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Short Communication

POPULATION STATUS OF WESTERN HORNED TRAGOPAN *(TRAGOPAN MELANOCEPHALUS)* IN MACHAIRA NATIONAL PARK, AZAD JAMMU AND KASHMIR, PAKISTAN

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ABSTRACT

The current population status of *T. melanocephalus* was determined through employing call count method at three sites and 14 selected vantage points i.e., Machiara (7 vantage points), Behri (3 vantage points) and Serli Sacha (4 vantage points) of Machiara National Park, Azad Jammu and Kashmir. The finding of this study showed that relative population density index of *T. melanocephalus* at Machiara was 4.37 birds/ Km^2 at Machiara, 2.14 birds/ Km^2 at Behri and 1.52 birds/ Km^2 at Serli Sacha. The estimated number of adult birds in Machiara was 16, at Behri was 6 and at Serli Sacha 10 birds. A total of 32 birds were estimated at three sites. Comparatively larger relative population density index of Western Tragopan at Machiara can be attributed to more suitable habitat containing dense vegetation, less disturbance by humans and their livestock as compared to Behri and Serli Sacha. This study provides a preliminary indication that population of Western Tragopan may be recovering in Machiara National Park as a result of better protection measures.

Key words: Western Tragopan, relative population density index, call counts, Machiara National Park.

INTRODUCTION

Pheasants are largely dependent on forested habitats, making them vulnerable to deforestation and habitat degradation. They yield significant material benefits to human populations, both locally and internationally and have been absorbed into human cultural traditions over the centuries such as art, religion, social customs, and folklore of different ethnic groups in Asia (Fuller and Garson, 2000). Western Tragopan *(T. melanocephalus)* is brilliantly plumaged, ground dwelling bird that shows high sexual dimorphism (Birdlife International, 2015). Female of Western Tragopan pheasant has black patches and central white streaks on feathers (Zaman, 2008). However, there is no clear demarcation between young females and males (Zaman, 2008). Male pheasants have naked throat (lappets) and use to attract females during breeding season (Ramesh *et al.,* 1999). Male is highly territorial and give territorial calls usually at dawn in the early spring (Roberts, 1991). Male is larger in size (body length 65-75 cm; weight 1.9 Kg to 2.3 Kg) than female body length 60 - 65 cm; 1 Kg to 1.7 Kg**)** (Ashraf *et al*., 2004; Zaman, 2008). Female of Western Tragopan pheasant has black patches and central white streaks on feathers. However, there is no clear demarcation between young females and males (Zaman, 2008). Western Tragopan is endemic to North-western Himalayas ranging from Hazara in North Pakistan through Jammu & Kashmir to Garhwal in India (Ramesh *et al*., 1999). Its populations is found in five isolated regions; 1) Palas Valley (Kohistan), 2) Kaghan and Neelum Valley (Azad Jammu & Kashmir (AJ&K), 3) Kishtwar and Chamba (Kashmir and Himachal Pradesh), 4) Beas catchment in Kulu Valley (Himachal Pradesh) and 5) East of Sutlej River to Garhwal (Birdlife International, 2001). In Pakistan, Western Tragopan is distributed in and around Palas Valley and adjacent areas of Kohistan, Kaghan valley in KPK, Machiara National Park, Salkhalla Wildlife Sanctuary, Pir Chinasi and Pir Hasimari in AJ&K (Whale, 1996; Awan, 2010; Ali *et al*., 2015).

Western Horned Tragopan is a shy bird with secretive behavior, inhabits open moist deciduous and coniferous temperate forest having dense under story and shrub-layer in Great Himalayan National Park (Ramesh *et al.,* 1999). Western Tragopan is generally found more abundantly on the moist humus rich slopes (Delacour, 1977), on undisturbed plateaus or ground. Its apparent existence on the precipitous mountain sides having dense shrub layer indicated as the function of high disturbance and hunting rates (Mirza *et al.*, 1978). It prefers to stay in places having no disturbance and is confined to extreme steep terrain (Nawaz *et al.,* 2001).

During winter season *T. melanocephalus* moves down from higher elevation to lower valleys due to occurrence of snowfall which reduced the food resources (Roberts, 1991) on the contrarily, during summer season they return to higher elevation due to return of favorable condition (Islam, 1983; Liley *et al.*, 1995).

Male is highly territorial and give territorial calls usually at dawn in the spring (March to May) (Roberts, 1991). They are found in large flocks or small groups in

winter and breed in May and June (Ramesh *et al*., 1999). The male can be easily identified by its bright colors and from its call during the breeding season.

Human interventions may have caused the disturbance of their particular habitats (i.e., degradation and fragmentation) due to which nesting site has been reduced thus ultimately effect the population and reproduction rate (Johnsgard, 1986). Western Horned Tragopan is vulnerable in Pakistan as per IUCN Red List (2017). Present study determined relative population density of this bird in Machiara National Park.

MATERIALS AND METHODS

Study area: This study was carried out during 2012-2013 in Machiara National Park (MNP) of Azad Jammu and Kashmir, situated at 34º-31' N latitude and 73º-37' E longitude, covering an area of 13,532 ha between 2,000 m to 4,700 m elevation (Qamar *et al*., 2008) (Fig. 1).

Machiara National Park lies in the Great Himalayan chain that branches off from Nanga Parbat (Qamar, 1996). Dominant vegetation of MNP includes *Aesculus indica, Cedrus deodara, Juglans regia, Pinus wallichiana, Prunus pardus* and *Taxus wallichiana* (Baig, 2004; Ahmed, 1997) and associated fauna including Musk deer (*Moschus chrysogaster*), Snow leopard (*Uncia uncia*), Grey goral (*Naemorhedus goral*), Cheer pheasant (*Catreus wallichii*), Lammergeier (*Gypaetus barbatus*) and Himalayan griffon vulture (*Gyps himalayensis*) (WWF., 2008) is characterized by temperate Himalayan mixed-forest/alpine-scrub-rangeland ecosystem (Qamar *et al*., 2008). Machiara National Park has high ridges, deep valleys and steep slopes. Fresh water springs and perennial streams with cold clear water are found (GOAJK, 2005). The selected study site falls into Western Himalayan Eco-region that was one of the global 200 eco-regions. It has two distinct forest types that can be recognized: evergreen broadleaved forest and deciduous broad-leaved forest (WWF, 2008).

Methodology: Western Tragopan population density was estimated through call count census (Gaston, 1980). Reconnaissance survey was conducted in the study area to identify potential habitat of Western Horned Tragopan. Information about its occurrence was gathered from park employees and local people based on which study sites were selected in the potential habitat of Tragopan. Study sites were selected based on accessibility to the area and where bird can be heard over as wide an area as possible.

Call Counts: Western Horned Tragopan is elusive species, often prefers undergrowth thick vegetation that protects it from predators and to reduce the rate of disturbance, therefore, direct sighting of the species was difficult. Call count method was applied for population density estimates (Gaston, 1980), which is generally applicable for pheasants. Male Tragopan gives loud calls in dawn hours during breeding season. Calling birds count in a particular area yield an estimate of number of males present. It also shows species pairs for breeding and this number can be doubled to provide an estimate of breeding population. A total 14 vantage points were selected in three localities based on accessibility and where bird call can be heard clearly. A detail of calling sites, altitude, and coordinates has been included in Table 1. In addition, weather conditions, wind velocity, and topographical features (i.e., slope, aspect and altitude) were also recorded to understand the habitat selection by *T. melanocephalus*. The data was collected early in the morning at 4:30am-7:30am during March to June 2013. The methodology was followed as described by Ramesh *et al*. (1999).

Data Analysis: The data was analyzed employing E = n/P equation (Gaston, 1980) to determine the relative population density of *T. melanocephalus.*

Where, E= Estimate of call count

n = Number of calling sites/stations

P = Unit effort, i.e. sampling plots)

RESULTS AND DISCUSSION

A total of 14 vantage points at three localities were covered for data collection (Table 1). Average relative population density index in Machiara locality was 4.37 calling sites/ Km^2, in Behri 2.14 calling sites / Km^2 while in Serli Sacha it was 1.52 calling sites /Km^2 (Table 2). Relative population density index was highest at Machiara (4.37 calling sites/Km^2) and lowest at Serli Sacha (I.52 calling sites/Km^2). Chi square test highlighted that the population density index of *T. melanocephalus* ($P > 0.05$, $\chi 2 = 0.88$, $df = 2$) was not significantly different among three sites of MNP. However, apparently Machiara had more birds as compared to Behri and Serli Sacha that could be attributed to micro-climate habitat features and low interference that were not tested.

Machiara locality contained seven vantage points and five study sites, where average number of calls of adult male Tragopan heard was eight. Hence, adult (usually males call) estimated population at this locality was 16 birds (Table 3). Behri had 3 vantage points, 2 study sites where 3 calls were heard, estimating 6 birds. Serli Sacha had 4 vantage points, 3 study sites where five calls were heard, estimating 10 adult birds (Table 3). It is usually assumed that male: female (ratio) is 1:1. Hence 32 adult Tragopan occurred in the three localities.

Machiara locality had highest estimated relative population density (4.37 calling sites/Km^2) as compared to other sites Behri (2.14 calling sites/Km^2) and Serli Sacha 1.52 calling sites/Km^2. This could possibly be because of more suitable habitat having dense vegetations and relatively low disturbance caused by humans and

their livestock. Earlier studies estimates of 1.5 birds /Km^2 in Machiara (Islam, 1982). However, Awan *et al*., 2015 estimated 22 adult males in 10.9 Km^2 area in Machiara (2.01 / Km^2). A study conducted in Daranghati Sanctuary in India by Pandey (1994) reported a population of 150 - 200 Western Tragopan with a density of 0.5 birds /Km^2. Other studies conducted in India reported relative population abundance of Western Tragopan 2.66+0.47/ calling point (Ahmed *et al.,* 2017) and 3.2+1.4 birds / station (Miller, 2010).

The study sites in MNP having comparatively higher population density contained mixed coniferous-broad leave forest with dominant plant species of *Pinus wallichiana* (0.49/10m^2), *Abies* pindrow (0.27/10m^2), Quercus *incana* (0.03/10m^2), *Aesculus indica* (0.11/10m^2), *Taxus wallichiana zucc.*, (0.01/10m^2) *Cedrus deodara* (0.01/10m^2), *Indigofera heterantha* (0.25/10m^2), *Geranium wallichianum* (0.22/10m^2) and *Ajuga bracteosa* (0.15/10m^2) falling between 2800 m and 3300 m elevation characterized by steep slopes, rocky and rugged terrain covered by thick vegetation. Miller (2010) also reported that Western Tragopan prefers a habitat on higher elevation with in broad leaved and conifer forests in Great Himalayan National Park, India.

Results of present study are comparable with findings of other studies conducted in Pakistan and elsewhere which indicates that this species has sustained its population in this National Park. This can be attributed to better protection of population and habitat of Western Tragopan and other wildlife. However, population density was found lower in areas having more human and livestock disturbance in the Park as compared to better protected sites. Strict protection measures by strengthening wildlife staff and awareness campaign among local people in and around the park are suggested. This study provides baseline data of Tragopan's population in Machiara National Park which can be used for the management and conservation of this threatened bird.

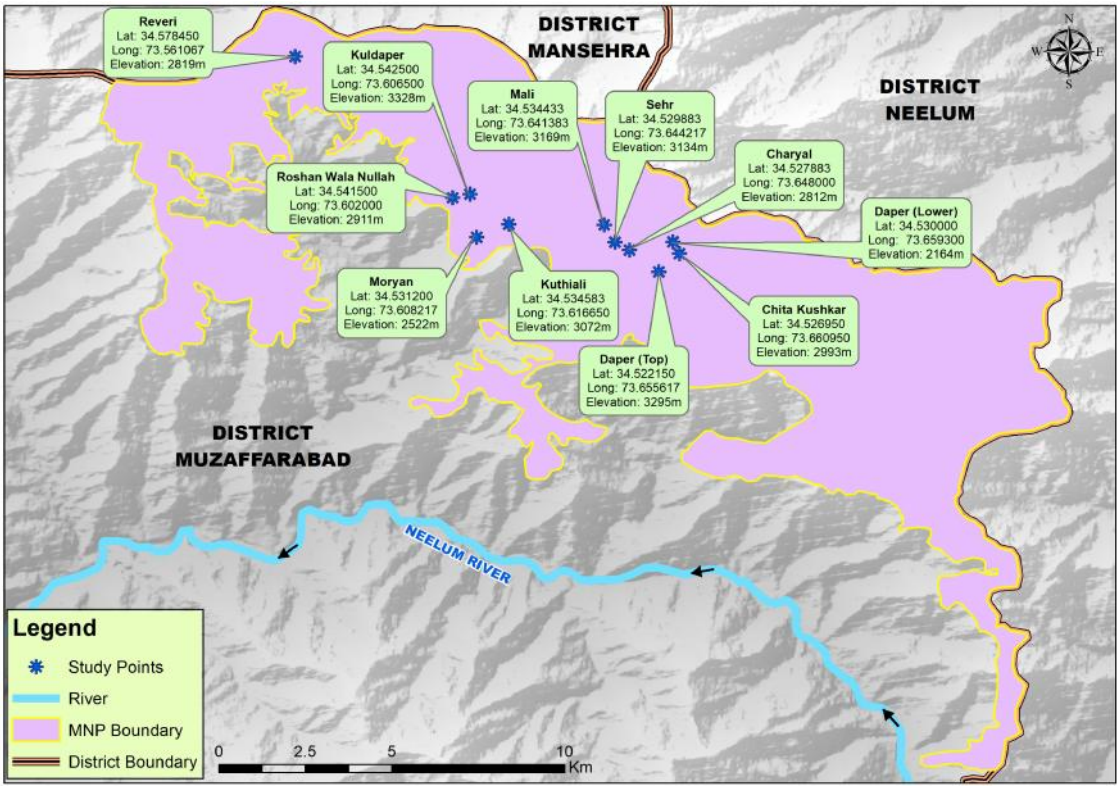

Figure1: Map of the study area showing study sites of Western Horned Tragopan

Table 1. Characteristics of study sites and number of calling sites in the Machiara National Park

Locality	Study site	Altitude	Coordinates	No. of calling sites
1-Machiara	Raveri	2819m	N34 ˚34.707' E 73 ˚33.664'	2
	Mali	3169m	N34º32.066' E73º38.483'	2
	Kuthiali	3072m	N34º32. 075' E73º36. 999'	1
	Moryan	2522m	N34º 31.872' E73º 36.493'	1

	Charyal	2812m	N 34 °31.673' E073 °38.880'	1
2-Behri	Roshan wala nullah	2911m	N34°32.49' E73°36.12'	1
	Kuldaper	3328m	N34°32.55' E73° 36.39'	2
3-Serli Sacha	Chita Kushkar	2993m	N34°31.617' E73°39.657'	2
	Sehr	3134m	N34° 31.793' E73°38.653'	1
	Daper	3295m	N34°31.329' E73°39.337'	1

Table 2. Population density index of Western horned tragopan in Machiara National Park during 2012-2013

Locality	Vantage points	Area surveyed (Km^2)	Density index (calling sites/ area surveyed) (Km^2)
Machiara	7	1.60	4.37
Behri	3	1.40	2.14
Serli Sacha	4	2.63	1.52
Average density index			2.67

Table 3. Population estimation of Western horned tragopan in Machiara National Park during 2012-2013.

Locality	Study site	No. of vantage points	Average No. of calls heard at vantage points (V)	Estimated adult population (average No. of calls at a vantage point×2)
1-Machiara	Raveri	2	V1=1 V2=2	6
	Mali	2	V1=1 V2=1	4
	Kuthiali	1	1	2
	Moryan	1	1	2
	Charyal	1	1	2 **Sub-total 16**
2-Behri	Roshan wala nullah	1	1	2
	Kuldaper	2	2	4 **Sub-total 6**
3-Serli Sacha	Chita Kushkar	2	V1=1 V2=1	4
	Sehr	1	2	4
	Daper	1	1	2 **Sub-total 10**
				Total 32

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