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Seasonal Diet Variation of (*Tetracerus quadricornis*) Four-horned Antelope in Rangayyanadurga Wildlife Sanctuary, Karnataka, Southern India

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Authors' contributions

This work was carried out in collaboration between both authors. Both the authors worked together on this original research paper, which was author BSA gathered data, wrote the manuscript and overseen by author VK offered suggestions for the project's completion. Both authors read and approved the final manuscript.

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ABSTRACT

In the ecosystem, the four-horned antelope were selective feeders by browsing and grazing plant species in different compositions. These species have adaptable characteristics to feed on nutritious parts of available shrubs and trees in their habitat. The study was conducted through fecal analysis studies on the diet of four-horned antelopes in Rangayyanadurga four-horned Antelope Wildlife Sanctuary, Karnataka, Southern India. The study identified 95.7% of the plant species that occurred in the pellet sample, with 4.30% remaining unidentified. The percentage occurrence of dicots in the pellet sample was 80.85%, while monocots had a minimum occurrence

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of 19.15%. In point of growth forms, trees accounted for 34.52%, shrubs for 19.15%, herbs for 19.10%, grasses for 19.14%, and climbers for 3.5%. The Poaceae family had the highest composition percentage of occurrence in the diet with 19.13%, followed by Fabaceae at 17.53% in the diet of four-horned antelope. The study concluded that antelopes were adaptable in nature when it comes to the matter of food and survival, picking out the nutritious food that they need as available in nature. The composition of plant species in the diet helps in understanding the food habits and habitats of the four-horned antelope, which is essential for conservation and management in their natural habitat. This study provides valuable knowledge of the food habits and habitats of four-horned antelopes for further studies in this area.

Keywords: Diet; four-horned antelope; rangayyanadurga; wildlife sanctuary; conservation.

1. INTRODUCTION

In the ecosystem, antelopes play an essential part to live on Earth. These animals provide an important source of food to the apex predators like lions, tigers, leopards, cheetahs, hyenas, etc., and also mass to other small carnivore species in the ecosystem. Antelope are primarily herbivores; they can find the most nutritious food that feeds on plants. They consume different parts of plants from roots to shoots on bushes and small trees for food. Besides food, these species depend on plants for shade on the hottest day and sometimes to hide from predators. Leaves provide their primary water source, making it advantageous for them to feed on vegetation with high water content in arid environments. Facing a range of threats, including habitat loss, climate change, and overhunting. Understanding the dietary needs and ecological roles of herbivores is essential for effective conservation and management efforts aimed at protecting these important animals and their habitats.

The four-horned antelope (FHA) is a species categorized as “Vulnerable” in the Red data book with population is up to 10,000, under the Schedule-I of the Wildlife protect act 1972 [1]. In balancing the ecosystem antelopes play an important role. As part of the conservation of this species, it is important to understand the diet composition of vulnerable wildlife species, particularly ungulates in seasonal environments where resource availability is pulsed [2]. This knowledge is important for devising conservation management actions for their long-term persistence. The text focuses on the four-horned antelope (FHA) *Tetracerus quadricornis*, which is a medium-sized, solitary ungulate endemic to the Indian sub-continent [1,3-6]. From the foothills of the Himalayas in Nepal to Gangetic floodplains and in the Indian peninsular region, the species is widely distributed, with fragmented populations in dry deciduous forests [7-9]. The population of four-horned antelope is suspected to have declined throughout its range, mainly due to habitat loss and fragmentation. The studies on wild populations of four-horned antelope have been focused on its distribution and habitat ecology [10-13], with few studies on its feeding ecology. Understanding the diet composition of FHA during resource-lean seasons is critical for understanding diet flexibility and informing forage management measures [2,9,12-15]. This study aims to assess the seasonal variation in the diet of four-horned antelope, which helps to know the food habits in its different lesser-known areas. Results towards the knowledge of four-horned antelope for conservation and to be part of habitat management.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted in the Rangayyanadurga Four-horned antelope Wildlife Sanctuary, Karnataka, Southern India. Situated in Southern Peninsular the Maidan region on the Deccan Plateau locally known as Bayalu-Seeme, the Rangayyanadurga Four-horned antelope Wildlife Sanctuary is previously as Rangayyanadurga State Forest in Jagaluru Range in the dry district of Davanagere district in the south interior Karnataka (Fig. 1). Rangayyanadurga Four-horned antelope Wildlife Sanctuary is named after the administration of a “Paleyagara” of Chitradurga who had ruled this area constructing a fort inside the forest near Gurusiddapura village. It was carved out of Rangayyanadurga State Forests and declared a sanctuary in 2011 [16-19].

Geographically it is located between the longitudinal parallels of 14.68368056ºN - 76.13700000ºE and 14.56272222ºN - 76.28511111ºE (Fig. 1) [16-19]. The Rangayyanadurga Four-horned antelope

sanctuary is covered with tall grasses of Dry Deciduous Thorny Scrub vegetation and open grassland habitat. The average rainfall is close to 611.60 mm/annum, with an elevation of 668 meters (2191 feet) and a lackadaisical attitude (2509 feet). The Temperature ranges from 17°C to 38°C. The sanctuary can be classified into three beats Gurusiddapura, Kelagote and Malemachikere [16-19]. The forests of this area belong to dry deciduous scrub [5DS1] and southern thorn forests [6A/DS1] as per the revised classification of Indian Forest Types by Sir Harry G. Champion and Sri S.K. Seth [19]. There is no river source for this area, which completely depends upon rainfall only and several tanks around the sanctuary and inside the sanctuary [16-19].

The four-horned antelope, found in India, and is considered to be a vulnerable species by the IUCN Red List. This means that the population of this species is declining, and it is at risk of becoming endangered in the near future. In India, the four-horned antelope are protected under the Wildlife (Protection) Act, which makes it illegal to hunt, capture, or trade this species under the Schedule-I of the Wildlife (Protection) Act 1972 (53 of 1972) provides the highest level of protection to this species [1,5]. The conservation of the four-horned antelope is important as it plays a crucial role in maintaining the ecological balance of the region where it is found. The sanctuary is a habitat for various wildlife, including butterfly species, bees, birds, bats, and spiders. The bird, White-naped tit, which can be found in the sanctuary, is also categorized as a vulnerable species according to the IUCN Red List [18].

2.2 Methods

The diet of four-horned antelope was examined by identifying and quantifying fragments of plant epidermis egested in the faeces. A reference collection of epidermal material from the plants in the study area was prepared and used to aid identification. Faecal analysis was used because direct observations of the sighting of this species are very low [2,5,12,14]. Meanwhile, ruminal analysis and fistulative techniques were not possible [20] 34 Pellet samples were collected in the study area found between December 2018 - November 2019. These samples were hand-picked from different sampling sites throughout the year. As this species, *T.quadricornis* regularly defecate at specific sites within their home ranges [8-9,21] also called a midden, here pellet samples were collected easily. After conducting a preliminary survey using literature and a questionnaire, we gained knowledge about the plants consumed by FHA from local experts and forest department staff in study area. This information was instrumental in collecting 68 plant species, along with their available parts, for use in creating reference slides in RDWLS.

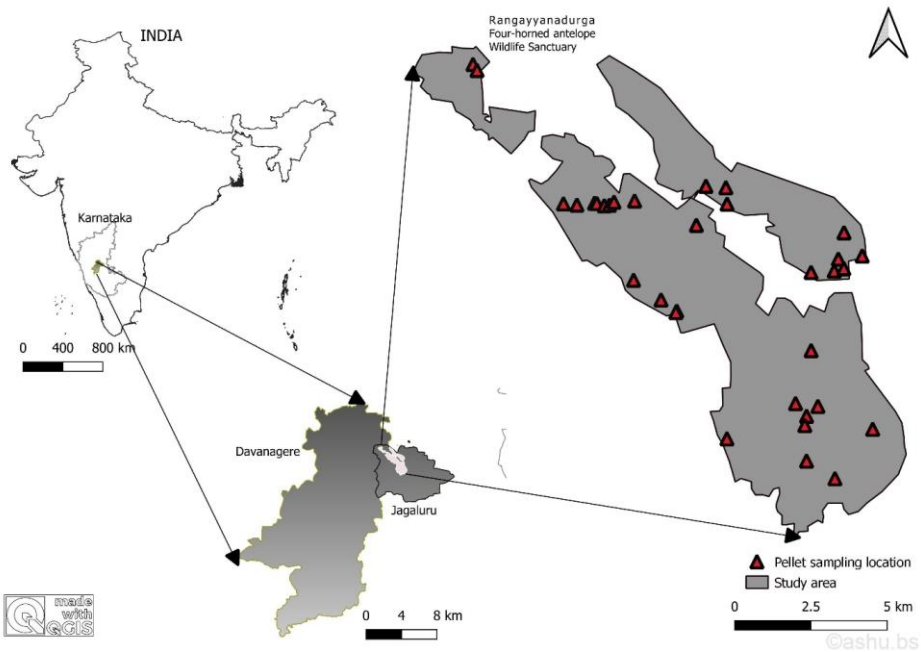

Fig. 1. Map of the study area, Rangayyanadurga four-horned antelope Wildlife Sanctuary

Fig. 2. Midden point of Four-horned antelope

To determine the food composition of FHA, a faecal analysis method was employed [2,14]. Plant parts were collected through direct observation of feeding behavior and with the assistance of local experts. In the lab, the plant parts were dried in an oven set at 60°C and individually ground into powder. Each sample's powder was then separated using a 0.3mm mesh sieve. The slide preparation involved creating reference plants and faecal sample slides. A collection of fresh pellets was placed in Petri dishes and bleached with 50ml of 4% sodium hypochlorite for 6-24 hours at room temperature to remove mesophyll tissue and make epidermis identification easier. After rinsing well in a sieve, the fragments were stained with gentian violet solution (1/100 ml water) for 10 seconds and rinsed again. The fragments were mounted with DPX medium and the cover slipped on standard microscope slides. Identification was done under a compound microscope at 40x and 400x magnification with an ocular measuring unit. Images were recorded on paper or captured with a camera, such as the Nikon D3200 with 18-55mm lenses that are easily available on Android phones. On the basis of specific histological key features, such as cell wall structure, size, shape, trichrome, and stomata, were used to match reference plant fragments. This method was useful for microscopically comparing undigested plant fragments in faeces slides to identify the FHA food composition.

2.3 Analysis

The diet data were analyzed using a classification system with four levels. The first level was based on the functional group of the plant fragments, which were categorized into grasses, herbs, shrubs, climbers, and trees. The second level classified the fragments into broad taxonomic groups, either monocots or dicots. The third level identified the family of the plants, and the fourth level identified the specific species. In cases where a fragment could not be identified to the species or genus level, it was placed in a category corresponding to its functional group, such as “unidentified species” [2,14]. This classification system allowed for a detailed analysis of the antelope's diet and provided insights into the types of plants consumed, their taxonomic relationships, and their functional significance in the antelope's nutrition [2].

Collection and Identification of FHA dung/pellets: The pellets from the midden of FHA that were confirmed in the study area were taken as a reference to avoid misidentification during further sign survey. The different methodologies used are Opportunistic Focal Animal Sampling, Midden Mapping and Monitoring. There was considerable variation exhibited in the shapes of FHA pellets. In some cases, the size, shape, and colour noted pellet [22]. In some midden, there was a mixture of pellets with different shapes and sizes and in some, very small pellets, possibly of young one’s antelope, were also observed.

The pellets samples were categorized mainly by class: monocots or dicots, growth forms grasses/herbs/shrubs/climber/trees, followed by family and species to assess the plant taxa under each category classification to the diet of FHA. The percentage occurrence of plant species in the diet composition of FHA was expressed from the below equation [2,14].

$$\text{Percentage Occurence} = \frac{\text{Number of fragments of species or other category}}{\text{Total number of plant fragments identified}} \times 100$$

(Equation)

We performed an analysis in Microsoft Excel by distinguished plant species and examined whether FHA ate all the plants uniformly in its diet. After categorizing the pellet samples by class, growth forms and family, we analyzed the plant taxa present in each category to determine their contribution to the diet of FHA. This approach allowed us to identify the specific plant species that were being consumed and to assess the dietary preferences of FHA in relation to the available plant resources in the study area. This analysis provides valuable insights into the feeding ecology of FHA and can be used to inform conservation strategies aimed at protecting the plant species that form a significant part of their diet.

3. RESULTS AND DISCUSSION

3.1 Results

A total of 1240 plant fragments from 34 pellet samples were examined in the diet of the Four-horned antelope. Out of these, 9 monocots and 38 dicot plant species were identified, while the unidentified species comprised 8 shrubs, trees, and grasses. The overall plant species composition was categorized based on their growth forms, revealing that trees constituted the highest percentage at 34.59%, followed by grasses at 17.3% and herbs at 17.5% (Fig. 3) (Table 1).

3.2 Diet Composition in Different Seasons

The diet composition of antelopes can vary depending on several factors, including the quality and availability of food sources in their natural habitat in different seasons. Understanding the dietary habits of an animal in different seasons is essential for developing effective conservation and management strategies. In this study, we investigated the diet composition of the Four-horned antelope (FHA) during three different seasons. Our results provide insight into the feeding ecology of FHA and how their diet varies across seasons (Fig. 4).

In diet, the major percentage of occurrence contributed from trees in all three seasons. Shrubs were consumed relatively in a higher proportion in summer (20.07%) than in monsoon (18.85%) or winter (17.09%). The preference order of herbs followed from summer (16.27%) to monsoon (15.93 %) and winter (12.12%). Grasses during the monsoon were consumed distinctly at a higher percentage (13.63 %) than in summer (11.62%) or winter (7.31%). Climbers contributed a small proportion during all three seasons (Fig. 4).

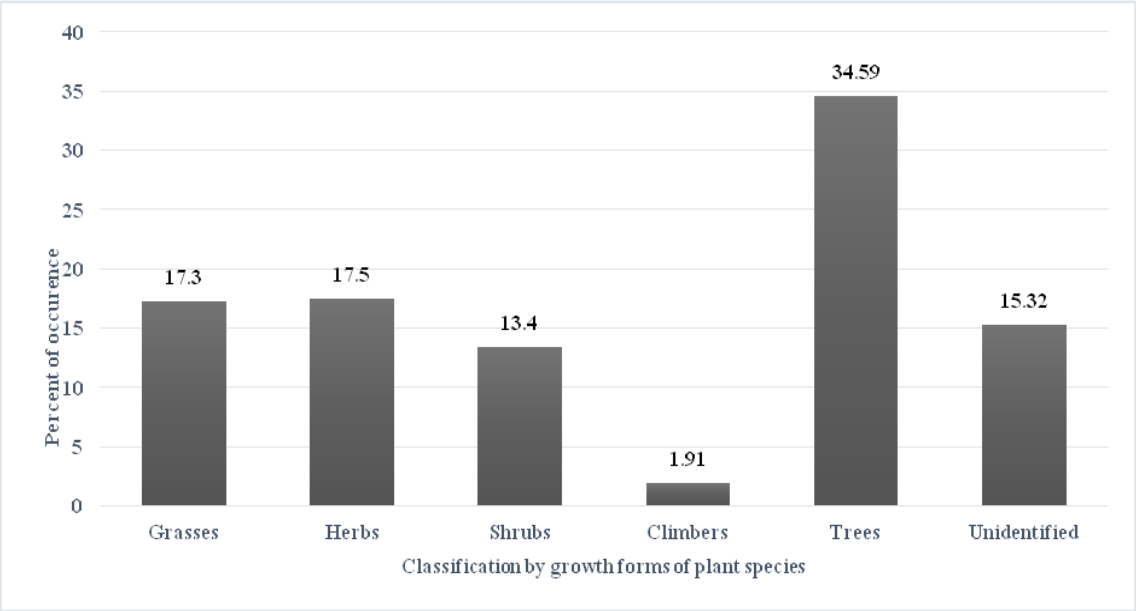

Fig. 3. The occurrence and percentage of growth forms of plant species in the diet of four-horned antelope

Table 1. Percentage Occurrence of different plant species in the diet of four-horned antelope

Plant Category classified						
Functional/ growth form	**Clade**	**Family**	**Species**	**Summer**	**Monsoon**	**Winter**
Grasses	**Monocots**	**Poaceae**	*Cynodon dactylon*	2.3	4.22	3.12
			Eleusine indica	-	0.71	-
			Paspalum sps.	-	0.72	-
			Digitaria ciliaris	0.72	2.12	0.79
			Apluda mutica	2.17	-	-
			Themeda triandra	1.41	2.11	-
			Aristida adscensions	1.98	-	-
			Sehima nervosum	-	0.75	-
			Dichanthium annulatum	-	-	0.78
Herbs	**Dicot**	Astreaceae	*Ageratum conyzoides*	4.61	3.51	-
			Blumea balsamifera (L.) DC.	-	-	4.62
		Amaranthaceae	*Achyranthes aspera*	1.42	3.52	0.79
			Alternanthera species	6.32	4.22	0.79
			Digera muricta (L.) Mart.	-	-	0.69
			Amaranthus spinosus L.	1.42	1.12	-
			Celosia argentea L.	0.72	1.41	0.78
			Protulaca quadrifida L.	2.13	4.22	1.62
		Nyctaginaceae	*Boerhavia diffusa L.*	1.41	2.13	1.69
Shrubs	**Dicot**	Phyllantaceae	*Emblica officinalis*	1.41	1.43	1.11
		Apocynaceae	*Wrightia tinctoria*	4.23	3.25	2.36
		Caesalpinioideae	*Cassia auriculata*	1.41	0.69	-
			Senna auriculata	0.71	-	-
		Lamiaceae	*Clerodendrum phlomidis*	1.41	1.81	1.56
		Fabaceae	*Cassia fistula*	1.02	2.13	3.96
		Apocynaceae	*Carissa carandus*	2.84	2.81	1.58
		Rubiaceae	*Gardenia gummifera.*	3.54	1.42	0.75
			Canthium parviflorum Lamk	4.23	5.63	6.5
		Tilaceae	*Grewia tiliaefolia.*	1.46	1.42	4.11
Trees	**Dicot**	Rhamnaceae	*Ziziphus mauritiana*	5.01	3.52	6.41
			Zizyphus jujube	1.43	5.63	4.56
		Fabaceae	*Butea monosperma*	6.88	2.81	4.51

Plant Category classified						
Functional/ growth form	**Clade**	**Family**	**Species**	**Summer**	**Monsoon**	**Winter**
			Acacia catechu	5.91	3.51	3.9
			Acacia nilotica	3.51	-	3.65
			Albizzia lebbek.	1.41	0.71	2.34
			Albizia amara	0.71	-	1.54
			Pithecellobium dulce	-	2.65	0.79
			Tamarindus indica	3.42	1.42	-
		Leguminoseae	*Bauhinia sps.*	1.45	-	0.65
		Boraginaceae	*Cordia dichotoma*	0.75	2.11	0.76
		Combretaceae	*Anogeissus latifolia*	-	0.71	4.61
			Terminalia chebula	-	0.72	0.85
		Burseraceae	*Boswellia serrata*	-	0.72	-
		Meliaceae	*Soymida febrifuga*	0.72	1.39	1.85
		Moraceae	*Ficus racemosa*	2.85	2.13	4.16
			Ficus religiosa	0.71	1.44	6.16
Climbing shrub	**Dicot**	Capparaceae	*Capparis sepiaria*	4.25	1.46	0.81
			Capparis zylanica	1.41	-	0.79
				5.66	1.46	1.60
Unidentified:				4.30		
Identified species:				95.7		
Dicots:				80.85		
Monocots:				19.15		
Trees:				34.52		
Shrubs:				19.15		
Herbs:				19.10		
Grasses:				19.14		
Climbers:				3.5		
Total				100		

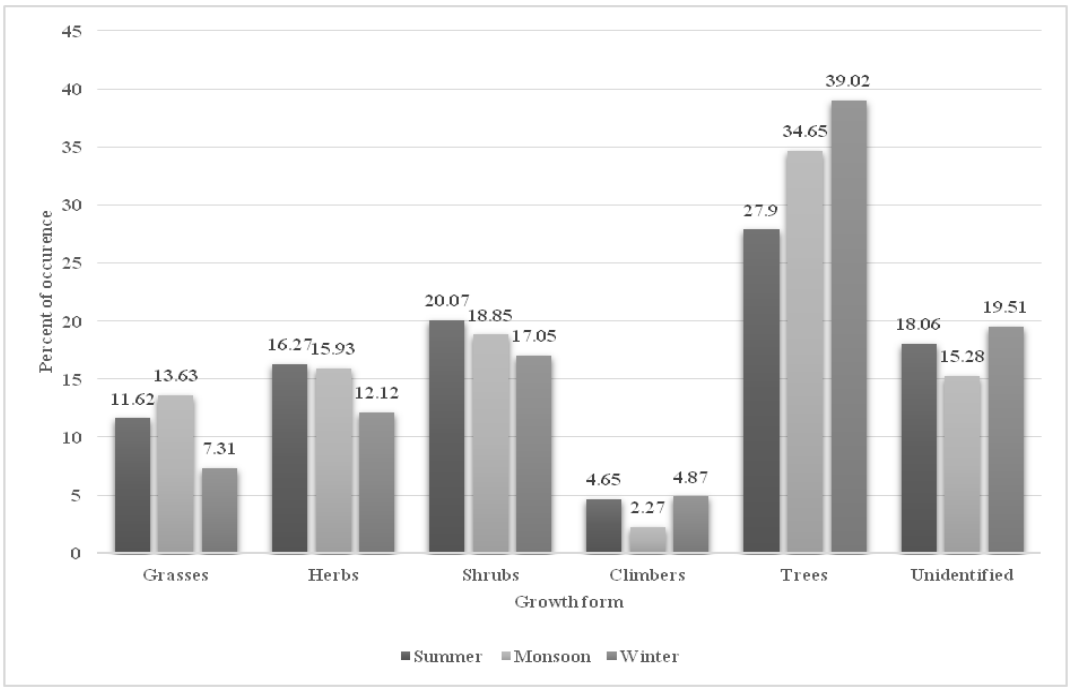

Fig. 4. The occurrence and percentage of growth forms of plant species in the diet of four-horned antelope in different seasons

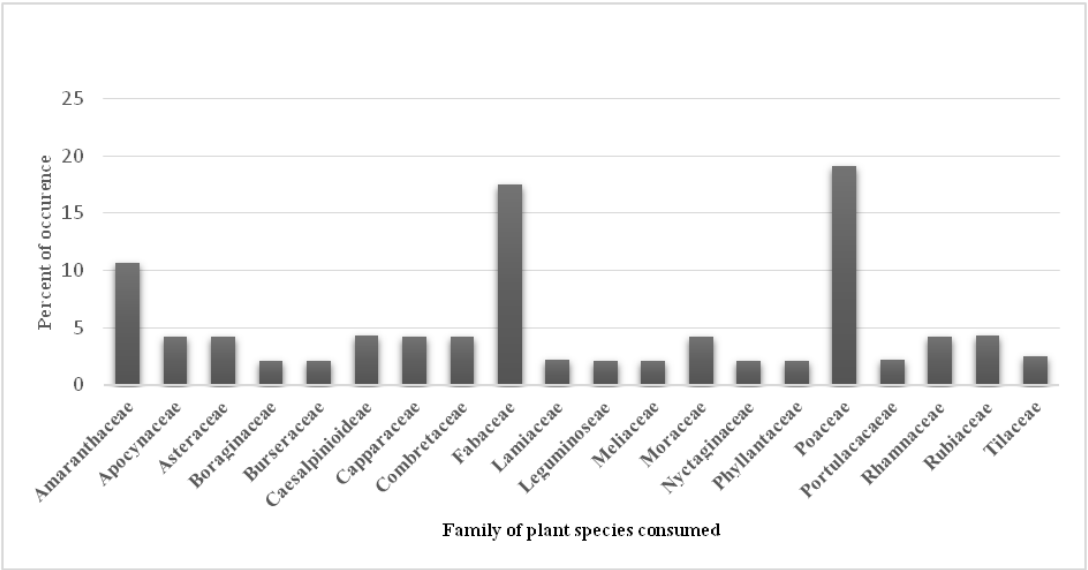

Fig. 5. The occurrence and percentage of different families of plant species in the diet of four-horned antelope

3.3 Diet in Summer Season

During the summer season, we found that the diet of FHA was primarily composed of browsing plants. Our analysis showed that browsing plants accounted for 80.71% of the plant fragments identified in the fecal samples, while grasses constituted only 8.58% of the fragments. The most frequently consumed browsing plants were trees, which constituted 32.11% of the fragments, followed by shrubs (23.89%) and herbs (18.03%). The remaining browsing plants (less than 5%) were climbers. Among the identified browsing plants, the most frequently consumed species were *Butea monosperma, Acacia catechu, Bauhinia sps., Ziziphus*

mauritiana and *Terminalia sps*. The results suggest that browsing plants are the primary food source for FHA during the summer season (Fig. 4).

3.4 Diet in Monsoon Season

In the monsoon season, we found that the diet composition of FHA was slightly different from that of the summer season. While browsing plants remained the primary food source, we observed an increase in the consumption of grasses. Grasses constituted 13.63% of the plant fragments identified in the fecal samples, which is significantly higher than in the summer season. Browsing plants accounted for 70.19% of the fragments, with trees (34.65%) being the most frequently consumed followed by shrubs (18.85%) and herbs (15.93%). The remaining browsing plants (less than 1%) were climbers. The most frequently consumed grass species were *Cynodon dactylon, Digitaria ciliaris, Themeda triandra*, and *Sehima nervosum*. These results suggest that while browsing plants are still the primary food source, FHA may supplement its diet with grasses during the monsoon season (Fig. 4).

3.5 Diet in Winter Season

In the winter season, we found that the diet composition of FHA was more diverse compared to the other two seasons. While browsing plants were still the dominant food source, grasses and herbs also made significant contributions to the diet. Browsing plants accounted for 77.13% of the plant fragments identified in the fecal samples, with trees (39.02%) being the most frequently consumed followed by shrubs (17.05%) and herbs (12.12%). Grasses accounted for 7.3% of the fragments, and the most frequently consumed species were *Cynodon dactylon, Paspalum sps., Digitaria ciliaris,* and *Dichanthium annulatum*. Among the identified herbs, the most frequently consumed species were *Achyranthes aspera, Alternanthera* species, and *Protulaca quadrifida* L (Fig. 4). These results suggest that FHA's diet is more balanced and diverse during the winter season, with significant contributions from browsing plants, grasses, and herbs.

Furthermore, the data provide information on the occurrence and percentage of different plant families in the area. The most commonly occurring plant family is Poaceae, which accounts for 19.13% of the occurrences and includes 9 different plant species. Fabaceae is the second most common plant family, accounting for 17.53% of occurrences and including 8 different plant species. Other common plant families include Amaranthaceae, Apocynaceae, Asteraceae, Boraginaceae, Burseraceae, Caesalpinioideae, Capparaceae, Combretaceae, Lamiaceae, Leguminoseae, Meliaceae, Moraceae, Nyctaginaceae, Phyllantaceae, Portulacacaeae, Rhamnaceae, and Rubiaceae.

These results can provide important insights into the ecology of the area, including the types of plant species available and their abundance. This information can be useful for understanding the feeding patterns of animals that inhabit the area and informing conservation efforts and management practices.

Also, it includes a breakdown of plant species by family and their percentage of the occurrence. The most common family is Fabaceae with a percentage occurrence of 17.53%, followed by Poaceae with a percentage occurrence of 19.13%. Other families that were present with a percentage occurrence greater than 4% include Amaranthaceae, Apocynaceae, Asteraceae, Capparaceae, Combretaceae, Moraceae, Rhamnaceae, and Rubiaceae. The remaining families had a 2.5% or less percentage of occurrence (Fig. 5).

Overall, these results provide insights into the species composition of plants in diet of FHA in the study area, which can be useful for understanding the feeding ecology of antelopes in different seasons. The higher percentage of grasses and herbs suggests that these may be important food sources for antelopes, while the lower percentage of climbers and shrubs suggests that they may be less important. The presence of a variety of plant families also indicates that antelopes have access to a diverse range of plant species, which can contribute to a balanced diet. The breakdown by family provides more specific information on the types of plants that are available in the study area, which can be used to further investigate the feeding ecology of antelopes.

3.6 Discussion

Understanding the feeding habits of a species is essential to gain insight into its ecology and management practices. In this study, we investigated the dietary preferences of the four-

horned antelope, a Vulnerable species [1] endemic to India and Nepal. with a limited understanding of its feeding ecology. We aimed to determine the percentage of occurrence of plant species in different compositions of the FHA diet, which is based on the analysis of faecal analysis studies by the pellet samples of FHA. We hypothesized that the Four-horned antelope is a selective browser and grazer, and its diet would consist predominantly of trees and shrubs [15].

In our investigation, we discovered that *T. quadricornis* predominantly feeds on browse species (80.85%) compared to grasses (19.15%). Trees were the most commonly consumed plant type (34.59%), followed by shrubs (13.4%), grasses (17.3%), herbs (17.5%), and climbers (1.91%). These results are consistent with previous studies conducted by Kunwar et al. (2016) and Oli et al. (2018) in Nepal [2,14]. However, Meghwal et al. (2020) found that trees were the primary food source (60.91%) for *T. quadricornis* in tropical deciduous forests in the Aravalli mountain range of Western India, followed by shrubs (20.49%), grasses (16.92%), forbs (1.50%), and climbers (0.18%) [15]. Baskaran et al. (2011) observed that grasses (28.6%) were the most common food item for *T. quadricornis*, followed by trees (8.18%), shrubs (5.56%), herbs (9.61%), and unidentified (48.07%) [9]. In contrast, Kunwar et al. (2016) reported trees as the primary food source (25.87%), followed by shrubs (21.3%), forbs (18.2%), grasses (10.5%), climbers (4.36%), and unidentified (19.77%) [14]. The variation in results may be due to differences in study methodologies and periods. Our study and the studies by Baskaran et al. (2011), Kunwar et al. (2016), and Oli et al. (2018) used fecal analysis via pellet examination, which may have led to unidentified plant material bias [2,9,14].

The diet of Four-horned antelope results, in dicots with a higher percentage of occurrence followed by less quantity of monocots. Due to the differences in having smaller stomachs in smaller ruminant species of antelope with high metabolic requirements, which restricts maximum feed on grass species consisting of lower protein and higher fiber content in food [14,15]. In summer the grass species which belong to the Poaceae family, the presence of graminoids lost their nutritive and moistness quality [14,20] compared to the wet season in this area. Probably this could be the reason why the antelope consumes less percentage of monocots in their diet. To maintain the proper digestive system in smaller ruminant antelope FHA, amplify in order to protein intake and reduce in intake of fiber in the diet by means it concluded as a selective feeder [5-6,23].

Antelopes that consume herbs, shrubs, and grasses in equal proportion are practising a mixed feeding strategy, which allows them to exploit a wide range of food sources and maximize their chances of finding food in different habitats and seasons. This strategy also helps antelopes obtain a diverse range of nutrients and reduce the risk of consuming harmful levels of any particular toxin. Pellet analysis is often used to determine the proportion of different types of plant material consumed by antelopes. When the analysis shows that an antelope has a diverse diet, it suggests the animal is not dependent on any one type of plant material for its nutrition. This is an important adaptation for antelopes living in areas where the availability of food varies seasonally or from year to year.

4. CONCLUSION

In brief, a study on the diet of *Tetracerus quadricornis* found to be browse plant species than grazing in the Rangayyanadurga Four-horned Antelope Wildlife Sanctuary provides valuable insights into the diet varies with seasons throughout the year around. In diet trees play a significant proportion whereas consuming grasses in monsoon and the antelope consuming herbs, shrubs, and grasses in equal proportion, indicating that the antelope are likely feeding on a diverse range of vegetation in their habitat [14,15,23].

The seasonal variation diet of the four-horned antelope (*Tetracerus quadricornis*), varies with the seasons throughout the year. Further, the antelope consumes a diverse range of vegetation in their habitat, with trees playing a significant proportion of their diet, particularly in the dry season. During the monsoon season, they consume grasses, while herbs, shrubs, and grasses are consumed in equal proportion throughout the year. The antelope prefers browse plant species over grazing, and the most significant contributors to their diet are Aristida adscensionis, Carissa carandus, Butea monosperma, Acacia catechu, and Bauhinia sps. Ziziphus mauritiana, and Zizyphus jujube in the study area.

Based on the results of our study, we recommend promoting the natural regeneration of plants, particularly *Aristida adscensionis, Carissa carandus, Butea monosperma, Acacia catechu, and Bauhinia sps. Ziziphus mauritiana, and Zizyphus jujube,* as have been found to be the most significant contributors to the diet of *T. quadricornis*. Seasonal forest fire is a thoughtful problem in the study area and implementing fire management plans before the onset of these fires can help to protect the forest area. The Rangayyanadurga Four-horned Antelope Wildlife Sanctuary provides valuable insights into the ecology of this elusive and threatened species. The data implicate the practical application of knowledge in the management and conservation of this sanctuary and the wider ecosystem. Additionally, effective monitoring is necessary to prevent illegal human activities and livestock grazing from causing further damage to the sanctuary.

A study on the diet of the four-horned antelope in Rangayyanadurga Wildlife Sanctuary found that the antelope mainly consumes browse plant species, with a significant proportion of trees in their diet. The antelope also consumes herbs, shrubs, and grasses in equal proportion, showing a diverse range of vegetation in their habitat. The study recommends promoting the natural regeneration of specific plant species and implementing fire management plans to protect the forest area. Effective monitoring is also necessary to prevent illegal activities from causing further damage to the sanctuary. Overall, the study provides valuable insights into the ecology and conservation of this vulnerable species and the wider ecosystem.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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