Ecological Observations of Avian Fauna on Different Trees in the Thar Desert of Rajasthan, India

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The vegetation of the Thar Desert has great economic importance and many of them contribute to varieties of product for human use and also meet out the domestic requirement of birds. Among these, the Khejari (Prosopis cineraria), Ker (Caparis decidua), Jal (Salvadora persica) and Bordi (Zyzipus nummularia) have the vital role for biodiversity and supporting biocological activities of many birds for their survival in this region. The observations reveal that the Khejari has major important role and support a varieties of birds on the tree and in the understory of it. These trees are used for night rest as well as for short rest during the day by birds. Caparis decedua is found to support about five species of birds. This shrub provides shelter to birds as night abode. Salvadora percica support four species of birds. Interestingly its holes of old tree trunk provide nesting to nocturnal bird i.e., spotted owlet (Althene brama). Similarly, Zyzipus nummularia support birds primarily for food and subsidiary for nesting purposes. This also provides shelter to birds from predator attack. In present work, bio-ecological observations related to food, feeding and resting behavior of various birds are discussed and are and presented in tables.

Key words: Birds, Thar Desert, Biodiversity, Predator.

1. INTRODUCTION

The biological activities of almost all the birds species either lower to higher group of birds are closely associated with different plant species or on same in the Thar desert of Rajasthan is an ecological niche had has the important role in ecosystem. These all may not have the symbiotic relationship but have the mutualistic relationship with them. The Thar Desert is fortunate to have attracted the attention of a great deal of naturalist, mammologist, taxonomist, ornithologist, herpetologist and entomologist to work together and constitute a fairly good treatise on desert texa and biodiversity. Wroughton [1] was perhaps the first mammologist who carried out mammal survey of the Kutch and Thar Desert. Whistler [2] undertook comprehensive ornithological survey of the desert zone the then the Jodhpur state. This was followed by more systematic survey by Pecock [3]. Roonwal [4] reported on zoogeography, ecology, biology, physiology and conservation highlighting the fauna of the Great Indian Desert. Rama Rao [5] and Ghosh [6] dealt with the status of Rajasthan fauna. Barnes [7] work our on the nesting behaviour in Rajputana especially covering the desert. Sharma & Vazirani [8] and Prakash [9] reported on food and feeding of reptiles of the Thar Desert. Ahuja [10] reported on grass production under Khejari (*Prosopis cineraria*) in the Indian desert and its role in agro forestry. Singh & Lal [11] documented about Khejari (*P. cineraria*) and Babool (*Acasia arabica*) trees on soil

fertility along with profile characteristics. Kaul & Gaguli [12] reported on fodder potential of *Ziziphus* spp. in the shrub grazing land of arid zones and Daymana [13] on fodder plant resources of Rajasthan. Chakravarty *et al.* [14] carried out the work on grazing in the arid and semi zones of Rajasthan giving emphasis on utilization of vegetation cover, grazing behaviour of sheep, and seasonal variation of crud protein contents of plant in different pastures. Parihar & Mohnot [15] reported that survival of different animals' species in the Thar Desert depends on different specific plant species. Any alteration in the flora will lead to survival problems for all those animals that are closely associated and survive on particular plant species. Hence, this suggests that a study in the Thar Desert is not only old but there was a consistent interest to study desert texa and on others is evident from the records of the last two centuries.

Recently, Parihar & Rajpurohit [16] reported about understanding of bio-resource and its uses in day to day life and during drought and famines; using them as food, fodder, thatching, fire wood, fibre, herbal and industrial raw materials is well known to local inhabitant who make the best use of animals and plants materials for their survival. Parihar [17] has also reported occurrence of Albinism in Peacock in Thar Desert. Further, they synthesized the information on weather forecast system based upon the behaviour of animals and physiological changes in plants prior to monsoon season in detail with co-relating rains and crops.

Many more scientists have worked out on biodiversity and on others in the Thar Desert in different fields and well documented but studies on biological and ecological aspects in relation to food, feeding, harbouring and resting behaviour in a form of group of different animals on different trees is lacking. This is perhaps the first attempt to carry out the work in this region. Since the study was restricted in two villages only but in contrast to these, investigations will be helpful to understand the existence of trees and the basic need of the different animals' as well as for biodiversity point of views.

2. MATERIALS AND METHODS

The studies carried out in the village's institutions using transect method, animal-plant relationship considering the biological ecological aspects to ascertain the precise biodiversity profile in the villages. The random observations were made for the investigation in Rasala (Barmer) and Kanaser (Jaisalmer) villages, Rajasthan. Each one of the tree attaining the age of about 25 years i.e., *Prosopis cineraria, Caparis deciduas, Salvadora persica* and *Zyzipus nummularia* were under taken for the study paying six days per tree regularly during the month of June-July and total 150 hours were devoted. The observations were made three times in a day for two hours at a stretch during 6-8AM, 12-2PM and 6-8PM respectively sitting within the radius of 5 meters of the tree trunk. These trees were considered for study because of their occurrence and endemic nature in this region. The different data were collected on Biocological aspect i.e., food, feeding, harbouring, nesting and resting behaviour of different animals and are presented in tables.

3. RESULTS AND DISCUSSION

The observations on Khejari (*P. cenerariа*), Ker (*C. decidua*), Jal (*S. percica*) and Bordi (*Z. nummularia*) yielded results pertaining to food, feeding, harboring, resting and nesting of different bird species on these four dominant desert tree species are depicted in Tables 1- 4.

The bird species i.e., Pied Myna *(Sturnus contra),* Red turtle dove (*Streptopelia tranquebarica),* White vulture *(Gyps bengalensis),* Pea fowl *(Pavo cristatus*), King vulture (*Sarcogyps calvus),* House crow *(Corvus splendens)* and Five stripped squirrel (*Funnanbulus pennanti)* (total seven) *were* recorded on Khejari for feeding, resting, nesting and breeding. The data of these tree support birds and mammals both including Vultures and Squirrels in the tree and on the ground under it and used by them for night as well as for short rest during day hours is given in Table 1.

Table 1: Khejri (*Prosopis cineraria*) supporting different bird species.

Sl. No.	**Species**	**Food and feeding behavior**			**Resting behavior**		**Remarks**
		6-8 AM	**12-2 PM**	**6-8 PM**	**Night rest**	**Day rest**	
1.	Pied Myna *(Sturnus contra)*	Insect under tree	-	-	-	7 Minutes	-
2.	Red turtle dove (*Streptopelia tranquebarica)*	Seeds under tree	-	-	-	4 Minutes	-
3.	White vulture *(Gyps bengalensis)*	-	Cattle bone, flash on ground and lizards	-	Whole night	14 Minutes	Seen next morning
4.	Pea fowl *(Pavo cristatus*)	-	Seeds, Insects	-	Whole night	-	Seen next morning
5.	King vulture (*Sarcogyps calvus)*	-	Lizards	-	Whole night	-	Seen next morning
6.	House crow *(Corvus splendens)*	-	-	-	-	32 Minutes	-

Ker (*C. decidua*) was supporting to the bird species (five birds) namely House sparrow (*Passer domesticus),* Redveted bulbul (*Picnonotus cafer*), Common babbler (*Turdoides caudatus),* Grey shrike *(Lanius exubitor),* Grey partridge *(Francolinus pondicerianus.* His

medium size tree provides fruits, seeds and variety of insects, and serves as night abode. Their data as summarized in Table 2.

Table 2: Ker (*Capparis deciduas*) supporting different bird species.

Sl. No.	Species	Food and feeding behavior			Resting behavior		Remarks
		6-8 AM	12-2 PM	6-8 PM	Night rest	Day rest	
1.	House sparrow (*Passer domestices)*	Insects, fruits in tree and on ground	---	---	---	3 Minutes	---
2.	Redveted bulbul (*Picnonotus cafer*)	Seeds under tree	Fruits on the ground	---	---	10 Minutes	---
3.	Common Babbler (*Turdoides caudatus)*	Fruit in the tree	Fruit in the trees	---	---	5 Minutes	---
4.	Grey shrike *(Lanius excubitor)*	---	Insects on the ground	---	Whole night	---	Seen next morning
5.	Grey partridge *(Francolinus pondicerianus)*	---	Termites, ants, moths & files	---	Whole night	---	Seen next morning

Jal (*S. persica*) was supporting (four birds) to Spotted owlet *(Athene brama*), Spotted dove (*Streptopelia decocto),* Common babbler *(Turdoides caudatus),and* Red turtle dove *(Streptopelia tranquebarica).* Interestingly, the holes on tree trunk support nocturnal bird, Spotted Owlet, for nesting and breeding as shown in Table 3.

Bordi (*Z. nummularia*) was supporting to five birds i.e., Common babbler *(Turdoides caudatus),* Redveted bulbul *(Picnonotus cafer*), Spotted dove (*Streptopelia decocto),* Grey shrike (*Lanius excubitor)* and House sparrow *(Passer domesticus*). This tree was observed to support birds primarily for food and subsidiary for resting as well as protect from predator attack by their spines and compact branching. Their data is given in Table 4.

Table 3: Jal (*Salvadora persica*) supporting different bird species.

Sl. No.	Species	Food and feeding behavior			Resting behavior		Remarks
		6-8 AM	12-2 PM	6-8 PM	Night rest	Day rest	
1.	Spotted owlet *(Athene brama*)	Insects on the ground and tree	Insect on ground	---	Night and day	---	In hole of old tree trunk
2.	Spotted dove (*S. decocto)*	Flower and seeds	Flower and seeds	---	Whole night	---	Seen next morning
3.	Common babbler *(Turdoides caudatus)*	---	Flowers insects	---	---	15 Minutes	---
4.	Red turtle dove *(S. tranquebarica)*	---	Fruits and insects	Fruits	---	25 Minutes	---

Table 4: Bordi (*Zizyphus nummularia*) supporting different bird species.

Sl. No	Species	Food and feeding behavior			Resting behavior		Remarks
		6-8 AM	12-2 PM	6-8 PM	Night rest	Day rest	
1.	CommonBabbler *(Turdoides caudatus)*	Flowers	Flowers	---	---	27 Minutes	---
2.	Redveted bulbul *(Picnonotus cafer*)	Fruits	Fruits	---	Whole night	---	Seen next morning
3.	Spotted dove (*Streptopelia decocto)*	Flowers	---	---	---	20 Minutes	---
4.	House sparrow *(Passer domesticus*)	---	Leaves	---	---	12 Minutes	---
5.	Grey shrike (*Lanius exubitor)*	---	Lizards	---	---	6 Minutes	---

The Red turtle dove was observed to visiting for feeding on fruits and flowers on the trees; fruits, flowers, seeds, insects and lizard on the ground under the trees till forenoon and up to 2 PM. These observed to appear in the evening time in-between 6-8 PM for foraging purpose. The insects were not taken in to account for study purpose, these were found abundantly under and on the trees, and these were observed as good source of food especially for birds. Among these Khejari and Ker trees are preferred by maximum different birds for foraging, nesting, breeding, shelter and resting i.e., mainly due to dense canopy of trees, non flexibility of the middle branches and themselves to feel free from predator attack. The King Vulture and White Vulture recorded on Khejari only on top of the tree for nesting and breeding. Hence, the presence of Vulture encourage to other birds to meet out their biological activities and feel safe on the tree. Similarly, termites (specimen not collected) attack was also recorded that damaged tree trunk of *Jal* which hollowed out and in that hole Spotted Owlet was nested.

Moreover during the biological activities of different species in and under these trees on ground they release litters, scats urine which mixed in the soil and increase the soil fertility/ improve soil humus that help to plants for better growth and longer survival. Presently, the local inhibitors are pruning, clipping, harvesting leaf and pollarding the trees in this region is a major problem which breakdown the inter relationship in between animals and plants and biological activities as well as loss to ecosystem.

The study carried out in different times in different intervals may be lesser and if full day and night the investigations carry out, the result may yield more information on this aspect.

ACKNOWLEDMENT

Author is thankful to Professor G. Tripathi, Head, Department of Zoology, Jai Narain Vyas University, Jodhpur (Rajasthan) for encouraging and paying attention to bring these investigations in the form of scientific manner. Sincere thanks are due to Dr. L.S. Rajpurohit, Professor, Department of Zoology for extending moral support and valuable suggestions.

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