# PHYTOSOCIOLOGICAL STUDIES IN CHITRAL GOL

*by*

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The vegetation of Chitral Gol was studied in 1977. The forest type is dry temperate. The following communities were identified:

| *Elevation (metres)* | *Communities* |
|---|---|
| 1440—1570 | *Quercus ilex—Rumex hastatus—Artemisia fragrans—Polygonum gilesii* |
| 1600—1680 | *Sophora mollis—Quercus ilex—Pistacia khinjuk—Artemisia fragrans* |
| 1760—1965 | *Cedrus deodara—Juniperus excelsa—Quercus ilex—Sophora mollis—Heracleum candicans* |
| 2420—2480 | *Cedrus deodara—Viburnum cotinifolium—Polygonum gilesii—Rosa ecae—Ferula narthex—Astragalus* sp. |
| 2320—2500 | *Cedrus deodara—Viburnum cotinifolium—Rose ecae —Prangos pabularia.* |

**Study area.** Chitral Gol is a narrow valley. It starts 3 km west of Chitral town, runs as a gorge for about 18 km and then broadens into three sub-valleys each surrounded by high peaks. The area is mountainous with steep slopes. It is bounded on the north and west by Butkoh tehsil, on the east by Singur Gol, on the south by Chitral town and Molen Gol. A number of small watersheds, Meran Tangogh, Kasavir, Bakhtanshal, Bironshal, Gokshal, Chat and Duni drain into Chitral Gol, which later on joins the river Chitral near the Chitral town (Fig. 1).

The altitude ranges from 1500 m to 4900 m. There are 24 peaks out of which Dunigol is the highest. Snow slides and landslides are common. A thin layer of slate and phyllites (paleozoic) overlies the crystalline or grey limestone of mid-cretaceous period. The soil formed by disintegration of rocks is generally fertile and varies from clay loam tc sandy loam. The climate is dry temperate. Frosts and snow start from October on high

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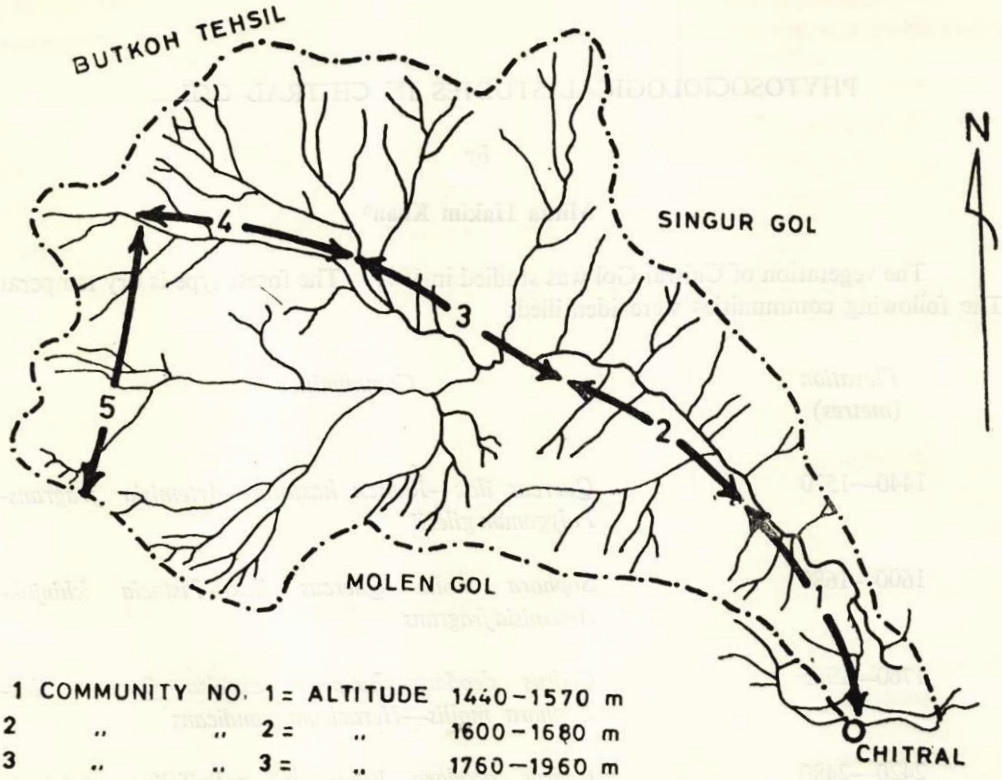


| | | | | | |
|---|---|---|---|---|---|
| 1 | COMMUNITY | NO. | 1 = | ALTITUDE | 1440–1570 m |
| 2 | ,, | ,, | 2 = | ,, | 1600–1680 m |
| 3 | ,, | ,, | 3 = | ,, | 1760–1960 m |
| 4 | ,, | ,, | 4 = | ,, | 2420–2480 m |
| 5 | ,, | ,, | 5 = | ,, | 2320–2500 m |

peaks and late November in valleys. Snow stays till March in the valleys and till June on the mountains. Rainfall occurs mostly from December to May. No climatic data are available for the tract.

Sixty persons live in the valley and they own 580 goats and sheep and 20 cattle. 3000 goats and sheep and about 200 cattle from outside also graze in the area in July and August.

**Method.** The reconnaissance study of the entire area was carried out. 84 releves were laid out in relatively undisturbed sites with homogeneous vegetation. These were 200m$^2$ in size. The vegetation of these sample plots was recorded and analysed in accordance with the method of Braun-Blanquet (1965) and association tables were arranged according to the preferential constant dominant species method of Cetik 1973.

**Vegetation of the Study Area.** While observing the vegetation, the following three strata were found over the study area:

**Tree layer.** *Quercus ilex, Cedrus deodara, Juniperus* sp. *Pinus gerardiana, Pistacia khinjuk, Fraxinus xanthoxyloides, Celtis australis, Prunus amygdalus, Acer* sp., *Betula* sp., and *Salix* spp.

**Shrub layer.** *Cotoneaster lindleyi, Sophora mollis, Lonicera griffithii, Prunus prostrata, Viburnum cotinifolium, Sorbaria tomentosa, Rosa ecae, Juniperus* sp.; *Rubus fruticosus, Haloxylon* sp; *Daphne oleoides, Jasminum* sp.

**Herbaceous layer.** *Prangos pabularia, Scutellaria edelbergii, Euphorbia cornigera, Chenopodium, botyrs, Chrysanthemum* sp; *Polygonum gilesii, Rheum webbiana, Saponaria griffithianum, Verbascum thapsus, Dianthus angulatus, Ziziphora clinopodioides, Arum jacquemontii, Silene moorcroftiana.*

Since the vegetation season of the area is spring and early summer, several varieties of rhizomatous and bulbous geophytes such as members of *Liliaceae, Ranunculaceae, Iridaceae* and many others may have dried at the time of this study. According to local information *Liliaceae* and *Iridaceae* flower in mid-April. Many *Cruciferae, Rubiaceae, Umbelliferae, Leguminosae, Labiatae, Dipsacaceae* come up late April and May; while many *Boraginaceae* and *Caryophyllaceae* flower in June. Seeds of most of them ripen in the mid of July.

After analysing the vegetation the following habitat types were recognised:

1. *Quercus ilex-Rumex hastatus-Artemisia fragrans-Polygonum gilesii community.*

This community occurred over six releves from 1440 to 1570 metres. Some of the constant dominant species of the community are: *Quercus ilex, Rumex hastatus, Artemisia fragrans, Polygonum gilesii* each with 100% frequency. The community is developed after the exploitation of *Quercus ilex* and *Pistacia khinjuk* in many places. Species like *Artemisia fragrans* and *Rumex hastatus* are secondary invaders. The coverage percentage of the habitat is comparatively poor, and food value is low. (Table. I)

Table 1

*Quercus ilex-Rumex hastatus-Artemisia fragrans-polygonum gilesii community*

| No. of releve | 1 | 2 | 3 | 4 | 5 | 6 | Presence | Frequency % | Class of constancy |
|---|---|---|---|---|---|---|---|---|---|
| Area $(m)^2$ | 100 | 100 | 150 | 200 | 200 | 200 | | | |
| Direction and | S | S | SE | SW | NW | NE | | | |
| slope (%) | 80 | 70 | 60 | 60 | 70 | 75 | | | |
| Elevation (m) | 1440 | 1500 | 1500 | 1550 | 1530 | 1570 | | | |
| HCL reaction | + | ++ | + | ++ | + | + | | | |
| Mother rock | Cal. | Cal. | Cal. | Cal. | Cal. | Cal. | | | |
| Coverage (%) | 80 | 70 | 60 | 60 | 75 | 80 | | | |
| Total number of species | 17 | 14 | 13 | 11 | 12 | 10 | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Quercus ilex ..... | 2 | 2 | 2 | 1 | 2 | 2 | 6 | 100 | V |
| Rumex hastatus..... | 1 | 2 | 1 | 2 | 1 | 1 | 6 | 100 | V |
| Artemisia fragrans ..... | 1 | 1 | 2 | 1 | 1 | 1 | 6 | 100 | V |
| Polygonum gilesii ..... | 1 | 1 | + | 1 | 1 | 1 | 6 | 100 | V |
| Daphne oleoides ..... | + | 1 | . | 1 | + | + | 5 | 83 | V |
| Cotoneaster nummularia | + | + | 1 | + | . | + | 5 | 83 | V |
| Minuartia lanceolata .... | + | + | + | . | + | . | 4 | 67 | IV |
| Polygonum paronychioides ..... | + | + | . | . | + | + | 4 | 67 | IV |
| Linum perenne ..... | + | + | + | . | . | + | 4 | 67 | IV |
| Onosma limitaneum .... | + | . | + | + | . | + | 4 | 67 | IV |
| Pistacia khinjuk..... | + | + | . | + | + | . | 4 | 67 | IV |
| Chenopodium botrys ... | + | + | + | . | + | . | 4 | 67 | IV |
| Silene moorcroftiana .... | + | . | + | + | + | . | 4 | 67 | IV |
| Lotus corniculatus..... | + | + | + | . | + | . | 4 | 67 | IV |
| Verbascum thapsus..... | + | . | + | + | + | . | 4 | 67 | IV |

The species with single frequency: *Polygonum bucharicum* (1) *Impatiens balfourii* (4) *Linaria lanceolata* (2) *Onosma chitralicum* (1) *Haplophyllum tuberculatum* (2) *Artemisia scoparia* (6) *Lactuca viminea* (3)

2. *Sohora mollis-Quercus ilex-Pistacia khinjuk-Artemisia fragrans community.*

The community was observed near the subrubs of Miran area. The community consists of seven releves. The community starts at 1600 m and goes up 1680 m elevation. Some of the constant dominant species of the community are: *Sophora mollis, Quercus ilex, Pistacia khinjuk,* and *Artemisia fragrans* each with 100% frequency. The community is very much subjected to biotic pressure; *Quercus ilex* and *Pistacia khinjuk* are heavily damaged. Species like *Artemisia fragrans, Rumex hastatus* and *Sophora mollis* are invaders of secondary succession. The community provides a poor habitat to the wildlife on account of its low cover value. (Table. 2).

Table 2

*Sophora mollis-Quercus ilex-Pistacia khinjuk-Artemisia fragrans community*

| No. of releve..... | 11 | 12 | 17 | 18 | 20 | 21 | 22 | Presence | Frequency % | Constancy Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Area $(m)^2$ ..... | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | |
| Direction and..... | S | SW | SE | SE | NW | NW | NW | | | |
| slope (%) ..... | 80 | 80 | 75 | 70 | 70 | 75 | 80 | | | |
| Elevation (m) .....1620 | | 1600 | 1680 | 1640 | 1640 | 1640 | 1600 | | | |
| HCL reaction.....++ | | ++ | + | + | ++ | ++ | ++ | | | |
| Mother rock ..... | Cal. | Cal. | Cal. | Cal. | Cal. | Cal. | Cal. | | | |
| Coverage (%)..... | 70 | 70 | 70 | 60 | 70 | 70 | 60 | | | |
| Total number of species | 17 | 16 | 14 | 15 | 14 | 14 | 13 | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sophora mollis ..... | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 7 | 100 | V |
| Quercus ilex ..... | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 7 | 100 | V |
| Pistacia khinjuk..... | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 7 | 100 | V |
| Artemisia fragrans ..... | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 7 | 100 | V |
| Rumex hastatus..... | + | 1 | 1 | + | 1 | 1 | . | 6 | 85 | V |
| Prunus amygdalus..... | . | + | + | 1 | + | + | 1 | 6 | 85 | V |
| Bromus japonicus ..... | + | + | + | . | + | + | + | 6 | 85 | V |
| Artemisia scoparia..... | + | + | . | . | 1 | + | + | 5 | 71 | IV |
| Delphinium uncinatum | . | + | + | . | + | + | + | 5 | 71 | IV |
| Chenopodium album ... | + | + | . | + | . | + | + | 5 | 71 | IV |
| Haplophyllum tuberculatum ..... | + | + | . | + | . | + | + | 5 | 71 | IV |
| Medicago sp ..... | + | . | . | + | + | + | + | 5 | 71 | IV |
| Cuscuta pulchella..... | + | . | + | + | . | + | . | 4 | 57 | III |
| Atriplex tatarica..... | + | + | + | . | + | . | . | 4 | 57 | III |
| Arum sp ..... | + | + | . | + | + | . | . | 4 | 57 | III |
| Celtis australis ..... | + | + | . | + | + | . | . | 4 | 57 | III |
| Verbascum erianthum .. | + | + | + | . | + | . | . | 4 | 57 | III |
| Convolvulus arvensis .. | + | . | + | + | . | . | + | 4 | 57 | III |

The species with single frequency: *Capparis spinosa* (17) *Arum jacquemonitt* (18) *Aster altaicus* (17) *Onosma limitaneum* (12) *Scabiosa speciosa* (22) *Ferula narthex* (18) *Dactylis glomerata* (21) *Crepis flexuosa* (11)

3. *Cedrus deodara-Juniperus excelsa-Quercus ilex-Sophora mollis-Heracleum candicans community.*

The community was determined near Kasavir. It begins at 1760 m to 1965 m elevation. The community consists of five releves. Some of the constant dominant species of the community are: *Cedrus deodara, Juniperus excelsa, Quercus ilex, Sophora mollis* and *Heracleum candicans* each with 100% frequency. On the degraded slopes from where *Juniperus excelsa*, and *Pinus gerardiana* are cut, species like *Rumex hastatus* have colonized the area. In the north-west of the community from where *Cedrus deodara*, has been cut, species like *Heracleum candicans, Sophora mollis* and *Acantholimon* sp. are the dominant pioneers.

The community has fifth class cover and consititutes good habitat for the markhor. (Table. 3).

Table 3

*Cedrus deodara-Juniperus excelsa-Quercus ilex-Sophora mollis-Heracleum candicans community*

| No. of relevé | 23 | 24 | 25 | 26 | 27 | Presence | Frequency % | Constancy class |
|---|---|---|---|---|---|---|---|---|
| Area $(m)^2$ | 200 | 200 | 200 | 200 | 200 | | | |
| Direction and | N | S | SW | NW | SE | | | |
| slope (%) | 70 | 80 | 70 | 80 | 90 | | | |
| Elevation (m) | 1760 | 1840 | 1870 | 1965 | 1940 | | | |
| HCI reaction | ++ | ++ | + | + | ++ | | | |
| Mother rock | Cal. | Cal. | Cal. | Cal. | Cal. | | | |
| Coverage (%) | 90 | 70 | 85 | 80 | 80 | | | |
| Total Number of species | 22 | 23 | 19 | 22 | 19 | | | |
| *Ist storey* | | | | | | | | |
| Cedrus deodara | 2 | 2 | 2 | 2 | 2 | 5 | 100 | V |
| Juniperus excelsa | 1 | 2 | 2 | 2 | 1 | 5 | 100 | V |
| Quercus ilex | 2 | 1 | 2 | 1 | 1 | 5 | 100 | V |
| Pinus gerardiana | + | . | . | + | 1 | 3 | 60 | III |
| *2nd Storey* | | | | | | | | |
| Sophora mollis | 1 | 1 | 1 | + | 1 | 5 | 100 | V |
| Cotoneaster nummularia | + | + | + | . | + | 4 | 80 | IV |
| Rosa macrophylla var. minor | + | + | . | + | . | 3 | 60 | III |
| Lonicera griffithii | + | . | + | . | + | 3 | 60 | III |

Table 3—*Continued.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Oxytropis sp | + | + | . | + | . | 3 | 60 | III |
| Astragalus sp | 1 | + | + | . | . | 3 | 60 | III |
| Haloxylon griffithii | + | + | . | + | . | 3 | 60 | III |
| *3rd Storey* | | | | | | | | |
| Heracleum candicans | 1 | + | 1 | 1 | 1 | 5 | 100 | V |
| Rumex hastatus | . | + | + | 1 | 1 | 4 | 80 | IV |
| Acantholimon sp | + | + | + | . | + | 4 | 80 | IV |
| Ferula narthex | . | . | + | + | + | 3 | 60 | III |
| Thymus squarrosus | . | + | + | + | . | 3 | 60 | III |
| Artemisia fragrans | + | . | + | + | . | 3 | 60 | III |
| Vicia soongaricum | . | + | + | . | + | 3 | 60 | III |
| Hypericum scabrum | . | + | . | + | + | 3 | 60 | III |
| Scutellaria edelbergii | + | + | . | . | + | 3 | 60 | III |
| Verbascum thapsus | . | + | . | + | . | 2 | 60 | II |
| Galium sectaceum | . | + | . | + | . | 2 | 40 | II |
| Andrachne telephoides | + | + | . | . | . | 2 | 40 | II |
| Delphinium uncinatum | . | + | . | + | . | 2 | 40 | II |
| Dianthus angulatus | + | . | . | . | + | 2 | 40 | II |
| Chrysanthemum sp | . | . | + | + | . | 2 | 40 | II |
| Polygonum mucronatum | + | . | . | + | . | 2 | 40 | II |
| Cousinia sp | . | . | . | + | + | 2 | 40 | II |
| Nepeta podostachys | . | . | + | . | + | 2 | 40 | II |
| Periploca aphylla | + | . | . | + | . | 2 | 40 | II |
| Bromus japonicus | + | . | . | + | . | 2 | 40 | II |
| Allium sp | . | + | + | . | . | 2 | 40 | II |

The species with single frequency: *Linaria lanceolata* (25) *Linum perenne* (23) *Aster altaicus* (27) *Lindelofia anchusoides* (23) *Tragapogon gracile* (25) *Onosma chitralicum* (24) *Impatiens balfourii* (24) *Minuartia lineata* (27)

4. *Cedrus deodara-Viburnum cotinifolium-Polygonum gilesii-Rosa ecae-Ferula narthex-Astragalus sp. community.*

The community was observed at Gokshal over five releves, from 2420 to 2480 m elevation. Some of the constant dominant species of the community are: *Cedrus deodara, Viburnum continifolium, Polygonum gilesii, Rosa ecae, Ferula narthex* and *Astragalus* sp. *Prangos pabularia* and *Nepeta podostachys* are species of secondary succession of the woodland. *Juniperus squamata* and *Haloxylon griffithii* are also observed on the degraded places. The community has fifth class cover value and provides one of the best habitats for the markhor. With a little protection from biotic influence, it can be an ideal habitat for the wildlife. (Table. 4).

Table 4

*Cedrus deodara-Viburnum continifolium-Polygonum gilesii-Rosa ecae-Ferula narthex-Astragalus sp. community.*

| No. of releve | 30 | 35 | 37 | 39 | 40 | Presence | Frequency % | Constancy Class |
|---|---|---|---|---|---|---|---|---|
| Area $(m)^2$ | 200 | 200 | 200 | 200 | 200 | | | |
| Direction and | S | N | W | NE | E | | | |
| slope (%) | 80 | 90 | 70 | 80 | 85 | | | |
| Elevation (m) | 2420 | 2440 | 2460 | 2480 | 2480 | | | |
| HCL reaction | + | + | ++ | + | ++ | | | |
| Mother rock | Cal. | Cal. | Cal. | Cal. | Cal. | | | |
| Coverage (%) | 90 | 80 | 90 | 85 | 80 | | | |
| Total number of species | 23 | 22 | 22 | 22 | 22 | | | |
| *Ist storey* | | | | | | | | |
| Cedrus deodara | 2 | 2 | 1 | 2 | 1 | 5 | 100 | V |
| *2nd storey* | | | | | | | | |
| Viburnum cotinifolium | 1 | 2 | 2 | 1 | 1 | 5 | 100 | V |
| Rosa ecae | 1 | 1 | 1 | 2 | 1 | 5 | 100 | V |
| Astragalus sp | 1 | + | 1 | 1 | 1 | 5 | 100 | V |
| Sorbaria tomentosa | + | . | . | + | + | 3 | 60 | IV |
| Cotoneaster nummularia | + | . | + | . | + | 3 | 60 | IV |
| Haloxylon griffithii | + | + | . | + | . | 3 | 60 | IV |

Table 4—*Continued.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prunus prostrata | + | . | . | . | + | 2 | 40 | II |
| Juniperus squamata | . | . | . | + | + | 2 | 40 | II |
| *3rd storey* | | | | | | | | |
| Polygonum gilesii | 2 | 1 | 2 | 1 | 1 | 5 | 100 | V |
| Ferula narthex | + | 1 | 1 | 1 | 1 | 5 | 100 | V |
| Nepeta podostachys | 1 | + | 1 | 1 | 1 | 5 | 100 | V |
| Prangos pabularia | 1 | 1 | + | + | . | 4 | 80 | IV |
| Artemisia sp | . | . | + | + | 1 | 3 | 60 | IV |
| Acantholimon sp | + | . | + | + | . | 3 | 60 | IV |
| Vicia soongaricum | . | . | + | + | + | 3 | 60 | IV |
| Delphinium uncinatum | + | + | . | + | . | 3 | 60 | IV |
| Hypericum scabrum | . | + | . | + | + | 3 | 60 | IV |
| Cucubalus baccifer | . | + | + | + | . | 3 | 60 | IV |
| Minuartia lineata | . | + | . | + | + | 3 | 60 | IV |
| Scrophularia scabiosifolia | + | . | + | + | . | 3 | 60 | IV |
| Leonurus cardiaca | + | . | + | . | + | 3 | 60 | IV |
| Aster altaicus | . | + | + | + | . | 3 | 60 | IV |
| Dianthus angulatus | . | + | + | . | + | 3 | 60 | IV |
| Ziziphora clinopodioides | + | . | + | . | + | 3 | 60 | IV |
| Verbascum erianthum | + | + | + | . | . | 3 | 60 | IV |
| Bergenia stracheyi | . | + | + | . | . | 2 | 40 | III |
| Polygonum bucharicum | + | . | . | . | + | 2 | 40 | III |
| Rheum sp | + | . | . | + | . | 2 | 40 | III |
| Cirsium arvense | . | + | . | . | + | 2 | 40 | III |
| Rubia chitralensis | . | + | + | . | . | 2 | 40 | III |
| Chrysanthemum griffithii | + | + | . | . | . | 2 | 40 | II |

Species with single frequency: *Festuca* sp. (30) *Bromus japonicus* (37) *Thymus serpyllum* (35) *Rheum webbiana* (30) *Saponaria griffihianum* (35) *Epilobium angustifolium* (40) *Scrophularia scabiosifolia* (39) *Sedum adenotrichum* (40)

5. *Cedrus deodara-Viburnum cotinifolium-Rosa ecae-Prangos pabularia community.*

The community was observed at Chat area, from 2320 to 2500 m over five releves. Some of the dominant and constant species of the community are: *Cedrus deodara, Viburnum cotinifolium, Prangos pabularia, Rosaecae, Cotoneaster nummularia, Dianthus* sp. and *Stipa* sp. The community has many grass species, which could not be determined. *Nepeta podostachys* is the dominant species from where *Viburnum cotinifolium* has been cut. The community has 5th class cover value and provides an excellent habitat among all the habitat types discussed so far. (Table. 5).

Table 5

*Cedrus deodara-Viburnum cotinifolium-Rosa ecae-Prangos pabularia community*

| No. of releve | 50 | 51 | 55 | 60 | 62 | Presence | Frequency % | Constancy Class |
|---|---|---|---|---|---|---|---|---|
| Area $(m)^2$ | 200 | 200 | 200 | 200 | 200 | | | |
| Direction and | S | N | W | E | NW | | | |
| slope (%) | 60 | 70 | 75 | 80 | 90 | | | |
| Elevation | 2320 | 2380 | 2390 | 2400 | 2500 | | | |
| HCL reaction | + | ++ | + | + | + | | | |
| Total coverage (%) | 80 | 90 | 85 | 90 | 80 | | | |
| Total No. of species | 22 | 20 | 21 | 20 | 19 | | | |
| *Ist storey* | | | | | | | | |
| Cedrus deodara | 1 | 2 | 2 | 2 | 2 | 5 | 100 | III |
| Acer sp | . | . | + | + | + | 3 | 60 | III |
| Salix sp | . | . | . | + | + | 2 | 40 | II |
| Betula sp | . | . | . | + | . | 1 | 20 | I |
| *2nd storey* | | | | | | | | |
| Viburnum cotinifolium | 2 | 2 | 1 | 2 | 2 | 5 | 100 | V |
| Rosa ecae | 2 | 1 | 1 | 2 | 2 | 5 | 100 | V |
| Juniperus squamata | 1 | + | . | . | . | 2 | 40 | II |
| Cotoneaster nummularia | + | . | + | . | . | 2 | 40 | II |
| Crataegus sp | + | . | . | . | . | 1 | 20 | I |

Table 5—*Continued.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *3rd storey* | | | | | | | | |
| Prangos pabularia ..... | 2 | 1 | 2 | 2 | 1 | 5 | 100 | V |
| Acantholimon sp ..... | . | + | 1 | 1 | 1 | 4 | 80 | IV |
| Nepeta podostachys ..... | + | 1 | + | + | . | 4 | 80 | IV |
| Astragalus sp ..... | . | 1 | + | + | + | 4 | 80 | IV |
| Artemisia fragrans..... | + | + | . | + | + | 4 | 80 | IV |
| Minuartia lineata ..... | + | . | + | + | + | 4 | 80 | IV |
| Scutellaria edelbergii..... | . | + | + | + | + | 4 | 80 | IV |
| Chrysanthemum albida ..... | + | + | + | . | + | 4 | 80 | IV |
| Rumex hastatus..... | + | + | + | . | . | 3 | 60 | III |
| Hypericum scabrum ..... | . | + | + | . | + | 3 | 60 | III |
| Anaphalis virgata..... | . | + | + | . | + | 3 | 60 | III |
| Dianthus angulatus ..... | + | . | . | + | + | 3 | 60 | III |
| Polygonum affine ..... | + | . | + | + | . | 3 | 60 | III |
| P. gilesii ..... | + | + | + | . | . | 3 | 60 | III |
| Silene pseudoverticellata ..... | + | . | + | + | . | 3 | 60 | III |
| Cicer micranthum ..... | + | . | . | + | + | 3 | 60 | III |
| Bromus japonicus ..... | + | + | + | . | . | 3 | 60 | III |
| Allium rotundum ..... | + | + | + | . | . | 3 | 60 | III |
| Saponaria griffithianum ..... | + | + | . | + | . | 3 | 60 | III |
| Thymus serpyllum..... | . | . | . | + | + | 2 | 40 | II |
| Cucubalus baccifer ..... | . | . | + | . | + | 2 | 40 | II |

The species with single frequency: *Sorbaria tomentosa* (50) *Solidago virgaurea* (51) *Aster altaicus* (50) *Inula rhizocephala* (62) *Delphinium uncinatum* (51) *Verbascum thapsus* (60)

**Discussion and Conclusions.** Out of the five habitat types the community 3, 4 and 5 are highly rich in species as well as their abundance and dominance, whereas the other two communities are poor in this respect.

Consequently, the last three habitats contain ample number of food plants of markhor and the others poor. This is merely due to the fact that, at lower altitudes, habitats are

badly damaged due to overgrazing by heavy livestock population, pouring in from all sides in summer.

The situation needs immediate necessary action in restoration of these habitats to full capacity for markhor. This will have to be done by removing the heavy pressure of livestock and reseeding of these ranges at lower altitudes, in order to encourage markhor in the area.

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