

# NOCTURNAL FORAGING BY SPOT-BILLED PELICAN *PELECANUS PHILIPPENSIS* IN KARAIVETTI BIRD SANCTUARY, TAMIL NADU, INDIA

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It is not uncommon for birds to be occasionally active at night (Martin 1990), but fewer than 3% are strictly nocturnal, completing all aspects of their life cycle after dark. The majority of nocturnal animals have refined sensory and behavioral strategies for being active at night. Open water is a suitable environment for nocturnal activity. Aquatic birds can receive the full illumination provided by the moon and starlight, without interception by foliage.

Aside from nest arrival and departure, the primary nocturnal activity of waterbirds is feeding (Brooke and Prince 1990, Owen 1990). Among waterbirds, grebes (Burger 1997), night herons *Nycticorax* spp. (Watmough 1978), Great Blue Herons *Ardea herodias* (Willard 1975, Bayer 1978, Pratt 1980, Black & Collopy 1982, Powell 1987), Black-necked Storks *Ephippiorhynchus asiaticus* (Whitting & Guinea 1999), White Spoonbills *Platalea leucorodia* (Aguilera 1990), Wood Storks *Mycteria Americana* (del Hoyo *et al.* 1992), American White Pelicans *Pelecanus erythrorhynchos* (McMohan & Evans 1992) and Painted Storks *Mycteria leucocephala* (Kannan & Manakadan 2007) have been reported foraging at night despite also being active during the day. Recent observations conducted at Karaivetti Lake, Tamil Nadu, India, suggest that the Spot-billed Pelican *Pelecanus philippensis* might be active, at least occasionally, at night.

Night observations of Spot-billed Pelican were first made incidentally during a study of their ecology at Karaivetti Lake. The nocturnal foraging by pelicans was then studied on moonlit nights.

Observations were made on one full-moon day in every month from 18h00 to 24h00 during January 2009 to April 2010. However, no observation was possible for the months of April, June, July, August, September and October 2009 due to poor visibility nor for May 2009 due to absence of water in the lake, leaving only nine full-moon nights of observations. Before the start of observation, the number of pelicans on the lake was counted (roosting count) to assess whether all the birds forage at night. Observations were conducted only during periods of sufficient moonlight. In order to record behavioral activities, study hours (18h00 to 24h00) were divided into six periods of one-hour duration, and the number of pelicans sighted at the first sighting of each hour was recorded as the number found in the respective one-hour duration. Any increase or decrease in the number after the first recorded sighting during each hour was not considered for the present study. Based on plumage and size, pelicans were classified into breeding adults (> 3 years), subadults (< 3 years) and immature (<1 year). Classification was largely done during 16h00 to 18h00, as differentiation of breeding adults from subadults was not possible in moonlit hours. Hence, late arrivals were classified as adults or immature.

During all the nocturnal observations, Spot-billed Pelicans were seen foraging (Table 1). However, only <25% of the individuals present were found foraging after 18h00, as the majority of the individuals ceased their foraging activities before dark. Moreover, the number of individuals foraging at night decreased as the night progressed. Although pelicans foraged up to 24h00, very

TABLE 1  
Nocturnal foraging observed in Spot-billed Pelican at Karaivetti Bird Sanctuary

Date (night of full moon in month)	Total number present	Number (%) foraging, time of night					
		18h00–19h00	19h00–20h00	20h00–21h00	21h00–22h00	22h00–23h00	23h00–24h00
Jan. 2009	180	32 (17.8)	19 (10.6)	4 (2.2)	NO <sup>a</sup>	0	0
Feb. 2009	184	29 (15.8)	21 (11.4)	NO	NO	0	0
Mar. 2009	261	48 (18.4)	26 (10)	4 (1.5)	1 (0.4)	1 (0.4)	1 (0.4)
Nov. 2009	203	16 (7.9)	NO	NO	0	0	0
Dec. 2009	186	34 (18.3)	21 (11.3)	9 (4.8)	1 (0.5)	NO	NO
Jan. 2010	186	42 (22.6)	28 (15.1)	NO	NO	NO	NO
Feb. 2010	201	39 (19.4)	16 (8)	4 (2)	NO	0	0
Mar. 2010	207	12 (5.8)	NO	NO	0	NO	NO
Apr. 2010	295	18 (6.1)	16 (5.4)	3 (1)	0	NO	0

<sup>a</sup> NO = no observations due to poor light.

few continued their foraging after 21h00. Unlike during the daytime, pelicans rarely foraged in groups at night, most foraging independently. Of all the age groups, breeding adults were most likely to forage at night. The majority of breeding adults engaged in nocturnal foraging continued throughout the night, rather than roosting around 18h00, as pelicans in other age groups did. During daylight pelicans avoid foraging close to the bank of the lake because of human disturbance. However, at night, pelicans were seen foraging near the bank of the lake. Both adults and subadults foraged at night, but not immatures.

Nocturnal foraging may be a prudent strategy when food requirements cannot be readily met during daylight hours. Furthermore, it may be necessary, at least for adult parent birds, during the breeding season as parental care (incubation and vigilance over the eggs or chicks in the nest) reduces the amount of time available for foraging during daylight. McNeil *et al.* (1993) considered nocturnal foraging to be a strategy to avoid predators and perhaps to access preferred prey, particularly for aquatic birds. Hence, nocturnal foraging by Spot-billed Pelicans may be a compensatory foraging strategy, at least for breeding adults. Moreover, night foraging may be profitable for breeding adults, as eggs/chicks in the nest may be safer at night than during the day.

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