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RESEARCH ARTICLE

POPULATION STATUS AND HABITAT USE BY GOLDEN JACKALS IN SEMI-ARID LANDSCAPES OF WESTERN KACHCHH, INDIA

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ABSTRACT

Golden jackal is an opportunistic feeder and can survive in all sorts of habitats due to its unique ability of survival on any kind of food available. The golden jackal is widely distributed in India across all the climatic zones and vegetation types. The present study deals with the population and habitat characteristics of golden jackals in semi-arid landscapes of western Kachchh, India. During the study direct sightings, camera traps and sign surveys were done in the study area to assess the status of the golden jackals in western Kachchh. The study was carried out for a period of 4 months in which we had 108 trap nights and recorded 37 independent captures of golden jackals out of a total of 211 captures. The trapping rate of golden jackals was found to be low i.e. 0.34 independent photos per trap night. The golden jackals were most active during 19:30-00:30 hrs. and from 4:00-6:00 hrs. in the early morning hours. The most favored habitat of the golden jackal was found to be dominated by *Prosopis juliflora* and comparatively low number was recorded in wetland habitats.

INTRODUCTION

Golden jackal (*Canis aureus*) is the only species of jackal in India out of four species of jackal found globally (Sheldon, 1992). Golden jackal is the most common canid species found in India. The body length of an adult golden jackal is 70–106 cm, with the shoulder height being 38–50 cm and a weight of 7–15 kg. There is a difference of about 12% in the body weight of males and females, it generally its habitat comprises of open country with scrub and has a vast distribution, ranging from South east Europe, North and east Africa, South asia upto Burma and Thailand. (Ginsberg and MacDonald, 1990). The golden jackal is widely distributed in India across all the climatic zones and vegetation types. It's an opportunistic predator and widely distributed in human settlements, semi-arid areas, deserts and shrub lands. (Giannatos, 2004, Jaeger *et al*., 2007).

Golden jackals can tolerate wide range of temperature and their omnivorous diet helps them to survive in evergreen forests as well as hot deserts. The general dietary composition of golden jackal is birds, carcasses, small mammals and other vertebrates (Mukherjee *et al*., 2004). Due to their habitat plasticity and opportunistic feeding habits, golden jackals can live in a wide variety of habitats. A minimum population of golden jackals in Indian sub-continent is estimated to be around 80,000. But still, top predators are often the most threatened species in human dominated landscapes (Crooks and Soule, 1999). The main threat to these species comes from hunters and diseases such as distemper and rabies, which is mainly responsible for the death of large numbers of jackals, also the habitat is being degraded due to increased industrialization, invasion of *Prosopis juliflora* and other developmental activities.

No data is currently available on the population status of the golden jackals in western Kachchh despite its importance as one of the main scavengers responsible for the proper functioning of the food chain and food web. Keeping this in mind, the present study was done to assess the population status and the habitat use by golden jackal in the semi-arid regions in Kachchh district of Gujarat.

MATERIAL AND METHODOLOGY

Kachchh, (22°41'11" to 24'41'47" N and 68°9'46" to 71°54'47"), extending over 45,652 sq. km. area lies in the western part of Gujarat state and falls under the Desert bio-geographic zone and 3B Desert Kachchh Province (Rodgers *et al*. 2002). Kachchh represents all major terrestrial ecosystems like Grassland, tropical thorn forest, Scrub savannah and sand interspersed with dry land forming (arid agro ecosystem). The average annual rainfall in Kachchh is estimated to be 326mm and highly erratic leading to protracted droughts that are believed to be common phenomena. The present study (figure

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1.) was undertaken in the western part (5000 sq. km.) of this district covering Lakhpat, Nakhatrana and Abdasa taluka.

For night trapping of jackals

The survey was carried out for a period of four months. A total of 108 camera trap nights we used for trapping the golden jackal in eight localities within the study area. Four camera traps were used for trapping golden jackal but sometimes the number of camera traps installed per night varied due to climatic conditions and other disturbances. The cameras were placed 30-40 cm above the ground on trees or bushes, about 1-2 m apart from the expected passing route of jackals (Katuwal, H.B. and Dahal, S., 2013) and every capture was considered as an independent event as usually done in camera trapping (O'Brian *et al*., 2003; Thapa *et al*., 2013). Trapping rate of the jackals was calculated by dividing the total number of independent photo captures by the total number of trap nights. The camera traps were installed in the evening at about 19:00 hrs. and collected at 6:30 hrs. in the morning. Sometimes baits were also used to attract jackals. Interviews were also done with the locals to know their perception about the golden jackals.

For determination of habitat use

For determination of the habitat use, direct encounters and sign surveys were done to document the presence of golden jackals in different habitats. The data collected from camera trappings was also used for better understanding of the habitat of golden jackals. Using these data, the habitat was categorized into: frequently used (F), moderately used (M) and rarely used (R) (Gajera *et al*., 2009). The percentage occurrence on the categorized habitats was taken as: frequently used (more than 40%), moderately used (10-40%) and rarely used (less than 10%). Information about the dens of golden jackals was obtained from Maldharis (pastoralists) and was confirmed through scat and sign surveys.

RESULTS AND DISCUSSION

Number of golden jackals captured and the trapping frequency of jackals

Out of a total of 211 camera trap photos, we captured 37 independent photographs of golden jackal in all the eight localities we studied during 108 trap nights. All baits were evenly taken by the golden jackal. The trapping rate was found to be low i.e. 0.34 independent photos per trap night.

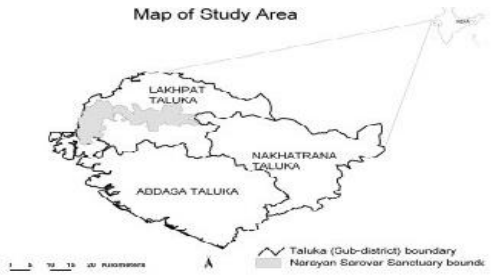

Figure 1 Map of the study area

We recorded four golden jackals at Gugaliyana near agriculture land, two at Sheh, two at Bhujpar Rakhal, three at Akari, seven at Oranmata, ten at Fulai, two at Bagpat and seven at Kua Padhar (Figure 2).

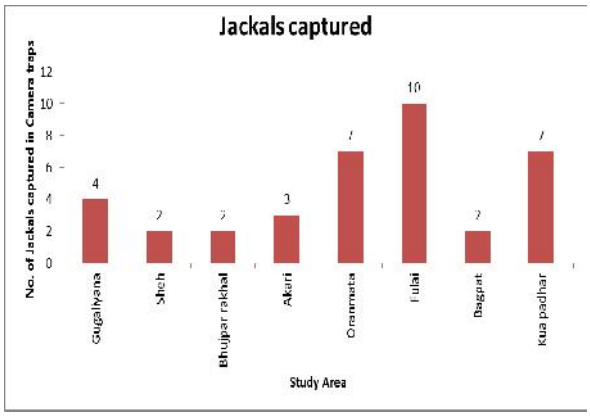

Figure 2 Total number of Jackals captured in camera traps during survey period

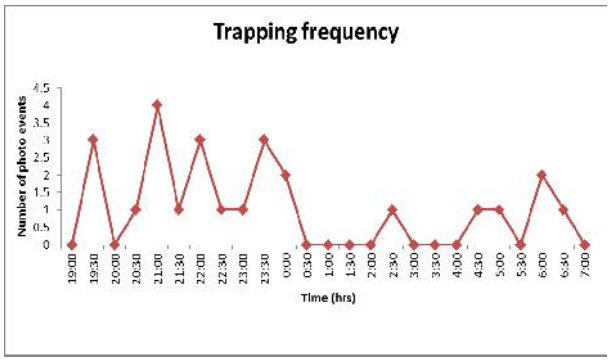

Figure 3 Trapping frequency of Golden Jackal during trap nights

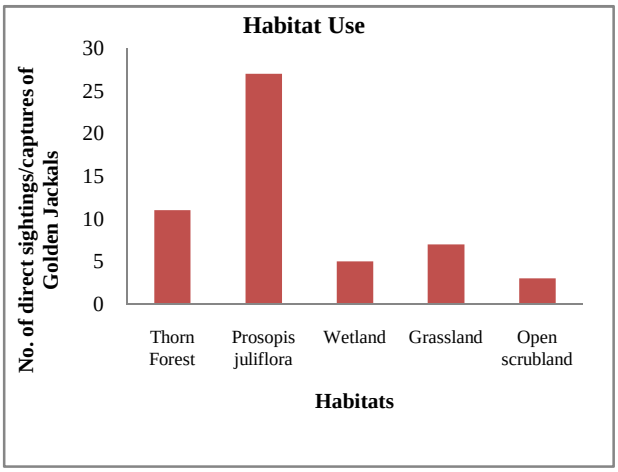

Figure 4 Habitat Use by Golden Jackals

We captured the jackals mostly from 19:30-00:30 hrs. and from 4:00-6:00 hrs. in the early morning hours (Figure 3). Mostly the jackals were trapped individually. All carnivores are generally nocturnal, but the golden jackal is also a frequent daytime visitor (Hunter, 2011). The locals were sometimes in direct conflict with the golden jackals as they are predator to their livestock. We observed that the population of the golden jackals was low in the area. Similar study when done in Nepal by (Katuwal, H.B. and Dahal, S. 2013) resulted in a high trapping rate of 1.27 photos per trap night in just 18 trap nights.

Table 1 Habitat use by golden jackal based on direct, indirect evidences and camera trap captures

S.No.	Category	Direct Evidences	Indirect Evidences	Photo captures	Total	Status
1	Mixed Thorn Forest	0 (0%)	0 (0%)	11 (29.73%)	11(9.91%)	R
2	*Prosopis juliflora*	5 (31.25%)	3 (50%)	22 (59.46%)	30(46.90%)	F
3	Wetland	1 (6.25)	0 (0%)	4 (10.81%)	5 (5.69%)	R
4	Grassland	7 (43.75)	3 (50%)	0 (0%)	10(31.25%)	M
5	Open scrubland	3 (18.75)	0 (0%)	0 (0%)	3 (6.25%)	R

After comparison, we can easily make out that the population in the area is quite low.

The number of jackals captured in the camera traps were somewhat found to be constant. Poor sanitation, less disturbance is the key factor for the range expansion of the golden jackals (Szabo *et al*., 2007). The golden jackal is more nocturnal when it occurs near human habitation. In relatively less abundant areas it's recorded to be diurnal (Fox, 1975; Sheldon, 1992).

Habitat use and characteristics

The distribution and habitat study showed a wide occurrence of golden jackals in the study area. Out of the total population of the golden jackal, about half of the golden jackals were mostly found in the *Prosopis juliflora* dominated habitat with an occurrence of 46.90% (Table 1).

This was further followed by grassland, mixed thorn forest and open scrubland with an occurrence of 31.25%, 9.91% and 6.25% respectively. Minimum numbers of jackals were recorded in the wetland habitats (5.69%). The presence of more number of jackals in the *Prosopis* dominated area can be attributed to the availability shelter and food which also comprised of *Prosopis juliflora* pods and *Ziziphus* fruit. Low population was recorded in the wetland areas as there is no perennial wetland present in the area, all the wetlands are rain fed and due to scarce rainfall from past few years, the condition of the wetlands has deteriorated. Threat from the Maldharis (pastoralist), anthropogenic activities and frequent attack of dreadful diseases among the jackals like rabies and canine distemper are some of the causes for low population of jackals in the area.

Martin *et al*., 2013 suggested that differences in population densities across the regions can be associated with different agricultural management practices and land use intensity, such as portions of heterogeneous agricultural vegetation and shrub-herbaceous, which were noted as main predictors of occurrence of golden jackal. According to the data collected from the study, open dry forest in the hilly areas is found to be more suitable for golden jackals to construct their dens. *Prosopis juliflora* was the most preferred habitat by the golden jackals (Figure 4). However, some dens were observed in saline desert on uplands or islands called bets, which are land mass systems in the saline deserts of Kachchh (Singh, 2001). They remain above the water during the monsoon and are ideal sites to construct dens by the animals like the hyena and jackals.

Present study can be considered as the pilot study for the population assessment of golden jackals in western Kachchh and further detailed study is required to assess the status of golden jackals in Kachchh.

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