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Movement Models of the Rose-ringed Parakeet (*Psittacula krameri*) in Daylight Hours in its Communal Roost

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Abstract: Studies on the day long movement patterns of the rose-ringed parakeet (*Psittacula krameri*) carried out for two consecutive days in five months viz., January, March, April, June and October in a communal roost, showed total number of parakeets recorded to be 821 ± 13.3 , 1111 ± 18.8 , 1199 ± 8.35 , 1066 ± 8.99 , 848 ± 9.72 , 752 ± 10.1 , 508 ± 14.2 , 631 ± 9.95 , 567 ± 18.0 and 483 ± 15.5 , respectively. It was concluded that the movement of parakeets varied in all five months, and the roost located closer to the food items, provided the parakeets with an almost effortless access to the food, and thus, obliterated the food items, to cause economic losses.

Key words: Rose-ringed parakeet, roost, food source

Introduction

Of all the bird pests found in the region of Central Punjab, Pakistan, the rose-ringed parakeet (*Psittacula krameri*) enjoys the status of the most serious avian pest. This parakeet, by virtue of its large feeding niche, has become a potent pest. It frequently consumes and plunders the nutritious food items in fairly good proportions (Khan and Ahmad, 1983; Shafi *et al.*, 1986; Chakarvorty *et al.*, 1998; Gupta *et al.*, 1998). Certain important aspects of the life history of the parakeet relevant to population management have not yet been investigated in depth. Its food and feeding behaviour have largely been studied with reference to the cultivated crops only. Information on foods other than those grown in the agroecosystems is fragmentary. Similarly, its breeding habits and reproduction have been studied by a number of workers (Shivanarynan *et al.*, 1981; Paton *et al.*, 1982; Dvir, 1985; Sarwar *et al.*, 1989), but habitat distribution of the breeding pairs seems to have been ignored. There is also an acute paucity of information on the role of communal roosts in the life history of the rose-ringed parakeet. Information about the number of roosts and their distribution in and about the agroecosystem and the size of the parakeet's nocturnal aggregations in the roosts in a given region may be useful from population management point of view. The above indicated information on the food, breeding habitats and communal roosts of the rose-ringed parakeet may be useful in maximizing target selectivity, the spatial and temporal life history activity of the parakeet population in relation to the breeding season and vulnerable crops. The present studies were, therefore, aimed at investigating the importance of the communal roosts in the life history of the parakeet with a view to formulate a future strategy to control its unrestrained population.

Materials and Methods

The morning and evening counting of the parakeets leaving from and returning to the roost located at the Old Campus started 30 min before sunrise and continued till 30 min after sunset. The counts were done in the January, April, June, July and October, 1999. Counting was made from a vantage point near the parakeet communal roost. The procedure of counting was simple. The field of vision was well defined using such objects as trees, cable pylons, and other similar objects located at a distance of approximately 100 m from the point at which the observers were positioned. For the accuracy sake, field of vision for monitoring the parakeet movements and flock size was kept small. It may be pointed out that the counting were done around the communal roost and not around the nocturnal roost. There were three reasons for doing so: 1) a nocturnal roost was rarely a separate entity as the tree grove serving as a nocturnal roost was a continuous part of the communal roost; 2) before going directly to the nocturnal roost, the parakeets descended to a tree in the communal roost; and 3) it was not possible to count the number of parakeets entering the nocturnal roost. For these reasons, all the counting were done outside the nocturnal roost. At the University farms, all sorts of cereals, oil-seeds and leguminous crops, vegetables and sugarcane are grown; wheat, maize and sugarcane being the common ones. All these farms are located close to the parakeet's roost. The orchards are located within one kilometer radius of the roost. As some parakeets were observed to be already present in the communal roost throughout the day, it was, thus, necessary to assess their numbers also. Before the counting started, a brief walk within the premises of the parakeet roost was necessary to cover all its parts, and making a visual assessment of the number of parakeets present within the

roost. Immediately, after obtaining the above estimate, the counts of the incoming and outgoing parakeets commenced, at least, half an hour before the sunrise and continued without break till 30 min. after the sunset. The entire visual field around the communal roost was included in making the parakeet counts. All these measures were necessary to avoid an overlap in the counting. The difference between the number of incoming and outgoing parakeets within the counting period and the estimate of the parakeet numbers present in the roost gave an approximation of the size of the nocturnal roost.

Results and Discussion

Studies on the movement patterns of the rose-ringed parakeet were extended for five months viz., January, March, April, May and October, 1999 to obtain an information about the number of parakeets present in a communal roost, University of Agriculture, Faisalabad. A communal roost is the one which harbours a large number of the birds, and such a roost is housed near the Health Centre, University of Agriculture, Faisalabad, consisting of a long strand old and tall trees viz., *Dalbergia sissoo* and *Salmalia malabarica* offering the parakeets suitable roosting sites.

It is evident from Table 1 that in January, the parakeets began leaving the roost at dawn at about 15 min before sunrise, in March and April about 15 to 30 min before sunrise and in June five minutes before sunrise, while in October, they started flying out of the roost only a few minutes before sunrise. Thus, the parakeets began leaving the roost for the morning foraging from a few to several minutes before sunrise. For the nocturnal roosting they returned to the roost 20 min after the sunset in January, about 14 min in March and April, 10 min in June and 14 min in October after the sunset. Barring rains, fog and dust storm, the parakeets quit foraging and other activities and returned to the nocturnal roost 10 to 20 min. after sunset and began leaving the roost earlier than sunrise time. In between the morning's first departures and the evening's last arrivals, the parakeets kept on flying in and out of the roost, and to the nearby tree groves within the communal roosts. It may be pointed out again that the parakeets use only a small and specific area as a nocturnal roost. The specific area used for roosting at night was designated as the nocturnal roost. During the day hours, the entire wooded area in the proximity of the nocturnal roost may be used as a diurnal roost, such social activities as pair formation, allofeeding and preening, searching, examining or modifying a tree cavity into a suitable nest, potential nest cavities, mobbing

predators, and intra and inter-specific tussles near the nest cavities. The whole wooded area around the nocturnal roost was designated as the communal roost, which is relatively more permanent than a nocturnal roost which is located within the former. A communal roost may be used for decades. The number of departing parakeets generally peaked before sunrise. After the dawn peak of departures in January, the number of departing parakeets declined rapidly by about sunrise time after which the parakeets kept on leaving the roost in varying numbers till 1125 h. From 1125 to 1425 h, the number of parakeets ranged from zero to four per 30 min counting period. After 1425, the number of outflying parakeets increased and peaked between 1525 and 1555 h. After this peak, the number of parakeets leaving the roost rapidly declined and finally stopped after 1655 h. In March, at about sunrise the parakeets left the roost in large numbers and then the number rapidly declined. From 1125 to 1255 h no parakeet was recorded leaving the roost. After 1255 the picture changed as the afternoon foraging movements started. The number of departing parakeets increased but not regularly till 1625. From 1625 to 1725 a large number of parakeets left the roost. After 1825, no departing parakeet was recorded. In April, generally a similar pattern of movement was observed; the major differences being a) the parakeets started leaving much earlier than in March, and b) during the period extending from 0855 to 1425 departing birds, though in small numbers were observed leaving the roost. After 1425, the number of departing parakeets progressively increased till peak departures were recorded between 1625 and 1725. After 1825, no parakeet was recorded leaving the roost. In June, the pattern of departure from the roost was generally similar to that of April except for the fact that the bulk of the parakeets had left for the morning foraging at dawn between 0455 and 0555. From 0755 to 1555, only 13 parakeets were recorded flying out from the roost at staggered times. From 1555 to 1825, comparatively small number of parakeets left the roost. In October, the rhythm of leaving the roost approximated the one observed in January. In October, from 0955 to 1425 only a few parakeets left the roost. From 1425 to 1655, a large number of parakeets flew out of the roost. After 1655, no departing parakeet was recorded.

In January, except for one individual, no parakeet was recorded to fly back to the roost from 0655 to 0725. After 0725 h, the parakeets began returning to the roost in good numbers till 1155 h after which this process continued till 1455 but involving only a small number of parakeets. Later

Table 1: The numbers of rose-ringed parakeets leaving (L) from and returning (R) to the nocturnal roost and its immediate surroundings at the Campus of University of Agriculture, Faisalabad

Time Period	Jan. 12 and 13		Mar. 13 and 14		Apr. 23 and 24		Jun. 26 and 27		Oct. 23 and 24	
	L	R	L	R	L	R	L	R	L	R
0455-0525	-	-	-	-	174	10	285	04	-	-
0525-0555	-	-	-	-	66	39	48	18	-	-
0555-0625	-	-	-	-	39	66	16	46	-	-
0625-0655	-	-	139	10	17	61	09	38	177	01
0655-0725	134	01	87	62	20	22	06	27	68	39
0725-0755	23	47	97	10	18	28	11	26	33	118
0755-0825	46	27	65	87	09	21	02	10	18	64
0825-0855	57	52	53	75	10	09	01	05	02	20
0855-0925	23	71	40	74	01	02	-	03	02	07
0925-0955	32	36	35	51	01	03	-	02	08	02
0955-1025	23	42	25	39	04	-	-	-	-	-
1025-1055	23	42	04	13	01	01	-	-	-	-
1055-1125	10	21	16	17	04	-	02	-	-	-
1125-1155	04	09	-	-	06	01	-	-	02	-
1155-1225	03	03	-	-	04	05	-	-	-	-
1225-1255	02	02	09	-	01	01	02	-	-	-
1255-1325	03	03	10	09	09	04	-	01	-	-
1325-1355	-	04	25	21	03	02	02	-	-	-
1355-1425	-	06	31	19	08	01	-	01	-	-
1425-1455	16	07	51	22	08	08	02	02	-	-
1455-1525	86	45	25	33	26	08	01	02	01	-
1525-1555	218	33	72	66	26	06	01	01	107	04
1555-1625	98	68	83	63	54	15	10	02	143	07
1625-1655	20	40	104	68	128	34	39	05	06	39
1655-1725	-	18	129	63	121	70	13	104	-	173
1725-1755	-	05	73	100	85	238	55	64	-	09
1755-1825	-	-	26	160	08	97	03	65	-	-
1825-1855	-	-	-	04	-	-	-	198	-	-
1855-1925	-	-	-	-	-	-	-	07	-	-
Total	821.0	1111	1119.0	1066.00	848.00	752.0	508.0	631.00	567.0	483
± SE	13.3	18.8	8.3	8.99	8.72	10.1	14.2	9.95	18.0	15.6
Sunrise	0705		0630		0628		0503		0615	
Sunset	1718		1810		1844		1906		1729	

on the number of returning parakeets improved and a high peak was reached between 1625 to 1655 h. After 1755 h, no parakeet was recorded returning to the roost. In March, the parakeets started returning to the roost after 0625 and the process continued till 1125. Generally, the number of returning parakeets was high during the period from 0755 to 1025. No returning bird was recorded between 1125 and 1255. From 1255 the number of returning parakeets generally steadily increased till a high peak was recorded between 1125 and 1255. In April, the parakeets started returning to the roost much earlier than in the preceding two months although the length of the day in March was only 36 min shorter than in April. The process of arrivals at the roost continued till 0955. Between 0955 and 1125 the process almost stopped. But it recommenced after 1125 and continued till 1825. The peak arrival was recorded between 1725 and 1755. In June, usually the hottest month of the year, the parakeets began flying out of the roost between 0455 and 0525 and some returned to it during the same time period. The process of

the arrivals speeded up after 0555 and continued till 0955 after which there was a complete quiescence for three hours. After 1255, the parakeets began coming to the roost but in exceedingly small numbers till 1655 after which a large number of the parakeets returned to the roost. In October, when the day length was only 26 min shorter than in March, parakeets leaving the roost were recorded from 0625 to 0955. After 0955, there was a long period of quiescence which ended by about 1525 h. From 1525 to 1755 h, a total of 232 parakeets returned to the roost.

In the forenoons, generally the number of departures from the roost was greater than the number of returns to it. In March, April and June, the gap between the number of departures from and arrival at the roost was greater than in January and October. Contrary to this, the number of arrivals at the roost in the afternoon was either smaller or approximated the departures. The departure and arrival counts were high in March rather it was the highest of all the months Gupta *et al.*, 1998; Paton *et al.*, 1982). The

elevated levels of activity could have been due to frequent departures and arrivals of the small nest cavity searching parties between the morning and evening foraging bouts. The activity level was lower in April than that in March. Perhaps, the nest searching activity had subsided in this month (Dvir, 1985). The departing and returning activity with respect to the roost were at the lowest ebb in October. The reason for this could seemingly have been neither due to relative small population size, the length of the day, nor the weather conditions. The logical conclusion is that some change in the pattern of activity of the parakeets occurs in October. The most probable reason could be that a good number of the parakeets remained outside the communal roost for the greater part of the day perhaps in search of mates and nest cavities (White *et al.*, 1985; Garner, 1978).

A communal roost comprising old trees of the right type of species and located in close proximity to farmlands, orchards, and fruit trees is an ideal one for the parakeets. During the breeding season such a roost provides the breeding parakeets an easy access to nutritious foods available in the nearby oil-seed and ripening wheat fields, and in the mango and date palm groves. When the brooding females start foraging and feeding on their own towards the end of the brooding period they indirectly improve the food fetching efficiency of the males which might in turn improve the survival rate of the chicks (Heisterberg, 1984; Bruggers *et al.*, 1992). It thus augments that the food crops should always be located away from the parakeet roosts, and logically, to sneak the food, the parakeets would need to voyage to a fairly considerable distance which might not be useful from the energy budget of the parakeet. An apparent reason, for the non availability of the substantial information on the roosts, is the lack of such studies in Pakistan.

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