AN EXOTIC HERPETOFAUNAL BIOBLITZ SURVEY AT A STATE PARK IN SOUTHERN FLORIDA

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Abstract: We conducted an exotic herpetofaunal bioblitz survey at the Barnacle Historic State Park (BHSP), an urban Florida state park in Miami-Dade County in November 2005. On that day and evening, we recorded seven exotic species and two native species. Three additional exotic species and six additional native species were known to occur there but were not observed that day. The exotic herpetofaunal community at the BHSP comprised 26.3% of exotic amphibians and reptiles known to occur in Miami-Dade County. Despite its protection as a park, the overwhelming dominance of exotic species at this site typifies urban systems in southern Florida. Bioblitzes, such as this one, provide a useful first step in pointing out a park's susceptibility to exotic species colonization events, so that targeted studies can subsequently evaluate impact and feasibility of various management techniques.

The state of Florida leads the United States in the number of exotic amphibian and reptile species (Meshaka, 2008), and southern Florida is the epicenter of exotic herpetofaunal diversity (Meshaka et al., 2004; Meshaka, 2006, 2008). Many but not all of these species thrive in disturbed habitats, and some species such as the Greenhouse Frog (Eleutherodactylus planirostris), Cuban Treefrog (Osteopilus septentrionalis) and Indian Python (Python molurus) thrive in natural habitats as well (Meshaka, 2001; Meshaka et al., 2004; Meshaka and Layne, 2005; Snow et al., 2007). Lands in the public trust are charged with maintaining natural systems as close to historical norms as possible, and parks are important sources both of remaining natural habitats and altered habitats that can be restored. We undertook an exotic herpetofaunal bioblitz survey at a small urban park located in extreme southern mainland Florida with the goal of evaluating its susceptibility to exotic herpetofaunal colonization, the results of which can be used in formulating future studies concerning ecological impact and future resource management plans.

Study Area and Methods

Acquired by the State of Florida in 1973, the Barnacle Historic State Park (3HSP) is located in Miami-Dade County, Florida, USA, within Coconut Grove, Miami. The park is encapsulated within high-rise urban development and likewise is the smallest, southeastern Florida state park, containing only about 9.0 acres. Four habitat types, rockland hammock (4.0 acres), mangrove swamp (0.02 acres), ruderal habitat (2.7 acres), and developed habitat (0.7 acres) comprise approximately 7.4 acres that can support terrestrial, arboreal, and building-dwelling herpetofauna. The remaining acreage is submerged estuarine habitat that parallels Biscayne Bay, unsuitable for most herpetofauna. The major residual upland natural community of rockland hammock is a hardwood forest where oolitic limestone is near or at the surface, with a thin layer of decaying leaf litter forming organic soil over the rock. This sub-tropical forest is dominated by remnant South Florida Slash Pine (Pinus elliottii var. densa), with a canopy of Gumbo Limbo (Bursera simaruba), Live Oak (Quer-
cus virginiana), Redbay (Persea borbonia), Strangler Fig (Ficus aurea), and Mastic (Mastichodendron foetidissimum). The understory consists largely of Stoppers (Eugenia spp.), Wild Coffee (Psychotria nervosa), Marberry (Ardisia escallonioiides), and white Indigo Berry (Randia aculeate).

We assembled 10 field workers, who collectively spent 38.75 hours searching during the day and evening of 14 November 2005. Vouchers were taken of the species encountered, and the specimens were deposited in the Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas. Common names follow Collins and Taggart (2002).

Results and Discussion

The 10 collectors searched in the park and captured 30 individuals of seven exotic amphibian and reptile species and two individuals of a native species (Table 1). On average, 0.18 exotic species was captured every hour and 0.77 specimens of each of these exotic species was captured every hour. It should be noted, however, that the latter estimate is extremely conservative of the overall abundance of individual specimens because numbers were based on capture only. As noted by Gibbons (2005), more than 200 Brown Anoles (Anolis sagrei) were encountered during the survey. In light of the overcast weather, we were not surprised that the Common Agama (Agama agama), known to occur along the rocky bank in front of a building, and the Green Iguana (Iguana iguana) and Knight Anole (A. equestris), also known from this park, were not encountered on our visit.

Typical of the southern Florida herpetofauna, more reptile species, especially lizards, were encountered than amphibians (Meshaka et al., 2004). The exotic herpetofaunal community at the BHSP, 10 species, comprised 26.3% of the possible 38 exotic species in Miami-Dade County (Meshaka et al., 2004; Meshaka, 2006; Snow et al., 2007). The eight native reptile species, on the other hand, comprised only 21.1% of the possible 38 lizard and snake species native to Miami-Dade County and 10.5% of the total herpetofauna (n=76) native to Miami-Dade County (Meshaka and Ashton, 2005). This lopsided pattern of exotic herpetofaunal species-dominance typifies urban developments (Meshaka et al., 2008) and small island-like gardens that are surrounded by urban development (Meshaka, 1999a,b).

The single Eleutherodactylus planirostris and three Brahminy Blind Snakes (Rampophisops braminus) were found under rocks in the tropical hardwood hammock at the fore of the park. The Bark Anole (Anolis distichus) was found mostly on smooth-barked trees at approximately eye level. Whereas A. sagrei was most commonly seen on the vegetation growing near and on the walls of the property, the Puerto Rican Crested Anole (A. cristatellus) occurred mostly in the tropical hardwood hammock. What morphologically appeared to be the Cuban Green Anole (A. porcatus) was found on trees at heights above 180 cm, and Hemidactylus mabouia was found under rocks during the day (n = 2), and on trees (n = 6) and a house (n = 2) at night. These habitat associations and structural uses that we report at the BHSP did not conflict with those noted for these species in Florida (Meshaka et al., 2004). Few young Green Anoles (A. carolinensis) were found in trees, and the single Eastern Corn Snake (Pantherophis guttatus) was found on a palm tree at night.

Although anoles provide an abundant prey base for the Eastern Racer (Coluber constrictor) and P. guttatus, we are concerned that the inclusion of vertebrates in the diets of several of these anoles (Meshaka et al., 2004) combined with their high abundances could prove to be a source of mortality for the geographically-restricted Reef Gecko (Sphaerodactylus notatus), the regionally-imperiled Six-lined Racerunner (Aspidoscelis staggeriana), and the state-listed Rim Rock Crowned Snake (Tantilla oolitica).

With more management attention being paid to exotic herpetofauna by the Florida Park Service, herpetofaunal bioblitz surveys, such as the one we report here, provide a useful first step with respect to awareness of exotic species impact on public trust lands as measured by diversity and relative abundance. Subsequently, more targeted study can be conducted, the results of which can form the basis for good management decisions that balance the severity of ecological impacts by these species with the feasibility of removal programs.

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