INSECT PREY OF BREEDING SOUTH AMERICAN TERNS

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The South American Tern *Sterna hirundinacea* is a migratory species endemic to South America (Alfaro *et al*. 2011). Its diet is predominantly marine, as reviewed by Favero *et al*. (2000), Alfaro *et al*. (2011) and Mariano-Jelicich *et al*. (2011). However, the non-breeding season diet of this species, described on the basis of pellet collections, is more diverse than during the breeding season (Fracasso *et al*. 2011).

Insects have been reported in low numbers from South American Tern pellets collected during the non-breeding season (Alfaro *et al*. 2011, Fracasso *et al*. 2011, Mariano-Jelicich *et al*. 2011), constituting a very small contribution to the diet by mass (Alfaro *et al*. 2011, Fracasso *et al*. 2011). Alfaro *et al*. (2011) reported a single record of an unidentified grasshopper (Insecta: Orthoptera) and multiple records of beetles (Insecta: Coleoptera). Fracasso *et al*. (2011) reported "insects" in prey brought to nesting colonies but did not further identify these.

Here we report two instances of male South American Terns returning to their nesting colony with katydids (Tettigoniidae) during courtship feeding at Laje de Santos, Brazil (24°15′S, 46°10′W), a small uninhabited granite island ~36 km offshore of the city of Santos, São Paulo State, Brazil. The island was visited on 7 June 2013 to map a large Brown Booby *Sula leucogaster* colony and to assess whether other breeding seabird species were present. The field team (LF, JYS and EJW) landed on the central north coast at 10h30 local time (UTC-3) and remained ashore until 14h30. Weather conditions were good, with a 0.5 m southerly swell, sunny, visibility to at least 10 km, and winds south to southwest 5–10 knots (9.25–8.5 km/h), increasing to 10–15 knots (8.5–27.8 km/h) by 15h00.

Fig. 1. South American Tern overflying the breeding colony, Laje de Santos, São Paulo State, Brazil, 7 June 2013 with female katydid. Image © Eric J. Woehler.

An estimated 100–120 South American Terns were observed attending Laje de Santos. A very brief and cautious inspection located ~10 nests with one or two eggs under ledges and boulders at the southwestern end of the island. Based on the numbers in attendance, it is believed that between 20 and 50 breeding pairs were present. Further searching might have uncovered additional nests but were not undertaken to minimise potential disturbance to nesting terns. The colony was very noisy, with many birds calling, including those overhead in flight; the level of activity was unrelated to the presence of the authors as observations were made from well outside the colony.

Many male terns were seen flying overhead carrying small fish. At least two terns were observed carrying a large bright green katydid at different times (Fig. 1). Both terns carrying katydids were seen to fly to the island from the north, from the direction of the mainland. Based on the photographs, one katydid was a female, approximately 5 to 6 cm in length; the ovipositor is clearly visible. The gender of the second katydid was not determined.

Some courtship feeding was observed at the colony and on adjacent terraces, but the terrain and safety concerns prevented observation of the katydids being offered to potential or actual mates. It is believed that the katydids were involved in the terns' courtship feeding as they had been brought to the island intact.

Tettigoniids are the most speciose of the Ensifera families, having almost 6 000 living species in 1 070 genera (Gwynne and Morris 2002). They are large orthopterans, with some species attaining 6 cm in length. There are no records of species of neotropical Tettigoniidae with migratory habits, and virtually all katydids are associated with vegetation. Many species have cryptic patterns, with wings mimicking leaves (Belwood 1990). Green cryptic insects are generally palatable, having no noxious or toxic compounds found in mimetic aposematic species.

Female katydids, in particular (Fig. 1), have a high energetic content, and are therefore of high nutritional value as prey for breeding terns, particularly important during the pre-breeding and pre-laying periods. The near-complete absence of vegetation on Laje de Santos

(other than short grasses) suggests that the terns must have been captured the katydids over the adjacent mainland (36 km distant) and brought them to the island. We believe this is the first record of katydid prey by South American Terns, and doubles the number of reported orthopteran prey taken (Alfaro *et al*. 2011).

Whether katydids are taken opportunistically or are regular components of the diet of South American Terns at Laje de Santos will require further observations. Insect exoskeletons will remain in the tern casts, so collections of casts from breeding colonies should provide further evidence of the presence of katydids (and other insects) during the breeding season at Laje de Santos to complement the non-breeding diets reported by Alfaro *et al*. (2011). Additional data on the frequency of insects during the breeding season will permit a better understanding of the non-marine prey species in the annual diet and energy demands of South American Terns.

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