

"A NOTE ON THE WINTER FLORA OF CHERAT HILLS"

by

Dr. K. M. SALIM

Chairman Department of Botany

University of Peshawar

and

REHMAN GUL SHAHID

B.Sc. (Hons.) M.Sc.

(PART I)

INTRODUCTION.

The Cherat Hill tracts form a part of the Peshawar District and lie in Nowshera Tehsil in 34° 40' latitude North and 71° 50' longitude East. They form a part of the Khattak range which is situated along the south-eastern boundry of Peshawar Valley and separates it from the Kohat district.

The maximum length of the range is about 25 miles, from West to East. The greatest extent of the northern aspect is about 10 miles. The southern aspect is the shortest and is terminated by the 'Khawara' Valley. The highest peaks in the range are Doulas Ghaiban (5054 ft.) and Jalala Sir (5033 ft.) The lowest point is at Azakhel (996 ft.) near the main road leading to Nowshera.

The Cherat hills are barren, mountaineous and rocky with few level plains. Cherat is a cantonment town built by the British Army authorities in 1865. The forests around the cantonment were declared as Forest Reserve in that year and protected from felling, grazing and other disturbances. There are other villages in the area, which are connected to one another by narrow and difficult paths, and by moderately good roads to Nowshera and Pabbi. The Cherat range lies in the Poor-Monsoon-Western type vegetation zone but because of its altitude and situation it is a mixture of Poor-Monsoon-Western type and Poor Mediterranean vegetation types. The annual precipitation is about 16" most of which is received during winter. The temperature range is around 28-90-92° F at Cherat. Snowfall at Cherat is upto a foot or two in colder winters but is variable from place to place. There is a steady wind blowing most of the time usually from the South-East to North-West. Storms are common when the temperature rises above 80°F in June and July. Drought is common in summer months.

The foothills and plains are traversed by numerous 'Khawars' or seasonal streams which are specially numerous in the 'Khawara' Valley. A number of perennial springs also occur in the foothills in the Khawara Valley and support some cultivation.

The vegetation of Cherat range has not been investigated so far. The present study is a preliminary report on the winter flora of the region and some of its ecological aspects.

The authors are grateful to the Army Authorities at Cherat for permission to visit the area as often as required.

ENUMERATION OF THE SPECIES COLLECTED.

Family: RANUNCULACEAE.

Tribe.—CLEMATIDEAE.

Genus.—CLEMATIS.

1. *C. garata*. Wall.

In exposed dry places, on coarse to fine gravelly soil with low moisture content, found on Southern, warmer aspects; occasional in association with *Artemisia scoparia*, Waldst at about 4000 ft.

Family.—MENISPERMACEAE.

Tribe. 1.—COCCULEAE.

Genus.—COCCULUS.

2. *C. pendulus* (L) Diel.

In exposed locations, small in size, on coarse to fine-gravelly soil with low moisture content, only found near Dag, in association with *capparis spinosa*, Linn. at an altitude of about 2000 ft.

Tribe 2:—CISSAMPELIDEAE.

Genus.—CISSAMPELO .

3. *C. pareira*. Linn.

In exposed situations on coarse-gravelly soil with moderate moisture content, rare, found near Dag, at an altitude about 2000 ft.

Family.—BERBERIDACEAE.

Tribe:—BERBEREAE.

Genus:—BERBERIS.

4. *B. ceratophylla*, D. Don.

A xerophyte, growing on coarse-gravelly soil with low moisture content, mostly on the protected aspects, very abundant beyond Dag upto Chapri village in association with *Otostegia limbata*, Bth. and *Pennisetum flaccibum* Griseb at an altitude of about 2000-4500 feet.

Family:—CRUCIFERAE.

Tribe 1:—ALYSSINEAE.

Genus:—ALYSSIUM.

5. *A. desertorum* Stapf.—Exposed, much branched small herb, also found occasionally in shade, preferably on coarse to fine-gravelly to silty clayey soil with moderate to high moisture content; Northern, Eastern and North-Western Aspects, upto an altitude of 4200 ft.

Tribe 2.—LEPIDINEAE.

Genus.—CAPSELLA.

6. *C. bursapastoris*. Moench. A common small herb growing near water or in moist places.

Family.—CAPPARIDACEAE.

Tribe 1.—CLEOMEAE.

Genus.—CLEOME.

7. *C. viscosa*. Linn.—A small herb growing on exposed rocky soil with low moisture content, in association with *Capparis spinosa*, Linn., very occasional, upto an altitude of about 4000 ft. on Northern slopes.

Tribe 2.—CAPPAREAE.

Genus.—CAPPARIS.

8. *C. spinosa* Linn.—On exposed cliffs, not found on soil or hill slopes fairly common on the cliffs of the dry streams near Dag, at an altitude of about 2000 ft.

Family.—POLYGALACEAE.

Genus.—POLYGALA.

9. *P. Chinensis*. Linn.—Occurs in both shaded and exposed places common near or in water and muddy places, Dag village.

Family.—CARYOPHYLLACEAE.

Tribe 1.—SILENEAE.

Genus.—GYPSOPHILA.

10. *G. Cerastioides*, Don.—A shade loving plant growing mostly on wet soil, occasional, found in Chapri and Dag streams in shade.

Tribe 2.—ALSINEAE

Genus.—STELLARIA.

11. *S. media*, Linn.—Common herb of mostly shady and wet places.

Genus.—ARENARIA.

12. *A. serpyllifolia*. Linn. Profusely branched. On coarse to fine gravelly soil, also on silty clayey soil with high to moderate moisture content fairly common on

Northern aspect, occasional on Eastern and Western aspects upto 4000 ft.

13. **A. holosteoides**. Edgew.

A shade loving small plant, appearing in early spring on gravelly soil with high moisture content, fairly common on Northern, North-Western and Eastern aspects, ascending upto 4000 ft.

Family.—PORTULACACEAE.

Genus.—PORTULACA.

14. **P. oleraceae**, Linn.—A shade loving plant growing under the shade of cliffs where sufficient moisture is available, very common on the Eastern and Southern aspects, in association with *Portulaca quadrifida*. Linn. upto 4000 ft.

15. **P. quadrifida**. Linn.—A shade loving small plant, rarely found in exposed places; on coarse gravelly soil with high moisture content, common on Eastern, Western and Southern aspects, at an altitude of upto 4200 ft.

Family.—TAMARICACEAE.

Genus.—TAMARIX.

16. **I. aphylla** (Vahl). Karst.—A tree on road sides, with small, reduced, xerophytic leaves, cultivated.

Tribe.—MALVEAE.

Family.—MALVACEAE

Genus.—ABUTILON.

17. **A. indicum**. G. Don. On exposed warm Southern aspects; growing on coarse to fine gravelly soil with low moisture content; rare, at an altitude of 4000 ft.

Family.—ZYGOPHYLLACEAE.

Genus.—TRIBULUS.

18. **T. terrestris**, Linn.—A prostrate small herb of sun-exposed dry streams of Dag and Chapri, among sand, small stones wherever faecal matter of goats was found in the drystream beds. No where found in the hills, altitude about 2000 ft.

Family.—OXALIDACEAE.

Tribe.—OXALIDEAE.

Genus.—OXALIS.

19. **O. Corniculata**, Linn.—A small herb of wet and shady places, on coarse gravelly soil, in association with *Phagnalon niveum*, Edgew. Very abundant on Northern, North Western aspects, fairly common in Cherat; Absent on Southern slopes; ascending upto 4000 ft.

Family.—CELASTRACEAE.

Tribe.—CELASTREAE.

Genus.—GYMNOSPORIA.

20. *G. royleana*. Wall.—Northern slopes, Chapri; on rocky soil with moderate moisture content, in association with other local trees.

Family. RHAMNACEAE.

Tribe. ZIZYPHEAE.

Genus. ZIZYPHUS.

21. *Z. mauritiana*. Ham.—A medium sized tree, from exposed places on lower altitude upto 3200 ft., growing on coarse gravelly soil with moderate moisture content, rarely on rocky soil with low moisture content; found in Dag and Chapri occasionally in association with *Acacia modesta* Wall.

22. *Z. oxyphylla*. Edgew. A small tree, on northern aspect near the top (4200 ft. altitude) on coarse gravelly soil with moderate moisture content in association with *Olea cuspidata*, Wall. and *Acacia modesta*, Wall.

Tribe 2.—RHAMNEAE.

Genus.—SAGERETIA.

23. *S. theezans*, Brandis, A bushy tree with small leaves and sharp straight spines growing on northern aspect; abundant near Chapri Check Post (3000 ft.) rarely ascending upto the peak, Usually on rocky soil with moderate moisture content; in association with *Olea cuspidata*, Wall and *Acacia modesta*, Wall.

Family.—SAPINDACEAE.

Tribe.—DODONAEAE.

Genus.—DODONAEA.

24. *D. viscosa*, Linn.—A small bushy shrub of dry places and lower altitudes usually on coarse gravelly soil with moderate to low moisture content, in association with *Hordeum sp.* and *Cymbopogon schoenanthus*, Schult. Very common in Dag, Southern foot-hills and Khawara Valley.

Family.—LEGUMINOSAE.

Sub-Family 1.—PAPILIONATAE.

Tribe 1.—GENISTEAE.

Genus.—ARGYROLOBIMUM.

25. *A. flaccidum*, Jaub.—A plant of exposed places, occasionally found in shade, on coarse gravelly to rocky to silty-clayey soil with moderate-low moisture content, in association with other small herbs; as a whole occasionally found in the area, found at Dag and Chapri Checking Post. ascending upto 4200 ft.

26. *A. roseum*, Jaub.—A small herb of exposed places, commonly on coarse rocky

soil with low-moderate moisture content; in association with *A. flaccidum*, Jaub; found at Dag, Chapri and Northern aspects ascending upto 4200 ft.

Genus.—CROTALARIA.

27. *C. medicagina*, Lamk.—A small herb of exposed places, mostly found on rocky soil, occasionally on coarse gravelly soil with moderate to low moisture content occasional, found near Dag and Chapri at an altitude of 2300 - 3000 ft.

Tribe. 2.—GALEGEAE.

Genus. 1.—INDIGOFEA.

28. *I. wightii*, Grah.—A small herb of exposed places, rarely found in shade, on coarse to fine gravelly soil with low to moderate moisture content, in association with grasses, also found alone, as a whole rare, found on northern aspects at an altitude of 4000 ft.

29. *I. pulchella*, Roxb.—A large shrub on coarse to fine gravelly soil with high moisture content, only one specimen has been found on the northern aspect which seems to have grown accidentally from seed, at an altitude of 4000 ft.

Genus. 2. ASTRAGALUS.

30. *A. subumbellatus*, Klotzsch.—A small herb of exposed places, occasionally found in shade, abundant in beds of dry streams, found at Dag and Chapri in association with *Pennisetum flaccidum*, Griseb, at an altitude of 2300-3000 ft.

31. *A. pyrrhotrichus*, Boiss. A plant of exposed, warm southern aspect, rarely found on shaded northern aspect, commonly in the cliffs, not observed in association with other plants, near Chapri village (3000 ft.); an occasional plant with beautiful flowers, ascending upto an altitude of 4200 ft.

Tribe. 3.—HEDYSAREAE.

Genus.—DESMODIUM.

32. *D. parviflorum*, Baker. A exposed rocky plant found occasionally on coarse gravelly and silty clayey soil with low-moderate moisture content, in association with *Crotalaria medicagina*, Lamk. found at Dag, Chapri and northern aspects, distribution as a whole occasional, upto an altitude of 4000 ft.

Tribe 4.—PHASEOLEAE.

Sub-Tribe.—EUPHASEOLEAE.

Genus. 1.—VIGNA.

33. *V. sp.*—A small twining plant of both exposed and shady places, on coarse to fine gravelly to rocky soil with moderate-low moisture contents, found at Chapri

village; as a whole occasional, in association with grasses, at an altitude of 3000 ft.

Genus. 2. DOLICHOS.

34. **D. sp.** A small herb found both in exposed and shady places; mostly on coarse gravelly to rocky soil with moderate to low moisture content; in association with grasses like *Hordeum* sp. and *Aristida depressa*, Linn; occasional, found at Dag, Chapri and the Northern aspect, upto an altitude of 3000 ft.

Sub-family: 2. MIMOSOIDEAE.

Tribe, 1 : MIMOSEAE.

Genus : MIMOSA.

35. **M. himalayana, Gamble.** A large prickly plant, in exposed places at lower altitude; growing on rocky soil with low moisture content, in association with *Acacia modesta*, Wall and *Acacia, arabica*, Willd; found only at Dag and observed nowhere else on hills; at an altitude of 2300 ft.

Tribe, 2.—ACACIEAE.

Genus.—ACACIA.

36. **A. arabica Willd.** A spiny tree of exposed places; on rocky soil with low moisture content, in association with *Acacia modesta*, Wall; found at Dag and Chapri; occasionally found in Khwara Valley; upto 3000 ft. altitude.

37. **A. modesta, Wall.**—A xerophytic tree growing on rocky soil with moderate to low moisture content, in association with other trees, except at the Southern foot of the hills in Khawara Valley, very abundant at Dag, Chapri dominant tree at some places, ascending upto the peaks.

Family. ROSACEAE.

Tribe. ROSEAE.

Genus. RUBUS.

38. **R. fruticosus, Linn.** A small tree, in wet places, commonly along the banks of streams of flowing water; in association with *Mentha sylvestris*, Linn. at an altitude of 3000 ft.

Family : FICOIDEAE

Tribe : MOLLUGINEAE

Genus : MOLLUGO

39. **M. nudicaulis, Lamk.** A small plant found in exposed and shady places; on stony soil with moderate to high moisture content, very occasional in the area; Chapri; 3000 ft.

Family : UMBELLIFERAE

Tribe : AMMINEAE

Genus : BUPLEURUM

40. **B. falcatum, Linn.** A small herb, on coarse gravelly soil with high moisture content, only found on the Northern aspect at an altitude upto 3000 ft, very rare.

Family : RUBIACEAE

Tribe : SPERMACOCEAE

Genus : GAILLONIA

41. **G. hymenostephana, Jaub.** On exposed places at lower altitude ; on coarse to fine gravelly soil with low moisture content; found at Dag and Chapri, at an altitude of 2300-3000 ft. occasional

Family : COMPOSITAE

Tribe : 1. ASTEROIDEAE

Sub. Tribe. 1. CONYZEAE

Genus : CONYZA

42. **C. crispa, Pourr.** A small herb, in exposed and shaded places both on coarse to fine gravelly soil mixed with little sand, with moderate to low moisture content, very rare, ascending upto Cherat at an altitude of 4200 ft.

43. **C. sticta, Willd.** A small herb, on exposed places, rarely found in shade, on coarse gravelly soil with moderate to low moisture content. At Cherat at an altitude of 4200 ft. in association with *Hordeum* sp., rare.

Sub-tribe : 2. HETEROCHROMEAE

Genus : ERIGERON

44. **E. canadensis, Linn.** A small herb on exposed places occasionally found in shade; on coarse to fine gravelly soil with low moisture content; found at Chapri and Dag, at an altitude of 2300 ft.

Tribe : 2. INULOIDEAE

Sub-tribe : 1. GNAPHALIEAE

Genus : 1. ANAPHALIS

45. **A. nubigena, Clarke.** A very small plant with wooly leaves and inflorescence, on rocky soil with moderate moisture content; in association with *phagnalon niveum*, Edgew; very rare; found on Northern slopes, and Cherat Cantt upto an altitude of 4200 ft.

Genus : 2. PHAGNALON :

46. **P. niveum** Edgew : A small herb; on northern and other shaded aspects growing in the shade of trees where sufficient moisture is available; in association of *Oxalis corniculata*, Linn. at an altitude of upto 4200 ft.

Sub-tribe : 2. EUINULEAE

Genus : INULA

47. **I. graveolens**, Desfort. A small herb on exposed places, very rarely found in shade; on coarse to fine gravelly soil with moderate to low moisture content; very rare in the area; found at Dag, Chapri and Khawara Valley, at an altitude of 2300-3000 ft.

Tribe : 3. HELIANTHOIDEAE

Sub-tribe. VERBESINEAE

Genus : ECLIPTA

48. **E. prostrata**, Linn. A small herb of wet places commonly growing along the bank of streams at all seasons; in association with other moisture or water loving plants. Common.

Tribe : 4. ANTHEMIDEAE

Genus : ARTEMISIA

49. **A. scoparia**, Waldst & Rit. A small bushy shrub of warm southern aspect, on rocky soil with low moisture content; in association with an other unidentified species of *Artemisia* and *Dodonaea viscosa*, Linn. This species was found only at a certain place on the Southern slopes where it is the dominant shrub. Occasionally observed at Cherat, in association with *Clematis grata*, Wall.

50. *Artemisia* sp. An occasional herb or small shrub of warm Southern aspect on a rocky dry soil with low moisture content, in association with *A. scoparia*, Waldst and kit.

Tribe : 5. CALENDULACEAE

Genus : CALENDULA

51. **C. arvensis**, Linn. A small herb on both exposed and shaded places, on coarse to fine gravelly soil with moderate to low moisture content occasionally observed on rocks found at Dag, Chapri and ascending upto Cherat (4200 ft. altitude).

tribe : 6. CICHORIACEAE

Sub-tribe : 1. HYPOCHAERIDEAE

Fenus : TARAXACUM

52. **T. officinale**, Widdg. A small herb of shady or sunny places on silty clayey soil with high to moderate moisture content; found at Cherat and Northern aspect in association with *Oxalis corniculata*, Linn. ascending upto an altitude of 4200 ft. frequently found at lower altitudes.

Sub-tribe : 2. LACTUCEAE

Genus : 1. LACTUCA

53. **L. orientalis**, Boiss. A small herb of exposed, dry, rocky soil with low moisture content; found at lower altitudes near Dag and Chapri occassionally in the Khawara Valley where the land is plain, mixed with small stones; very rare.

54. **L. dissecta**, D. Don. A small herb of both exposed and shady places with moderate to low moisture content, on coarse gravely rocky to silty clayey soil; common throughout the area, ascending upto an altitude of 4000 ft.

55. **L. polycephala**, Benth. A small herb, found in exposed and shady places both on coarse gravely soil with low to moderate moisture content, a very occasional plant in the area, found at Dag and Chapri at an altitude of 2300-3000 ft.

Genus : 2. SONCHUS.

56. **S. maritimus** Linn. A small herb found in both exposed and shady places on coarse to fine gravely soil with moderate to low moisture content, occasionally found on dry rocky soil, rare in the area, found at Dag, Chapri and low hills, ascending upto an altitude of 3200 ft.

Family : PLUMBAGINACEAE

Tribe : STATICEAE

Genus : STATICE

57. **S. griffithii**, Aitch. A xerophytic herb of exposed, dry places on rocky soil with low moisture content; rare on the hills; found near Chapri village on barren rocks at an altitude of 3000 ft.

Family : OLEACEAE

Tribe : OLEINEAE

Genus : OLEA

58. **O. ferruginea**, Royle. Found in the Cantonment Reserved forest, dominant at some places, growing in association with *Acacia modesta*, Wall. and *Sageretia theezans*, Brongn. which constitute the Cantt. Forests.

Family : APOCYNACEAE

Tribe : PLUMERIEAE

Sub-tribe : CERBEREAE

Genus : RHAZYA

59. **R. stricta**, Dene. A small shrub, mostly in exposed places, on rocky soil with

low moisture content, very common at lower altitudes; dominant at Dag, occasional at other places with lower altitude like Chapri.

Family. ASCLEPIADACEAE.

Tribe. CYNANCHEAE.

Genus. CALATROPIS.

60. *C. procera*, R. Br.—A small shrub of waste places exposed to sun, commonly at lower altitudes, found near Dag in association with *Rhazya stricta*, Common.

Family. BORAGINACEAE.

Tribe: 1. HELIOTROPEAE.

Genus. HELIOTRIPIUM.

61. *H. strigosum*, Willd. A small herb of rocky soil exposed to sun, with low moisture content found on coarse gravelly soil also in association with *Trichodesma indicum* Bt. occasional in the area; found at Dag and Chapri, at an altitude of 2300-3000 ft.

Tribe: 2. BORACEAE.

Sub-tribe: 1. CYNOGLOSSEAE.

Genus: 1. TRICHODESMA.

62. *T. indicum*, Br. A small herb of both exposed and shady places, on coarse to fine gravelly soil with moderate to high moisture content, commonly found at high altitudes at lower altitudes it is occasional found at Cherat in wet places, upto an altitude of 4200 ft.

Genus: 2.—CYNOGLOSSUM.

63. *C. lanceolatum*, Forsk.—A small herb of exposed rocky to silty soil with low moisture content, in association with *Trichodesma indicum*, Br. and the common grasses, found at Dag Chapri, Northern aspect and Cherat, ascending upto an altitude of 4200 ft.

Sub-tribe :— 2. LITHOSPERMEAE.

Genus : MYOSOTIS.

64. *M. sylvatica*, Hoffm. A small herb of both exposed and shady places on silty soil with moderate to low moisture content, found at Cherat at an altitude of 4200 ft.

Family: CONVULVOLACEAE.

Tribe: GUSCUTEAE.

Genus: CUSCUTA.

65. **C. reitexa, Roxb.**—An epiphyte on *Ziszyphus mauritiana*, Lamk.

Family: SOLANACEAE.

Tribe: SOLANAE.

Genus: SOLANUM.

66. **S. nigrum, Linn.**—A small herb found in exposed and shady places, on coarse to fine gravelly or rocky soil with moderate to low moisture content, common in shady places near cultivation.

67. **S. suratense, Burm.**—A small herb of waste dry places where the moisture content is low, occasional, found at Dag and Chapri commonly in the fields; at an altitude of 2300-3000 ft.

Genus, 2. WITHANIA.

68. **W. somnifera, (L) Dunal.**—A small shrub of exposed and shady places, of lower altitudes, commonly on coarse gravelly soil with moderate to low moisture content, found at Dag, Chapri and Khawara Valley, ascending upto an altitude of 3000 ft.

69. **W. coagulans, Dunal.** A small shrub in exposed places at lower altitudes, having thick leaves, commonly on table land also in association with grasses; Dag, Chapri and Khawara Valley.

Family: SCROPHULARIACEAE.

Tribe: 1. ANTIRRAINEAE.

Genus: KICKXIA.

70. **K. ramosissima, (Wall) Janchen.** A small prostrate herb of exposed dry cliffs growing in crevices, mostly at lower altitudes, occasionally found at high altitudes, on coarse to fine gravelly dry soil, Dag, Chapri and other shaded aspects, ascending upto an altitude of 4200 ft.

Tribe: 2. CHELONEAE.

Genus: SCROPHULARIA.

71. **S. scabiosaefolia, Benth.** A small herb on exposed dry places, on every type of soil, almost found throughout the area in association with grasses specially *Hordeum* sp.

Tribe: 3. GERARDIEAE.

Genus: LEPTORHABDOS.

72. **L. parviflora, Benth.** A small herb, on both exposed and shady places, commonly found on coarse to fine gravelly to rocky soil with moderate to low moisture content; found almost throughout the region but abundant at high altitudes.

Family: ACANTHACEAE.

Tribe.: JUSTICIEAE.

Genus: 1. BARLERIA.

73. **B. cristata, Linn.** A small shrub of exposed dry soil with low moisture content, exclusively a plant of coarse gravelly soil of Southern aspects, occurs in association with *Dicliptera roxburghiana*, Nees and *Hordeum* sp. at an altitude of about 4000 ft.

Genus: 2. DICLIPTERA.

74. **D. roxburghiana, Nees.** A small herb of exposed dry soil with low moisture content, exclusively found on the Southern aspect in association with *Barleria cristata* Linn. at an altitude of about 4000 ft.

Genus: 3. ADHATODA.

75. **A. vasica Nees,** A small shrub of lower altitudes commonly on coarse gravelly soil with moderate to low moisture content; found at Dag and Chapri, Khawara Valley at lower altitude where it is in the association of *Dodonaea viscosa*, Linn. and *Hordeum* sp:

Family: VERBENACEAE.

Tribe: 1. VERBENAE.

Genus: LIPPIA.

76. **L. nodiflora, Rich.** A shade and moisture loving prostrate plant commonly at the bank of streams where small stones and sand is present, found beside the stream near Chapri, at an altitude of 3000 ft.

Tribe. 2: VITICEAE.

Genus: VITEX.

77. **V. negundo, Linn.** A shrub or small tree growing along margins of Khawars and streams; frequent.

Family: LABIATAE.

Tribe: 1. SATUREINEAE.

Genus: 1. MENTHA.

78. **M. sylvestris, Linn.** A herb or under shrub of both exposed and shaded but wet places found along the banks of streams near Chapri village in association with *Rubus fruticosus*, Linn. Common.

Genus: 2. MICROMERIA.

79. **M. biflora, Benth:** A small herb found both in exposed and shady places but abundant where sufficient moisture is present; found all over the hills at high altitudes; occasional at lower altitudes.

Tribe: 2. MONARDEAE.

Genus: SALVIA.

80. *S. aegyptiaca*, Linn. A small xerophytic herb of exposed dry places commonly on coarse to fine gravelly to rocky soil with low moisture content; found almost all over the hills in association with *S. santolinaefolia*, Boiss. Very abundant on Northern and Eastern aspects, rare in Cherat, occasional on Southern aspect.

81. *S. santolinaefolia*, Boiss. A small xerophytic herb of exposed dry places growing on coarse to fine gravelly to rocky soil with low moisture content, in association with *S. aegyptiaca*, Linn. and grasses like *Aristida* and *Hordeum* sp. found at Dag in association with *Adhatoda vasica*. Nees, at Chapri with *Aristida depressa*, Linn. very occasional on Western and Eastern aspects and Khawara Valley, ascending upto an altitude of 4200 ft.

Tribe: 3. NEPETAE.

Genus: NEPETA.

82. *N. graciliflora*, Benth. A small shrub of exposed dry places commonly on rocky soil with low moisture content, found at Dag and Chapri at lower altitudes and on Northern aspect at high altitudes.

Tribe: 4. STACHYDEAE.

Genus: 1. SCUTELLARIA.

83. *S. linearis*, Bth. A small shrub of exposed dry places exclusively confined to the warmer Southern aspect, on coarse gravelly soil with low moisture content, in association with *Pennisetum flaccidum*, Griseb.

Genus: 2. MARRUBIUM.

84. *M. vulgare*, Linn. A small xerophytic herb or undershrub mostly found on the cliffs near Dag and Chapri.

Genus: 3. OTOSTEGIA.

85. *O. limbata*, Bth. A spiny undershrub of exposed places at lower altitudes commonly on rocky soil with low moisture content found near Chapri on the table land in association with *Berberis certophylla*, D. Don. at an altitude of 3000 ft.

Genus : LEUCAS.

86. *L. pilosa*, Benth. A small xerophytic herb of exposed places growing on coarse gravelly to rocky soil with low moisture content, found all over the area; frequent from an altitude of 2300 ft. upto 4200 ft.

87. *L. cephalotes*, Spreng. A herb of both exposed and shady places mostly on coarse gravelly to silty clayey soil with high moisture content, fairly common on Nor-

thern slopes, rare on Eastern and Western aspects; occasional in Cherat, ascending upto an altitude of 4200 ft.

Tribe: 5. AJUGOIDEAE.

Genus: AJUGA.

88. **A. bracteosa** Wall, A small herb of wet and muddy places commonly found near or in water near Dag and Chapri.

Family. NYCTAGINACEAE.

Tribe. MYRABILICEAE.

Genu. BOERHAVIA.

89. **B. repens**. Linn. On exposed dry places, common on rocky soil with low moisture content, fairly common at lower altitudes at Dag and Chapri, and Khawara Valley.

Family: AMARANTACEAE.

Tribe: AMARANTAE.

Genus: 1. AMARANTUS.

90. **A. spinosus**, Linn. A large herb on exposed or shady places commonly in coarse gravelly or clayey soil with moderate-high moisture content, found near Dag and Chapri villages.

91. **A. blitum**, Linn. A small herb of both exposed and shady places mostly on silty clayey soil with moderate to low moisture content, as a whole very occasional in the area, found at Cherat at an altitude of upto 4200 ft.

92. **A. polygamus**, Linn. A small herb of both exposed and shady wet places abundant where shade and moisture is available, mostly found on clayey or silty clayey with moderate to high moisture content, found at Dag. ascending to higher altitudes.

93. **A. sp.** A small herb or undershrub of both exposed and shady places at high altitudes where it is very abundant, at lower altitudes it is a rare or occasional plant; found at Cherat in exposed places, in association with *Chenopodium album*, Linn and *Hordeum* sp.

Genus: 2. PUPALIA.

94. **P. lappacea**, Moq An undershrub in exposed locations rarely found in shade, commonly on silty clayey to rocky soil; on the southern sides and Cherat, occasional at lower altitude.

Genus, 3: AERUA.

95. **A. persica**, (Burm) Merrill. A very abundant shrub of lower altitudes, commonly on rocky soil with low moisture content, and exposed to sun, in association with

Aristida depressa, Linn and *Chrysopogon gryllus*, Trin.

Family: CHENOPODIACEAE.

Tribe: 1. EUCHENOPODIEAE.

Genus: CHENOPODIUM.

96. *C. album*, Linn. A small herb common in shady and wet places almost found throughout the area, cultivated area and at lower altitudes in the plains; common near Dag and Chapri becoming rare on the slopes and Cherat but is abundant in the Khawara Valley.

97. *C. botrys*, Linn. A small herb, commonly found in exposed places on silty clayey soil, near Dag, Chapri and ascending upto Cherat to an altitude of 4200 ft. common in the Khawara Valley.

98. *C. ambrosioides*, Linn. an aromatic herb of shaded and wet places, with high moisture content, found at high altitudes at Cherat, where it was found in the association of *Pennisetum flaccidum*, Griseb.

Tribe: 2: ATRIPLICEAE.

Genus: ATRIPLEX.

99. *A. lacinata*, Aitchison. Exposed, commonly on rocky soil with low moisture content, common on the southern aspect.

Family: POLYGONACEAE.

Tribe: 1. EUPOLYGONEAE.

Genus: 1. PTEROPYRUM.

100. *P. erioides*, Boiss. A small shrub of exposed places commonly on rocky soil with low moisture content, occasional in the area found almost all over the hilly tract, collected from Chapri at an altitude of 3000 ft. in association with *Pennisetum flaccidum*, Griseb.

Genus: 2. POLYGONUM.

101. *P. nepalens*, Meissn. A herb of wet places commonly near water, found almost all over the area in wet places, collected from Dag, Chapri and Cherat at an altitude of 2300- 4200 ft.

Tribe: 2. RUMICEAE.

Genus: RUMEX.

102. *R. hastatus*, D. Don. A shrub of exposed dry rocky soil with low moisture content, found almost all over the hills at high altitudes; abundant on northern aspects.

103. *R. vesicarius*, Linn. A small herb of wet and shady places commonly in the shade of trees; as a whole very occasional, found only at Cherat at an altitude 4200 ft.

(To be continued)