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Feeding Ecology of Chinkara (Gazella Bennetti Sykes) in Desert National Park, Rajasthan, India

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Abstract

Chinkara (*Gazella bennetti*) is the state animal of Rajasthan and protected under the schedule- I of Wildlife (Protection) Act, 1972. This is herbivore and mainly found in arid and semi-arid regions. Survival of the chinkara is depended on the natural vegetations those are found in its surrounding habitats. Chinkara feeds mainly on twigs, leaves, flowers and fruits of small trees, bushes, grasses and herbs etc. The study was conducted on the feeding ecology of chinkara in Desert National Park. Direct observation technique was used for taking observations. Seasonal variations were found in its feeding preference. During monsoon season chinkara mostly likes grasses and herbs whereas in summer it feeds upon leaves, twigs, flowers, fallen pods and fruits of bushes and trees. Maximum grazing activities were recorded in monsoon season whereas maximum browsing activities were recorded in summer season.

Keywords: Chinkara; Desert national park; Season; Grazing; Browsing

Introduction

Desert Wildlife Sanctuary is famous as name of the "Desert National Park". It is situated at the heart of the Thar desert near Indo-Pak boarder. It supports vide variety of desert fauna and flora. Kankane [1] listed about 21 species of mammals from Desert National Park. Chinkara and other mammalian are frequently seen here. In the western Rajasthan Chinkara is known as 'Chhinkaro'. It is distributed in arid and semi-arid regions of India while density is low in most areas [2]. Chinkara was once common even in the salt ranges in the Pakistan and Punjab [3]. Its distribution is wide which ranges from extensive sand dune areas, the rocky plateaus and hilly regions of up to 1500 m elevation [4]. Chinkara is not only grazer but also browser. Feeding habits are depended on the presence of food type and quantity.

Study Area

Three specific sites (Sudasari, Khuri and Kanoi) of desert wildlife sanctuary were selected for the study. Sudasari study site is 40 km south-west to Jaisalmer and lies at 26°43' N latitude and 70°35' E longitudes. It is a core area surrounded by wire fencing. The habitat is plain ground with *Lasiurus sindicus* (Sevan grass) and bushes. The Khuri site is situated at 40 km south to Jaisalmer city. It lies between 26°36' N latitude and 70°43' E longitudes. It is not a closed area. It is sandy area with undulating sand dunes of about 20-60 feet height. The inter-dunal space between two sand dunes is locally called 'Bewar'. Sand dunes are naked or rare vegetation found on them however, Bewar have rich vegetations. The Kanoi is 35 km west to Jaisalmer city on Sam road and lies at 26°46' N latitude and 70°34' E longitudes. It is rocky area with gravel plain and hillock.

Methods

Food matters used by the Chinkara were assessed by the direct observation [5] and fecal pellet analysis techniques. During study period 8 x 40 field binocular was applied to record the feeding activities. Fecal pellets were collected from different study sites (periodically) in every season. These were stored in plastic bags dismembered with the help of needle and forceps and undigested material such as seeds, small twigs of different plant were separated.

Result and Discussion

Feeding habits

During study period total 447 observations of feeding were taken. It was observed that Chinkara browsed maximum (73.50%) in summer season and lowest (36.87%) in monsoon season. Chinkara was observed grazing highest (63.12%) during monsoon season followed by winter (38.77%) and summer (26.49%) during the study period (Table 1). In previous study Gehlot [5] reported that Chinkara grazing was highest (35.16%) during monsoon season followed by winter (33.9%) and summer (23.32%).

Season	No. of observation	Grazing in natural habitat (%)	Browsing in natural habitat (%)
Winter	147	38.77	61.22
Summer	151	26.49	73.50
Monsoon	179	63.12	36.87

Table 1: Feeding habits (patterns) of Chinkara observed during the study period.

Feeding preferences

Food is of prime importance throughout an individual life. Moving, resting, playing and all other routine activities were influenced by the availability of food. Survival of the Indian gazelle depended on the natural vegetations those were found in harsh Desertic condition.

We found the Chinkara feeding on 61 plant species of which 9 were field plant and 52 were wild. Gazelle have been observed eating on herbs like Sinawari (*Boerhavia diffusa*), Chag (*Crotalaria burhia*), Bekar (*Indigofera spp.*), Lamp (*Aristida spp.*), Matira (*Citrullus lanatus*), Tumba (*Citrullus colocynthis*), Kilandh (*Convolvulus mycrophyllus*), Kanti (*Tribulus terresteris*), grasses like Sevan (*Lasiurus sindicus*), Tantia (*Dactyloctenium sindicus*), Murat (*Penicum turgidum*), Karad (*Dichanthium annulatum*), Dhaman (*Cenchrus ciliaris*), Bhurat (*Cenchrus biflorus*), moth (*Cyperus rotundus*) and twigs, leaves, flowers and fruits of small trees like Kumat (*Acacia senegal*), Israeli babul (*Acacia tortilis*), Khejri (*Prosopis cineraria*), Angreji babul (*Prosopis juliflora*), Jal (Salvadora spp.) and on bushes like Morali (Lycium barbarum), Gangani (*Grewia tenax*), Aak (*Calotropis procera*), Bordi (*Ziziphus spp.*), Ker (*Capparis decidua*), Thor (*Euphorbia caducifolia*) etc. (Table 2). In previous study Gehlot [5] reported that Chinkara preferred 39 wild plants species and 5 crop plants for feeding.

Botanical name	Common name	Summer	Winter	Monsoon
Trianthema portulacastrum	Sato	W	-	-
Calotropis procera	Aak	Yt, P, F, L	Yt, F, L	F, L
Leptadenia pyrotechnica	Kheemp	Dt, Yt	Yt	-
Odontanthera virians	Dodha	-	-	W
Aerva javanica	Bui	Dt, L	L	-
Tecomella undulata	Rohida	fl, L	fl	-
Arnebia hispidissima	Ram bui	Dt	Dt	W
Capparis decidua	Ker	Dt,Yt, F, P	Yt, Dt, F	Yt, P
Citrullus colocynthis	Tumba	R	R	P
Citrullus lanatus	Matira	-	R	P
Cucumis caliosus	Kachrio	-	-	P
Cucumis melo	Kachri	-	-	P
Cucumis prothetarum	Khar kachrio	-	-	P
Cyperus arenarius	Moth	W	W	-
Convolvulus microphyllus	Kilandh/Sintar	W	W	W
Euphorbia caducifolia	Thor	Yt, F	Yt, F	-
Crotalaria burhia	Chag	W	W	W
Cyamopsis tetragonoloba	Gawar	-	-	W
Indigofera cordifolia	Bekar	Dt	Dt	W
Indigofera hochstetteri	Adio bekar	Dt	Dt	W
Indigofera linifolia	Lambio bekar	Dt	Dt	W
Indigofera oblongifolia	Jhil	Dt	Dt	W
Boerhavin diffusa	Sinawari	Dt	Dt	W
Acacia nilotica	Desi babul	fl	-	-
Acacia senegal	Kumat	fl, L	L, fp	-
Acacia tortilis	Israili babul	L, fl	L, Yt	-
Prosopis cineraria	Khejri	fl, fp, F,	L, Yt	L, Yt
Prosopis juliflora	Angreji babul	fp, P	P, fp	-
Mollugo cervina	Chirio ro khet	Dt	Dt	W
Lasiurus sindicus	Sevan grass	W	W	W
Cenchrus biflorus	Bhurat	Dt, L	Dt, L	L
Cenchrus ciliarus	Dhaman	W	Dt, L	L
Cenchrus prieurii	Lambio Bhurat	W	Dt, L	L, P
Desmostachiya bipinnata	Dab	W	-	-
Panicum antidotale	Gramno	W	-	-
Panicum turgidum	Murat	W	L, T	-
Dactyloctenium sindicus	Tantia grass	W	W	W
Dactyloctenium aegyptium	Zernia grass	W	W	W
Dichanthium annulatum	Karad	W	-	-
Aristida adscensionis	Lamp	W	W	W
Aristida funiculate	Lamp	W	W	W
Aristida hystriculata	Dholiolamp	W	W	W
Aristida Mutabelis	Lamp	W	W	W
Brachiaria ramosa	Murat Makra	W	-	-
Ziziphus mauritiana	Ber	fl, F	Yt, L,P	Yt,L
Ziziphus nummularia	Ber	fl, L	Yt, L	Yt ,L, P
Salvadora persica	Mithi Jal	L, fL, P	L	-
Salvadora oelioedis	Khari Jal	L, fL	L	-
Lycium barbarum	Morali	fl , L, Dt	L, Yt	-
Corchorus depressus	Chamgrass	-	--	W
Chorchorus tricularis	Hade ka Khet	-	Dt	W
Chorchorus olitorius	Hade ka khet	-	Dt	W
Chorchorus trident	Kag nasha	-	Dt	W
Grewia tenax	Gangani	fl, L, Dt	L, Yt	L, p
Tribulus pentadrus	Dhakda	Dt	Dt	W

Tribulus terrestris	Kanti	Dt	Dt	W
Fagonia bruguieri	Dhamasa	Dt	-	-
Fagonia schweinfurthii	Dhamasa	Dt	-	-
Pennisetum glaucum	Bajra	-	-	L
Vigna radiata	Mung	-	-	L, P, Yt
Sismum indicum	Til	-	-	L, P

Table 2: Plants and their parts used by the Chinkara in different seasons. L-Leaves, F- Flowers, P- Pods, W-Whole, R-Root, Dt-Dry twigs, Yt- Young twigs, fl- Fallen leaves, fp-Fallen pods or fruits.

Seasonal variations

Seasonal variations were observed in food preferences in different study areas. The food preferences were depended upon availability of food. During winter Chinkara started feeding activity after sun rise and it continued throughout the day. Chinkara took rest for short intervals during feeding activities in winter and monsoon season. During summer and monsoon feeding activities were observed in the night.

Winter

In winter gazelle scraped soil with forefeet to expose the roots of Tantia (*Dactyloctenium sindicus*), Moth (*Cyperus arenarius*), Tumba (*Citrullus colocynthis*), Bui (*Aerva javanica*), Sinawari (*Boerhavia diffusa*), and Ber (*Ziziphus spp.*) for food and water. Chinkara mostly preferred Chag (*Crotalaria burhia*) followed by Ber (*Ziziphus sp*). Khejri (*Prosopis cineraria*), Ker (*Capparis decidua*) and Aak (*Calotropis procera*), but it did not prefer Dab (*Dichanthium annulatum*), Dhamasa (*Fagonia spp.*) and Gramno (*Panicum antidotale*) during winter season (Table 2).

Sudasari is a close area and vegetation was not consumed by livestock, thus at Sudasari site Chinkara grazed on dry parts of grasses, herbs, and browsed on twigs and leaves of bushes and small trees. But Khuri and Kanoi study sites were not closed area so most of the vegetation were consumed by the livestock. As a result gazelle grazed on Chag (*Crotalaria burhia*), dry parts of Murat (*Panicum turgidum*), Tantia (*Dactyloctenium sindicus*) and browsed on bushes and small trees. Chinkara became more browser during winter season.

Summer

In summer when leaves and twigs were not available on lower branches of bushes and small trees, Chinkara reared up on his hind legs to browse the parts of small trees and bushes. Gazelle eats on leaves, twigs, flowers and fruits of bushes and fallen pods, fruits and leaves of trees. As mentioned earlier the Sudasari study site is a closed site so dry grasses and parts of herb were available in summer season also, so gazelle grazed on them. In Khuri study site only parts of Israeli babul (*Acacia tortilis*) and Angreji babul (*Prosopis juliflora*) and leaves and pods were available for browsing and consumed by gazelle (Table 2). In early study Ghosh et al. [7] and Goyal et al. [8] reported that Indian gazelle consumed more fruits, pods, flowers and fallen leaves of preferred plants during summer season.

Monsoon

During monsoon gazelle mostly liked grasses and grazed on Sevan grass (*Lasiurus sindicus*), Tantia grass (*Dactyloctenium sindicus*), Kanti (*Tribulus terrestris*), Lamp (*Aristida spp.*), Sintar (*Convolvulus microphyllus*), Sinawari (*Boerhavia diffusa*), Bekar (*Indigofera spp.*), Hade ka khet (*Chorchorus spp.*) and for browsing they preferred Bordi (*Ziziphus spp.*), Khejri (*Prosopis cineraria*) and fruits of Ker (*Capparis decidua*). In monsoon season Israeli babul (*Acacia tortilis*), Bui (*Aerva javanica*), Kheemp (*Leptadenia pyrotechnica*), Murat (Penicum turgidum), Dhamasa (*Fagonia spp.*), Angreji babul (*Prosopis juliflora*) and Jal (*Salvadora spp.*) were not preferred by the gazelle (Table 2).

Fecal matter analysis showed the presence of seeds of different plants. In summer season seeds of Ker, Khejri and Jal were observed in fecal pellets. In winter seeds of Chag, and Ker were observed. In monsoon season seeds of Ber, Ker, Hade ka khet, Gangani, Matira, Kachri, Moth, Mung and Guar were observed. In previous study Gehlot [9] reported seeds of Chag, Moth and Mung in fecal pellets of Chinkara. Dookia [10] reported that Chinkara feed mainly four plants viz., *Crotalaria burhia*, *Ziziphus nummularia*, *Mayterus emerginata* and *Prosopis cineraria* which constitute overall 77% of total dietary requirements. The present study showed that chinkaras feeds upon more number of plant species as stated in the earlier studies [9,10] for its feeding behavior. Feeding habits are depended on the presence of food quality and quantity. The preference of the feeding related to the vegetation types alteration during the different seasons in the desert. The large feeding range of this antelope is helpful for the survival of species in the harsh climatic conditions of extreme desert.

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