

Habitat Utilization of Cheer Pheasant (*Catereus wallichii*) in Jhelum Valley, Muzaffaraabad, Azad Kashmir, Pakistan

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Abstract: Sum of 28 surveys were conducted from June 2002 to June 2003 in three main zones (Pir Chinasi, Lowasi-Ghari Dopatta and Chinari-Qazinag) of Jhelum valley Muzaffarabad to collect data on Phytosociological habitat analysis of Cheer Pheasant (*Catereus wallichii*). Three zones were divided into 8 main localities, each of which was further divided into sub-localities or calling sites of Cheer Pheasant. The Phytosociological analysis of five localities was carried out at calling sites of Cheer Pheasant. The importance value (dominant and co-dominant vegetation by Quadrant Method) of each plant species was calculated in order to find out the relationship of Cheer Pheasant population with various variables of habitat. Phytosociological habitat comparison of dominant and co-dominant vegetation of five main localities showed that the following plant species are common and characteristic of each habitat. These species are *Pinus walliachiana*, *Placanthus rugosus*, *Indigofera heterantha*, *Berberis lycium*, *Fragaria indica*, *Oenothera rosea*, *cynoglossum lanceolatum*, *Saccharum rufipilum* and *onychium japonicum*. Correlation analysis between Cheer Pheasant density indices at various sites and habitat variables showed non-significant results with ground cover ($r = 0.24, p > 0.5$), with shrubs ($r = 0.44, p > 0.5$) and with tree cover ($r = 0.36, p > 0.5$). However the higher value of r with shrubs showed some relationship of Cheer population. Similarly, correlation analysis between Cheer Pheasant population and with canopy cover showed non-significant results i.e. with ground canopy cover ($r = -0.08, p > 0.5$), with shrub canopy cover ($r = 0.33, p > 0.5$) and with tree canopy cover ($r = -0.05, p > 0.5$). Again the higher value of r with shrub canopy cover indicates some affinity of Cheer Pheasant population.

Key words: Phytosociology, habitat analysis, *Catereus wallichii*, Jhelum valley, Azad Kashmir, Pakistan

INTRODUCTION

The Cheer Pheasant is distributed through the southern foothills of the Himalayas from Pakistan to Nepal, occurring in northern Pakistan, Azad Jammu and Kashmir, two states of India (Himachal Pradesh and Uttar Pradesh) and Nepal^[1]. The species is found sparingly at the fringes of Azad Jammu and Kashmir at Kazinag^[2-4], Kishtwar and the hills of the Jhelum valley, but not in "Kashmir valley"^[5].

The species generally frequents outer hill ranges of the Himalayas, typically avoiding dense forest and favouring very precipitous terrain with scrub, tall grass and stunted trees, particularly where interspersed with rocky crags^[6-11]. It is thus often found on steep rugged hillsides covered with long grass, *Berberis* scrub and oak forest, or in wooded ravines and hollows where it

generally stays well hidden amongst undergrowth^[7], it favours "grassy hill-sides, with or without brushwood, or patches of the dwarf bamboo"^[12-17] study site in Himachal Pradesh was covered with scrub.

In Nepal it has been observed on boulder-strewn slopes intermingled with grassy patches^[18] and in ravines containing scrub, bamboo and grass^[19]. It was found at Ghasa on steep, craggy hillsides supporting scrub and stunted trees and at Dhorpatan it occurred in burnt, felled and cut-over areas with secondary growth in forest containing pine, juniper, fir and rhododendron^[20,21]. Although well-wooded habitats are generally avoided, it was recorded once in "dense pine forest" at Majathal Wildlife Sanctuary^[22]. In conclusion, high grass, high shrub density and low shrub height appear to be the most important factors in determining the use of sites by the species^[23].

They have been recorded roosting socially in trees in patches of oak forest lining or overhanging gullies^[2]. Mishra^[22] mentioned a group of five found roosting 4-5 m up in a *Prunus pudum* tree in a dense nullah and Rasool^[24] found a male apparently sleeping 6 m up a small oak at dawn. In fact the species usually roosts in traditional tree sites, usually on steep slopes, the male roosting alone while the female incubates^[16,17,25]. The captive birds released in the Margalla hills of Pakistan, however, were not recorded roosting above the ground^[26].

The current population of cheer is confined to India, Nepal and Pakistan. Some authors^[8] have reported it as scarce and other^[27] reported it at the brink of extinction in Azad Kashmir, Pakistan. Globally small population (n=5000) of pheasant is naturally fragmented because it lives in small patches of succession grassland. Human population pressure, hunting and changing patterns of land use are resulting in its decline, qualifying it as vulnerable^[28,29]. These entire human related activities results in habitat degradation, which in turn results in population decline. In this situation it becomes important to determine the relation and affiliation of this bird with vegetation cover, which provides shelter, food and other requirements, necessary for its survival. Keeping all these factors in view, the present study was designed to study following objectives:

- Analyze the phytosociological habitat of the study area.
- Determine the correlation analysis between cheer pheasant population at various study sites and habitat variables.
- Determine habitat characteristics of cheer pheasant in study area.

MATERIALS AND METHODS

Sum of 28 surveys were conducted from June 2002 to June 2003 in three main zones of Jhelum valley Muzaffarabad. The three main zones were divided into 13 main localities, each main locality was further divided into sub-localities or calling sites of Cheer Pheasant. For density indices estimation, each calling site was treated as an individual data point. At each site height, aspect, slope, number of villages within one to two kilometer, their total population, livestock, presence of water body, cliff/ravine and cultivation within 600m were all noted. Land use practices with respect to cutting, burning within one year and grazing were also recorded.

In order to analyze the potential habitat used by Cheer Pheasant, the phytosociological habitat analysis using Quadrature Method was carried out at calling sites in

each of the main locality. Trees were analyzed using quadrature of 10×2 m, while shrubs were sampled by 5×2 m quadrature and herbs were sampled by 0.5×0.5 m quadrature. The phytosociological attributes were measured in each case i.e. density, frequency, canopy cover, relative density, relative frequency and relative canopy cover. By pooling relative density, relative frequency and relative canopy cover, importance values of each plant species was determined. The quadrates were laid accordingly at each calling site as per suitability and natural contours of the habitat.

Correlation co-efficient between estimated Cheer Pheasant Populations and various variables of habitats were carried out.

Study area: Pir Chinasi (33° 55' N 73° 38' E) lies about 32 km from Muzaffarabad city at an elevation of 2700 m. A fair metaled road leads to the study area. Saran (2430-2480 m) is the main habitat of the Cheer Pheasant in Pir Chinasi, having Hari Wala Par, Batangi Wala Par as sub-localities. The area is Himalayan sub-tropical pine forest with extensive east and north facing grassy steep slopes having scattered blue pine (*Pinus wallichiana*) trees. In Saran, shrub species are *plactranthus rugosus* and *Indigofera heterantha*. The ground cover includes *Fragaria indica*, *Elsholtzia ciliata*, *Eriophorum sp.* and *Themeda anathera*.

Low Gali is main locality in Gari Dopatta Range, 15 km from the historical famous town of Gari Dopatta. The potential habitat of Cheer lies in Low Gali, 3 km from Awan Patti, at an altitude of 1930 to 2120 m. The study area is divided into two sub localities, i.e. Low Gali 1 and Belay Wala Par. Cheer habitat is characterizing by the presence of *Pinus roxburgii*, *Pinus wallichiana* and long grasses at slopes and shrub cover including *Plactranthus rugosus*, *Debregessia salicifolia*, *Indigofera heterantha* and *Berberis lycium*. The ground cover includes *Eriophorum spp.*, *Oenothera rosea*, *Onychium japonicum* and *Themeda anathera*.

Qazinag (35° 09' N 73° 58' E) Chinari Range lies 20 km from famous town of Chinari, located on the way to Srinagar, occupying foot hills of Pir Punjal Range. The study area is divided into six main localities. Among these Kavshan is main locality, having two sub-localities i.e. Sokar Behk and Larguchi Behk at the elevation range of 2450-2500 m. The potential habitat used by Cheer is found at the left of Larguchi Behk at 2500 m elevation. The habitat is steep grassy with patchy distribution of *Pinus wallichiana*. The shrub cover includes, *plactranthus rugosus*, while herbs include *Cyanoglossum lanceolatum*, *Saccharum rufipilum*, *Fragaria indica*, *Themeda anathera* and *Polystichum yunannense*. Other potential

sub-locality in Kavshan is Sokar Behk, located at 2600 m elevation, having relatively thick tree cover of *Pinus wallichiana*.

The second main locality is Garang, located at 2 km from Nardajian village. The potential habitat of Cheer in this locality are Garang 1 (Tatta Pani) and Garang 2 (above village Gail) at 2220 m-2300 m elevation. Shingar is third main locality, located 1 km from village Tararan. Cheer habitat is characterized with open steep grassy area and scattered distribution of *Abies pindrow*. The shrub cover includes *Indigofera heterantha*, *Plactranthus rugosus*, *Berberis lycium*, *Viburnum nervosum* and *Clematis grata*. The ground cover includes *Eriophorum sp.*, *Saccharum rufipilum* and *Polystichum yunannense*.

Cheetah is located in front of Garang below village Loon Ban at an altitude of 2000-2120 m. The fragmented population of Cheer is present in two sub-localities in this area i.e., Cheetah-1 (below Loon Ban) and Cheetah-2 (above village Jabra) up to base of Sing Top. The area is characterized by open rocky, very steep similar to Garang.

The Sangar Bari is another potential habitat of Cheer Pheasant having sub-localities Batal Ka Daman (above village Loon Ban) and Nar Ka Daman (on left of Sangar Bari behk). The height ranges from 2650 m to 2500 m approximately. Batal Ka Daman is open grassy steep area with scattered *Pinus wallichiana*. *Plactranthus rugosus* and *Indigofera heterantha* are common shrubs while ground cover includes *Eriophorum sp.*, *Saccharum rufipilum*, *Themeda anathera*, *Poa angustifolia* and *Euphorbia cognata*. Nar Ka Daman is a relatively densely covered with *Pinus wallichiana*.

Khatir Nar is another potential habitat of Cheer pheasant in Qazinag Range. There are two major sub-sites of Cheer in this locality i.e., Khatir Nar 1 at 2300 m elevation and Khatir Nar-2 at 2000 m. The sloppy ridge separates these two sub-sites from each other. The Khatir Nar 1 (Thub) has open sloppy, precipitous, moist temperate forest with *Cedrus deodara*. Under story includes *Plactranthus rugosus* and *Indigofera heterantha*. Khatir Nar 1 (below Thub) is characterized by open, steep, grassy habitat with scattered *Abies pindrow* and *Cedrus deodara* while *Plactranthus rugosus* is the most common shrub.

RESULTS

Detailed phytosociological analysis of 5 main localities was carried out using quadrat method (Table 1).

Saran Pir Chinasi habitat (comprising three sub-localities) lie at a distance of 32 km from Muzaffarabad city at the south corner of Jhelum Valley at an altitudinal range of 2430-2480 m. In sub-locality Hari

Wala Par, *Pinus wallichiana* (IV=81.45) and *Fragaria indica* (IV=52.22) were the dominant and co-dominant species (Table 1). Hari Wala Par and Sikki Wala Par show relatively thick cover of *Pinus wallichiana* and sloppy (70°) cliffs (Table 2). The shrub cover include *Plactranthus rugosus* (IV=22.73) and *Indigofera heterantha* (IV=14.22) (Table 1). The sub locality Batangi Wala Par is open, sloppy (72°) with patchy distribution of long grasses, having less tree cover. *Plactranthus rugosus* and *Indigofera heterantha* are the representatives of shrubs at this sub-locality.

Low Gali lies at an altitude of 2120 m. The phytosociological analysis at Belay Wala Par sub-locality shows that *Oenothera rosea* (IV=127.99), *Onychicum japonicum* (IV=36.139) and *Berberis lycium* (IV=25.55) are dominant and co-dominant species establishing the ground community (Table 1). Both sub-localities of Low Gali representing the steep slopes (75°) with rugged cliffs, with few scattered *Pinus wallichiana* trees and long grasses, as well as, patchy distribution of *Indigofera heterantha*, *Berberis lycium* and *Debregeesia salicifolia* shrubs (Table 2).

Kavshan locality lies 1 km from the left of village Kavshan at an altitude range of 2500-2600 m. The Kavshan Larguchi habitat has open, thickly covered with *Plactranthus rugosus* and steep sloppy while the sub locality Sokar Behk having relatively thick cover of *Pinus wallichiana*, moist and sloppy. The habitat analysis of Kavshan reveals that *Plactranthus rugosus* (IV=137.19), *Cyanoglossum lanceolatum* (IV=29.245) and *Fragaria indica* (IV=28.22) are dominant and co-dominant species (Table 1). The highest importance value of *Plactranthus rugosus* (IV=137.19) shows that ground is heavily covered with shrubs, providing suitable cover for Cheer population in breeding season. The habitat is open with steep slopes (75°), less tree cover with patchy distribution of grasses (Table 2).

Shingar Tararan is another favorite habitat used by Cheer Pheasant at an altitudinal range of 2500-2700 m, situated 1 km on top of village Tararan. Habitat analysis at Thera Gali shows that *Indigofera heterantha* (IV=95.10) and *Berberis lycium* (IV=83.84) are dominant and co-dominant species, respectively (Table 1). The habitat is open, with angular slope (70°) and dominated by shrubs (70%) (Table 2).

Of all localities of study area, the Sangar Bari is the most favorable Cheer Habitat at a distance of 3 km from Loon Ban at an altitudinal range of 2500-2600 m. The habitat analysis was done at nesting site that was observed at Nar Ka Daman, sub-locality of Sangar Bari that was located 1 km Left of Sangar Bari Behk, having altitude of 2600 m. Habitat analysis showed that

Table 1: Comparison of importance values (IV) of dominant and co-dominant vegetation of surveyed sites in 2002-2003

Name of species	Saran Pirchinasi (IV)	Kavashan (IV)	Low Gali (IV)	Sangar Bari (IV)	Shingar (IV)
<i>Pinus wallichiana</i>	81.45*	14.16	12.53	41.18**	-
<i>Fragaria indica</i>	52.22**	28.22**	-	25.98	4.28**
<i>Plactranthus rugosus</i>	22.73**	137.19*	5.31	43.33**	-
<i>Indigofera heterantha</i>	14.22	-	19.91	29.08	95.10*
<i>Saccharum rufipilum</i>	10.87	9.11	-	45.97*	-
<i>Cyanoglossum lanceolatum</i>	2.58	29.24**	-	-	-
<i>Oenothera rosea</i>	2.28	-	127.99*	-	-
<i>Berberis lycium</i>	-	-	25.55**	-	83.84**
<i>Onychium japonicum</i>	-	-	36.13**	-	-

*= Dominant Species, **= Co-dominant Species

Table 2: Details of habitat use at calling sites survey during study 2002 and 2003

Name of Site	Altitude (m)	Aspect	Slope (°)	Cliff / Ravine	Grass cover (%)	Land use practices	Dominant tree sp.	Dominant shrub sp.	Dominant herb sp.
Saran Pir Chinasi (Hari Wala Par)	2420	NE	70	Cliff	60	G, C, B	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus</i>	<i>Fragaria indica</i>
Low Gali (Belay Wala Par)	2120	NW	75	Cliff	65	G, C, B	<i>Pinus wallichiana</i>	<i>Debregessia salici</i>	<i>Oenothera rosea</i>
Kavashan (below left side of Larguchi Behk)	2500	NW	75	Cliff	50	G, C	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus</i>	<i>Cyanoglossum lanceolatum</i>
Sangar bari (Nar Ka Daman)	2500	NE	70	Ravine	70	G, C	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus</i>	<i>Saccharum rufipilum</i>
Shingar Tararan (Thera Gali)	2700	NW	70	Cliff	60	G, C	<i>Abies pindrow</i>	<i>Indigofera heterantha</i>	<i>Saccharum rufipilum</i>
Batal Ka Daman (above village Loon Ban)	2650	NW	81	Cliff	60	G, C, B	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus</i>	<i>Fragaria indica</i>
Khatir Nar 1 (Thub)	2300	NE	65	Cliff	55	G,C	<i>Cedrus</i>	<i>Plactranthus deodara</i>	<i>Saccharum rugosus</i>
<i>rufipilum</i> Nardajian (Cheetah)	1900	SE	85	Cliff	40	G,C	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus, Salix</i>	<i>Saccharum rufipilum tetrasperma</i>
Nardajian (Garang)	2220	SE	85	Cliff	35	G, C	<i>Pinus wallichiana</i>	<i>Plactranthus rugosus, Salix</i>	<i>Saccharum rufipilum tetrasperma</i>

G=grazing, C=cutting, B=burning

Saccharum rufipilum (IV=45.97) and *Indigofera heterantha* (IV=43.33), *Pinus wallichiana* (IV=41.18) are dominant and co-dominant species (Table 1). Resultantly habitat is a mixed coniferous forest. The habitat of other sub-locality Batal Ka Daman (2660 m) is located 1 km above village Loon Ban characterized with open (40%), shrubby (55%), sloppy (81°) with stunted trees (5%).

In conclusion, comparison of phytohabitat analysis of 5 localities of potential Cheer Pheasant population showed that shrubs *Indigofera heterantha*, *Plactranthus rugosus* have close affinity with Cheer population, while other plant species show inconsistent pattern (Table 1). Correlation between adult Cheer population and densities of ground cover (r =0.24), shrub (r =0.44) cover and tree cover (r =0.36) showed non-significant correlation. However correlation between Cheer population and shrub cover showed high value than other two habitat variables representing comparatively affinity with Cheer population. Similarly the correlation between Cheer Pheasant population between canopy cover of herbs (r =0.08), shrubs (r =0.33) and trees (r =-0.05) also showed non-

significant correlation. However, the highest value with shrubs, shows some affinity with Cheer Pheasant population.

DISCUSSION

The phytosociological habitat analysis of five localities was carried out at 18 calling sites of Cheer Pheasant. The importance value (dominant and co dominant vegetation) of each plant species were recorded in order to find out the relationship of Cheer Pheasant population with various variables of habitat (Table 1).

In Saran, Hari Wala Par, Batangi Wala Par and Sikki are the potential habitats for Cheer population. All these sub sites lie within the radius of 5 km². Phytosociological analysis at Hari Wala Par showed that *Pinus wallichiana* (IV=81.45) and *Fragaria indica* (IV=52.22) represented the dominant and co-dominant species (Table 1). These values show that habitat is having relatively thick cover of trees, patchy distribution of grasses and under story of *Plactranthus rugosus* shrub. The Batangi Wala Par sub

locality is open, with thick cover of *Plactranthus rugosus*, patchy distribution of grasses and with stunted trees of *Pinus wallichiana*. Both these sub localities are steep sloppy.

Cheer pheasant generally frequents outer hill ranges of the Himalayas, typically avoiding dense forest and favoring very precipitous terrain with scrub, tall grass and stunted trees, particularly where interspersed with rocky crags^[6-11]. Phytosociological and general habitat analysis showed that Batangi Wala Par sub-site had similar habitat. But sub locality Hari Wala Par is densely coniferous precipitous with long grasses at slopes. Due to strong hunting, grazing and cutting activities, majority of Cheer population took shelter of thick cover at this shrub locality. In Pakistan, the Pir Chinasi forest area is subject heavy human pressure of wood cutting and grazing and the area is has no sanctuary status^[8].

Low Gali habitat is open sloppy and with stunted trees. In Himachal Pradesh, Cheer occupied sites tend to have a significant higher grass cover and a significantly low forest cover than unoccupied sites and occupied sites had a significant higher shrub foliage height diversity than vacant sites, as most occupied sites contain shrub cover between 0.5-1.0 m in height appear to be most important factor in determining the use of sites by the species^[23]. The present phytosociological study of this locality also showed high value of herbs those were *Oenothera rosea* (IV=127.99) and *Onychium japonicum* (IV=36.13), lower forest cover (*Pinus wallichiana* with IV=12.53) and higher shrub cover (*Berberis lycium* with IV=25.55) (Table 1). The density index of Cheer at this locality is 0.5/ km² with only one calling site because 6 month before, fire might probably compelled Cheer Population to migrate from this site. Osmaston^[30] considered the annual forest fires “which usually occur just before these birds are breeding”, to be the principal check to their further increase. He thus believed that the species would “become very much more plentiful” following the practice of closing forests to fire for the purpose of regeneration, a prediction that has proved obvious reasons, unduly optimistic. This locality is in the possession of land owner of Lawasi so the land use practices are almost banned here, except fire providing positive inclination to future potential habitat of Cheer Pheasant. Locals n=7, hunters n=3 reported that before fire, the total estimated adult Cheer Population was 10-12 pairs that reduced to only six now.

The analysis of Kavshan (Below Larguchi Behk) showed that *Plactranthus rugosus* (IV=137.19) and *Cyanoglossum lanceolatum* (IV=29.24) *Fragaria indica* (IV=28.22) are dominant and co-dominant species (Table 1). The highest value of *Plactranthus* showed that

shrub cover is dominant over the ground cover, which provide suitable nesting site and protection habitat to Cheer population (Table 1). Whistler^[14] reported the same observation that Cheer Pheasant prefers steep hill sites with a thick crop of spear-grass and studded with *Berberis* bushes. Kaul's^[15-17] study site in Himachal Pradesh also had the covered scrub (e.g. *Berberis kumaonensis*, *Indigofera heterantha*) and scattered trees of *Quercus semecarpifolia*. No records are available for the presence of shrub *Plactranthus rugosus* in Cheer pheasant habitat. Nevertheless this plant species was present in all localities of study area showing close affinity with Cheer Pheasant. Near left of Larguchi Behk a pair was flushed, during survey and disappeared in long bushes of *Plactranthus rugosus* which cover, 70% of the habitat. Three summer residences (Behks) that Sokar, Larguchi and Nanga Tuc are situated within the habitat exerting considerable hunting, grazing, cutting and burning pressure on habitat and Cheer population. Most of the Cheer habitat in Himachal Pradesh is within 1-2 km of human settlements and this leaves them open to disruptive land-use practices^[23]. Grasslands are frequently disturbed through grass cuttings, cattle grazing and stubble-burning^[10].

At Sangar Bari the phytosociological analysis was done at sub-locality Nar Ka Daman where a female was found with 8 incubating eggs. The analysis showed that the habitat is mixed coniferous type, having *Saccharum rufipilum* (IV=45.97), *Plactranthus rugosus* (IV=43.33) and *Pinus wallichiana* (IV=41.18) dominant and co-dominant plant species (Table 1). Habitat is moist having relatively thick cover of *Pinus wallichiana*, patchy distribution of grasses (*Saccharum rufipilum*, *Poa angustifolia* and *Eriophorum* sp.) while shrubs include *Indigofera heterantha*, *Plactranthus rugosus* and *Viburnum nervosum*. This habitat is similar to that of Pir Chinasi (Hari Wala Par). The sub-locality Batal Ka Daman is relatively open grassy, steep sloppy with stunted trees of *Pinus wallichiana* and having thick cover of under story i.e. *Plactranthus rugosus* and *Indigofera heterantha*.

Phytohabitat comparison of dominant and co-dominant vegetations of five main localities showed that the following plant species are common and characteristics of each habitat. These species are *Pinus wallichiana*, *Plactranthus rugosus*, *Indigofera heterantha*, *Berberis lycium*, *Fragaria indica*, *Oenothera rosea*, *Cyanoglossum lanceolatum*, *Saccharum rufipilum* and *Onychium japonicum* (Table 1). Among these, shrubs and herbs showed high importance values indicating that Cheer Pheasant like more grasses and shrubs than trees. In Nepal, Cheer has been observed on bulder-strewn slopes, intermingled with patches of grasses^[18] and

ravines containing scrub, bamboo and grass^[19]. Mishra^[22] reported that well wooded habitats are generally avoided by the Cheer Pheasants. Cheer were most frequently seen in (and heard callings from) the cut areas with secondary growth and they were not seen in thick forest^[20].

Above mentioned observations matched with present four main study habitats except sub-locality Nar Ka Daman at Sangar Bari and Hari Wala Par at Saran Pir Chinasi, where Cheer prefers moist temperate forest having relatively thickly covered *Pinus wallichiana*. Except these two sub localities, all other main sites are open, sloppy with patchy distribution of grasses relatively thick cover of shrubs with stunted trees of *Pinus wallichiana*. All these localities have following main features in common.

- Cheer Pheasant preferred altitudinal range between 1900-2700m
- Steep slopes (70°-85°) with broken cliffs
- Scattered trees (80% *Pinus wallichiana*)
- Patches of shrubs (65% *Plactranthus rugosus*, 30% *Indigofera heterantha* and 5% *Berberis lycium*)
- Long grasses (40% *Saccharum rufipilum*, 20% *Poa angustifolia*, 20% *Fragaria indica* and 10% *Oenothera rosea*)
- All habitats are located within 1-2 km of human settlements.

Correlation analysis between Cheer Pheasant density indices at various sites and habitat variables showed non-significant results with ground cover ($r = 0.24$, $P > 0.5$), with shrubs ($r = 0.44$, $p > 0.5$) and with tree cover ($r = 0.36$, $p > 0.5$). However, the higher value of r with shrubs showed some relation of Cheer population.

Similarly, correlation analysis between Cheer Pheasant population and with canopy cover showed non-significant results i.e. with ground canopy cover ($r = -0.08$, $P > 0.5$), with shrub canopy cover ($r = 0.33$, $P > 0.5$) and with tree canopy cover ($r = -0.05$, $P > 0.5$). Again the higher value of r with shrub canopy cover indicates some affinity of Cheer Pheasant population. On the other hand, Kalsi (1999) reported that density indices were positively correlated with ground cover ($r = 0.86$, $p > 0.5$) and shrub cover ($r = 0.75$, $p > 0.5$) and negatively correlated with tree density ($r = -0.018$, N.S) and sampling density ($r = -0.20$, N.S).

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