Boiga irregularis) is an efficient nocturnal predator that hunts in the tropical forest canopy and on the ground, using visual and chemical cues. To identify the factors influencing Brown Treesnake microhabitat use, we experimentally manipulated an abiotic factor, moonlight level, and a biotic factor, prey presence. We hypothesized that (1) moonlight would affect microhabitat use and (2) the presence of prey would alter microhabitat use in various moonlight levels. Trials were conducted in a large laboratory chamber with artificial trees in simulated new, half, and full moonlight. In each trial, the snake's location in canopy, subcanopy, or open ground was recorded at 60-sec intervals for 100 min. Treesnake microhabitat use was determined in three moonlight levels without prey present and in two moonlight levels with a mouse (adult Mus musculus) or a Mangrove Monitor (juvenile Varanus indicus) present. The treesnakes used open ground areas more as moonlight decreased, and they used the canopy more as moonlight increased. No significant differences existed within a moonlight level between trials with or without prey. Thus, moonlight appeared to supercede prey availability in affecting Brown Treesnake microhabitat use. Additionally, the effect of nocturnal illumination on Brown Treesnake habitat use may also have important conservation implications regarding trapping techniques and deterring the snakes from specific areas.

Reptiles are often faced with the conflicting demands of simultaneously avoiding predation and locating food, both of which are influenced by abiotic factors. Relatively few studies have considered both biotic and abiotic factors and their effects on reptile behaviors, such as activity in particular microhabitats. In nature, the interplay between biotic and abiotic factors affecting microhabitat use can be exceedingly complex and impossible to control. Laboratory studies can increase our understanding of the selective pressures driving daily variations in habitat use by testing each variable that may be involved. In one such study, Garden Skinks (Lampropholis guichenoti) were found to prefer open areas for foraging and basking but avoided open areas if predator (snake) scent was present (Downes, 2001). Similarly, geckos (Oedura lesuerii and Nephrurus milii) chose retreat sites with warm temperatures that lacked predation scent in laboratory tests (Downes and Shine, 1998; Shah et al., 2004).

The objective of our study was to test the influences of an abiotic and a biotic factor on microhabitat selection in the Brown Treesnake (Boiga irregularis) in an experimental setting. The Brown Treesnake is a primarily nocturnal, arboreal species that uses visual and chemical cues in hunting in the tropical forest canopy and also on the ground (Cogger, 1975; Fritts et al., 1987; Chiszar, 1990; Rodda and Fritts, 1992). Brown Treesnakes were accidentally introduced on Guam around 1950 and have proved to be formidable predators, contributing to the decimation of the island's bats, birds, and reptiles

2000). Pigmy Rattlesnakes (*Sistrurus miliarius*) preferred areas with prey (frog) scent cues (Roth et al., 1999), whereas Gray Rat Snakes (*Elaphe obsolete spiloides*) used visual cues of birds provisioning nestlings to focus arboreal activity on specific trees with prey (Mullin and Cooper, 1998). In the field, Water Pythons (*Liasis fuscus*) were observed to alter their habitat use to coincide with seasonal variation in habitat use by the Dusky Rat (*Rattus colletti*), their primary prey species (Madsen and Shine, 1996).

The first objective of our study was to test the hypothesis that moonlight levels affected microhabitat use by Brown Treesnakes. We predicted that a direct relationship would be observed between increased moonlight level and Brown Treesnakes' use of canopy vegetation. Our second objective was to test the hypothesis that the presence of terrestrial prey affected microhabitat use by Brown Treesnakes. We predicted that Brown Treesnakes would be observed significantly more often in open ground areas in all moonlight levels when terrestrial prey were present, compared to similar moonlight conditions when prey were absent.

Materials and Methods

Animals.

The effect of terrestrial prey on Brown Treesnake microhabitat use was tested in new and full moonlight conditions. During these trials, we used a live mammalian prey and a live reptilian prey. A domestic mouse or a juvenile Mangrove Monitor lizard was placed in a transparent plastic box (210 3 300 3 180 mm tall) that had numerous small holes drilled in the top and sides to allow for airflow and scent dispersal. The box was placed in the center of the chamber, equidistant from the trees, to allow equal viewing opportunities of the prey from either tree's canopy or subcanopy microhabitat. When the prey box was in place, the treesnake was released onto the floor in the center of the chamber. Trials were then conducted for 100 min under new or full simulated moonlight (hereafter, termed moonlight)

Data Analyses.—Spearman Rank correlations were used to determine microhabitat use relationships among moonlight levels. We documented the snakes' presence in the canopy, subcanopy, and open ground to determine

Mangrove Monitor in the box, but they did not descend from the canopy nor did they ever appear to seek a way out of the chamber.

Discussion

Species that are both predator and prey, such as the Brown Treesnake, are confronted with a challenging array of factors when making foraging decisions. The demands of avoiding predation while locating food, both of which are influenced by abiotic factors, place a complex set of pressures on species in this trophic level. Our findings overwhelmingly indicated that moonlight is a dominant factor affecting Brown Treesnake microhabitat use, appearing to exceed terrestrial prey cues. With and without mouse or lizard prey present, the Brown Treesnakes in our tests preferred canopy vegetation and avoided open ground areas in bright moonlight. Thus, our prediction that Brown Treesnakes would exhibit an increased preference for canopy microhabitat with increased moonlight was supported. However, our prediction that prey cues would change this trend was not supported. Even in the darkest illumination (new moon = starlight only), the snakes were aware of the presence and location of the prey and they oriented toward the prey or actively tried to enter the box (in 50% of all new moon tests). However, in full moonlight, the