Food preferences and food acceptance in juvenile brown treesnakes (*Boiga irregularis*)

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On the Pacific island of Guam, control of the invasive brown treesnake (*Boiga irregularis*) relies largely on methods using mice as bait. While stomach content analyses have shown that juvenile snakes feed primarily on lizards and their eggs, little is known about prey preference. We conducted an experiment to investigate the preferences for, and also the acceptance rate of, euthanized geckos, skinks, and neonatal mice, in juvenile snakes ranging from 290 mm to ca 700 mm snout-vent length (at which size they start appearing in mouse-baited traps). Snakes of the entire size range showed a preference for geckos over skinks and neonatal mice; a gecko was the first prey chosen in 87% of 224 initial trials (56 snakes subjected to four trials each; 33% would be expected from a random choice). This preference was most pronounced in the smallest snakes tested. While many of the snakes accepted neonatal mice and/or skinks, some snakes across the entire size range were reluctant to feed on anything but geckos – especially when not starved. Our data indicate that between 15 and 40% of a small snake population exhibiting a demographic pattern similar to our test snakes may be refractory to capture with rodent bait. The design of the experiment also allowed us to test whether repeated experience of a certain prey type makes a snake increase its preference for that particular prey; data on which will be presented at the meeting. Our results suggest that control methods relying solely on rodent bait may be inefficient for targeting snakes <700 mm SVL and that individual heterogeneity may cause a significant part of this juvenile cohort to be completely refractory to capture with rodent bait – even if the bait is dead, thus not posing any threat to the snake, and small enough to be readily swallowed.

Funnel trap traits, and how (not) to improve capture rates of small brown treesnakes

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Much of the brown treesnake interdiction around Guam's airports, seaport, and cargo facilities rely on funnel traps that use live, adult mice as a lure. Unfortunately, these traps are almost totally ineffective for snakes smaller than 700 mm SVL. Using 64 snakes <700 mm SVL in 16 laboratory trials each, we conducted a study that asked several questions regarding how particular trap design features may affect the chances that a small snake can, and will, enter a trap. Snakes were housed in experimental units consisting of a cage compartment and a 'trap' compartment, separated by a wall incorporating a funnel ending in a flap. Three key variables were tested: flap design,

orientation of entry path (vertical *vs.* horizontal funnel), and how much 'foothold' was offered by a structure leading up and into the funnel. Almost every snake that was active during a trial eventually entered the trap compartment. While even the smallest snakes could readily push and get past the conventional flaps mounted in the end of the funnel, the snouts of small snakes tended to get "stuck" in the wire mesh when pushing the flap. Trap entry after fewer push attempts was achieved with a novel flap type. Our prediction that snakes may enter more readily if the funnel is directed upwards (instead of sideways) was not supported; nor did snakes enter more easily if supplied with ample 'foothold' in the form of a branched stick (as opposed to a metal wire similar to those used to hang traps). It seemed as if most trap compartment entries were caused by cage exploration rather than stalking prey, since presence or absence of a gecko lure had no clear effect on the trap entry process. We discuss trap improvements that could help target also the smallest snakes.

Prey scents and guide ropes as a method to enhance brown treesnake (*Boiga irregularis*) trap capture success

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The brown treesnake is known to employ both visual and olfactory cues when searching for prey. At present, these cues emanate only from the trap proper, a small source. We hypothesized that trap success could be enhanced by providing substrate-born olfactory cues leading to the trap. In a laboratory setting, we exposed 24 snakes (12 small, <700 SVL; 12 large, >900 SVL) to seven different scent cues in a modified Y-maze. We used scents from live mice, geckos, and skinks; carrion mice, geckos, and skinks; and we also had a no-scent control. Large snakes spent significantly more time in arms of the Y-maze scented with live geckos and carrion geckos compared to control arms without scent, whereas small snakes spent significantly more time in arms scented with carrion mice and carrion geckos compared to controls ($P \leq 0.05$). We then conducted a field study in a 5-ha snake enclosure on Guam that examined effectiveness of standard traps baited with live mice and augmented with scented guide ropes as attractants. A pilot study using ropes with various scents suggested ropes scented with live mice might have the greatest utility. We established a trapping grid of 144 traps with live mice scented ropes, unscented ropes, and no ropes. Preliminary results suggest more captures for traps equipped with both live mice scented ropes and unscented ropes when compared to traps without guide ropes. No difference was found in number of captures between traps with unscented ropes and traps with live mice scented ropes, suggesting the rope alone may act as a guide to a trap. We discuss reasons for the lack of congruence between the lab and field results and suggest potential future research.