Predation of a Tree Snail *Drymaeus multilineatus* (Gastropoda: Bulimulidae) by *Iguana iguana* (Reptilia: Iguanidae) on Key Biscayne, Florida

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Abstract - *Iguana iguana* is a well-established introduced species in southern Florida, including a large population on Key Biscayne. In its native range, *I. iguana* is known to be almost strictly herbivorous. Juveniles are often reported to be somewhat omnivorous, but prey items are rarely identified. The tree snail *Drymaeus multilineatus* is common in southern Florida, where it is found on stems and leaves and in edificarian habitats. The examination of *I. iguana* stomachs from Bill Baggs Cape Florida State Park, Key Biscayne, resulted in the discovery of *D. multilineatus* in two lizards, including 12 snails in one juvenile *I. iguana*. The large and rapidly growing *I. iguana* populations in southern Florida may have the potential to devastate some highly localized native species of tree snails.

Introduction

A native of Central and South America and some Caribbean islands, *Iguana iguana* (Linnaeus, 1758) has become a well-established and commonly encountered introduced species in southern Florida (King and Krakauer 1966, Townsend et al. 2003, Wilson and Porras 1983). There is a large, well-established population of *I. iguana* on Key Biscayne, a barrier island southeast of downtown Miami bordered by Biscayne Bay to the west and the Atlantic Ocean to the east. Little has been documented regarding the diet of *I. iguana* in Florida, but it has been reported to eat both native and ornamental vegetation (Townsend et al. 2003). In its native range, *I. iguana* is known to be almost exclusively herbivorous throughout its lifespan. Van Devender (1982), who examined the stomach contents of 20 *I. iguana* (15 juveniles and five adults) from Guanacaste, Costa Rica, Rand et al. (1990), who examined the stomach contents of 31 adult *I. iguana* from three islands in the Panama Canal Zone, and Meshaka et al. (2004), who examined the stomach contents of a single adult specimen in Homestead, Miami-Dade County, FL, found no remains of animal material. While it is generally reported that juvenile *I. iguana* may be omnivorous and consume insects and other invertebrates (Fitch 1973, Savage 2002), few researchers specify the

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non-plant food items that are eaten. Hirth (1963) examined the stomachs of 24 *I. iguana* from Tortuguero, Costa Rica, finding only plant matter, but then noted observing a juvenile *I. iguana* eating a grasshopper. Carrion (Loftin and Tyson 1965) and bird eggs (Schwartz and Henderson 1991) have also been reported as occasional dietary items.

The tree snail *Drymaeus multilineatus* (Say, 1825) is a moderately sized (adults ca. 22 mm shell height [SH]) arboreal species of the family Bulimulidae that grazes microphytes on leaves and other surfaces in open native and disturbed forests and anthropogenic habitats. This species is often found aestivating in large numbers on leaves, stems, and terminal twigs of bushes and trees (Pilsbry 1946), usually within a few meters above the ground. In anthropogenic habitats, this species is commonly found on buildings, fences, walls, and other surfaces. *Drymaeus multilineatus* is widely distributed from Colombia and Venezuela north to southern Mexico, as well as southern Florida, the Bahamas, Cuba, and Hispaniola (Pilsbry 1946, UF Malacology collection). Originally described from southern Florida, the native range of *D. multilineatus* is difficult to determine, and much of its current distribution is likely the result of being transported on commercial plant materials. Plants from Florida are the likely source of a population on the Pacific island of Guam (UF 280974 [Malacology]), which is now being intercepted on exports of wood products from Guam (Robinson 1999).

Observation and Discussion

As part of an ongoing study on the exotic herpetofauna and its management in Florida, we have access to a large number of specimens of *Iguana iguana* collected at Bill Baggs Cape Florida State Park on the southern end of Key Biscayne, Miami-Dade County, FL. While examining 18 *I. iguana* stomach contents, we discovered remains of *Drymaeus multilineatus* in two specimens. A juvenile *I. iguana* (UF 141040 [Herpetology]) measuring 69 mm snout-vent length (SVL) and 172 mm tail length (TL) collected on 18 June 2003 had in its stomach 12 juvenile *D. multilineatus* (all = 6.4 mm SH). No plant material was found accompanying the snails. A subadult female *I. iguana* (UF 141041 [Herpetology]) measuring 186 mm SVL and 502 mm TL collected on 20 April 2003 contained one sub-adult *D. multilineatus* (13.2 mm SH), along with the semi-crushed remains of another unidentified snail and a large quantity of plant material. Most *D. multilineatus* recovered had remnants of epiphragms, a film of mucilage secreted between the shell aperture and substrate to conserve moisture during aestivation; thus, it is likely these snails were consumed during their aestivation. The large number of snails consumed by UF 141040 and the lack of any plant material suggest that the snails were not ingested accidentally. It is less clear whether the snails removed from the stomach of UF 141041 were ingested intentionally or consumed accidentally with the vegetation on which they were aestivating.

Even if *Iguana iguana* predation of tree snails were to be more commonplace than is currently understood, it is not likely to seriously impact the widespread and abundant *D. multilineatus*, whose native range overlaps that of *I. iguana*. However, the numerous large and rapidly growing *I. iguana* populations in southern Florida may have the potential to put additional pressure on other species of tree snails whose distributions are restricted to the southern Florida mainland and Florida Keys and whose populations are already threatened by urban development. Tree snails like *Orthalicus reses* (Say 1830) and the dozens of varieties of *Liguus fasciatus* (Müller, 1774) have very small population sizes that are restricted to relatively tiny patches of habitats in areas that could easily be colonized by *I. iguana* in the near future, if they have not been already. Preventing *I. iguana* from impacting these tree snail populations, as well as populations of some already threatened plants and invertebrates, would require a widespread and active management policy aimed at greatly reducing, if not completely removing, *I. iguana* from the natural communities of Florida.

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