SPOTTED DEER OR CHITAL

(*Axis axis* Erxleben, 1777)

K. Sankar and B. Acharya

Order	: Artiodactyla
Family	: Cervidae
Sub-Family	: Cervinae
Genus	: *Axis*
Species	: *A. axis*
Common name	: Spotted deer

Conservation Status	
WPA (1972)	: Schedule III
IUCN RED DATA BOOK	: Unlisted
CITES	: Not listed

INTRODUCTION

Chital or spotted deer *(Axis axis)* is the third largest deer inhabiting the plains and undulating terrain of India. A well-built stag stands 90 cm at the shoulder and weighs about 85 kg (Prater 1971). The coat is reddish-fawn, spotted with white, and with white underparts. The antlers curve in the shape of a lyre, with up to three points on each antler. This popular species is a favourite with zoological parks around the world for their beautiful appearance and graceful gait.

GEOGRAPHICAL AND ECOLOGICAL DISTRIBUTION

Chital is an endemic species of south Asia, occurring in India, Sri Lanka, Nepal and Bangladesh (Prater 1934, Schaller 1967). The northern boundary of chital's distribution runs along the foothills of the Himalaya from western Assam through West Bengal, Uttar Pradesh and

Uttaranchal. The eastern boundary follows western Assam, northern Bengal and Sikkim. The western boundary is formed by eastern Rajasthan and Gujarat. Chital occur throughout the rest of peninsular India sporadically in the forested areas. They are found in a variety of forest types in India viz. dry deciduous, moist deciduous, thorn and mangrove forests. The introduced chital population in Andaman Islands is found in evergreen forests. Eisenberg and Seidensticker (1976) were of the opinion that dry deciduous habitats with scrub serves the favoured habitat of chital.

POPULATION

Chital have declined drastically throughout their range, and are now only locally abundant within 123 Protected Areas of India and some forest tracts (Source: National Wildlife Database, WII). The strongholds of chital where they have been adequately studied are: Corbett (De and Spillit 1966), Kanha (Schaller 1967), Bandipur (Johnsingh 1983), Nagarahole (Karanth and Sunquist 1992), Sariska (Sankar 1994), Gir (Khan *et al.* 1995), Guindy (Raman 1997), Pench (Biswas and Sankar 2002), Ranthambore (Bagchi *et al.* 2003) in India, Chitwan (Mishra 1982) and Karnali-Bardia (Dinerstein 1980), in Nepal, and Wilpattu (Eisenberg and Lockhart 1972) in Sri Lanka. Introduced chital populations occur in USSR, Yugoslavia, USA, Argentina, Brazil, Uruguay, Australia, Hawaii and several private ranches in the Western Cape, South Africa (Lever 1985).

ECOLOGY

Group size and composition

Chital are essentially social animals, rarely seen as solitary individuals. The basic social unit among chital is a matriarchal family group, normally consisting of an adult female, her offspring from the previous year, and a fawn (Ables 1974). The usual herd is composed of two or more such family units and is often accompanied by individual deer of mixed sex and age-classes. Chital is known to exhibit a fission-fusion system or fluid group formation and dissolution (Schaller 1967, Mishra 1982, Barette 1991). Depending on various circumstances, a chital group may consist of one to 150 or more individuals (De and Spillit 1966, Eisenberg and Lockhart 1972, Fuchs 1977, Krishnan 1972, Schaller 1967). The composition of chital groups has been observed to change frequently

during feeding periods, during the rut when males frequently join groups of females (Schaller 1967), or while fleeing from predators (Dinerstein 1980). These social groupings of chital do not remain permanent (Schaller 1967, Eisenberg and Lockhart 1972).

According to Dinerstein (1980), chital group size in Karnali-Bardia (Nepal) varied from one to 91 individuals with a mean group size of 10.7. Mishra (1982) reported a higher percentage of chital in group size of between five to 10 individuals with a mean group size of 7.5 in Chitawan National Park, Nepal. Barrette (1991) reported two to 125 individuals in Wilpattu (Sri Lanka) with a mean group size of 12. In Nagarahole, where only 4% of chital sightings were of single individuals, the mean group size of chital was around six, (range 1-81) (Karanth and Sunquist 1992). In the scrublands of Sariska Tiger Reserve, Rajasthan, formation of large groups (> 20 individuals) occurred in June to August when forage conditions improved just after the monsoon rains. These large aggregations were attributed to local abundance of forage and predator avoidance strategy (Sankar 1994). The seasonal group size in Sariska varied from 2 to 88 individuals with an average group size of 7 to 8 individuals. About two-third of the chital groups observed had less than 6 individuals. The absence of open grassy patches within Sariska might have prevented formation of larger groups. Khan *et al.* (1995) observed chital group sizes ranging from one to more than 50 individuals in Gir. Mean group size of chital in Pench, in central India, was 3.4 (Biswas and Sankar 2002), while in Ranthambore, the mean group size was 4.6 (Bagchi *et al.* 2004). Ables (1974) reported group size of chital varied from 2 to 15 individuals in Texas, USA.

Antler condition and breeding season

The period of breeding (rut) of chital is determined by the annual antler cycle of antler development, the frequency of sexual behaviour, and, in a way, the time of fawning. Differences in the onset of the main rut and the peak of the rut of chital exist across locations. In Kanha, a high percentage of chital bucks were observed in hard antler throughout the year (Schaller 1967). The lack of definite season for antler shedding in Kanha is perfectly in accord with the observation that breeding was not confined to any season but took place through out the year, with the activity increasing greatly from March to June, peaking in May. In Karnali-Bardia, 100 percent hard antlers were seen in the month of July, of which 53 percent of them were seen with

antlers > 3 feet (Dinerstein 1980), while in Chitwan the peak rut was observed to be between April and May (Mishra and Wemmer 1987). In Bandipur the peak rutting season was between April and July (Sharatchandra and Gadgil 1975, Johnsingh 1983). However, the juvenile and yearling stags peaked their rut 2½ and five months later, respectively, possibly a strategy to gain mating chances at a time when the adult males are past their rut, thus avoiding interclass conflict for mates. Though chital in Sariska remained in hard antlers throughout the year, in summer close to 95 percent of the stags were observed in hard antlers, of which about 25 percent of them were with antlers > 3 feet in length (Sankar 1994). In Guindy National Park, 50% of the stages were in hard antlers for nearly the whole of the year, but a distinct seasonality existed among age classes of males, with most adult stags in hard antler during March-July; the peak rut being May-June (Raman 1998). For chital in Texas, USA, the major breeding season lasted from late May till August, which included a breeding peak (Ables 1974). In Hawaii, USA, the rut was in April through August with sporadic mating observed throughout the year (Graf and Nichols 1966). During the rut, stags bellow and fight to defend small groups (harems) of females with which they hope mate. Gestation is 210-225 days, after which a single fawn is born. Fawns are weaned off at about six months, and sexual maturity is reached by the 12th-14th month (Prater 1971).

Sex ratio

Invariably, the adult sex ratio of chital is biased towards females. Schaller (1967) reported sex ratio of 0.6 male :1 female in Corbett National Park, 0.7 : 1 in Keoladeo Sanctuary, Bharatpur, and 0.7:1 in Kanha. Dinerstein (1980) reported a sex ratio of 0.5 males:1 female, and 1 : 0.5 as female to fawn ratio in Royal-Karnali Bardia. In Bandipur, the average male : female ratio was 0.6 : 1, and the female : young ratio was 1 : 0.4 (Johnsingh 1983). The male : female ratio in Nagarahole (Karanth and Sunquist 1992) was 0.7 : 1. In Sariska, the average male : female ratio was 0.4 : 1, and the female: fawn ratio was 1 : 0.2 (Sankar 1994). Also, new-born fawns were seen all through the year with a peak fawning period from December to February. In Gir, the average male : female ratio was 0.4 : 1, and the female : young ratio was 1 : 0.2 (Khan *et al.* 1995). The ratio of males to females in Hawaii was 0.7 : 1 (Graf and Nichols 1966).

Predation and Mortality

The main causes of death in chital are predation, diseases and accident. Occasionally, stags kill each other when fighting. Humans avidly hunt and poach chital throughout their range. Chital are known to be susceptible to livestock-borne diseases such as rinderpest (Schaller 1967) and foot-and-mouth disease (Sankar 1994). Accidents especially from speeding vehicles are a cause of chital mortality but occur rarely within protected areas. Predation is by far the major cause of chital mortality. Older chital stags are more susceptible to predation than younger stags (Johnsingh 1983, Patel 1992, Karanth and Sunquist 1995). This may be due to their being less vigilant during rut, separation from the group after rut, or weakening from injuries from conflicts. In Kanha, chital remains were found in about 52% of tiger scats and 59% of leopard scats analysed (Schaller 1967). In Bandipur remains of chital were found in about 39 % tiger scats, 51% leopard scats, and 52% dhole scats (Johnsingh 1983). In adjoining Nagarahole remains of chital were found in about 31% tiger scats, 44% leopard scats, and 50% dhole scats (Karanth and Sunquist 1995). In Sariska, around 54% of the scats of tiger and 21% of leopard scats contained chital remains (Sankar 1994). Chital remains were found in about 53% of tiger scats in Pench (Biswas and Sankar 2002) and 61% of tiger scats in Ranthambore (Bagchi *et al.* 2002).

Food habits

Chital are known to feed on more than 160 species of plants (Schaller 1967, Johnsingh and Sankar 1991). Schaller (1967) showed that graze formed the bulk of the feed of chital, while Mishra (1982) considered chital primarily a grazer. On the basis of morpho-physiological ruminant feeding types, Hofmann (1985) classified chital as an intermediate/mixed feeder. Rodgers (1988) had categorised chital as a generalist feeder, with a diet consisting of grasses, forbs, and leaves of woody plants. In Sariska, chital was a grazer as long as green grasses were available (monsoon and post-monsoon seasons), but switched over to fallen leaves, flowers and fruits in winter (Sankar 1994).

Home range

In Sariska the mean home range of male chital stag was around 3.5 km^2, and that of a chital doe was around 2.5 km^2. The estimated annual home

range of a chital doe was around 16 km² (Sankar 1994). Annual mean home range of chital does in Karnali-Bardia was about 1.4 km², and that of stags was about 2 km² (Moe and Wegge 1994).

Water use

Chital usually drink water once a day, and more frequently in summer. This has made them inhabitants of forest tracts with widely scattered but assured presence of water.

BEHAVIOUR

Chital spend a major portion of their life in foraging, resting, and wandering within their ranges, with the extent of these activities determined by season (Schaller 1967). In a day, peak feeding times are around dawn and dusk. They usually have two major resting periods – before dawn and mid-day.

CONSERVATION

Chital form one of the important prey of top carnivores as is evident from studies in Kanha (Schaller 1967), Bandipur (Johnsingh 1983), Rajaji National Park (Johnsingh *et al.* 1993), Sariska (1994), Pench (Biswas and Sankar 2002) and Ranthambore (Bagchi *et al.* 2002). Chital is a species that is most amenable to wildlife management practices, and just a little effort and care is required to increase the numbers of this prolific breeder, in addition to maintaining the grassland-woodland interface (edge) habitat so essential for the survival of the species. Though the species has thrived well and, is now locally abundant within protected areas, the remaining population is highly vulnerable to poaching, habitat destructions and livestock-borne diseases. Livestock such as buffaloes out-compete chital in forage consumption during the pinch season as observed in Sariska (Sankar 1994), making the case strong for prevention of livestock grazing where chital is present. As would be obvious from the above fact, the conservation and management of chital populations is of paramount importance in reducing large carnivore depredation of livestock, and, consequently, mitigate the increasing levels of human-wildlife conflict.

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