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Population and Distribution of Four-horned Antelope *Tetracerus quadricornis* in Talamalai plateau, Sathyamangalam Wildlife Sanctuary, Tamil Nadu, Southern India

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Abstract
The present paper deals with population and distribution pattern of Four-horned Antelope *Tetracerus quadricornis* in Sathyamangalam Wildlife sanctuary. Of 24 individuals recorded in 19 sightings. The mean group size 1.26 (range 1 to 2 individuals) proved that this species is mostly solitary or semi-solitary. The study was carried out by grid based approach and recce samplings were followed to find out the distribution pattern of the species. This species is known to be shy in nature; because of its smaller size make direct sightings were difficult to find the animal. However indirect signs were also taken in to consideration for the assessment of its distribution. The majority of the records were high in hill/nulla slopes (~72%) and flat and open areas (28%). Meanwhile sightings (direct and indirect signs) of its locations were plotted in the map. This paper revels that the Four-horned Antelopes have sparsely distributed in different habitat types in the sanctuary.

Keywords: *Tetracerus quadricornis*, Population, Distribution, Sathyamangalam.

1. Introduction

The Four horned Antelope *Tetracerus quadricornis* is only member of this group with two pairs of horns (Prater, 1980) [15]. Males (Plate 1) have horns whereas in females (Plate 2) horns are absent. It is a small sized antelope among the Bovidae family, and dull light brown in colour (Jerdon, 1867; Brander, 1923; Prater, 1980; Macdonald, 1984) [7, 5, 15, 14]. It has pre-orbital glands and well developed glands between the false hooves of the hind legs (Prater, 1980 and Roberts, 1977) [15, 18]. It is an endemic species to the Indian subcontinent (Jerdon, 1867; Brander, 1923; Viceroy, 1936) [7, 5, 28] and its 95% of its current global population occurs in India (Rahmani, 2001) [16], the remaining 5% found in Nepal (Krishna *et al.*, 2009) [10]. The IUCN listed the species Vulnerable (IUCN, 2014) [27]. The distribution of the species is reported that it is found in all of the Indian States except Kerala (Rice, 1990) [17]. Despite its wide distribution in India, this species has received very little scientific attention.

Literature review shows that the species is mentioned briefly in multi-species studies (Schaller, 1967; Krishnan, 1972; Sharatchandra and Gadgil, 1975; Karanth and Sunquist, 1992; Saxena, 1996; Singh, 2001; Sharma *et al*., 2003) [20, 12, 21, 9, 19, 25, 24]. The first detailed study on this species provided information on population density, age structure and diet of the species in Gir Forest was by Berwick (1974) [4]. A questionnaire survey on information of the status of four-horned antelope was reported in 1990 (Rice, 1990) [17]. At the beginning of 20th century a few targeted field based studies was carried out on this species (Baskaran and Desai, 1999) [1]; Krishna *et al*., 2008; Baskaran *et al*., 2009; Sharma 2006; Sharma *et al*., 2009 and Leslie and Sharma, 2009; Krishna *et al*., 2009) [11, 2, 22, 23, 13, 10,]. Many aspects of this species are remaining unclear, virtually there is no information exists on the four-horned antelope in Sathyamangalam Wildlife Sanctuary. The Working Plan of the Sathyamangalam Forest Division also no report of the species presence in Sathyamangalam Wildlife Sanctuary, antelope presence in Talamalai plateau except it is being reported in Talamalai Reserve Forest by Rice, 1991. The majority of the research studies were carried out in this division was limited to the Moyar valley. Considering all these facts, this study was carried out in the Sathyamangalam Wildlife Sanctuary to evaluate the population and distribution of the four horned antelope from 2009 to 2010.

2. Materials and Methods

The Sathyamangalam Forest Division (11º 29' - 11º 48' N and 76 º 50' - 77 º 27' E) recently acquired the protected area status as Wildlife Sanctuary in November 2008. It is located in the Erode district of Tamil Nadu, in Southern India. Total area of the forest division is 1411.6 sq.km, of which 524 sq.km of area declared as Wildlife Sanctuary. It has rich in bio-diversity and function as a bridge between Western Ghats and Eastern Ghats for the migratory animals. This forest division shares its boundary with Erode, Nilgiris North, Coimbatore forest divisions in Tamil Nadu and Kollegal, Chamrajnagar Wildlife Sanctuary (BRT), Bandipur Tiger Reserve in Karnataka. It has five ranges such as Talavadi, Bhavanisagar, Hasannur, Sathyamangalam and Tooka Nayakan Palayam. The altitude ranges between 280 to 1678 msl. The rainfall of southwest and northeast monsoons, average annual rainfall was 755mm. The perennial river Moyar, flows in the southern boundary of the division, is the main water source for the wildlife. The forest

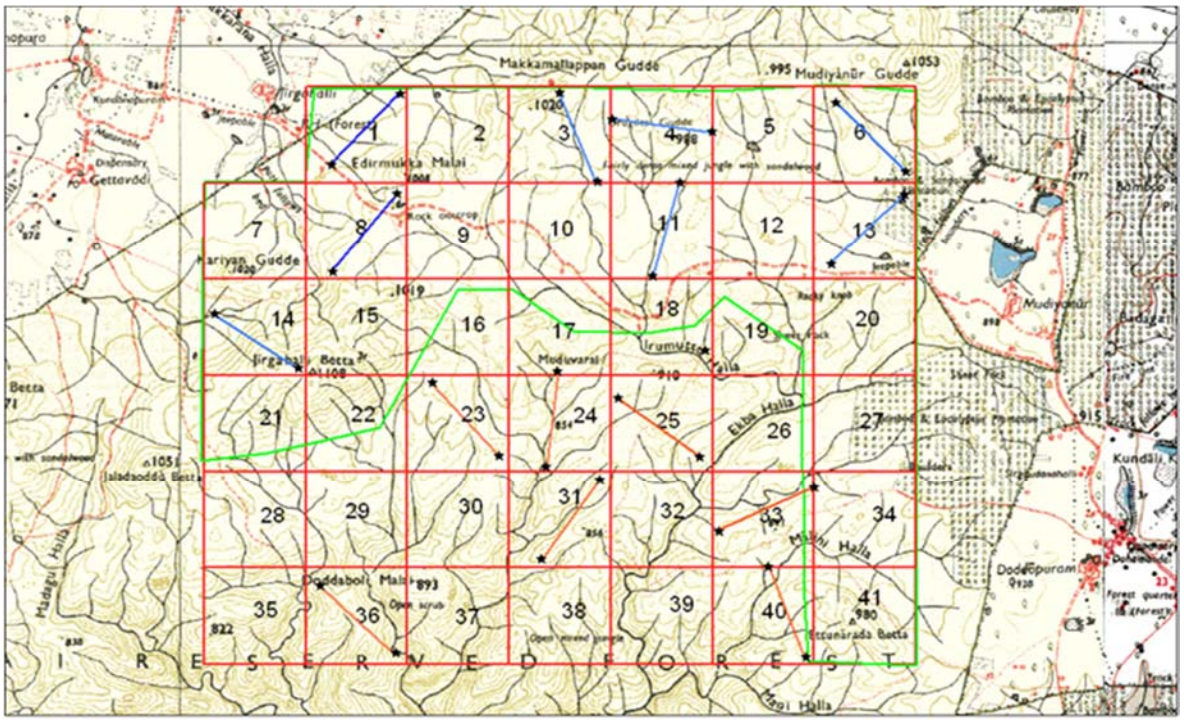
types are Open Savanna type Deciduous Forest and Dense Mixed Deciduous Forest. The dominant vegetation found in the dry deciduous forests with *Tectona grandis*, *Anogeissus latifolia* and *Terminalia alata*.

The study area was overlaid with a 1 x 1 km grid layer (Krishna *et al*., 2009) [10]. A total of 41 grids were laid covering with two vegetations viz: open habitat and dense mixed forest. Of the total grids 15 were randomly selected in proportion to the vegetation structure (7 grids in open habitat and 8 in fairly dense mixed forests). In each grid 1 km transect was laid and were systemetycally monitored for the four months (Map.1). Additionally recce sampling (Swapna *et al*., 2008) [26] was also adopted to find the distribution patterns of the species across the plateau due to the animals are shy in nature. Further information on the group size, age class and sex was also collected to understand the composition of four-horned antelope in the sanctuary. Direct sightings and indirect signs (defecation sites) (Plate. 3) GPS coordinates were taken for plotting on the map (Map.2).

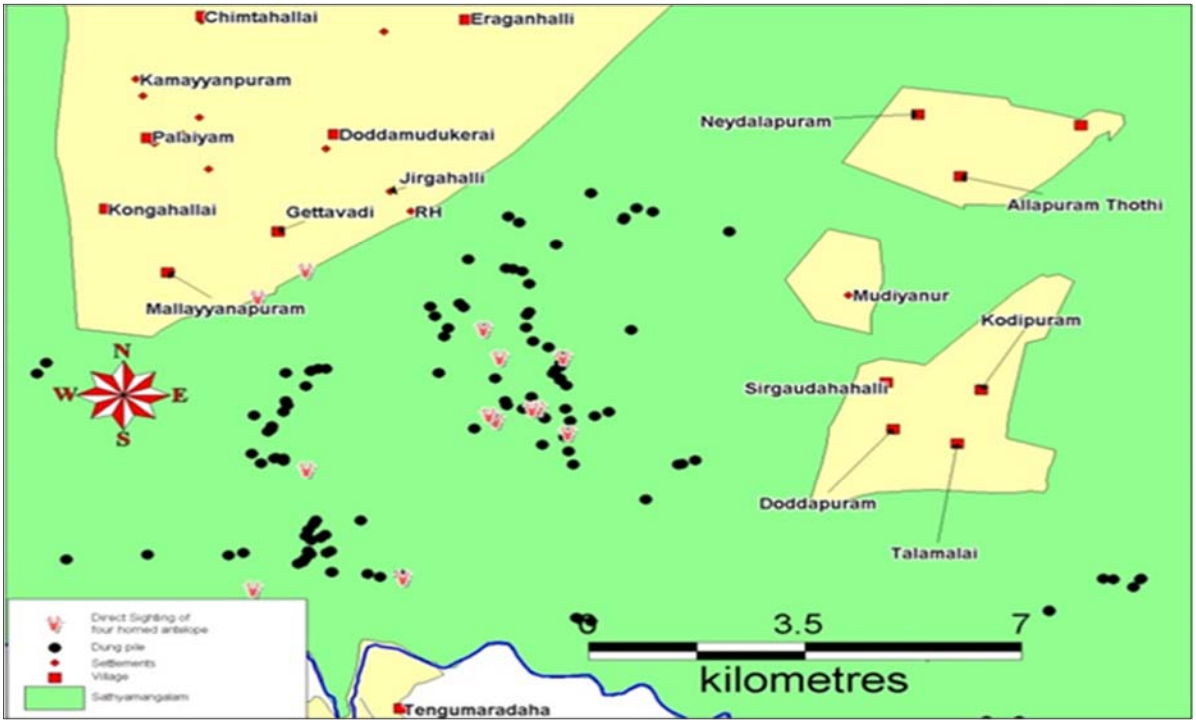
Plate 1: An Adult Male

Plate 2: An Adult Female with Fawn

Plate 3: Defecation sight of Four-horned Antelope



Map 1: Gridded study area map



Map 2: Distribution map of Four-horned antelope in the study area

3. Results and Discussion

A total of 15 grids were surveyed, among which only one individual was found on the transect number 31, this transect falls in the open habitat and 24 individuals were seen in the 19 sightings, 145 defecation sites were observed by using recce sampling. The above observations revels that the Four-horned Antelope were sparsely distributed in the study area. The number of animals sighted on transects, the most common species were Gaur, Chital and Sambar (Figure 1)

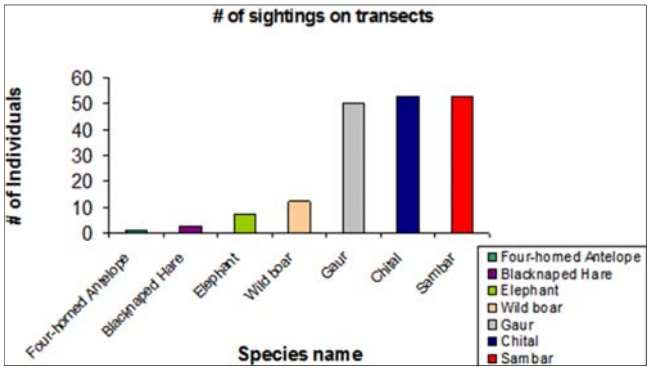


Fig 1: Direct sightings of various species recorded on transects

Their shy nature and small size make sightings difficult (Baskaran *et al*., 2009) [2], so indirect signs also taken into consideration when assessing their distribution and relative abundance in the study area. The Four-horned Antelopes signs were seen on only 7 of the 15 transects (Figure 2), this would be an underestimate as the sample size and replication was very low. Nevertheless, it does give us an understanding of the general distribution and relative abundance in the study area. We found that Transect number 31, 40, 24 and 25 had two or more records, and this clearly indicate that they were presently the best areas for this species, Transects 4, 14 and 20 had just one record and the rest had no records/signs of the species. The majority of the records (~72%) were on hill/nulla slopes; however this may be due to the terrain being largely composed of such areas. Moreover, the Flat and open areas had only 28% of the records. The encounter rate for signs/sightings was high in the open habitat (1.71/km) and it was much lower in the fairly dense forests (0.25/km). Our results clearly indicated that the Four-horned Antelopes largely prefer open habitat and appear to avoid dense areas. Apart from that the fixed transects recce survey (not straight line) was also used to determine Four-horned Antelope and their signs. By using this method, total of 24 individuals were seen in 19 sightings, the average sighting distance (ocular estimate) was ~52 meters (range 10 to 80 meters). The mean group size was 1.26 (range 1 to 2 individuals), its indicating that this is largely a solitary or semi-solitary species. In addition of 145 total defecation sites were seen during this survey.

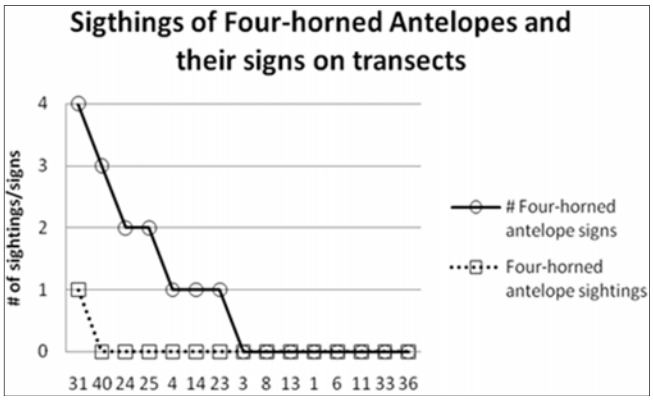


Fig 2: Four horned antelope direct signs and indirect signs recorded on transects

The present results shows the Four-horned Antelope were sparsely distributed over the study area being nature it's considered as largely solitary species (Krishnan, 2006, Baskaran *et al*., 2009, Prater, 1971) [2]. An account of rarely forming groups more than 2 to 4 individuals; such groups are largely composed of a female and her young or a female and male seen together. They appear to be territorial and have marking sites (common/communal latrines) where they defecate regularly. This makes their distribution fairly sparse even in good habitats. Although it is widely distributed in India, nowhere found in high abundance (Sharma and Rahmani, 2005).

The present study area the Talamalai plateau, sector between Gettavadi and Talamalai has high distribution of four-horned antelope, conversely, the rest of the area constitutes low distribution (from the East of Talamalai towards Ramaranai the distribution is low and descending) it could be due thick vegetation (dense mixed forest). We found that the four-horned antelope prefers open savanna type deciduous forest in the study area (77%), in this habitat, the vegetation is sparsely distributed with open grass patches and the dominant tree species found *Anogeissus latifolia*, *Phyllanthus* spp. *and Lannea coromandelica*. Baskaran *et al*., 2011 [3] stated that being a grazer species it prefer grass for its major food, its preferred food item of *Phyllanthus* fruit (Kannan, 1999) [8]. The young ones were frequently sighted in the edge between dense mixed forest and open savanna type deciduous forest (Vijayakumar pers. Comm.). Hence, the detailed ecological studies are needed on population structure, distribution pattern and feeding ecology for the long-term conservation of the species in the Sathyamanagalam Wildlife Sanctuary.

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