OBSERVATION OF BLACK NODDIES *ANOUS MINUTUS* SWALLOWING CORAL PEBBLES ON A POLYNESIAN ATOLL

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ABSTRACT

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We report the observation of Black Noddies *Anous minutus* ingurgitating small pieces of coral debris on top of beachrock on the atoll of Teti'aroa, 50 km north of Tahiti in French Polynesia.

RÉSUMÉ

Nous rapportons l'observation de noddis noirs *Anous minutus* avalant de petits débris de coraux sur le grès de plage, sur l'atoll de Teti'aroa, 50 km au Nord de Tahiti en Polynésie française.

Key words: gastrolith, geophagy, Laridae, seabird, stomach stone, Teti'aroa

INTRODUCTION

Stomach stones have been documented in a diversity of birds (Downs et al., 2019), from hummingbirds (Maya-García et al., 2021) to ostriches (Wings, 2007) and penguins (Beaune et al., 2009). Although their function is unclear, several hypotheses have been proposed. For example, they may facilitate food crushing (Wings, 2007), affect buoyancy in diving birds (De Villiers & De Bruyn, 2004), help with stomach cleansing in raptors (Albuquerque, 1982), or alleviate hunger (Roman et al., 2021). However, stones may also be swallowed unintentionally, such as when they are confounded with prey (Wings, 2007), and not associated with a particular function. In seabirds, stones have been found in the stomachs of a wide range of species and families, including Spheniscidae, Phalacrocoracidae, Alcidae, Laridae, and Procellariidae (Downs et al., 2019; Kenyon & Kridler, 1969; Lavers & Bond, 2023; Møller & Erritzøe, 2010). Information on the ingestion of stomach stones by seabirds often comes from stomach content analyses (but see De Villiers & De Bruyn 2004), making it difficult to assess whether the stones were swallowed intentionally or accidentally. Observations of seabirds ingesting stones are scarce, but they are valuable for interpreting the intentionality of the ingestion and their potential function. Here, we report observations of Black Noddies *Anous minutus* swallowing coral pebbles on a beachrock platform close to a colony in Polynesia.

OBSERVATIONS AND DISCUSSION

On 31 May 2023, between 12h51 and 12h59, we observed a minimum of seven different Black Noddies standing on beachrock, 1–4 m from the lagoon shore, ingurgitating small pieces of coral debris at Teti'aroa, 50 km north of Tahiti in French Polynesia. We used binoculars and took photographs and videos during the observation. For four individuals, we counted the number of pecks at the beachrock during 40–50 s focal observations (based on video recordings) and found a mean pecking rate of 12 pecks/min (range: 7–20 pecks/min, depending on the individual). Most individuals were static, standing on the rock and pecking around them (see Supplementary Video, available on the website), while two individuals also moved to peck further away. Given the distance between the observers and the birds (~25 m), it was not possible to determine how frequently the birds were actually swallowing pebbles. However, video and binocular observations confirmed that the birds occasionally swallowed items picked up from the surface of the beachrock (see Supplementary Video), several of which were identified as small coral pebbles. We inspected the area of beachrock used by the Black Noddies 2 min after this observation and did not detect any snails or other potential prey. In contrast, scattered small pieces of stone and coral debris were present. The swallowed stones were small—at most a few millimeters in size, based on their dimensions relative to the culmen length (37–48 mm; Gauger, 2020). We were unable to remain at the site beyond the observation period, and the behavior may have resumed after our departure at 12h59.

In Teti'aroa, the species nests on two islets (motu, in Tahitian): Rimatu'u, which hosts up to five nesting pairs, and Reiono, where several hundred pairs nest. Our observations were made in Reiono, close to the colony that occupies most of the motu. There, Black Noddies nest on branches of *Pisonia grandis*, *Guettarda speciosa*, and *Pandanus tectorius*. Some nests were detected < 200 m from the area where pebbles were swallowed (Fig. 1).

Rarely observed, the consumption of stones or debris by seabirds such as the Black Noddy might play a role in food crushing, stomach cleansing, or the alleviation of hunger. Black Noddies forage on fish, squids, and crustaceans captured at or near the surface. They do not dive (Gauger, 2020) and, therefore, stone swallowing is unlikely to be associated with buoyancy. In addition, because Black Noddies are not known to forage on land, it is unlikely that stone

Fig. 1. Black Noddies *Anous minutus* at motu Reiono, Teti'aroa, French Polynesia, May 2023. Top left: Adult sitting next to its nest, which is occupied by a nearly-fledged chick. Bottom left, top right, and bottom right: Black Noddies standing on beachrock, grabbing and swallowing small coral pebbles. Photo credits: Simon Ducatez

swallowing resulted from mistakenly grabbing stones while looking for prey. Although we cannot exclude the possibility that food scarcity led the birds to collect stones to alleviate hunger (e.g., see Roman et al., 2021), we did not observe evidence of starvation in birds around Teti'aroa in May 2023.

Although the noddies were nesting at the time of observation, it was unclear whether the birds swallowing stones were nesting. We were also unable to determine whether the birds were adults, juveniles, or both, as their plumage is similar. However, because most nesting adult Black Noddies were on their nests (suggesting they were at the beginning of the nesting cycle, either incubating eggs or brooding young chicks), it is possible that some individuals were approaching egg laying and were seeking calcium for eggshell formation. On Cousin Island (Seychelles), Black Noddies were similarly observed picking up coral sand grains on the beach during the period preceding egg laying (T. Diamond, personal communication).

We have been monitoring seabirds around Teti'aroa on a quarterly basis since July 2021 and have observed this behavior once, and only in the Black Noddy. This behavior could easily go undetected, however, as pecking events are brief and may be performed by only some individuals. Understanding the conditions that trigger this behavior remains challenging given its apparent rarity and the fact that, to our knowledge, it has not previously been reported in this species.

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AUTHOR CONTRIBUTIONS

Observations: SD and JLD. Writing—original draft: SD. Writing—review & editing: SD and JLD.

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