mites to invade because non-scaled skin is exposed inside the structure, and the fold itself provides partial shade from solar radiation. Also, this was one of the highest loads of mites observed among multiple species of lizards occurring on IMRS during prior mark-recapture studies. When finished, we marked the lizard with toe-clips and then released it a short time later back on the same outcrop.

Two weeks later, on 25 September 2010, we recaptured the same lizard on the same rock at ca. 1200 h. The lizard was placed into another zip-lock plastic bag and quickly taken to the laboratory for processing. The lizard gained 1.6 g during the two-week period (SVL was the same), but the mite infestation appeared much heavier than before. After carefully counting them several times, 79 mites were documented and again, they were only under the cervical folds. This time, the *S. poinsettii* had 51 mites under the left cervical fold, and 28 mites under the right fold. The parasite load increased 3x on the left side while increasing 1.75x on the right side. The overall increase in the ectoparasitic load was roughly 2.4x from that observed on 11 September.

The increase in abundance of mites could be attributed to different factors. However, in this case, due to the brief two-week period between the two captures, it is reasoned that rainfall, and possibly decreased temperature, influenced increasing mite infestation. Within that time period, two significant rain events occurred in the area. On 19 September 2010, eight days after initial capture and release, it rained 3 mm and the 24 h period had an average temperature of 21.6°C. Two days later, on 21 September 2010, it rained 9.15 mm and the average temperature for the day was 24.3°C. Thus, increased water availability, in possible combination with lower ambient temperatures, likely played a role increasing mite infestation on the lizard, a conclusion partially supported by another study investigating a similar situation. Phang and Manikumaran (1977. Southeast Asian J. Trop. Med. Publ. Health 8:217–20.) found a greater abundance of trombiculid mite larvae along transects during heavy rainfall events when comparing increased rainfall to periods of dryness, but they were hard to impossible to find during dry periods. They also exposed larval mites to simulated rainfall, which retained mite larval populations for longer periods during dry weather. Temperature and dryness were not determined to be a contributor to the frequency changes observed in the parasitic load, because they thought that the amount of time required for those factors to take effect on physiology and immunity processes was too short. We tentatively associate the load frequency changes on the *S. poinsettii* to environmental factors, especially rainfall, primarily because the lizard was caught during a brief two-week period when rainfall events occurred. Significant rainfall probably concentrates these larval mites in dry microhabitats, where they can be picked up by the lizards occurring in the areaby.

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*TROPIDURUS HISPIDUS* (Peters' Lava Lizard). **PREDATION.** Predator-prey relationships play an important role in community structure (Miller et al. 2006. J. Anim. Ecol. 75:101–110), however, predation events in nature are often difficult to quantify due to the rarity of observations (Shepard 2007. Herpetologica 63:193–202). Birds are potential predators of small vertebrates including rodents (Motta-Junior and Talamoni 1996. Ararajuba 4:38–41), anurans (Toledo et al. 2004. Herpetol. Bull. 94:31–32), and lizards (França and Braz 2009. Biotemas 22:243–245). Lizards are commonly recognized prey items of birds in Neotropical habitats (Rocha and Vcbradic 1998. Ciência e Cultura 50:364–368).

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FIG. 1. *Rupornis magnirostris*, preying on an adult *Tropidurus hispidus*, Sergipe, Brazil.

On 18 October 2010 at 1002 h in retinga of Aruana Beach, south coast of Aracaju, Sergipe, Brazil (11.0122°S, 37.0650°W, 5 m elev., datum SAD69), we observed a Roadside Hawk (*Rupornis magnirostris*) preying on an adult *Tropidurus hispidus* (Fig. 1). The hawk was near its nest, in which we observed a chick. It is possible the prey was to feed the chick we but did not observe any interactions. The Roadside Hawk has a diet of reptiles, amphibians, insects, mammals, and birds (Panasci and Whitacre 2002. Wilson Bull. 114:114–121). Predation on lizards by birds have been reported for Brazil (França and Braz 2009, *op. cit.*; Sherpard 2007, *op. cit.*), however, this is the first record for the restinga area in the northeast.

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## SQUAMATA — SNAKES

*BOIGA IRREGULARIS* (Brown Treesnake). **PREDATION ATTEMPT BY CRAB.** The Coconut Crab (*Birgus latro*), also known as the Robber Crab, is the heaviest terrestrial invertebrate in the world with a mass occasionally exceeding 3 kg (Amesbury 1980. Univ. Guam Tech. Rep. 17:1–39). While primarily an omnivore

feeding on vegetative matter and scavenging for dead animals, it may also prey on live invertebrates and vertebrates such as sea turtle hatchlings and rats (Greenaway 2003. Mem. Mus. Victoria 60:13–26; Kessler 2005. Crustaceana 78:761–762).

On 8 March 2010 we were searching for snakes in northern Guam. At 2230 h we observed a Coconut Crab sitting at the entrance to a tree (*Premna obtusifolia*) hole ca. 0.7 m above ground, holding onto the tail of an adult *Boiga irregularis* with one of its claws. The snake was partly suspended in mid-air and had anchored the forepart of its body to some roots and branches close to the ground, apparently trying to pull loose. As we approached, the crab retreated into the tree hole while maintaining its hold of the snake's tail. A few minutes later, after more human disturbance, the crab released the snake. The crab had a thoracic width of about 45–50 mm, which would correspond to a thoracic length of about 22–25 mm (unpubl. data) and a mass of about 100 g (Amesbury, *op. cit.*). We captured the snake and determined that it was a gravid female (SVL = 1124 mm; total length = 1423 mm; 255 g). Close inspection of the tail revealed minor indentations from the crab's claw, but there was no bleeding, nor any visible rupture of the skin.

There have been several observations of both terrestrial and marine crabs feeding on snakes (Maitland 2003. J. Crustacean Biol. 23:241–246; Voris and Jeffries 1995. J. Tropical Ecol. 11:569–576) but most accounts deal with snakes smaller than the one we observed. It is possible that the crab eventually would have started feeding on the tail while it was still attached to the snake, even if it had failed to kill the snake (Maitland, *op. cit.*).

Of the 295 individual *Boiga irregularis* we have encountered and marked in our main study population to date, 15% suffered damage to the tail. Damage ranged from the tip to most of the tail lost, leaving only a short stump. In 21 cases the damage had occurred before we first encountered a snake, so we do not know the size of the snake at the time of the injury. But for 23 snakes that we captured before and after tail damage (including major and minor damage), the mean of the snakes' pre- and post injury sizes is 1095 mm SVL. Some of these tail damages might have been inflicted by coconut crabs (or possibly other terrestrial crabs, several smaller species of which inhabit the area) in attacks similar to the one we observed. The Orote Peninsula in Guam reputedly has high densities of crabs (*B. latro* and others) and 40% of the *Boiga irregularis* there have damaged tails (Deni Porej, pers. comm.), suggesting a correlation between crab densities and incidence of tail damage.

Among snakes in our study population, we have seen tail damage in only five snakes < 800 mm SVL, and in two of these, only the very tip of the tail was missing. However, crab attacks on small juvenile snakes are likely to end in death for the snake, hindering our ability to assess rates of attack and the effects of such predation attempts on snake fitness. Even so, careful analyses of size-dependent injury incidences may help reveal potential impact of predators on prey populations when direct observations of predatory attempts are lacking.

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***BOIGA IRREGULARIS*** (Brown Treesnake). **PREDATION ATTEMPT BY PRAYING MANTIS.** The Western Pacific island of Guam is known for its introduced population of *Boiga irregularis* that has had considerable negative effects on vertebrates native to the island (Rodda et al. 1997. BioScience 47:565–574; Savidge 1987. Ecology 68:660–668). Few animals in Guam are known to prey on the snakes, but Mangrove Monitors (*Varanus indicus*) and feral/domestic cats (*Felis catus*) may do so (Fritts and Rodda 1998. Annu. Rev. Ecol. Sys. 29:113–140; pers. obs.).

In Guam, on the evening of 11 November 2009, the first author was filming a small (SVL = 450–500 mm) *B. irregularis*, perched in vegetation 4 m above ground. The snake suddenly started thrashing violently and after about ten seconds it fell to the ground. The snake slithered through a meter of grass and coiled up under a flattened soda can. A praying mantis was observed next to where the snake first landed on the ground. A review of the video footage (http://vimeo.com/13407786) showed that the snake had been attacked by a large praying mantis (*Hierodula patellifera*) that held the snake's head with both forelegs. The mantis tried to hold on to the vegetation, but the snake eventually pulled the mantis from its perch and both fell to the ground. The snake was not closely examined after the event, but it did not appear to be harmed.

Mantids have been observed preying on birds, lizards, frogs, and mice (Benrekaa and Doumandji 1997. Entomologiste 53:253–256; Brothers 2008. Herpetol. Rev. 39:351; Nickle 1981. Proc. Entomol. Soc. Washington 83:801–802; Ridpath 1977. J. Aust. Entomol. Soc. 16:153–154). Our observation suggests that juvenile *B. irregularis* might also be at risk of mantid predation, as mantids have been observed to kill large prey even in situations where they are dragged around by the prey item (Reitze and Nentwig 1991. Oecologia 86:568–574).

In Guam, hatchling *B. irregularis* measure 290 mm SVL (Lardner et al. 2009. Herpetol. Cons. Biol. 4:313–323) to 430 mm SVL (Rodda et al. 1999. *In* Rodda et al. [eds.], Problem Snake Management: the Habu and the Brown Treesnake, pp. 44–80. Cornell University Press, Ithaca, New York). Average-sized hatchlings (SVL = 360 mm) typically weigh 7–8 g, but we have seen a *B. irregularis* that weighed merely 4 g. Assuming the snake observed measured 475 mm SVL, its weight would have been ca 15 g. Adult specimens of *H. patellifera* collected from the site where the predation attempt occurred have a mean head-body length of 69 mm and an average mass of 2.9 g (range 1.6–4.1 g; N = 6). Thus, the snake that was attacked probably weighed about five times as much as the praying mantis, but some hatchling *B. irregularis* weigh no more than a large *H. patellifera*. For a comparison, the large mantid *H. werneri* has been seen feeding on frogs and birds weighing as much as three times the mantid's weight (Ridpath, *op. cit.*).

*Hierodula patellifera* are common in trees and bushes frequented by small *B. irregularis* on Guam. It therefore seems plausible that encounters between small snakes and large mantids are not rare. Further information about the frequency and outcomes of such encounters, especially encounters that lead to death or serious injury for the snake, would be useful.

We thank Aubrey Moore for help with mantid identification and references. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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