens 5.

Family Violaceae

A *Viola* species was collected from Banda Dawood Shah . Leaf lamina ovate, narrowed into a long petiole.

Order Myrtiflorae

Key to the Families

1: Flowers perigynous . Fruit berry like.....Punicaceae.

1. Ovary inferior .Flower epigynous . Fruit berry , drupe, capsule or nut Myrtaceae.

Family Punicaceae

Punica granatum L.

Large shrubs , erect or prostrate.Flower beautiful reddish. Perianth leaves persist in the form of a crown on the top of the fruit .

Family Myrtaceae

Eucalyptus lanceolatus.

Large tree. Leaves lanceolate , petiolate , thick .

Order Umbelliflorae

Family Umbelliferae

Key to the Genera

1: Leaves 1-2-3 pinnate . Segments broad.

2: Calyx teeth obsolete , primary and secondary ridge hairy Psamogeton.

2: Calyx teeth evident or obsolete, secondary ridges winged, with bristles or spines..... Daucus.

1: Leaves very much divided, segments linearScandix.

Daucus carota L.

Annual or biennial, usually hispid herbs. Leaves 2-3pinnate, pinnae pinnatifid, segment narrow. Flowers white.

Psamogeton biternatum Edgw.

Segments of the lower leaves ovate, pinnatifid into narrow lobes. Segments of the upper leaves narrowly cuneate, laciniate. Flowers pinkish.

Scandix pecten-veneris L.

An erect branched annual. Leaves much divided. Fruit 30-70 mm long, ridged, linear.

Order Primulales.

Family Primulaceae

Anagalis arvensis L.

Annual, procumbent herbs. Leaves sessile, ovate or lanceolate, opposite, peduncle slender, decurved in fruit. Flowers blue. Fruit with persistent style.

Order Ebenales

Family apotaceae

Monotheca buxifolia (falc.) A.DC.

Small tree, branches many, Whitish. Leaves thick, entire, petiole short, spatulate. Fruit rounded, black when ripe, stoney, outer portion edible.

Order Contortae

Key to the Families

1: Androecium free from the stigma and without translators. Polen grains not forming pollinia Apocynaceae.

1: Androecium conerescent to the stigma and provided with translators. Pollen grains in pollionia Asclepiadaceae.

Family Apocynaceae.

Rhazya stricta Decne.

Under shrub or shrub, erect . Leaves alternate, elliptic-lanceolate, turning yellowish with age, thick or leathery, sessile. Flowers white. Follicles erect, sub cylindrical, 5-7.5cm long.

Family Asclepiadaceae

Key to the Genera

1. Leafless shrub with short and thick branches.....Periploca.

1. Leafy shrub with large opposite leaves.....Calotropis.

Calotropis procera (Willd) R.Br.

A tall shrub, much branched form the base, covered with soft white tomentum. Leaves large, broadly ovate-oblong, sessile, opposite, thick. Flower whitish to violet. Seed silky.

Periploca aphylla Decne.

Erect shrub. Ussally leafless, branches smooth, green. Leaves when present 1/2 cm long. Flower green, fragrant, in small axillary opposite cymes, bracteate. Calyx 5 partite. Follicle 5-10 cm long, woody.

Order Tubiflorae

Key to the Families

1. Root parasite. Sometime fleshy herb, seemingly lacking chlorophyll. Leaves scales like.....Orobanchaceae.
1. Mostly green herbs with normal leaves. Chlorophyll present.
 2. Fruit drupaceous or usually nutlets. Corolla imbricate.
 3. Leaves usually alternate. Flowers in characteristic, one sided cymes.....Boraginaceae.
 3. Leaves usually opposite. Flowers not as above.
 4. Style terminal. Fruit drupe or berry.....Verbenaceae.
 4. Style gynobasic. Fruit nutlet.....Labiatae.
 2. Fruit capsular or baccate. Corolla twisted.
 5. Flowers usually regular.
 6. Flowers bracteate. Anther dehiscing longitudinally..Convolvulaceae.
 6. Flowers ebracteate. Anthers usually dehiscing by pores and connivent.....Solanaceae.
 5. Flowers usually irregular.
 7. Seed endospermic.
 8. Fruit usually septicidal capsule, 2-locular without barbs or wings.....Scrophulariaceae.
 8. Fruit usually loculicidal capsule or nut, completely or incompletely 4-locular, usually barbed or winged.....Pedaliaceae.
 7. Seed non-endospermic. Fruit explosively dehiscing.....Acanthaceae.

Family Convolvulaceae

Key to the Genera

1. Plant not twining.....Evolvulus.
1. Plant twining.
 2. Corolla tube mostly entire, pollen not echinulate.....Convolvulus.
 2. Pollen echinulate.....Ipomoea.

Convolvulus arvensis L.

Annual or perennial, usually twining, herbs. Leaves stalked, with auriculate or hastate bases. Peduncles solitary axillary, bearing 1-4 flowers on short or long pedicels. Flowers pink.

Evolvulus alsinoides.

A low perennial, branches many from the base, prostrate. Leaves many, elliptic-oblong, apiculate, petiol very short or absent. Flowers light blue, solitary or sometime two. Peduncle long and faliform.

Ipomoea hedracea.

Twining. Leaves long petiolate, base of lamina hastate or auriculate.

Family Boraginaceae

Key to the Genera

- 1: Inflorescence coiled.....Heliotropium.
- 1: Inflorescence not coiled.
 - 2: Plant much hispid.....Arnebia.
 - 2: Plant not much hispid.....Lithospermum.

Arnebia.

Herbs, hispid, diffused. Raceme terminal, elongate. Flowers sessile, whitish or yellow. Nutlets 4.

An Arnebia species was collected from Bahader Khel and Gurguri. Herb. Leaves alternate. Flowers bracteate, yellow. Corolla tube longer than the calyx.

Heliotropium L.

Leaves alternate, scabrid. Flowers small, usally white, 5-merous, on coiled inflorescence. Corolla tubular. Fruit dry, usually of 4 one-seeded cocci.

Key to the Species

- 1: Leaves linear-lanceolate, nearly sessile.....*H. strigosum*.
- 1: Leaves large, long-petioled, ovate to elliptic-oblong..... *H. europeum*.

Lithospermum arvense.

Herb. Leaves linear, lanceolate, hispid. Flowers axillary, bracteate.

Family Verbenaceae

Key to the Genera

1. Shrub or small tree. Fruit drupe..... Vitex.

1. Herbs. Fruit separating into Pyrenes Lippia.

Lippia nodiflora (L.) L.C. Rich. ex Michaux.

Syn: *phylla nodiflora* (L.) Green.

A widely creeping perennial, rooting at nodes. Leaves opposite, spatulate, sub-sessile, toothed toward the rounded apex. Heads on 2.5-7.5cm long peduncles. Flowers white or pinkish.

Vitex trifolia L.

Shrub or small tree. Leaves 3-foliolate, leaflet entire. Panicles closely white tomentose.

Family Labiatae

Key to the Genera

1. Plant spiny.....Otostegia.

1. Plant not spiny.

2. Corolla obviously 2-lipped.

3. Perfect stamens 2 Salvia

3. Perfect stamens 4 .

4. Upper lip of corolla arched.....Lamium.

4. Upper lip of corolla not arched

5. Calyx not or scarcely bilabiate..... Micromeria.

5. Calyx 2 lipped.....Scutellaria.

2. Corolla not 2-lipped.....Ajuga.

Family Solanaceae.

Key to the Genera

1. Corolla wheel-shaped (valvate)..... Solanum.

1. Corolla various (tubular, imbricate), not wheel-shaped.

2. Fruit berry Withania.

2. Fruit capsular..... Datura.

Solanum L.

Key to the Species.

1. Unarmed, annual herbs *S. nigrum*.

1. Armed with prickles or spines.

2. Prostrate herb..... *S. surattense*.

2. Erect shrub or under shrub *S. incanum*.

Withania Panguy.

Key to the Species

1. Flowers hermaphrodite. Leaves mostly ovate, thin, green. Berry loosely enclosed..... *W. somnifera*.

1. Flowers dioecious. Leaves oblanceolat-oblong, thick, whitish. Berry tightly enclosed
..... *W. coagulans*.

Family Scrophulariaceae

Key to the Genera

1. Leaves triangular- hastate..... *Kickxia*.

1. Leaves not as above *Veronica*.

Family Pedaliaceae

Sesamum indicum.

Herbs. Leaves opposite, simple. Fruit capsule.

Family Orobanchaceae

An Orobanche species was collected from Daggar Nari. Inflorescence terminal spike, branched. Flowers bracteate.

Family Acanthaceae

Key to the Genera

1. Stem mostly hexagonal. Flowers in axillary or terminal cymes, spikes, penicle or thyrses..... *Diclyptera*.

1. Flowers usually in spike..... *Justicia*.

Order plantaginales.

Family Plantaginaceae

Key to the Species

1. Leaves entire or distantly toothed. Spike usually ovoid..... *P. ovata*.

1. Leaves oblanceolate. Spike oblong or cylindric..... *P. ciliate*.

Order Cucurbitales

Family Cucurbitaceae

Trichosanthes palmata.

Weak stemmed, trailing herbs, much branched. Leaves having long petiole, lamina several lobed. Flowers yellow. Fruit about 2.25cm across, yellow, with green strips.

Order Campanulatae

Family Compositae

Key to the Genera

1. Head always monoecious. Achenes enclosed in hardened involucre.....Xanthium.

1. Head and Achenes not so.

2. Head compound Echinops.

2. Head not compound.

3. Head heterogamous.

4. Leaves clustered, head nesting among leaves Ifloga.

4. Leaves and head different.

5. Achenes heteromorphous.....Calendula.

5. Achenes not heteromorphous.

6. Involucre bristly at the apex.Pappus feathery..... Saussuria.

6. Involuere spiny at the apex .pappus scaly Centaurea.

3. Head homogamous.

7. Achenes incurved , birds clawlik..... Koelpinia.

- 7. Achenes not so .
- 8. Involucre spinescentCousinia.
- 8. Involucre not spinescent .
- 9. Usually sub scadent or prostrate. Capitula distant .Stem usully slender..... Launaea.
- 9. Erect herbs .Capitula in closed clustered Sonchus.

Launaea Cass.

Key to the Species

- 1. Plant usually much tufted in habit..... *L. procumbens*.
- 1. Plant not tufted in habit *L. nudicaulis*.

Angiospermae

Angiospermae or Magnoliophyta, are the most diverse group of land plants. Angiosperms are seed producing plants like the gymnosperms and can be distinguished from the gymnosperms by a series of synapomorphies. These characteristics include folowers, endosperm within the seeds, and the production of fruits that contain the seeds. The ancestors of Angiospermae diverged from gymnosperms around 245–202 million years ago, and the first flowering plants known to exist are from 140 million years ago. They diversified enormously during the lower cretaceous and became widespread around 100 million years ago, but replaced conifers as the dominant trees only around 60-100 million years ago. Ovules enclosed in an ovary. Pollination takes place through receptive stigma and style.

Table 2. List of species of class Monocotyledonae in Banda Daud shah.

Order	Family	Species
Pandanales	Typhaceae	<i>Typha angustata</i> Bory et Chaubard.
		<i>Typha latifolia</i> L.
		<i>Cenchrus</i> spp.
		<i>Cymbopogon jwarancusa</i> (Jones) Schult.
		<i>Dichanthium annulatum</i> (Forsk) Staph.

Glumiflorae	Graminae	<i>Echinochloa colonum</i> (L) Link.
		<i>Pennisetum typhoideum</i> (Burm.f) Stapf. Et Hubb.
		<i>Saccharum spontaneum</i> L.
		<i>Sorghum vulgare</i> Pers.
		<i>Zea mays</i> L.
		<i>Aristida cacrulascens</i> Desf
		<i>Avena sativa</i> L.
		<i>Cynodon dactylon</i> (L) Pers.
		<i>Desmostachya bipinnata</i> (L) Stapf.
		<i>Eragrostis poaoides</i> Beauv.
		<i>Hordeum vulgare</i> L.
		<i>Phragmites karka</i> (Retz) Trin . Ex. Steud.
		<i>Triticum aestivum</i> L.
Principes	Palmae	Cyperaceae <i>Cyperus</i> spp.
		<i>Phoenix dactylifera</i> L.
Spathiflorae	Araceae	<i>Arisaema</i> spp.
		<i>Aloe barbadensis</i> Mill.
Liliflorae	Liliaceae	<i>Asparagus gracilis</i> Royle.
		<i>Asphodelous tenuifolius</i> Cavan.

Table 3. List of species of Class Dicotylidonae in Banda Daud Shah.

Order	Family	Species
Urticales	Moraceae	<i>Morus alba</i> L.
		<i>Polygonum aviculare</i> L.
Polygonales	Polygonac eae	<i>Rumex dentatus</i> L.

		<i>Chenopodium album</i> L.	Papilionac	<i>Crotalaria medicaginea</i> Lam.
		<i>Chenopodium murale</i> L.	ae	<i>Dalbergia sissoo</i> Roxb.
Chenopodi		<u>Chenopodium</u> sps.		<i>Dumasia villosa</i> DC.
aceae		<i>Kochia prostrata</i> (L.) Schrad.		<i>Indigofera linifolia</i> L.f.) Retz.
		<i>Achyranthes aspera</i> L.		<i>Medicago laciniata</i> (L) Mill.
		<i>Aerva javanica</i> (Burm.f.) Juss.		<i>Melilotus indicus</i> (L.) All.
		<i>Alternanthera pungens</i> Kunth.		<i>Trifolium alexandrianum</i> L.
Centrosperm	Amaranth	<i>Amaranthus viridis</i> L.		Trigonella sps.
ae	aceae	<i>Digera muricata</i> (L). Mart.		<i>Vicia sativa</i> L.
		<i>Celosia argentea</i> L.	Oxalidaceae	<i>Vigna radiate</i> (L.) R. Wilczek.
		<i>Pupalia lappacea</i> (L) Juss.	e	<i>Oxalis corniculata</i> L.
Nyctaginac		<i>Boerhaavia diffusa</i> L.		
ae			Geraniaceae	<i>Erodium malacoides</i> Willd.
Aizoaceae	<i>Trianthema portulacastrum</i> L.		ae	
	<i>Silene conoidea</i> L.		Linaceae	Linum sps.
Caryophyl	<i>Spergula arvensis</i> L.		Z	<i>Fagonia cretica</i> L.
aceae	Spergula sps.		Geraniales	<i>Peganum hermala</i> L.
Ranales	Menisper	<i>Cocculus pendulus</i> (Forst) Diels.	ae	<i>Tribulus terrestris</i> L.
	maceae		Polygalaceae	Polygala sps.
	Papaverac	Papaver spp.	ae	
	ae			<i>Chrozophora obliqua</i> (Vahl) A. Juss.
		<i>Fumaria indica</i> (Hauskn)	Euphorbia	<i>Euphorbia heliscopia</i> L.
	Fumariaceae	H.N.Pugsley.	ceae	<i>Euphorbia prostrata</i> Ait.
	ae	<i>Hypecoum pendulum</i> L.		Euphorbia sps.
		<i>Capparis decidua</i> (Forssk).Edge	Celastraceae	<i>Gymnosporia royleana</i> Wall.
Rhoeadales	Capparida	worth.	ae	
	ceae	<i>Capparis spinosa</i> L.	Sapindales	
		<i>Cleome viscosa</i> L.	Salvadorac	<i>Salvadora oleoides</i> Decne.
		<i>Coronopus didymus</i> (L.) Smith.	ae	
		<i>Eruca sativa</i> Millel.	Sapindaceae	<i>Dodonaea viscosa</i> L.
		Farsetia sps.	ae	
	Cruciferae	Lepidium sps.		<i>Zizyphus maurtiana</i> Lam.
		<i>Malcolmia africana</i> (L) R.Br.	Rhamnales	Rhamnaceae
		<i>Neslia apiculata</i> F.M.and Av.all.	ae	Wt.
		<i>Raphanus sativus</i> L.	Tiliaceae	<i>Corchorus trilocularis</i> L.
	Rosaceae	Cotoneaster sps.	Malvales	<i>Malva neglecta</i> Wallr.
		<i>Acacia modesta</i> Wall.	Malvaceae	<i>Malva parviflora</i> L.
	Mimosaceae	<i>Acacia nilotica</i> (Lamk) Willed.		<i>Malvastrum coromandelianum</i> (L) Garcke.
	ae			
		Cassia sps.	Tamaricaceae	<i>Tamarix aphylla</i> (L).Karst.
	Cesalpini	<i>Parkinsonia aculeata</i> L.	ae	
	aceae		Violaceae	Viola sps.
		<i>Alhagi pseudalhagi</i> (M.Bieb)	Punicaceae	<i>Punica granatum</i> L.
		Desv.	Myrtiflorae	e
		<i>Arachis hypogea</i> L.	Myrtaceae	<i>Eucalyptus lanceolatus</i> L.
		Argyrolobium sps.		
		<i>Astragalus psilocentros</i> Fisch.		<i>Daucus carota</i> L.
Rosales		Astragalus sps.	Umbelliflorae	Umbellifer
		<i>Cicer arietinum</i> L.	ae	<i>Psammogeton biternatum</i> Edgw.

		<i>Scandix pecten – veneris</i> L.
Primulales	Primulaceae	<i>Anagalis arvensis</i> L.
Ebenales	Sapotaceae	<i>Monotheca buxifolia</i> (falk) A.DC.
	Apocynaceae	<i>Rhazya stricta</i> Deene.
Contortales		<i>Calotropis procera</i> (Willd) R.Br.
	Asclepiadaceae	<i>Periploca aphylla</i> Decne. <i>Convolvulus arvensis</i> L.
	Convolvulaceae	<i>Evolvulus alsinoides</i> L. <i>Ipomoea hedracea</i> Jacq. Arnebia sps. <i>Heliotropium europaeum</i> L.
	Boraginaceae	<i>Heliotropium strigosum</i> Willd. Heliotropium sps. <i>Lithospermum arvense</i> L. <i>Lippia nodiflora</i> (L) L.C.
	Verbenaceae	Rich.ex. Michaux. <i>Vitex trifolia</i> L. <i>Ajuga bracteosa</i> Wall.
Tubiflorae		<i>Lamium amplexicaule</i> L.
	Labiatae	<i>Micromeria biflora</i> (Buch.Ham ex .D. DONE) Benth. <i>Otostegia Limbata</i> (Benth) Boiss. <i>Salvia moorcroftiana</i> Wall. ex Benth. Salvia sps. Scutellaria sps. <i>Datura metel</i> L. <i>Solanum incanum</i> L. <i>S. nigrum</i> L.
	Solanaceae	<i>S. Surattense</i> Burm .f. <i>Withania coagulans</i> (Stocks) Dunal. <i>W. somnifera</i> (L) Dunal. <i>Kickxia ramosissima</i> (Wall) Janchen.
	Scrophulariaceae	Veronica sps
	Pedaliaceae	<i>Sesamum indicum</i> L.
	Orobanchaceae	Orobanche sps. <i>Dicliptera roxburghiana</i> auct
	Acanthaceae	<i>Justicia adhatoda</i> L. <i>Plantago ciliata</i> Desf.

Plantaginales	Plantaginaeae	<i>P. ovata</i> Forssk.
Cucurbitales	Cucurbitaceae	<i>Trichosanthes palmate</i> Roxb <i>Calendula arvensis</i> L. <i>Centaurea iberica</i> Trev.Ex.Spreng. Cousinia sps. <i>Echinops echinatus</i> D.C. <i>Ifloga fontanesii</i> Cass.
Campanulatales	Compositae	<i>Koelpinia gracilis</i> L. <i>Launaea nudicaulis</i> (L) Hooker.f. <i>L. procumbens</i> (Roxb) Ramayya and Rajagopal. <i>Saussurea heteromalla</i> (D.Don) Hand Mazz. Saussurea sps. <i>Sonchus asper</i> (L) Hill. <i>Xanthium strumarium</i> L.

Discussion

The work presented in this project cover the M.Sc thesis duration of one year. The work may be considered as bird's eye view as the species collected and described over here are no doubtly few but without them the botanical aspect of the area remains incomplete. The work will surely provide much help to future workers trying in this field in this area. The area consists of both hills and plains, differing much in floristic composition. Irrigation facilities are very less in the area, depending on rainfall. Due to lack of irrigation facilities the Flora, particularly cultivated Flora has much difference from highly irrigated areas of Khyber Pakhton Khawa. No fruit orchards have been seen in the visited area. The chief Agriculture crops are Wheat, different legumes, fodder crops and barely, grown with the help of tube well system but mostly rain dependant. On hills different grasses, *Monotheca buxifolia*, *Acacia modesta*, *Cotoneaster* sps, *Rzhazia stricta*, *Justicia adhatoda* and *Dodonaea viscosa*, etc are commonly found.

Mostly of the Xerophytes such as *Temarix aphylla*, *Calotropis procera*, *Zizyphus* spp. and *Acacia*

nilotica are found on road sides while *Capparis decidua* and *Salvadora oleoides* are commonly found in Grave-yards *Aloe vera* is also very common in Grave-yards. Most of the floral elements of the area are found as weeds in cultivated crops, for example, in Wheat crops different weeds such as *Cirsium arvense*, *Papaver* spp., *Silene conoidea*, *Melilotus indicus*, *Anagalis arvensis*, *Echinops echinatus*, *Asphodelus tenuifolius* and *Cronopous didymus* etc are very common.

The most important factors affecting the Flora of area are light, temperature, humidity, soil conditions, topography, elevation from sea level, rain fall and other forms of precipitation. On soil having high Nitrogen content are found *Malva neglecta*, *Chenopodium album* etc, as occurring near human duellings, on compost heaps and in back yards. The finding is similar with that of Rehman (1982). The medicinal plants like *Withania coagulans*, *Aloe vera* and *Peganum hermala* are very common in the area. *Arachis hypogea* is also very commonly cultivated in the area and transported to other parts of the country.

Conclusion

The area is very rich in biodiversity. The halophyte should be introduced in saline area. There is need of establishment of Tube well system on high scales in this area, which will bring Agriculture revolution in the area. A lot of fruits, especially *Zizyphus* species, *Peganum hermala*, *Withania coagulans*, *Monothea buxifolia*, *Fagonia cretica* and *Acacia nilotica* are wasted annually due to non-availability of market. The market availability has good effect on plants and on people. Medicinal farm should be set up in the study area to promote the vital importance of the plants and its conservation.

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