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Rapid Communication

First record from Cuba of the introduced mourning gecko, *Lepidodactylus lugubris* (Duméril and Bibron, 1836)

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Abstract

The mourning gecko, *Lepidodactylus lugubris* (Duméril and Bibron, 1836), native to the Southwest Pacific, is one of the most successful reptile invaders. This study reports the first record from Cuba and the Greater Antilles. We document the occurrence of reproductive individuals in 2008, and collected five adult individuals in an urban environment of Havana city in 2017. Given the species is superficially similar to another invasive gecko; it is likely that there has been an established population in Cuba for at least the past decade. We warn about the possible spread and the potential impacts of this parthenogenetic species of gecko.

Key words: Gekkota, Greater Antilles, invasive, parthenogenetic species

Introduction

The mourning gecko, *Lepidodactylus lugubris* (Duméril and Bibron, 1836), is native to the Southwest Pacific, and it is widely distributed in the tropical-subtropical Pacific and Indian Ocean islands, and adjacent continental coasts, including Australia (Bauer and Henle 1994; Ineich 1999). This species is considered one of the most successful reptile invaders (Bomford et al. 2009). Some features of its natural history have allowed it to colonize new islands and regions around the world (Kraus 2009; Krysko et al. 2011). This gecko is unisexual and exhibits parthenogenetic reproduction (Cuéllar and Kluge 1972), has lower prevalence of parasites (Hanley et al. 1995), and produces eggs somewhat resistant to salt-water exposure and/or desiccation (Brown and Duffy 1992; Andrews 2012).

Hoogmoed and Avila-Pires (2015) compiled published information on the distribution of *Lepidodactylus lugubris*. These authors detailed all areas of introductions in the New World, correcting previous erroneous statements and reconstructing the history of the introduction events in this region. According to this evidence, the earliest material known from Central America and from the Caribbean coast (Colon, Panama) dates from at least one century ago. The first introduction of *L. lugubris* to the insular Caribbean was documented in 1976 on Big Corn Island off Nicaragua (Henderson et al. 1976). Since then it has been reported from south of Grande-Terre and northeast of Basse-Terre, Guadeloupe, Lesser Antilles (Lorvelec et al. 2011; Gomès and Ibéné 2013; Parmentier et al. 2013). Lorvelec et al. (2017) confirmed its establishment in Guadeloupe and chronologically ordered its discoveries in the island. Krysko and MacKenzie-Krysko (2016) reported a well-established population on North Bimini, Bahamas. In this contribution we document the first report of *Lepidodactylus lugubris* from Cuba and consequently the first report from the Greater Antilles.

Material and methods

Individuals of an introduced gecko were sighted, photographed and collected in a garden and inside of a house in the residential village known as Nuevo Vedado, Havana city (23.117064N; −82.402272W,

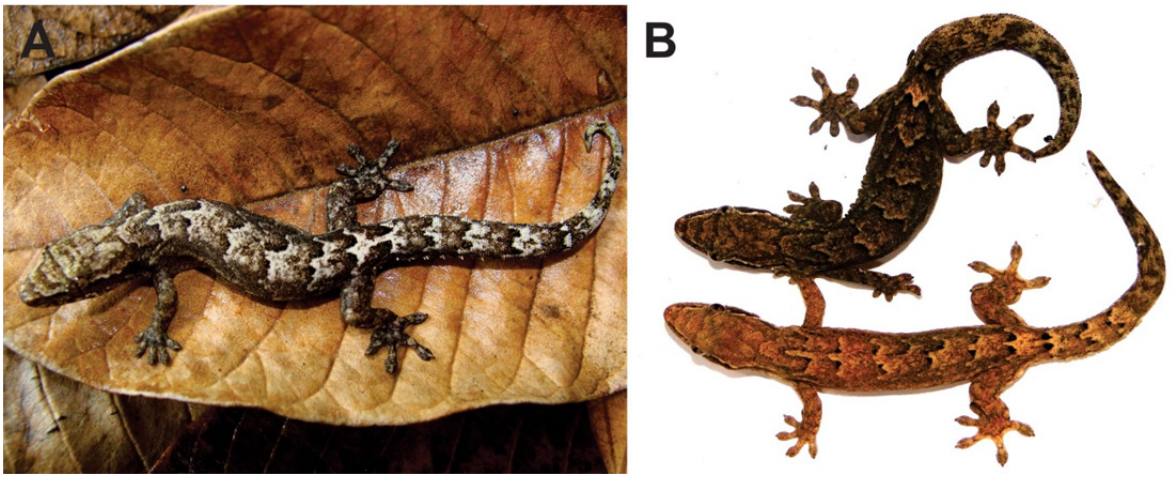

Figure 1. A. An adult individual of *Lepidodactylus lugubris* photographed in 2008 at NuevoVedado village, Havana city, Cuba. B. Dorsal view of two adult individuals of *Lepidodactylus lugubris*, photographed in the same locality in 2017, in two color phases with the pattern of spots that form part of a series of light brown W-shaped chevrons. Photograph by R. Alonso Bosch.

27 m elev.; Datum. WGS84). Five specimens were collected, fixed, preserved in 70% ethanol, and deposited in the Museum of Natural History "Felipe Poey", Faculty of Biology, University of Havana (MFP 12671–12674), and in the herpetological collection of the Institute of Ecology and Systematics of Cuba (CZACC 4.13044). We measured snout-vent length (SVL) and total length (TL) to the nearest 0.2 mm using a caliper. The individuals were identified based on morphological descriptions and conspicuous characters of adult specimens provided by Hoogmoed and Avila-Pires (2015).

Results and discussion

We first observed *Lepidodactylus lugubris* in Cuba in 2008 in a large pendant Elk Horn Fern (*Platycerium* sp.), but it was initially misidentified as *Hemidactylus mabouia*. One individual was collected and photographed (image voucher by R. Alonso, Figure 1A). This animal had a vertical pupil, a golden iris, and a brown stripe was visible from nostril to eye that continued above the ear opening and extended to the insertion of the forelimbs. In its dark phase, the dorsum exhibited spots that formed part of a series of light brown W-shaped chevrons from the forelimbs to the tail. In this pattern the external tips of the "W" are oriented towards the tail, whereas in *H. mabouia* (M-shaped chevrons), these are to the head. Although these characters permitted us to identify the presence of *Lepidodactylus lugubris* for the first time in Cuba, the animal escaped before preservation.

Between 15 and 20 May 2017 (19:30–21:00hrs), five adults of *Lepidodactylus lugubris* were collected in the same locality (Figure 1B). For these five specimens we recorded snout-vent and length (SVL = 40.35 ± 1.46 mm, Mean ± Standard Deviation) and total length (TL = 71.39 ± 6.06 mm, Mean ± Standard Deviation), although at least two of them had regenerated tails. Three individuals (MFP 12672–12674) had clearly visible developing eggs through the semitransparent skin of the abdominal cavity. The largest specimen (MFP 12674) was dissected, and its largest egg measured 8.7 × 6.5 mm. Two other individuals were observed at the collecting site a few days later, they were located using the sounds as guiding element. A series of loud vocalizations, or "clicks," were heard during an apparent intraspecific interaction between them.

We are uncertain of the introduction pathway of *Lepidodactylus lugubris* in Cuba, but it is possible that the species arrived by cargo or through the nursery plant trade, as has been suggested in other areas of its introduced range (Krysko and MacKenzie-Krysko 2016). Although we do not have estimates of population size and its current distribution, our observations suggest that it was introduced at least 10 years ago and reproducing. The species probably is much more widespread in Cuba and other islands of the Antilles than now known, especially because it is easily confused with small *Hemidactylus mabouia*, the most widely distributed introduced house gecko within the Caribbean islands (Powell et al. 2011; Borroto-Páez et al. 2015). The extent of the invasion

and the ecological impacts of *Lepidodactylus lugubris* in Cuba are unclear. This species could be considered as invasive (Borroto-Páez et al. 2015). According to the criteria of Krysko et al. (2011) regarding the situation of introduced animals independent of its impacts, *L. lugubris* in Cuba might qualify as a Stage 3 introduced species (i.e. an introduced species that is localized reproducing but remains localized and it is not yet abundant). It is still too premature to identify the impacts of this gecko, but if it continues the transition to subsequent stages, impacts on native species via competition or disease transmission, could be more visible in the future, leading to: decrease in abundance, population extinction or contraction, change in behavior, change in spatial ecology, etc. (Kraus 2015).

Six introduced species of Gekkonidae, four of them *Hemidactylus,* have been reported from Cuba in edificarian situations. Three of these *Hemidactylus* have successfully colonized and currently exist in the wild or around human settlements (Borroto-Páez et al. 2015). During our observations adult individuals of *Hemidactylus mabouia* were sighted syntopically with *L. lugubris*, but no interspecific interactions were observed. Although *L. lugubris* is rapidly displaced during ecological competition with certain *Hemidactylus* species in urban and suburban habitats (Petren and Case 1996, 1998), efforts are needed to evaluate the nature and intensity of competition among these species outside of their natural ranges.

Based on the life color pattern, all individuals collected could belong to the widespread parthenogenetic Clone A of *Lepidodactylus lugubris* (Yamashiro et al. 2000), apparently the most competitive clone in structurally simple human landscapes (Short and Petren 2008). Females lay two eggs at a time (Manthey and Grossmann 1997). Grismer (2011) suggested that the breeding season in Malaysia may last throughout much of the dry season, however Señaris et al. (2017) in the introduced population in Venezuela, found gravid females in August-September. Our finding of three gravid females, with one or two eggs, also during the rainy season could signal the extraordinary reproductive potential in the introduced range. The possible successive events of invasion of this or other clones and the probable spread of the population should be monitored throughout the Cuban archipelago. *Lepidodactylus lugubris* represents the second parthenogenetic lizard introduced in Cuba, after the finding of *Gymnophthalmus underwoodi* ten years ago from eastern Cuba (Alfonso et al. 2012). It is an important concern for the conservation authorities due to the threat of rapid colonization and spread of these unisexual species in which only one individual is required to establish a population.

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