

**ROOSTING BEHAVIOUR OF HOUSE SPARROW
(*PASSER DOMESTICUS*, LINNAEUS 1758) IN SOME URBAN
AND RURAL AREAS OF JAMMU DIVISION, J & K.**

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ABSTRACT: 447 roosting groups of house sparrow were studied from February 2009 to April 2012 at 6 rural areas and 2 urban areas of Jammu division. The pre-roosting behaviour and roosting sequences like assembly time, time of arrival of birds at roost, sundown, duration of chirping, sunset, first call and departure time in morning in House Sparrow were studied which were found directly linked with light intensity, time of sundown, sunrise, weather condition and type of locality (urban / rural). House Sparrow were found to roost in pure (non-communal) and mixed groups (Communal). 58.84 % groups were mixed roosters with one species, 3.93% mixed roosting with more than one species and 41.16 % groups are pure rooster. Sparrow was found to be more communal rooster (82 %) in urban areas because of less choices of vegetation and more risk of predation while in rural areas it prefer pure roosting (61%) because of availability of spiny shrubs and low risk of predation. House sparrow used spiny shrubs and trees less than 7 ft. height as favourite roosting vegetation. The spiny vegetation gives protection from predators. In mixed roosts of rural areas, the ratio of House Sparrow to other mixed roosters was found more in number because of less competition from other species due to availability of lot of choices for roosting sites. But in mixed roosts of urban areas, the ratio was found to be less because of less availability of roosting vegetation and more competition from other mixed roosters.

KEY WORDS: House sparrow, roosting, mixed roosters, pure roosters, vegetation, spiny.

The house sparrow (*Passer domesticus*) is a member of the family Passeridae. House sparrows are abundant near human habitations. The house sparrow has a historical commensal relationship with man and has followed his colonisation of the majority of the earth. It is the most widely distributed land birds in the world. The natural range of this subspecies runs from Saudi Arabia in the west to Myanmar (Burma) in the east, occupying the Indian subcontinent south of the Himalayas as well as Sri Lanka, a region throughout which it is a year-round resident. On the Arabian Peninsula, it occupies the western and southern coastal regions, including Yemen and Oman. It also occurs from extreme south-eastern Iran and southern Afghanistan south and eastward through most of Pakistan, India, Bangladesh, and Myanmar south to Rangoon (Summers-Smith, 1988). This race of the house sparrow has also been successfully introduced, both intentionally and unintentionally, to numerous places (Summers-Smith, 1988). Different species of birds assemble together to form diurnal or nocturnal mixed feeding flocks, breeding colonies and communal roosts by Zahavi (1971), Gadgil (1972), Ward & Zahavi (1973) and Gadgil & Ali (1975).

MATERIAL AND METHODS

To make a study on roosting behaviour, six rural sites namely Billawar, Doda, Chenani, Rajouri, Ramban and Ramnagar and two urban sites namely Jammu

and Udhampur were selected and 447 roosting groups of House sparrow are studied. The sites were the spaces where House Sparrow roosted. The parameters which we have considered during the study are Assembly time very near to roost, Arrival time on the roost, Sundown mean, chirping, last call after arrival, first call before departure and departure time. Observations were made from throughout the year from February 2009 to April 2012. Usually the observations were recorded during late evening (6 PM to 8:15PM daily) and following morning. (4:30 AM to 6:30 AM). Observation was made from the distance of about 20 to 30 meters. First, we identified the bird with the help of binocular (10×50).

RESULTS

The gamout of roosting sequences, viz. assembly time assembly time, time of arrival of birds at roost, sundown, duration of chirping, sunset, first call in morning and departure time in given in Fig. 1. As far as pre-roosting gathering is concerned, it was observed that the when the place roosting site is near (e.g. in rural areas Billawar, Doda, Chenani, Rajouri, Ramban and Ramnagar), the place of gathering is as near as 250 m. When the place of roosting is 1-2 km (e.g. in urban areas Jammu and Udhampur), the house sparrow inclined to roost, depart from assembly at an earlier time in groups of small numbers. Thus the original larger flock sheds off gradually towards the roosting groups in small sub-groups. Their time of arrival was found to be normally associated with the sunset and the day light. In cloudy weather they started roosting earlier than the normal days. The time period for assembly vary from 17 to 62 minutes (Av. 41 minutes) before sunset throughout the year. Mean arrival time at roosts varies from 1 to 9 minutes before sunset and 2 to 25 minutes after sunset. There is fighting and aggressive calls on roosting. Mean chirping time at roosting site after arrival varies from 32 to 50 minutes (Av. 40 min.). Last call after roosting varies from 51 to 75 after sunsets (Av. 62 mi). Mean first call in morning varies from 45 to 91 minutes (Av. 75 min) before sunrise. Mean departure time varies from 34 to 65 minutes (Av. 44 min) before sunrise.

Usually gathering started with the appearance of a few pairs on the gathering place and with the passage of time increasing number of house sparrows joined the gathering flocks. Both paired and unpaired house sparrow participated in gathering. The number of house sparrow in gathering flocks varied from 10-60 in urban areas and 20 to 200 in rural areas. The distance between individuals in gathering was 5-40 centimetres. In gathering individuals spent most of their time in foraging, preening, and social interaction and resting. The house sparrows made constant vocalization during gathering. The vocalizations reached the peak at the end of gathering. The time of arrival of birds in pre-roosting was early during the cloudy days than on clear days. The time of gathering in urban areas (Jammu and Udhampur) is late than the rural house sparrow. During non breeding season male and female of house sparrows roosted together but during breeding season/ summer, only one partner (male/ female) leave the nesting site for communal roosting and other partner roosts in the nest till the nestling was 10-14 days old. March onwards, as the breeding season progresses, roosts increased in size twice to three folds in August and September.

Communal roosting

House sparrow roosted both pure and mixed roosting groups (Fig. 2). Of the 447 groups studied, 58.84 % groups were mixed roosters and 41.16 % groups are pure rooster (Fig. 3). Common myna is most common communal rooster of House Sparrow accounting for 37.74 % of the mixed groups. The other communal

mixed roosting associates of house sparrow are Bank Myna, Jungle Babbler, Common Babbler, White-cheeked bulbul and Red-vented Bulbul. Sparrows were found to be more communal rooster (82 %) in urban areas (Jammu and Udhampur). While in rural areas (Billawar, Doda, Chenani, Rajouri, Ramban and Ramnagar) it preferred more pure roosting (61 %) because of availability of spiny shrubs and low risk of predation. The percentage of mixed roosting with more than one bird species is 3.93. The ratio of sparrow to Common myna in rural areas is found to be 70:30 while in mixed grouping in urban areas ratio was very small (2:10).

Selection of Roosting trees

The common trees used by house sparrow at eight different locations are given in Fig. 4. The dominant plants, type of vegetation and height of vegetation is given in Fig. 5. Shrubs and trees with height less than 7 ft. is most preferred type of vegetation (58.61%) used as roosting Fig. 6. Of the total roosting groups (292) in rural areas, 63.69 % of groups roosted on spiny vegetation. Relative percentage of type of vegetation and height used by roosting groups of house sparrow is shown in Fig. 6.

DISCUSSIONS

The roosting sites were found to use for roosting purposes during night and for foraging, preening, social interaction and resting during day. Anderson (2006) observed that sparrows form large communal roosts, which are used not only for nocturnal roosting but also as sites of social singing during the day, particularly in late afternoon and evening.

Mean arrival time at roosts varied from 1 to 9 minutes before sunset and 2 to 25 minutes after sunset. Anderson (2006) reported that sparrows begin arriving at communal roosts up to 2 h before sunset. Mean departure time varied from 34 to 65 minutes (Av. 44 min) before sunrise. North (1968) reported that in the morning, sparrows begin vocalizing about 30 min before sunrise, and they usually depart from the roost within 30 min after sunrise. This difference may be due to change regions, localities, feeding sites, weather condition etc. Summers-Smith (1963) also reported agitation calls frequently from communal roosts, however, suggesting that there are frequent aggressive encounters among birds at a roost.

Sparrows were found to be more communal roosters in urban areas the lack of choices of vegetation and more risk of predation. Communal roosting gave them protection. While in rural areas (Billawar, Doda, Chenani, Rajouri, Ramban and Ramnagar) it preferred more pure roosting (61 %) because of availability of spiny shrubs and low risk of predation. Heterospecific communal roosts have been observed with Spanish sparrows in Spain, Alonso, 1986), with European starlings in Poland (Gorska, 1975), with jungle babblers (*Turdoides striatus*) and common mynas (*Acridotheres tristis*) in India (Rana, 1989a), and with European starlings and Eurasian tree sparrows in North America (North, 1968). Mahabal & Bastawade (1985) also reported that house sparrows were among several species roosting communally near communal roosts of the common pariah kite (*Milvus migrans govada*) in India. Mahabal & Bastawade (1991) reported house sparrow as mixed roosting companions of India Myna.

The number of individuals in a group roosting observed range from 10 to 200. These were small groups as compared to 6000 sparrows roost observed by Leck (1973) at Lima Peru in August, 14000 sparrows winter roost (July) by Dawson (1967) in New Zealand, 19000 sparrows late summer roost by Summers-Smith

(1963) in London (UK), 100000 sparrows autumnal roost by Moreau (1931) in Egypt.

The number of sparrows roosting at a site changes seasonally, with larger numbers present during the nonbreeding season, but with smaller roosts persisting throughout the breeding season. Same observation has made by Summers-Smith (1963). The number of sparrows increased up to three folds in August and September. At a communal roost in Poland, for instance, Gorska (1990) observed the number of sparrows increased 3-4 folds between June and September by the addition of young of the year.

In the present study it was found that house sparrow shows preference for spiny shrubs and trees less than 7 ft. height as favourite roosting vegetation. The spiny vegetation gives protection from predators. In urban areas house sparrow used trees height between 7 to 15 ft as dominant roosting vegetation because of non availability of spiny shrubs and small trees due to extensive urbanisation. Anderson (2006) reported that communal roosting sites are usually located in trees, shrubs, or vines with dense foliage, and they change locally if deciduous sites lose their leaves. North (1968) reported that several tree species were utilized as communal roosting sites in Oklahoma (USA), with tree height (at least 6 m) and the density of the foliage (but not species) apparently being the principal criteria for selection.

In mixed roosts of rural areas, the house sparrow was found more in number because of less competition from other species due to availability of lot of choices for roosting sites. But in mixed roosts of urban areas, house sparrow number was found to be less because of less availability of roosting vegetation and more competition from other mixed roosters. Gupta & Goel (1994) reported Bank myna mixed roosting with the house sparrow in the ratio of 50:50.

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Months	Mean Assembly time very near to roost	Arrival time on roost	Mean time of arrival on roost	Sunset mean	Mean Chirping (Min.)	Last call after arrival (mean)	Mean 1st call Before	Departure Time mean	Mean sunrise M
November	4:23	5:16 to 5:32	5:24	5:25	43	6:24	5:30	6:15	7:01
December	4:32	5:18 to 5:34	5:29	5:25	35	6:29	6:00	6:20	7:24
January	5:05	6:00 to 6:20	6:10	5:45	44	6:48	6:05	6:25	7:30
February	5:19	5:52 to 6:15	6:04	6:08	50	7:08	5:48	6:10	7:13
March	5:45	6:42 to 6:52	6:47	6:32	43	7:47	5:18	6:00	6:39
April	6:23	6:42 to 7:04	6:53	6:50	37	7:53	4:49	5:30	6:02
May	6:54	7:02 to 7:26	7:14	7:11	41	8:14	4:38	5:01	5:32
June	6:56	7:18 to 7:48	7:33	7:26	32	8:33	4:39	4:48	5:24
July	6:45	7:05 to 7:32	7:18	7:27	36	8:18	4:45	5:01	5:35
August	6:18	6:42 to 7:15	6:58	7:16	38	8:18	4:30	5:10	5:52
September	6:00	6:25 to 6:44	6:34	6:38	38	7:34	4:53	5:36	6:12
October	5:15	5:42 to 5:52	5:47	5:45	41	6:47	5:05	5:48	6:35

Figure 1. Table showing the chronological sequence of various aspects related to roosting: assembly time, time of arrival of birds at roost, sundown, duration of chirping, sunset, first call in morning and departure time in House Sparrow at eight different locations of Jammu division.

S. No.	Species of communal rooster	Scientific name	No. of House sparrow groups the species roosted
1	Common myna	<i>Acridotheres ginginianus</i>	184
2	Bank myna	<i>Acridotheres tristis tristis</i>	56
3	Jungle Babbler	<i>Turdoides striatus somervillei</i>	14
4	Red- vented Bulbul	<i>Pycnonotus cafer cafer</i>	8
5	White-cheeked Bulbul	<i>Pycnonotus leucogenys leucogenys</i>	18
6	Common Babbler	<i>Turdoides caudatus caudatus</i>	28
7	Pure groups		121
8	Mixed with babbler, common myna		10
9	Mixed with common myna and white cheeked bulbul		8
		<i>Total</i>	447

Figure 2. Table showing name and no. of communal roosters of House sparrow for roosting at eight different locations of Jammu division. (n=447).

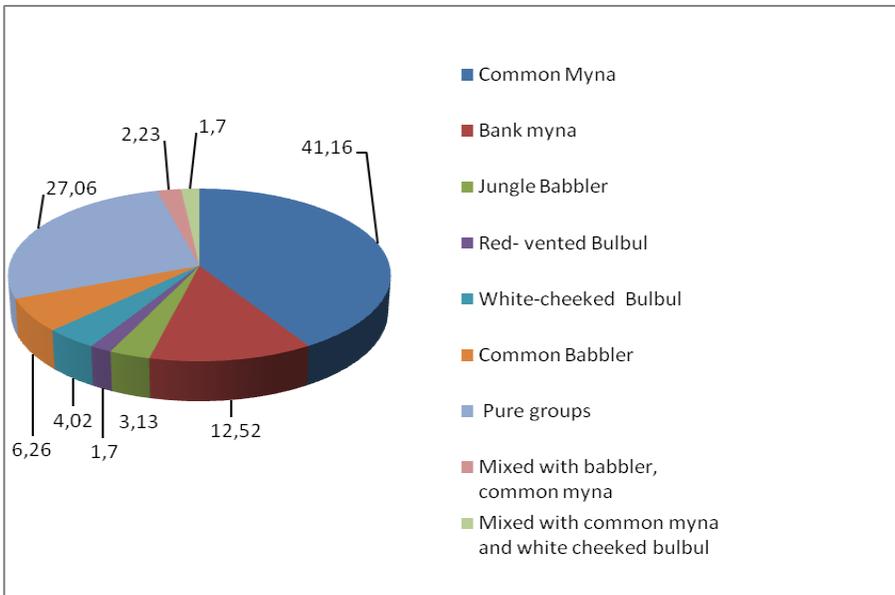


Figure 3. Pie diagram showing the relative percentage of communal roosters of House sparrow for roosting at eight different locations of Jammu division.

S/N	Roosting sites	Roosting trees
	Ramban 33.2500° N, 75.2500° E	<i>Berberis artista</i> , <i>Astragalus candolleanus</i> , <i>Berberis lyceum</i> , <i>Coraria nepalensis</i> , <i>Indigofera atropurpurea</i> , <i>leycesteria Formosa</i> , <i>Melia azaedarach</i> , <i>Olea ferruginea</i> , <i>Rhamnus virgata</i> , <i>Robinia pseudocasia</i> , <i>Rubus elliptica</i> , <i>Salix alba</i> , <i>vibernum cotinifolium</i> , <i>Viburnum grandiflorum</i> <i>Ziziphus mauritiana</i> , <i>Pyrus pashia</i>
	Ramnagar 32.4811 N 75.1844 E	<i>Punica granatum</i> , <i>Artemisia nilagirica</i> , <i>Bambusa arundinacea</i> , <i>Berberis artista</i> , <i>Berberis lyceum</i> , <i>Coraria nepalensis</i> , <i>Cotoneaster bacillaris</i> , <i>Gymnosporia royleana</i> , <i>Lonicera quinquelocularis</i> , <i>Melia azaedarach</i> , <i>Populus cilata</i> , <i>Robinia pseudocasia</i> , <i>Rubus elliptica</i> , <i>Ziziphus mauritiana</i> <i>Viburnum grandiflorum</i> , <i>woodfordia fruticosa</i> , <i>Pyrus pashia</i>
	Billawar 32.6200° N, 75.6200° E	<i>Aegle marmelos</i> , , <i>Asparagus adscendens</i> , <i>Bambusa arundinacea</i> , <i>Berberis artista</i> , <i>Coraria nepalensis</i> , <i>Dalbergia sisso</i> , <i>Dodonaea viscosa</i> , <i>Dodonaea viscosa</i> , <i>Gymnosporia royleana</i> , <i>Hypericum oblongifolium</i> , <i>Lepidagathis cuspidata</i> , <i>Leptodermis lanceolata</i> , <i>Mallotus philippensis</i> , <i>Melia azaedarach</i> , <i>Murraya koenji</i> , <i>Populus cilata</i> , <i>spiraea woodfordia fruticosa a canescens</i> , <i>Syzygium cumini</i> , <i>Viburnum grandiflorum</i> , <i>Ziziphus mauritiana</i> , <i>Pyrus pashia</i> , <i>Carissa opaca</i>
	Udhampur 32.9300° N, 75.1300° E	<i>Capparis sepiaria</i> , <i>Carissa opaca</i> <i>Berberis artista</i> , <i>Aegle marmelos</i> , <i>Dalbergia sisso</i> , <i>Eleaeagnus umbellata</i> , <i>Ficus bengalensis</i> , <i>Mangifera indica</i> , <i>Melia azaedarach</i> , <i>Populus cilata</i> , <i>Salix alba</i> , <i>Syzygium cumini</i> , <i>Ziziphus mauritiana</i>
	Jammu 32.7300° N, 74.8700° E	<i>Acacia catechu</i> , <i>Acacia farnesiana</i> , <i>Acacia gageana</i> , <i>Acacia modesta</i> , <i>Acacia nilotica</i> , <i>Aegle marmelos</i> , <i>Asparagus adscendens</i> , <i>Capparis sepiaria</i> , <i>Colebrookia oppositifolia</i> , <i>Dalbergia sisso</i> , <i>Dodonaea viscosa</i> , <i>Ficus religiosa</i> , <i>Ficus bengalensis</i> , <i>Greviella robusta</i> , <i>Lepidagathis cuspidata</i> , <i>Madhuca indica</i> , <i>Mangifera indica</i> <i>Melia azaedarach</i> , <i>Murraya koenji</i> , <i>Populus cilata</i> , <i>Syzygium cumini</i> , <i>Tamariudus indica</i> . <i>Terminalia arjuna</i> , <i>Toona ciliate</i> <i>Pyrus pashia</i> ,
	Chenani 33.0219 N 75.1700 E	<i>Punica granatum</i> , <i>Berberis artista</i> , <i>Aegle marmelos</i> , <i>Berberis lyceum</i> , <i>Carissa opaca</i> , <i>Lonicera Rubus elliptica quinquelocularis</i> , <i>Olea ferruginea</i> , <i>Populus cilata</i> , <i>Salix alba</i> , <i>spiraea canescens</i> , <i>Ziziphus mauritiana</i> , <i>Pyrus pashia</i> , <i>Morus alba</i>
	Rajouri 33.3800° N, 74.3000° E	<i>Berberis artista</i> , <i>Berberis lyceum</i> , <i>Cocculus laurifolius</i> <i>Eleaeagnus umbellata</i> , <i>Leptodermis lanceolata</i> , <i>Otostegia limbata</i> , <i>woodfordia fruticosa</i> , <i>Pyrus pashia</i>
	Doda 33.1300° N, 75.5700° E	<i>Astragalus candolleanus</i> , <i>Berberis artista</i> , <i>Berberis lyceum</i> , <i>Cocculus laurifolius</i> , <i>Coraria nepalensis</i> , <i>Cotoneaster bacillaris</i> <i>Eleaeagnus umbellata</i> , <i>Juniper communis</i> , <i>leycesteria Formosa</i> , <i>Lonicera quinquelocularis</i> , <i>Melia azaedarach</i> , <i>Olea ferruginea</i> , <i>Populus cilata</i> , <i>Robinia pseudocasia</i> , <i>Rubus elliptica</i> , <i>Salix alba</i> , <i>spiraea canescens</i> , <i>Viburnum grandiflorum</i> , <i>Ziziphus mauritiana</i> , <i>Pyrus pashia</i>

Figure 4. Table showing roost tree selection by House sparrow at eight different locations of Jammu division.

Roosting site	No. of House sparrow roosting group studied	Dominant roosting vegetation	No. of House sparrow groups roosted	Type of vegetation (Shrub/ tree)	Av. Height
Ramban	42	<i>Berberis artista</i>	8	Spiny shrub	<5 ft
		<i>Pyrus pashia</i>	7	Spiny deciduous tree	<15 ft
		<i>Rubus elliptica</i>	5	Spiny shrub	<7 ft
Ramnagar	56	<i>Berberis artista</i>	11	Spiny shrub	<6 ft
		<i>Punica granatum</i>	8	Spiny tree	<7 ft
		<i>Pyrus pashia</i>	7	Spiny deciduous tree	>15 ft
Billawar	54	<i>Pyrus pashia</i>	21	Spiny deciduous tree	>15 ft
		<i>Ziziphus mauritiana</i>	12	Spiny shrub	>7 ft
		<i>Carissa opaca</i>	9	Spiny shrub	>5 ft
Udhampur	58	<i>Populus cilata</i>	12	Deciduous tree	>15 ft
		<i>Aegle marmelos</i>	10	Spiny shrub	<5 ft
		<i>Ficus bengalensis</i>	9	Evergreen tree	>15 ft
Jammu	48	<i>Ficus bengalensis</i>	8	Evergreen tree	>15 ft
		<i>Populus cilata</i>	7	Deciduous tree	>15 ft
		<i>Greviella robusta</i>	6	Evergreen tree	>15 ft
Chenani	102	<i>Punica granatum</i>	18	Spiny tree	<7 ft
		<i>Berberis artista</i>	15	Spiny shrub	<6 ft
		<i>Carissa opaca</i>	12	Spiny shrub	<5 ft
Rajouri	32	<i>Berberis artista</i>	8	Spiny shrub	<6 ft
		<i>Pyrus pashia</i>	7	Spiny deciduous tree	>15ft
		Others	17		
Doda	55	<i>Berberis artista</i>	12	Spiny shrub	<7 ft
		<i>Pyrus pashia</i>	9	Spiny deciduous tree	>15 ft

Figure 5. Table showing dominant roosting vegetation, type of vegetation and average height of vegetation used by roosting house sparrow groups (n=447) at eight different locations of Jammu division.

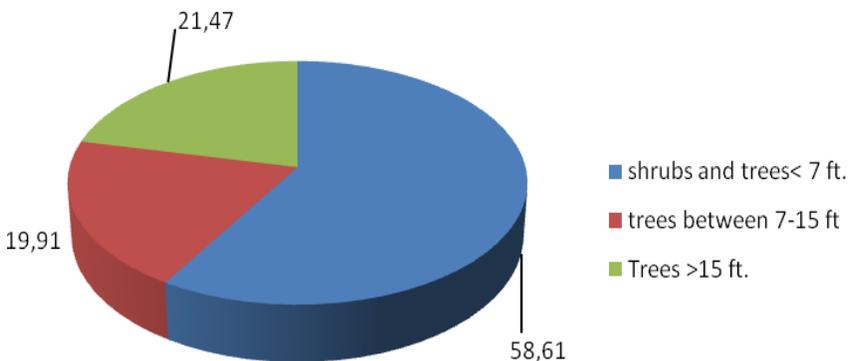


Figure 6. Pie diagram showing relative percentage of type of vegetation and height used by roosting groups of House sparrow for roosting at eight different locations of Jammu division.