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Research Article

A STUDY ON ROOSTING POPULATION OF COMMON MYNA (*ACRIDOTHERES TRISTIS*), BANK MYNA (*ACRIDOTHERES GINGINIANUS*) AND BRAHMINY MYNA (*STURNIA PAGODARUM*) IN BHAVNAGAR CITY, GUJARAT, INDIA

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ABSTRACT

Myna shows heterogeneous communal roosting. Study on roosting behaviour of avian species aid much information regarding their ecology. In this study we have recorded roosting population of three different species of myna i.e. Common myna (*Acridotherestrictis*), Bank myna (*Acridotheres ginginianus*) and Brahminy myna (*Sturnia pagodarum*) at potential roosting sites in Bhavnagar city. This study has been carried out during the period of June 2014 to May 2016. Potential roosting sites were identified by following flocks of Mynas from their foraging grounds. Arrival and Departure of Myna at roosting sites were recorded. Data for the study were collected during evening time and morning of the following day. Main roosting plant species were also identified. Average arrival period for all three Mynas species was 76.66 ± 6.05 min., while the total number of Myna arrived at different roosting site was 3417.83 ± 439.71 . The average departure period for all three Mynas species was 42.5 ± 7.58 min., while the average total number of Myna departed from the roosting site was found 3424.33 ± 440.12 . Common Myna were more adaptive to the disturbed site. While Brahminy Myna and Bank Myna mostly preferred less disturb area, where human disturbances were quite lower than at other roosting sites. Seasonal variations were also observed in arrival and departing time period at roosting site.

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INTRODUCTION

The word roost can be defined as the place where birds regularly settled or come to rest and sleep at night. Myna is a social bird and shows communal roosting. It roosts together with other species of Myna as well as with other avian species showing heterogeneous roosting (Mahabal, A 1997). Communal roosting in birds is thought to furnish various advantages in terms of reduced thermoregulation costs, reduced predation risk, and increased foraging efficiency (Eiserer 1984; Ydenberg and Prins 1984), however the results are still controversial regarding the significance of communal roosting (Richner and Hebb, 1996). According to Wynne-Edwards (1962), study on roosting population of avian species aid to evaluate population density.

Very few empirical studies have been carried out on the roosting ecology of the Indian Mynas in India. In Saurashtra region of Gujarat, Dhandhukiya (2011) has studied the roosting behaviour of 3 species of Myna. However, in Bhavnagar city no information regarding the roosting ecology of various species of Myna was available.

Here, in this study specifically emphasized parameters which include the factors affecting selection of roosting site, arrival and departure patterns of the three species of Myna at different study site.

MATERIALS AND METHOD

Present study was carried out during period of June 2014 to May 2016. Potential roosting sites were identified by following flocks of Myna, leaving their foraging ground during evening period. Data for roosting behavior were collected during evening time and morning of the following day. During this study six roosting sites were identified in the study area which includes Ambawadi, Pill Garden (Sardarbaugh), Railway colony, Maharaja Krishnakumarsinhji Bhavnagar University campus, Bortalav and Anandnagar. For convenience, study period was mainly divided in to non-breeding, breeding and post breeding season. The roosting population of three species of Mynas and its relationship with the habitat were determined by recording arrival and departure of the birds with regular interval of time period. Direct count method was used for counting of roosting population. During each visit at the

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roosting site last call of birds as well as the first call of the birds were recorded. Vegetation at the roosting site within study area was thoroughly identified with the help of expert Botanist. Observations were made with the help of Nikon 8x40 binocular and Nikon P 620 camera.

RESULT AND DISCUSSION

It was observed that all potential roosting sites i.e. Ambawadi area, Pill Garden (Sardarbaugh), Railway colony, Maharaja Krishnakumarsinhji Bhavnagar University campus, Bortalav and Anandnagar, were found to be utilized throughout the year by Myna species during breeding as well as non-breeding period.

Selection of roost sites likely has implications for better survival and long term fitness, hence, in selection of roosting site, availability of larger trees as well as distance to feeding sites are mainly concerned. Various tree species used by Mynas for roosting within study area were identified along with their vernacular and scientific names, as well as various parameters like tree height and GBH (Girth of Trunk at Breast Height) were considered. (Table-1).

Table 1 List of tree species used by three species of Myna for roosting

Common Name	Scientific name	Tree height (m)	GBH(m)
		\bar{X} -12.88	\bar{X} -1.25
Neem tree	<i>Azadirachta indica</i>	R- 9.12 to 17.60 SD-3.4	R- 0.55to 2.62 SD- 0.62
		\bar{X} -12.64	\bar{X} - 1.49
Peepal tree	<i>Ficus religiosa</i>	R- 10.15 to 15.17 SD - 2.51	R- 1.0 to 1.98 SD - 0.24
		\bar{X} -12	\bar{X} 1.64
Banyan tree	<i>Ficus benghalensis</i>	R -8 to 16 SD -4.08	R - 1.2 to 2.0 SD - 0.33
		\bar{X} - 9.23	\bar{X} - 0.88
Asopalav	<i>Polyalthia longifolia</i>	R- 9.8 to 12.12 SD - 1.46	R - 0.55 to 1.2 SD- 0.49
		\bar{X} - 13.86	\bar{X} - 0.84
Coconut tree	<i>Cocos nucifera</i>	12.12 to 15.0 SD- 1.20	R - 0.72 to 0.92 SD - 0.08
		\bar{X} - 7.6	\bar{X} - 0.78
Karanj	<i>Derris indica</i>	R - 6.08 to 9.12 SD - 2.14	R- 0.64 to 0.91 SD -0.19
		\bar{X} - 11.18	\bar{X} - 1.42
Tamrashingi	<i>Peltophora pterocarpus</i>	R- 6.08 to 13.6 SD - 2.80	R - 0.72 to 2.0 SD - 0.51
		\bar{X} - 14	\bar{X} - 1.32
Khatiamli	<i>Tamarindus indica</i>	R - 13 to 15 SD - 1	R - 1.08 to 1.77 SD - 0.38

Total number of Mynas arrived at the roosting site was highest during Oct-Nov in 2014 as well as in 2015 too. This might be due to addition of new fledgling in roosting population during post breeding period. The departure period was highest in January (55 min.). This might be due to late sun rise in winter season. The arrival and departure time recorded for all three Mynas shown in Table 2 and Table 3.

The average arrival period for all three Mynas species was 76.66 ± 6.05 min., while the total number of Myna arrived at different roosting site was 3417.83 ± 439.71. The average departure period for all three Mynas species was 42.5 ± 7.58 min., while the average total number of Myna departed from the roosting site was 3424.33±440.12. During arrival period most of the time flock size was observed smaller than flock of

5 birds. It was also observed that flocks of more than 40 birds were found rarely.

Table 2 Arrival time of three species of Myna at the roost site (2014 -15)

Observation	Month and Year	Total arrival period (min)	Time Duration for arrival (min)	Total no. of Myna arrived
1	Nov-Feb 2014	5:40 to 7:00 pm	80	3980
2	Mar-Jun 2014	6:30 to 7:55 pm	85	2939
3	July-Oct 2014	6:00 to 7:10 pm	70	3386
4	Nov-Feb 2015	5:45 to 7:00 pm	75	3859
5	Mar-Jun2015	6:25 to 7:15 pm	80	2943
6	July-Oct 2015	6:00 to 7:10 pm	70	3400
Average± SD			76.66 ± 6.05	3417.8 ± 439.71

Table 3 Departure time of three species of Myna at the roost site (2014 -15)

Observation	Month and Year	Total Departure period (min)	Time duration for departure (Min)	Total no. of Myna departed
1	Nov-Feb 2014	7:00 to 7:55 am	55	3990
2	Mar- Jun 2014	6:15 to 7:00 am	45	2946
3	Jul-Oct 2014	6:40 to 7:20 am	40	3391
4	Nov-Feb 2015	7:10 to 7:55 am	45	3864
5	Mar- Jun 2015	6:30 to 7:05 am	35	2950
6	Jul-Oct 2015	6:10 to 6:45 am	35	3405
Average±SD			42.5± 7.58	3424.3±440.1

All three species of Mynas started movement before sunrise. In early morning before departing from the roosting site different activities like preening, scratching, sunning and other comfort movements such as stretching etc. were observed. Mynas started departing from the roosting site just after sunrise in smaller and larger flocks. It took 35 to 55 minutes to depart from the roosting sites for Myna. (\bar{X} =42.5 ± 6.05), which was shorter than that of arrival time.

During the study period maximum numbers of Common Mynas were found to roost at Bortalav than other study site in both year i.e. 2014 and 2015. Maximum numbers of Common Mynas were recorded during Nov-Dec month at all different roosting sites. In 2014, least roosting population of Common Myna were recorded during May at all different sites, while in 2015 least roosting population of Common Myna were recorded during April. This might be due to scattering of Mynas at their nest site during breeding period i.e. March to September, while afterwards addition of new fledgling to the roosting population increased the number of Mynas at the roosting site. (Fig.1 and 2)

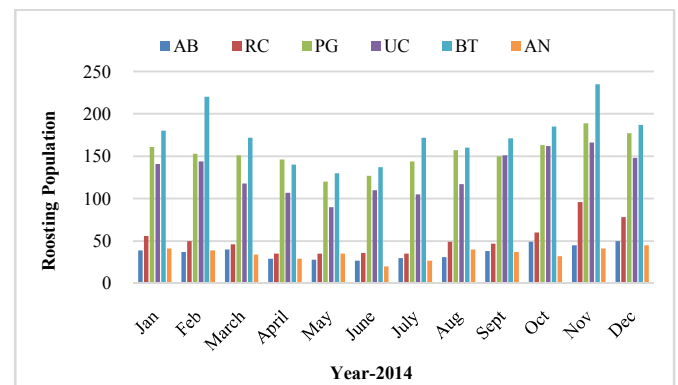


Fig 1 Roosting population of Common Myna at roosting sites during year 2014

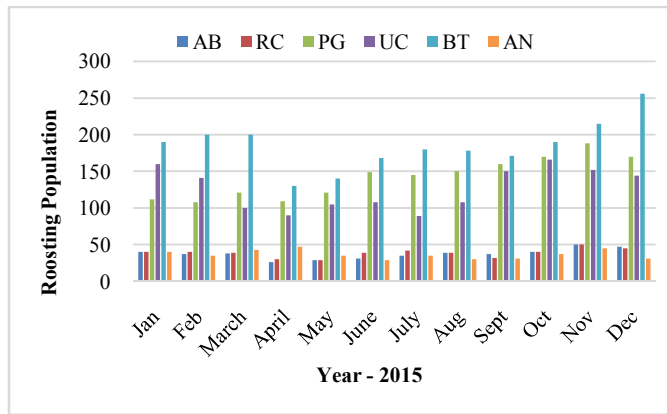


Fig 2 Roosting population of Common Myna at roosting sites during year 2015

During study period Bank Myna were found to roost at Railway colony and Bortalav. It was observed that Bank Myna was not found to roost at study sites like Ambawadi, pill garden, Maharaja Krishnakumarsinhji Bhavnagar University campus and Anandnagar. In case of Bank Myna too, highest roosting population was recorded in November - 2014, during study period at all different roosting sites. Least number of Bank Mynas was found to roost at the study site during April to August. The reason for the decreased population of Bank Myna at roosting site could not be exactly ascertained. In October and December highest population of Bank Myna might be due to addition of fledgling in the roosting population followed by its breeding season i.e. April-August(Fig.3 and 4).

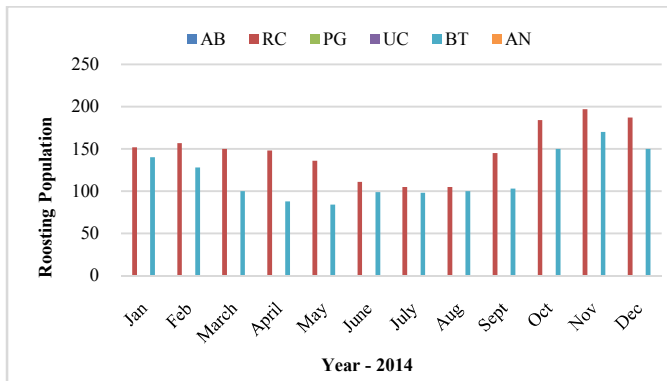


Fig 3 Roosting population of Bank Myna at roosting sites during year 2014

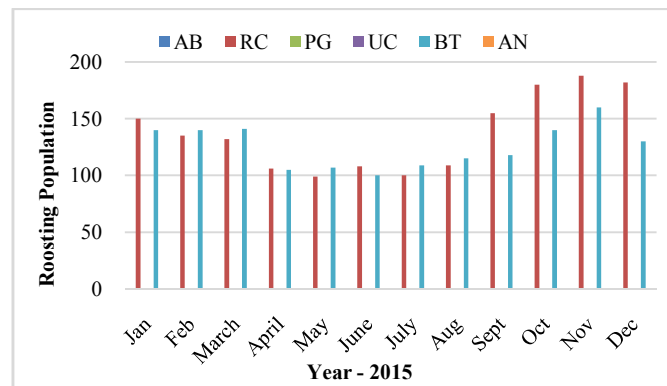


Fig 4 Roosting population of Bank Myna at roosting sites during year 2015

Unlike Common Myna and Bank Myna, in case of Brahminy Myna no significant variations in roosting population were observed. However maximum numbers were recorded in Nov-Dec (2014 and 2015). But this population didn't varied

significantly during different months of the study period (Fig. 5 and 6).

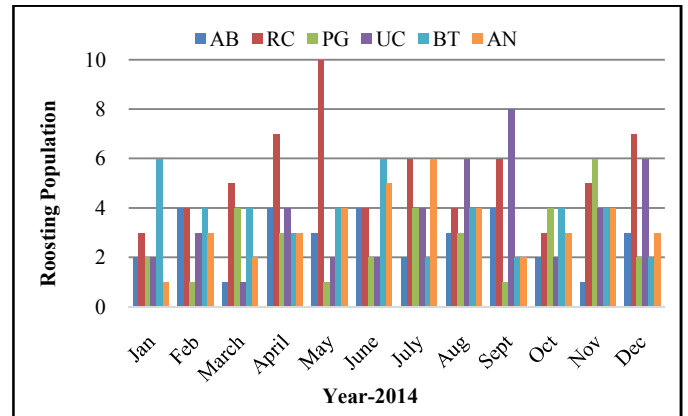


Fig 5 Roosting population of Brahminy Myna at roosting sites during year 2014

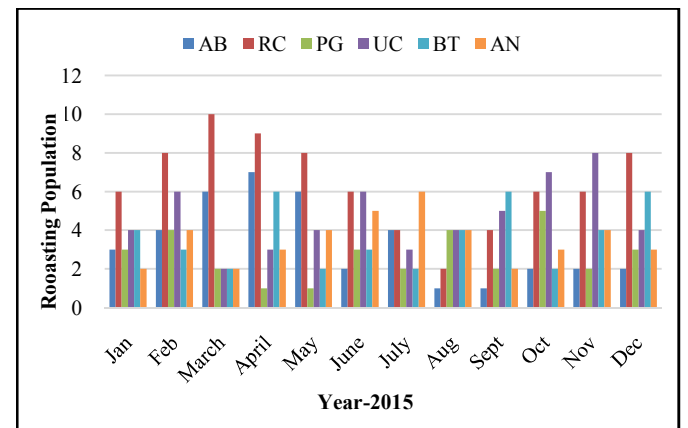


Fig 6 Roosting population of Brahminy Myna at roosting sites during year 2015

Last departure time of Myna in monsoon, summer and winter were 7:10 am, 7:35 am and 6:42 am respectively. Data indicates that there was very short duration for departure time.

Each species of Myna at different roosting sites arrived from the same direction and departed also in the same directions. This means that Mynas were arriving from their feeding site and departing towards the same place, same results were recorded by Dhandhukiya(2011). During this study we also recorded the distance between potential foraging sites and different roosting sites, which indicate that most of the potential foraging site located within the range of 2.5 km area from roosting sites. The proximity of food sources near to roosting site makes intuitive sense since the less distance travelled daily by the birds that means long time should be spent for feeding and less energy expended during foraging flights (Charlotte et. al., 2002). Foraging-based explanations for communal roosting in birds generally define the roost as a stable base of operation from which the birds disperse at different feeding site to exploit transient patches of food surrounding the roosting site (Ward and Zahavi 1973).

During study period 10 species of birds were recorded roosting along with the Myna at the different study site (Table 11).

During this study, it was observed that generally Bank Myna preferred less disturbed area as well as area nearby water sources. Railway colony and Bortalav were the sites most

suitable for roosting of Bank Myna than any other roosting site. This was quite different from the result of Dhandhukiya (2011) in which he found roosting site of Bank Myna in highly disturbed area. These differences in the result indicated the differentiation among species for roost site selection which was influenced by different environmental as well as natural and geographical factors affecting the roosting behavior. Brahminy Myna was sited at every roosting site but very less in number than that of Common Myna and Bank Myna. It was observed that Brahminy Myna mostly tried to avoid places having more disturbances during the selection of roosting site. Thus it is hypothesized that the disturbances had a negative impact on selection of a roosting site in case of each three species of Mynas.

Shorter dispersion of Myna is directly related to the flock feeding habit of Myna which tend to reinforce the birds to remain in a flock at the foraging site and induced them to leave the site as group (Dhandhukia 2011). Similar observation were recorded in the recent study which also confirms that the quicker dispersion of Mynas from the roosting site was due to their empty alimentary canal leading them to fly quickly at the foraging ground.

CONCLUSION

It was found that common Myna were more adaptive to the disturbed site than other two species of Myna. While Brahminy Myna and Bank Myna mostly preferred less disturb area like Bortalav and Railway colony where human disturbances were quite lower than at other roosting sites. Seasonal variations were also observed in arrival and departing time period from roosting site. Similarly changes in roosting population also varied in accordance with different seasonal time period.

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