



# Predation of the Cuban Treefrog (*Osteopilus septentrionalis*) and Three Nonnative Lizard Species by Eastern Screech-Owls (*Megascops asio*) in Manatee County, Florida, USA

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Florida has more established, nonnative herpetofaunal species than any other place in the world (Meshaka et al. 2004; Krysko et al. 2016, 2019), and densities of nonnative lizard species can be high in anthropogenic habitats. In Florida, Mediterranean Geckos (*Hemidactylus turcicus*) occurred at densities as high as 1,463 per ha in Tampa, Pinellas County (Punzo 2001), and Brown Anoles (*Anolis sagrei*) can reach ca. 12,000 per ha (Campbell and Echternacht 2003). Florida lacks native nocturnal lizard species, and several species of introduced geckos have exploited this vacant ecological niche, often feeding around artificial lights on buildings (Meshaka et al. 2004; Krysko et al. 2019). The only native species utilizing edificarian habitats at night are several species of treefrogs (*Hyla* spp.), but their presence requires a nearby suitable wetland for breeding. Assuming invertebrate prey around lights is a limited resource, native hylids may be deleteriously impacted by the presence of geckos and the larger, nonnative Cuban Treefrog (*Osteopilus septentrionalis*), which also preys upon other hylids and hemidactyline geckos (Meshaka 2001; Punzo 2001). In many areas of peninsular Florida, Cuban Treefrogs fill an underexploited terrestrial-arboreal structural niche that is analogous to their native mesophytic forest habitat (Meshaka 2001). The expansion of Brown Anoles throughout peninsular Florida has reduced native Green Anole (*A. carolinensis*) populations in some habitats, particularly suburban settings with reduced vegetative complexity (Campbell 2000; Kamath et al. 2013).

The Eastern Screech-Owl (*Megascops asio*) has the most varied diet of any North American owl species and preys opportunistically upon terrestrial and aquatic animals (Ritchison et al. 2017), including larval and adult amphibians, soft-shelled turtles (*Apalone* spp.), lizards, and small snakes (Craighead and Craighead 1956; Ritchison and Cavanagh 1992; Gehlbach 2008). It nests in tree cavities and

bird boxes and is often the most common avian predator in wooded suburban and urban habitats (Ritchison et al. 2017). Screech-Owls typically pounce on prey from perches 1.3–3 m high that allow an unobstructed view of the ground; perch height varies depending on the prey being hunted and moonlight availability (Abbruzzese and Ritchison 1997). Although Eastern Screech-Owls are primarily nocturnal or crepuscular, they are occasionally active during the day (Alderfer and Dunn 2006).

During the second week of April 2022, a pair of Eastern Screech-Owls started using a nest box in a yard in Palmetto, Manatee County, Florida. They were periodically observed from 1930 to 2200 h until 20 May, when the last of three nestlings fledged. Vertebrate prey primarily consisted of four nonnative species: the Brown Anole (Fig. 1; left), Indo-Pacific Gecko (*H. garnotii*) (Fig. 1; right), Mediterranean Gecko and Cuban Treefrog. These species have not been previously reported as prey of the Eastern Screech-Owls. During the egg incubation period, the male would typically bring one or two Brown Anoles to the perching female around dusk before she returned to the nest box. As the night progressed, the male usually brought beetles, geckos, or occasionally Cuban Treefrogs to feed the female. Once the eggs hatched, the female would briefly hunt at dusk and usually return with Brown Anoles or geckos.

These four nonnative species were the most commonly observed herpetofaunal species in this residential yard. Although Florida has five *Hemidactylus* species, only three species are widely distributed in the peninsula (Krysko et al. 2019). The Mediterranean Gecko was first observed in Key West in 1910 and subsequently invaded cities throughout Florida (Krysko et al. 2019). However, populations in the southern two-thirds of the peninsula have mostly been replaced by the parthenogenic Indo-Pacific House Gecko



**Fig. 1.** Male Eastern Screech-Owl (*Megascops asio*) with a female Brown Anole (*Anolis sagrei*) on 22 April 2022 in Palmetto, Manatee County, Florida (left) and a female Eastern Screech-Owl with an Indo-Pacific House Gecko (*Hemidactylus garnotii*) on 21 April 2022 in Palmetto, Manatee County, Florida (right). Photographs © William Steele.

(Meshaka et al. 2004; Meshaka 2011), which was introduced to Miami in the early 1960s (King and Krakauer 1966). More recently, the Tropical House Gecko (*H. mabouia*), a native to tropical Africa, was first documented in the Florida Keys in 1990 (Lawson et al. 1991). The Tropical House Gecko has rapidly expanded its range northward in the peninsula and replaced the other two house gecko species in many areas (Meshaka et al. 2004; Meshaka 2011; Krysko et al. 2019). Populations of the Cuban Treefrog have proliferated to the detriment of native hylids (Meshaka 2001). Despite toxic secretions, Cuban Treefrogs are eaten in Florida by the Common Snapping Turtle (*Chelydra serpentina*) and various native species of snakes and birds, including the Barred Owl (*Strix varia*) and Barn Owl (*Tyto alba*) (Meshaka 1996, 2001).

Owl predation would appear to be more likely on nocturnal species like the Cuban Treefrog and hemidactyline geckos than on the diurnal Brown Anole. However, many diurnal reptiles, including anoles, have modified their foraging activity to take advantage of increased prey density around artificial lighting at night, a phenomenon termed the “night light niche” (Perry et al. 2008). Brown Anoles have been observed foraging at night under artificial lights in Florida (Meshaka et al. 2004) and elsewhere (Schwartz and Henderson 1991; Badillo-Saldaña et al. 2016; Brown and Arrivillaga 2017). Most foraging by Eastern Screech-Owls occurs in the first four hours after dark (Abbruzzes and Ritchison 1997), and crepuscular or nocturnal activity by anoles makes them potentially susceptible to predation by owls. In southeastern Arizona, the closely related Whiskered Screech-Owl (*M. trichopsis*)

frequently preys upon two species of spiny lizard (*Sceloporus spp.*) that are typically diurnal but are also active in the evening (Duncan et al. 2003). The Indo-Pacific House Gecko is primarily, but not exclusively, nocturnal and may forage with Green Anoles on buildings at dusk (Meshaka et al. 2004). In nearby Tampa, Mediterranean Geckos were most active from 2100 h to midnight (Punzo 2001). All suitable-sized nonnative species that exhibit crepuscular or nocturnal activity are potentially susceptible to predation by owls.

In many anthropogenic habitats in peninsular Florida, Eastern Screech-Owls and other wildlife species may benefit from high densities of nonnative herpetofaunal species that provide food after native wildlife populations have declined or been extirpated by habitat loss or degradation. For example, Florida Burrowing Owls (*Athene cunicularia floridana*) have been observed preying upon juvenile Green Iguanas (*Iguana iguana*) (McKie et al. 2005). Dense Brown Anole populations have allowed native snake populations, like the Red Cornsnake (*Pantherophis guttatus*), to survive in suburban and some urban areas with reduced native prey populations (Wilson and Porras 1983). Although some nonnative herpetofaunal species are detrimental to native species, primarily due to competition for limited resources or predation, nonnative species are often better able to exploit human-altered landscapes, where native wildlife populations would not persist even if nonnative species were absent. As Florida’s natural habitats continue to be developed by a burgeoning human population, the persistence of populations of carnivorous species may depend upon food provided by more adaptable nonnative herpetofaunal species.

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