

SYNECOLOGICAL STUDY OF CONIFEROUS FOREST OF SHAWAL IN NORTH WAZIRISTAN AGENCY

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ABSTRACT

Phyto-sociological survey was carried out in the coniferous forest of Shawal, North Waziristan Agency with the objectives to find out vegetation status during August 2005. The data thus collected were analyzed and three-plant communities viz. *Pinus-Abies-Sophora*, *Abies-Cedrus* and *Abies-Pinus* communities were determined on the basis of the highest important value (HIV). The dominant species were *Cedrus deodara*, *Pinus wallichiana*, *Abies pindrow*, *Picea smithiana*, *Pinus gerardiana* and *Quercus dilatata*, *Quercus incana* etc. These plant species were the main source of income of the inhabitants. A number of medicinal plants like *Berberis lycium*, *Thymus serpyllum*, *Salvia* sp., *Solanum suratense* were also found in the area. The data reveals that due to ever-increasing human and livestock population, the area is under heavy biotic pressure resulted deforestation and soil degradation. Recommendation for the improvement of vegetation in the area was made of soil, unemployment and poor lively hood. The respective Forest Department may manage the area with community participation to conserve the forest and enhance biodiversity.

INTRODUCTION

Shawal is a small valley about 35 km long in North South direction, and 20 km wide from East to West, flanked by mountain ridges about 2000 to 3000 m high. The study area is located in the South – West part of North Waziristan Agency (FATA) Pakistan. It is bounded in the North-East by Miranshah, West by Razmak, in South by Bermal valley of Afghanistan, and in East by Koh-e-Sofid range along Afghanistan Border. Physically the North Waziristan Agency is divided into different valleys such as 1) Tochi, 2) Khaisor, 3) Shaktai, 4) Sheratalla and 5) Kaitu valley and plain area like 1) Daur, 2) Sham, 3) Razmak, 4) Lakka and 5) Dandy Plain. The climate around Razmak and Shawal is different and the rainfall is higher as compared to the rest Agency and minimum temperature may fall to – 10 °C. Most of the population concentrated around the stream where water is available to meet their requirement for living and agriculture purpose. Basically Shawal Valley inhabited by Utmanzai Wazir, in which are 3 main tribes are Kabul Khel, Baka Khel and Jani Khel. Each tribe is concentrated in their designated territory.

The North Waziristan Agency has different types of forests. The total area of coniferous and scrub forests is 127400 acres and classified as dry temperate forests (Champion at el 1965). The coniferous forest of Shawal, situated between 69° 15' to 70° 15' longitudes and 31° 55' and 32° 40' latitude. Climatically the area benefits from the summer monsoon rain. The snowfall is approximately 0.5 to 1.5 m in mountains communicated by the inhabitants, which start from February up to April. The average rainfall is about 75 mm of which maximum is received during the monsoon i.e., from late June to September, the winter are with a very little rainfall. The Shawal valley entirely

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falls under Sino-Japanese region (ALI & QAISER 1986), which extends from Japan, Korea, China, Upper Assam, Taiwan, West Nepal, Himachal Pradesh and extending to Koh-e-Sofid (Kurram N.W.F.P) upto Nuristan (East Afghanistan). The soil in this area is generally shallow and calcareous. Very little work has been done on the subject in the adjoining areas however; no quantitative data on the phytosociological study of the area is available. Therefore this study was initiated to probe in to the situation and find out the ways and means of deforestation. The present study aims to determine the different plants communities, find out regeneration status, to study some important medicinal plants and to investigate floristic composition at a greater detailed and suggestions for the improvement of vegetation through the introduction of suitable plant species. Therefore, efforts have been made to explore vegetation and find out plant communities as milestone for future research and management work of the area.

MATERIAL AND METHOD

During survey, vegetation was sampled by laying quadrates of 10 x 10 m for trees, 4 x 4 m for shrubs and 1 x 1 m for herbs respectively. Density, frequency and coverage of each species in the different stands were recorded and changed to relative scales and then added together to get the highest important value for each species in each stand. On the basis of homogeneity of vegetation the research area was divided into five different sites i.e. Site "A", or East side, Site "B", or South side, Site "C" and in each site 50 quadrates were laid down randomly. In total 150 quadrates were laid down. Data on species composition, with coverage abundance, vigor & phenology, altitude, slope and direction, total number of species in each quadrate were recorded. The plant species were dried, preserved and identified with the help of PFI, Botany Branch Herbarium and nomenclature followed after Stewart (1972). Vegetation data were processed to work out plant communities on the basis of highest importance value and wild fauna was also recorded with the help of local communities.

RESULT AND DISCUSSION

Analysis of data on vegetation-soil resulted in the establishment of three plant communities 1) *Pinus-Abies-Sophora* Community, 2) *Pinus-Abies* Community and 3) *Abies-Cedrus* Community on the basis of highest importance value (HIV). The detail is as under:

1. *Pinus-Abies-Sophora* Community

In the site "A" or East Side *Pinus-Abies-Sophora* community was determined. Altitude of this side varies from 2500 m to 2630 m. There are 38 plants species in this community. *Pinus wallichiana* has the highest importance value (19.60), followed by *Abies pindrow* (14.50), and *Sophora mallis* (I.V 11.50), and other associated species *Salvia* sp, *Cedrus deodara*, were extensively used for construction and furniture work and fodder for livestock.

The Oaks *Quercus incana*, *Quercus dilatata* and *Pinus gerardiana* are endangered species according to HIV status position. At the bottom of the hill slope *Sophora millis* and *Salvia* species are dominant however grazing and browsing was limited in this site. Soil at lower elevation is sandy loam, while at higher silty-loam, furthermore, the regeneration of the endangered and threatened species was observed seldom.

Table 1. Pinus-Abies-Sophora community with Highest Important Values

S. No	Plants Species	Important Values
1.	<i>Pinus wallichiana</i>	19.60
2.	<i>Abies pindrow</i>	14.50
3.	<i>Sophora mallis</i>	11.50
4.	<i>Salvia nobicola</i>	7.20
5.	<i>Astragalus psiolocentros</i>	3.45
6.	<i>Berberis lyceum</i>	3.45
7.	<i>Gnephaliun spp.</i>	2.72
8.	<i>Cynodon dactylon</i>	2.52
9.	<i>Potentila gerardiana</i>	2.52
10.	<i>Cedrus deodara</i>	2.30
11.	<i>Contoneaster spp.</i>	2.30
12.	<i>Salvia glotinsa</i>	2.25
13.	<i>Astragalus spp.</i>	2.10
14.	<i>Valeriana spp.</i>	2.09
15.	<i>Trifolium spp.</i>	2.07
16.	<i>Nepeta podostachys</i>	2.05
17.	<i>Ajuga spp</i>	2.00
18.	<i>Medicago lupulina</i>	1.96
19.	<i>Ranunculus sardous</i>	1.91
20.	<i>Caragana gerardiana</i>	1.87
21.	<i>Rosa macrophylla</i>	1.85
22.	<i>Taraxicum officnale</i>	1.85
23.	<i>Saussuria spp.</i>	1.84
24.	<i>Androsace spp.</i>	1.80
25.	<i>Circuim argyracanthum</i>	1.69
26.	<i>Morina persica</i>	1.69
27.	<i>Macfeydina ungnis-cati</i>	1.64
28.	<i>Desmodium spp.</i>	1.59
29.	<i>Gnephaliun spp.</i>	1.51
30.	<i>Calendula spp.</i>	1.49
31.	<i>Quercus incana</i>	1.46
32.	<i>Solanum nigrum</i>	1.45
33.	<i>Solanum suratense</i>	1.43
34.	<i>Quercus dilatata</i>	1.28
35.	<i>Conium orscaligeria</i>	0.95
36.	<i>Pinus gerardiana</i>	0.80
37.	<i>Pholmis stewartii</i>	0.78
38.	<i>Vernonia cinerea</i>	0.65

2. Pinus-Abies Community

In Site "B" or South Side Pinus-Abies Community was found. Altitude of the Southern slope varies from 2650 m to 2730 m. There are 50 plant species in this community. *Pinus wallichiana* has the highest important value (19.52) followed by *Abies pindrow* (16.80) while the other associate species include *Rosa macrophylla* (I.V.3.40), *Cedrus deodara* (I.V. 2.89), *Astragalus* (I.V. 2.23), *Berberis lyceum* (I.V. 1.93), *Trifolium*, *Potentila*, *Solanum Saratense* and so on. The woody species like *Quercus dilatata* (0.27), *Quercus incana* (0.22), *Pinus gerardiana* (0.20), *Celtis australis* (0.19) are endangered and needs special attention for improvement.

Table 2. Pinus-Abies community with Highest Important values

S.No.	Plants Species	Important Values
1.	<i>Pinus wallichiana</i>	19.52
2.	<i>Abies pindrow</i>	16.80
3.	<i>Ajuga</i> spp.	3.82
4.	<i>Rosa macrophylla</i>	3.40
5.	<i>Cedrus deodara</i>	2.89
6.	<i>Trifolium</i> spp.	2.79
7.	<i>Nepeta podostachys</i>	2.54
8.	<i>Circuim argyranthum</i>	2.53
9.	<i>Androsace</i> spp.	2.3
10.	<i>Traxicum officinale</i>	2.30
11.	<i>Astragalus</i> spp.	2.23
12.	<i>Desmodium</i> spp.	1.94
13.	<i>Astragalus</i> spp.	1.93
14.	<i>Berberis lyceum</i>	1.93
15.	<i>Salvia nobicola</i>	1.84
16.	<i>Macfeydina ungnisis-cati</i>	1.79
17.	<i>Conium orscaligeria</i>	1.72
18.	<i>Salvia glutinosa</i>	1.70
19.	<i>Sophora mallis</i>	1.65
20.	<i>Solanum suratense</i>	1.64
21.	<i>Astragalus psiolocentros</i>	1.59
22.	<i>Verbiscum thapsus</i>	1.58
23.	<i>Geranium</i> spp.	1.50
24.	<i>Potentila gerardiana</i>	1.50
25.	<i>Schinus terebenthifolia</i>	1.47
26.	<i>Ranunculus sardous</i>	1.41
27.	<i>Contoneaster</i> spp.	1.38
28.	<i>Calendula</i> spp.	1.35
29.	<i>Medicogo lupulina</i>	1.30
30.	<i>Scutellaraia edelbergie</i>	1.25
31.	<i>Gnephaliun</i> spp.	1.24
32.	<i>Fragarica vesca</i>	1.21
33.	<i>Valeriana</i> spp.	1.20
34.	<i>Voila</i> spp.	1.18
35.	<i>Astragalus purpurscence</i>	1.12
36.	<i>Caragana gerardiana</i>	1.04
37.	<i>Salsola baryosma</i>	0.96
38.	<i>Cynodon dactylon</i>	0.81
39.	<i>Desmostachya</i> spp.	0.80
40.	<i>Vernonia</i> spp.	0.78
41.	<i>Pinpinella</i> spp.	0.68
42.	<i>Morina persica</i>	0.66
43.	<i>Pholmis stewartii</i>	0.59
44.	<i>Aster</i> spp.	0.45
45.	<i>Stachys parviflora</i>	0.31
46.	<i>Quercus dilatata</i>	0.27
47.	<i>Quercus incana</i>	0.22
48.	<i>Pinus gerardiana</i>	0.20
49.	<i>Celtis australis</i>	0.19
50.	<i>Gnephaliun</i> spp.	0.19

Table 3. *Abies-Cedrus* community Highest Important values

S.No.	Plants Species	Important Values
1.	<i>Abies pindrow</i>	16.37
2.	<i>Cedrus deodara</i>	14.40
3.	<i>Circuim argyranthum</i>	9.13
4.	<i>Pinus wallichiana</i>	7.12
5.	<i>Androsace</i> spp.	5.55
6.	<i>Berberis lyceum</i>	3.75
7.	<i>Astragalus</i> spp.	3.75
8.	<i>Desmodium</i> spp.	3.29
9.	<i>Astragalus psilocentros</i>	2.96
10.	<i>Astragalus</i> spp.	2.69
11.	<i>Medicago lupulina</i>	2.53
12.	<i>Traxicum officinale</i>	2.15
13.	<i>Gnephaliun</i> spp.	2.15
14.	<i>Conium orscaligeria</i>	2.10
15.	<i>Trifolium</i> spp.	1.96
16.	<i>Aster</i> spp.	1.96
17.	<i>Verbiscum thapsus</i>	1.85
18.	<i>Ajuga</i> spp	1.83
19.	<i>Morina persica</i>	1.72
20.	<i>Voila</i> spp.	1.65
21.	<i>Salvia nobicola</i>	1.63
22.	<i>Calendula</i> spp.	1.50
23.	<i>Valeriana</i> spp.	1.47
24.	<i>Fragarica vesca</i>	1.46
25.	<i>Pimpinella</i> spp.	1.39
26.	<i>Saussurea</i> spp.	1.23
27.	<i>Potentila gerardiana</i>	1.14
28.	<i>Rosa macrophylla</i>	1.09
29.	<i>Contoneaster</i> spp.	1.07
30.	<i>Cynodon dactylon</i>	1.06
31.	<i>Macfeydina ungnis-cati</i>	1.06
32.	<i>Solanum suratense</i>	1.02
33.	<i>Sophora mallis</i>	0.90
34.	<i>Nepeta podostachys</i>	0.67
35.	<i>Caragana gerardiana</i>	0.61
36.	<i>Salsola baryosma</i>	0.58
37.	<i>Geranium</i> spp.	0.55
38.	<i>Astragalus purpurscence</i>	0.50
39.	<i>Desmostachaya</i> spp.	0.45

The soil of this site is loamy sand with high amount of litter was present on the soil. Due to deforestation, the numbers of plant species are constantly decreasing in the area.

3. *Abies - Cedrus* Community

This community was found on the western slope with an elevation range varies from 2500 m to 2550 m. The dominant plant species of this community were *Abies pindrow* with height important value (16.37) followed by *Cedrus deodara* (14.40) *Circuim*

argyranthemum (9.13) and *Pinus wallichiana* (7.12) and other associate species were *Berberis lyceum* (3.75), *Astragalus psilocentros* (I.V. 2.96), *Astragalus* (I.V. 2.69), *Taraxicum*, *Ajuga*, *Cynodon dactylon*, *Solanum suratense* (I.V. 1.02), *Sophora mollis* (I.V. 0.90) and so on.

Due to cutting the vegetation is thin in this site. *Abies pindrow*, *Pinus wallichiana* and *Cedrus deodara* are the major source of economy of the people. Soil is loamy with pH value of 8.14. Most of the fuel wood and timber wood is extracted from these forests. As such they have been degraded many important medicinal plants are uprooted for burning purposes and grazed by livestock.

Medicinal plants

Information on some medicinal plants were gathered from ethno-botanical point of view from inhabitants as recipe for local use to cure diseases.

Some medicinal plants and their local uses

S.No.	Name of plant	Local Name	Part used	Treatment
1	<i>Achyranthus aspera</i>	Ghoshkai	Leaves & root	Toothache
2	<i>Artemisia maritima</i>	Assantine	Plant (twig)	Blood purifier & used in diabetes & B. pressure
3	<i>Cannabis sativa</i>	Bhanga	Leaves & Seed	Sedative & narcotics and tonic
4	<i>Chenopodium album</i>	Surma (Lunak)	Plant, seeds & flowers	Tonic
5	<i>Chenopodium ambrosioides</i>	Skha bootay	Plant	Against hookworms, tonic
6	<i>Chrozophora obliqua</i>	-	Plant	Medicinal herb
7	<i>Citrullus colocynthis</i>	Maraghinya (Indrayan)	Leave & Shoot & Seed	Blood purification, constipation, fever & intestinal disorder
8	<i>Clematis orientalis</i>	-	Plant	It is poisonous plant.
9	<i>Compelina paludosa</i>	-	Plant Roots	Constipation & Snake bite
10	<i>Cymbogon awarancusa</i>	Khavai (grass)	Leaves	Decoction for blood purification
11	<i>Datura alba / metel</i>	Barbaka	Seed, Stem, Leaves & root	Narcotics, Snakebite, Antiseptic & painful cases
12	<i>Dodonia viscosa</i>	Sanatha	Leaves	Bitter & as stringent
13	<i>Galiumas perfolium</i>	-	Plant juice	Diuretic
14	<i>Heliotropium europaeum</i>	Kharpunai	Plant & Leaves	Against scorpion sting and Ulcer
15	<i>Malva parviflora</i>	-	Seeds	Cough and Ulcer
16	<i>Malva sylvestris</i>	Malva	Seeds	Urinary bladder, & externally inflammation
17	<i>Malya neglecta</i>	Perwotia	Seeds	Bronchitis, cough & skin disease
18	<i>Mentha longifolia</i>	Jangli Paudina	Whole plant	Chatnies, tomach agent & abdomen pain
19	<i>Nepeta hindostana</i>	Unknown	Plant	Fever & cardiac tonic
20	<i>Onosma bracteatum</i>	Mahluch (Gaozaban)	Plant	Tonic & Urinary problem
21	<i>Papaver dubium</i>	Gull-e-Daudi	Plant	Cough
22	<i>Peganum harmala</i>	Sponda	Seed	Narcotic, Colic & fever antiseptic kill lice.
23	<i>Pimpinella diversifolia</i>	-	Herb	Carminative
24	<i>Plantago lanceolata</i>	Gandarie	Seed & leaves	Dysentery, diarrhea & other stomach troubles
25	<i>Polygonum aviculare</i>	-	Root	Applied externally as ointment

26	<i>Polygonum plibegum</i>	-	Plant	Pneumonia
27	<i>Ricinus communis</i>	Randa (Arhand)	Leaves	Narcotics & applied on joint pain
28	<i>Solanum nigrum</i>	Gurabaie (Karozgi)	Plant	Tonic
29	<i>Solanum xanthocarpum</i>	Hamauli	Fruit	Killing worm, stomach pain & chest problem
30	<i>Stachys parviflora</i>	-	Stem	Guinea worm
31	<i>Stellaria media</i>	-	Plant	Employed on broken bone & swellings
32	<i>Thymus serpyllum</i>	Murvizej	Plant	Stomach, Tonic, Liver diseases
33	<i>Trifolium partense</i>	Shaftala	Plant	Bronchitis, whooping cough
34	<i>Trigonella corniculata</i>	-	Seed, Fruit	Tonic Astringent, bitter, styptic applied to swelling
35	<i>Urtica dioica</i>	Sazeenka	Juice of plant	External irritant & Consumption
36	<i>Verbascum thapsus</i>	Zarkey beeta	Leaves & Seed	Wound, cough, consumption disease, narcotics & fish poison
37	<i>Verbena officinalis</i>	-	Plant	Tonic & joint diseases
38	<i>Vernonia cinerea</i>	Devi	Seed	Tonic for horse
39	<i>Veronia undulata</i>	-	Plant	Blood purifier, Wounds & burns Ulcer plants give glycoside
40	<i>Viola serpanse</i>	Banafsha	Flower and Leaves	Perfume extraction, lung troubles Oil

Source: Zaman, M.B & Muhammad Sharik Khan, 1970, Mughal, M.S. 2009.

RECOMMENDATIONS / SUGGESTIONS

- The coniferous forests of Shawal are either communal or privately owned and have been subjected to over exploitation since time immemorial to meet the domestic needs. Dragging of logs and grazing pressure damages natural regeneration. Seeds bearer trees are confined to top of hills.
- Efforts should be made to conserve endangered plant species such as Chalghoza pine to earn handsome amount for domestic use.
- Launch of Forestry developmental packages for the area not only for management but also for poverty alleviation
- Due to ever increasing population pressure, the area is under heavy biotic pressure and many species are decreasing in the area because in the tribal area. Most of the medicinal plants were uprooted for fuel purposes. An alternate source of fuel may be provided to conserve biodiversity and national wealth.

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