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BREEDING ECOLOGY OF THE LITTLE TERN, *STERNA ALBIFRONS* PALLAS, 1764 IN SINGAPORE

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INTRODUCTION

Terns are a cosmopolitan group of birds that are closely allied to gulls. They are among the noisiest birds, making harsh and grating calls. They are also gregarious—breeding, foraging and migrating in flocks. There are 44 tern species in ten genera (Gochfeld & Burger, 1996). About a third of these species are black-capped terns belonging to the genus *Sterna.* Of the 14 *Sterna* species recorded for Southeast Asia, seven have been seen in Singapore, mostly as non-breeding visitors, winter visitors or vagrants (Robson, 2005). Only the black-naped tern (*Sterna sumatrana*) and little tern (*Sterna albifrons*) are residents.

The little tern is a common resident as well as a non-breeding winter visitor to Singapore. It is a small, slender and streamlined bird with a pair of narrow, sharp-pointed wings and forked tail. These features adapt it well to a swift and graceful flight as well as plunge-diving for fish from a height above the water. The white belly helps to reduce its conspicuousness to underwater prey when the bird is flying over the water foraging. It has been breeding on Singapore Island's coastal sand-fills at Changi, Seletar and Tuas since 1987 (Wang & Hails, 2007; Wells, 1999).

OBSERVATIONS

The study site for observing little tern nesting was a stretch of beach at Changi Cove, Singapore which unfortunately has since been scheduled for development. Observations were made over five weeks from Jul. to early Aug.2006, paying careful attention to ensure minimal disturbance to the nesting birds.

The birds fed as a flock, leaving the nests unguarded during certain periods when the ground is cooler and the chicks needed less shelter from the sun. It was during these periods that we entered the area carefully and marked each nest with plastic pickets for ease in relocating them. Also, this would prevent accidental trampling of the nests. Even after hatching, there was the constant danger of stepping on the chicks because they remained well-hidden, lying low and still. As far as possible, defined paths were used, especially when moving down the depressions, to further prevent accidents.

Courtstip and Egg-Laying – The plumage of the little tern during the breeding season of May to Jul. shows a neat white forehead and a yellow bill tipped with black. Courtship feeding is part of the breeding ritual and according to Gochfeld & Burger (1996) the male feeds the female. As the sexes are not morphologically distinct, we assumed it was the male who made the offer. If the female is receptive to the male's advances, it may accept the fish. Occasionally a male indulges in teasing, swallowing the fish as soon as the female shows interest. At other times the pair engage in aerial displays (Fig. 1), sometimes with the female still clutching the fish in its bill.

Once the pair bond, courtship rituals intensify and copulation occurs. The nest is a simple scrape on the ground. Eggs are laid in a bare depression in the sand. A full clutch consists of three but usually only two eggs are laid (Fig. 2).

Approximately 60 eggs were counted from 25–30 nests, of which 10–15% failed to hatch. About 75% of the chicks that hatched survived. Non-survivors usually died within a few hours of hatching (Fig. 3). A number of chicks were victims of feral dogs that roamed the area. The eggs that remained unhatched included the two clutches that consisted of three eggs each.

Fig. 1. Little terns in aerial display.

Fig. 2. A full clutch usually consists of three eggs.

Fig. 3. Death of a newly-hatched chick.

The eggs are well-camouflaged on the ground. They are densely spotted with dark brown and pale lavender. Both parents help in their incubation and brooding. Whenever a parent bird arrives at the nest, it inspects the eggs, settles down and positions them nearer its body (Figs. 4–5). We were not able to ascertain the length of incubation as we could not determine when the eggs were laid. However, we estimate that the incubation period is approximately three weeks.

Fig. 4. Parent bird arriving at the nest.

Fig. 5. Parent bird incubating the eggs.

Figs. 6–7. An adult removing the eggshell after the hatching of the second egg.

Chicks – Once an egg hatches, one of the adult birds invariably removes the shell and dumps it some distance away (Figs. 6–7). This is to ensure that the nest's visibility is not compromised as the inner surface of the shell, being white, can easily attract predators. The second egg hatches one day later and again, the eggshell is removed for disposal elsewhere.

Newly-hatched chicks are blind and partially covered with down feathers (Figs. 8–9). There is a partial covering of down, thus they are described as being semi-precocial. Within a few hours the chicks begin to move about and by the next day they were totally covered with down feathers (Fig. 8).

The first two days are crucial to their survival but once they are able to move about, their survival chances improve. They normally remain motionless in the nest until they hear the all-clear call of the adults. Then the chicks move out, bill gaping, sometimes chirping, to beg for food (Fig. 10). However, at any sign of danger they immediately stop moving and remain still (Fig. 11).

Fig. 8. A two-day old chick covered with down feathers with the second egg.

Fig. 9. Newly hatched chick with its sibling.

Fig. 10. Chick moving about a few days after hatching.

Fig. 11. Chick freezing at the nest.

Fig. 12. Adult feeding chick.

Fig. 13. The arrival of an adult excites the chick.

Chick fatality can be high as a result of predation by feral dogs or excessive heat. The adults may react strangely to the death of their chicks. In one instance, the parent covered the chick's bill with a piece of stone as ants began to crawl over the carcass. It continued to sit on the remaining egg and dead chick, whilst being harassed by the sudden increase of flies and ants. Unfortunately, the remaining egg failed to hatch, probably because of the excessive temperature from the heated ground.

The chicks require about 20 days to fledge and during this period the adults are kept constantly busy feeding fish to the chicks (Fig. 12). Prior to fledging, the chicks constantly exercise their wings, flapping them whenever there is strong wind.

The fledglings become near-hysterical whenever a parent arrives with fish (Fig. 13). They wave their wings to attract attention to themselves. Juveniles from surrounding nests, however, normally remain silent, waiting patiently for their own parents to arrive. After feeding a chick, the parent would fly off to obtain food for the other chick. Should the other chick manage to snatch the fish, the rightful chick would usually chase it around until the fish was dropped and retrieved.

Up to three days' old, the chicks are fed with a liquid mix of fish. Subsequently, they are fed whole fishes. The parent would hold the fish just behind the head and direct it into the gaping mouth of the juvenile, head first (Figs. 14–15). This prevents the sharp spines of the fins damaging the throat as the fish slides down into the stomach.

With a larger fish it was not possible to place it within the chick's gape. The juvenile would receive the fish by gripping it just below the head. The juvenile then manipulates the fish so that it can be swallowed head-first.

Courtship feeding, as described earlier continued throughout this period when the parents were continually feeding the juveniles. The duration of courtship feeding was not observed.

Fig. 14. Adult directing a fish, head-first to its chick.

Fig. 15. Chick with a fish in its bill.

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