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Observations of Seychelles Fodies feeding on mosquitos attracted to nesting Hawksbill Turtles on Cousin Island Special Reserve

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Abstract

Cousin Island Special Reserve is a nesting hotspot of Hawksbill Turtles. As part of on-going long-term monitoring, emerging females are observed and nests noted and marked. During the 2023/24 nesting season, unprecedented levels of mosquitos were recorded over the island. We observed the endemic Seychelles Fody predating mosquitos on and around nesting female turtles during their digging and egglaying process.

Introduction

In the Seychelles, Indian Ocean, the nesting season of the Hawksbill Turtle *Eretmocheys imbricata* is from September through to March, peaking in November-December-January (Diamond 1976). Nesting females emerge during daylight hours moving up the beach into the undergrowth to search for a suitable nesting location. The nesting process consists of selecting a nest site, often under bushes overhanging the highwater level, excavating the body-pit and the egg-chamber, laying the eggs, and finally camouflaging the nest (Diamond 1976). The process takes on average 150 minutes (Diamond 1976).

The nesting of the turtles is timed to coincide mainly with north-west monsoon season, the period of peak rainfall in the Seychelles (Diamond 1976). During this season, wet and humid conditions can lead to swarms of mosquitos (pers. obs). During this monsoon period in 2023/24 Cousin Island experienced unprecedented densities of mosquitos with the entire island being affected (pers. obs). The explosive mosquito population could be attributed to heavy precipitation and a weak north-west monsoon wind; as a result, high levels of humidity created the optimum environment for the mosquito population to breed successfully under these exceptionally good conditions.

The Seychelles Fody *Foudia sechellarum*, known as “Tok-Tok” in the local Creole language, is a small insectivorous species restricted to predator free islands. It has a threat status of Near-threatened; with a recovering population which can be attributed to protected islands providing a secure habitat (BirdLife International 2024). They are extremely territorial with small territories (Kraaijeveld & Komdeur 2003).

Observation

During the 2023/24 turtle nesting season, with the high density of mosquitoes, we observed Seychelles Fodies in association with the turtles. Closer inspection showed that the fodies were feeding on mosquitos that had been attracted to the turtles (Figure 1). The mosquitos were attracted to the emerging turtles and their densities increased as the turtles disturbed the ground and leaf litter by their body-pitting and digging behaviour. The mosquitos appeared to cause minor irritation to some individual turtles because behaviour such as twitching and head movements were observed.

The fody feeding behaviour was not anticipated and thus only observations and photography were carried out. The observations were made while monitoring the nesting females turtles. During the nesting process, turtle monitoring is undertaken to record nesting success, to collect egg counts where possible and to log the ID of the turtle tag. Because this can only be done while the female is laying, we had time to focus on the fodies and their feeding behaviour. This was carried out at a suitable distance so as to avoid disturbance of both the nesting turtle and the feeding fody.

We made two confirmed observations of fodies feeding on mosquitos on or around turtles, with photographic evidence. There were further similar, behavioural observations, but we were unable to confirm predation by fodies on mosquitos.

Confirmed observations included Seychelles Fodies feeding on mosquitos around nesting turtles and gleaning them off the areas of soft skin such as the flippers and face. Fodies also appeared to be targeting mosquitos close to the turtles; both on the ground and in flight. These mosquitos had reduced mobility, because they were full of blood (Figure 2).

One female fody was observed to encounter a turtle soon after her emergence and spent more than an hour feeding in and around the turtle, even taking mosquitos from the turtle's eyelid. The fody commenced feeding during the body-pitting period and carried on throughout digging, laying and covering stages of turtle nesting. The fody flew off when the turtle began to camouflage its nest, because the increased movement of the turtle prevented the fody from making a close approach as it had been able to when the turtle was mostly sedentary. The behaviour of this individual fody alternated between foraging in and around the turtle and flying onto a low perch to spot more blood-filled mosquitos. The only time the fody stopped feeding was when the monitors tagged the turtle and made the nest records. While this was happening, the fody remained on a perch nearby and promptly returned once the monitors moved away. The nesting female turtle showed few signs of disturbance. The turtle's behaviour never went beyond twitching and this was mostly seen when the fody was gleaning mosquitos off the turtle's face. The female in question

Figure 1: A turtle returning to the sea after nesting. Note the high density of mosquitos visible around the head.

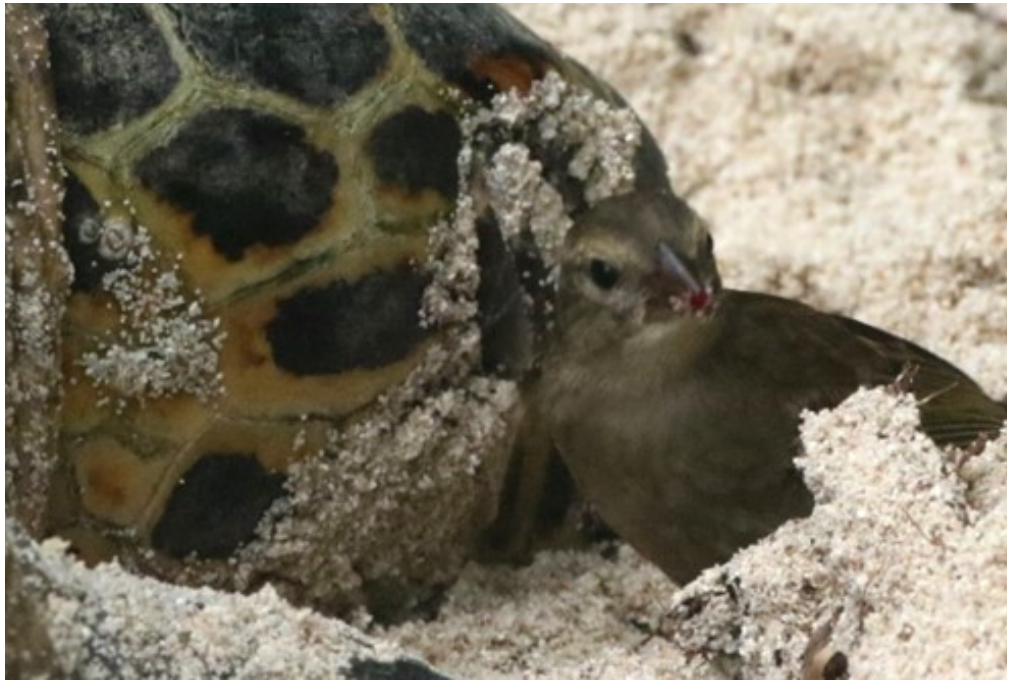

Figure 2: Female Seychelles fody with an engorged mosquito in its beak.

was young and this was potentially her first nesting season because she was small, untagged and her behaviour suggested she was unfamiliar and inexperienced.

A second female fody was confirmed to feed on blood-filled mosquitos elsewhere on the island, 350 m from the first observation. In this incident, the turtle was in dense foliage which prevented the fody from gleaning directly off the turtle. However, as previously observed, the fody perched before making predation attempts. The fody was already present and feeding, and the turtle was at the egg-chamber stage of nesting when they were encountered. The nesting female was not in her first season because she was tagged and had previously been recorded to nest on Cousin Island. The fody in this case had to evade large Horned Ghost Crabs *Ocypode ceratophthalmus* which were observed reacting to the movements of the fody; they charged towards it with the intention of catching and subduing it. Despite this risk the fody continuing to feed, evading the crabs and avoiding going close to them. This suggests the quality of food was worth the risk. As with the previous observation, the fody only stopped the feeding behaviour while the monitors were processing the nest. The turtle's reaction was hard to observe because she was in a bush. However, there appeared to be no reaction to the fody. Reactions were only seen in the previous incident when the fody was gleaning off the turtle directly which was not possible in this encounter, so it was likely the turtle was unaware the fody was even present. Given that the two incidents occurred c. 350 m apart, and that territories are small, it is likely that different birds were involved, even though neither was ringed.

Discussion

This is assumed to be isolated opportunistic feeding behaviour from the fodies. Fodies have not been recorded to exhibit this behaviour previously. It is possible the levels of mosquitos were so high that they became a visible viable target for the fodies to take advantage of. Cousin Island has a population of Aldabra Giant Tortoises *Aldabrachelys gigantea* which are widespread over the island; fodies have never been observed to exhibit this behaviour towards them, despite large numbers of mosquitos attracted to the tortoises. This could be due to the tortoises being more mobile; however, this behaviour has not been seen on sleeping giant tortoises. The nutrient quality of prey can play a role in it being selected to be predated (Razeng & Watson 2015). Alternatively, it could be possible the fodies were developing eggs feeding on mosquitos (and turtle blood) which are a food source high in protein as both birds recorded feeding were female.

Seychelles Magpie-warblers *Acrocephalus sechellensis* occur on Cousin Island and also feed by gleaning insects. They have been observed to snatch insects off the clothing of staff and visitors; yet there were no incidents of the warblers showing any signs of attention to the turtles.

The observations demonstrate a novel interaction between species. Future monitoring of nesting turtles will determine whether this behaviour is repeated, especially in the areas where it was previously observed. It is possible that this behaviour was developed to take advantage of the unprecedented mosquito density; if reoccurrence does occur, it is likely to be in seasons in which weather conditions cause higher levels of mosquito swarming.

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