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# A REVIEW OF POPULATION ECOLOGY OF HANGUL DEER (*CERVUS ELAPHUS HANGLU*, WAGNER/ *CERVUS CANADENSIS HANGLU*) IN DACHIGAM NATIONAL PARK, KASHMIR, INDIA

J. A. Malik<sup>1</sup> and S.K. Bansal<sup>2</sup>

<sup>1</sup>Department of Zoology, Govt. Degree College, Bijbehara, Anantnag, Kashmir, India

<sup>2</sup>Pest Control and Ayurvedic Drug Research Laboratory, SSL Jain PG College, Vidisha, Madhya Pradesh, India

\*Correspondence: malik.junaidahmad@gmail.com

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## ABSTRACT

The Kashmir Red Deer or Hangul (*Cervuselaphus hanglu*) a member of family Cervidae is presently surviving only under the moist temperate forests of Kashmir region. Most of its population is concentrated in the world famous Dachigam National Park which covers an area of 141 sq. kms. and is located in the foothills of Zabarwan range among the high mountains of the mighty western Himalayas.

**Keywords:** Hangul, Dachigam, Kashmir Red Deer, Population dynamics.

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## INTRODUCTION

Kashmir Red Deer commonly known as Hangul, *Cervuselaphus hanglu*, is critically endangered animal (IUCN 2004). The deer is the only survival of Red Deer Group in the Indian subcontinent. As per the studies of Holloway and Schaller, earlier in the nineteenth century the Hangul deer was confined to an area of about 65 km in width to North and East of Jhelum and lower Chenab river from Zakurah in the North to Ramnagar in the South. According to indirect evidences the distributary range of Hangul has considerably widened. Buffer zones such as Sindh valley, Dara Reserve, Brain Reserve, Shikargah Reserve, Khrew Reserve, Khonmoh Reserve, Overa Sanctuary and Lidder valley have become restocked by normal migration outside the Dachigam. Other areas namely Bandipora, Lolab, Kishtwar and Desu have recently been re-occupied by the stray congregations of Hangul deer. The population decline occurred as from as estimated 2000 Hangul in 1947 only 140-170 survived in 1970 (Gee 1965; Holloway 1970). Grazing, poaching and disturbance due to human activities were identified as major factors affecting the Hangul population in Dachigam National Park (Kurt 1978, 1979). The latest census exercises conducted by Wildlife Department of J&K from 2004 to 2011 have put the numbers in between 150 and 250.

## Dachigam national park

Dachigam National Park lies between 34°05"N - 34°11"N and 74°54"E-75°09"E in the Western region of Great Himalayan range. The mountainous range of the National Park is a part of Great Zansakar range, two steep ridges one arising from Harwan Reservoir with peaks about 2600 to 3000 mts above sea level and other North east of the New Thread rising to 4100 mts above sea level form the natural boundaries of the famous Dachigam National Park. Dachigam National Park is roughly rectangular in shape, approximately 22.5 Kms. Long and 8 Kms. Wide. The total area of Dachigam National Park is 141 sq. km and is divided in two zones; Lower (26 km<sup>2</sup>) and Upper Dachigam (115 km<sup>2</sup>) on the basis of forest types and altitudinal range. The park exhibits a variety of vegetation types and experiences asub-Mediterranean type of climate (Singh *et al.*, 1976).

## HABITS AND HABITAT

Hangul, Kashmir Red Deer being the state animal is a subspecies of European Red Deer. Although more than 150 species of deer are recognized globally. Hangul is the only surviving race of the Red Deer family of Europe in the subcontinent. Hangul was once distributed relatively widely in the mountains of Kashmir (Schaller 1969). However, the

only viable population today is the Dachigam population (Kurt 1978; Schaller 1969; Holloway 1971) where it is distributed between elevations of 1,700 m to 3,500 m (Department of Wildlife Protection 2003). This area harbours broad leaf mesophyll forest of Maple (*Acer* sp.), Mulberry (*Morus alba*), *Ulmus* spp., *Rhus* spp., Walnut (*Juglans regia*), Hatab (*Parrotiopsis jacquemontiana*), a variety of conifers such as Deodar (*Cedrus deodara*), Blue pine (*Pinus wallichiana*), Spruce (*Picea smithiana*) and Fir (*Abies pendrow*) (Singh *et al.*, 1987; Banoet.al., 1995; Sathyakumar *et al.*,2009). Hanguls are found in single or small groups of 2 to 25 members. With the onset of spring, groups separate and during summer mixed groups are hardly seen (Ahmad *et. al.*, 2002). The social organisation of deer shows it is matriarchal, mature stags live apart from the hinds except during the rut, the care of the young is left entirely on the hinds. In summer female forms groups in small units or mother fawn which may associate for shorter periods forming groups of 12-16 members and males are found in single or in small stag units of 2-9 members (Gee 1965; Holloway 1970). Various climatic factors and requirements of food, protection from predators etc. may bring these groups together in a single unit. Each unit with its component groups has its grazing territory, a low level winter territory which gives more or less direct access to high level summer territory. The wintering territory that is Lower Dachigam is really “the home ground”. The oak patches offer good cover during winters and are very much preferred for resting. Since the oak patch is very near the main road therefore due to heavy vehicular traffic deer avoids these patches during day time while as sighting is very frequent afterwards.

## MATERIALS AND METHODS

The population estimation exercise was systematically carried out in 1960s Gee 1965 had estimated the population size in 1957 and 1965. Schaller 1969 estimated Hangul population during the rut and concluded that rutting period is not good for population estimation. Holloway 1971 conducted a count in November 1969 and February 1970. He divided the total study area in sex blocks. Each block was scanned by a group of individuals by a simple Encounter Rate Method (ER) and modified Line Transect Method (LT) so as to maximise the detection. After that Jammu and Kashmir Wildlife Department from 1996 followed the same method for the census of Hangul. This method of Holloway

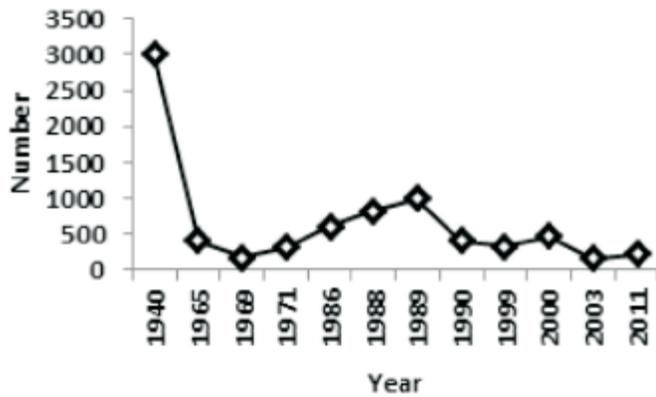
by Jammu and Kashmir Wildlife Department was more or less consistent and enumeration was done largely in mornings except in a few cases when it was conducted both in mornings and evenings (Department of Wildlife Protection, 1996, 1997, 2000, 2001, 2002, 2003).

## DISCUSSION

Dachigam has witnessed a drastic decline in the population of Hangul with the last three decades. In 1940 the population of Hangul was around 3000 (Holloway 1970). In 1947 it was estimated at 2000 and ten years later at 400 (Gee 1965). Schaller in 1969 censuses the population during the period of rut and estimated its size at 180 animals. Holloway in 1970 tailed 140-170 Hanguls. In 1971 WWF the Hangul and estimated its size at 320 animals while according to J&K Wildlife Department the number was put at 550 animals. In March 1980 the figure was at 347 animals. In March 1983 the population was estimated to be at 550 animals. According to Wildlife Protection Department in 1986 the number was estimated to be at 605 and in 1988 population was estimated as 818. But while insurgency griped the valley and Hangul made a great setback. Its population again decreased and was estimated between 140-170 animals. In 1995 the population was estimated to be at 290 (Department of Wildlife Protection 2003). As per census of 1999 the population of Hangul was estimated at 270-325 in the wintering ground of Dachigam whereas total population of Hangul in and around Dachigam National Park was estimated as 435-520. The census conducted in March 2000 in Dachigam National Park estimated the population as 350-470 animals. The censuses of 2003, 2008 and 2009 have put the population of 150-170, 117-119 and 201-234 respectively. Recent Hangul population estimation in March 2011 roughly put the number as 218±13.96.

**Table 1.** Hangul population in Dachigam national park

Year	Number	Year	Number
1900	5000	1988	818
1940	3000	1989	1000
1947	2000	1990	400
1965	400	1995	290
1969	180	1999	325
1970	150	2000	470
1971	320	2003	150-170
1980	347	2008	117-119
1983	550	2009	201-234
1986	605	2011	218 ± 13.96



**Fig. 1.** Diagrammatic representation of population trend of Hangul in dachigam, 1940-2011

## CAUSES OF DEPLETION

### Habitat fragmentation

The habitat of Hangul has been disturbed by many factors and the prominent ones being metallic road from Lower Dachigam to Upper Dachigam, fragmentation by fish farm, sheep farm, water supply from Marsar Lake to Dachigam village and adjacent areas, transmission lines and also encroachment by agricultural activities which limit the movement of the herbivores in the park.

### Biotic interference

Several departments of Jammu and Kashmir Government present in the Park, such as Game (Protection and Animal Enclosures), Fisheries (Trout Hatchery), Tawaza Entertainment (VIP Lodge at Draphama), Public Works (Maintenance of main road), Horticulture (Garden of VIP Lodge), Water and Irrigation, Public Health, Domestic Livestock (Sheep Farm) are also responsible for the decline of Hangul population.

### Poaching

Poaching has been identified as the main cause of decline of Hangul in the past and comprised both civilian and military personnel (Gee 1965; Holloway 1970; Kurt 1978). Poaching by nomads who take their livestock to upper reaches of the park during summer is still a major cause of Hangul population decline. Full-fledged settlements of nomads in upper Dachigam have been encountered during summer (Bhat 2008). Some of them possess herd protection guns which they use for poaching (Bhat 2008).

## Predation

Four large predators could be considered to influence the Hangul population, i.e. brown bear, snow leopard, leopard and Himalayan black bear. But leopard had been seen the main predator which has caused maximum decline in its population.

## RECOMMENDATIONS AND CONSERVATION MEASURES

The prevailing scenario in the National Park is almost satisfactory at present. There are many issues to be resolved by the Wildlife Department for ensuring proper conservation of Hangul and its habitat; i). Livestock grazing in the core habitat of Hangul Deer and Musk Deer at upper Dachigam should be completely banned. ii). Habitat areas of Hangul Deer and Musk Deer, especially the preferred plant species for forage in these areas should be protected. Efforts should also made for the plantation of these plant species in their degraded habitats. iii). For successful management of the National Park sheep breeding farm and other interferences like VIP lodge and trout hatchery should be removed and relocated in some other part of the valley with better grazing. iv). Scientific community should conduct research on priority management issues. It is often argued that the ecologists fail in communicating their knowledge to decision makers and, therefore, have limited influence. It is, therefore necessary to link science to management in order to have effective management. The advice provided by the researchers need to be fed into the developmental exercises. v). Awareness of public about importance of biodiversity in general and endangered/ threatened species in particular should be raised to win their support and cooperation in conservation efforts.

## CONCLUSION

The foregoing discussions present review information on the endangered red deer of Kashmir commonly known as Hangul (*Cervuselaphus hanglu*). It is quite evident from the discussion that overall conservation scenario continues to be dismal. A lot of management and research input is required to retain the population of Hangul deer. Restoration of important conservation measures is needed which include enforcement of legislation, evaluation of habitat, regular monitoring of the species status, factors responsible for its

degradation and use of latest technology like cloning using potential surrogates like goat for Hangul.

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