



## INTRODUCED SPECIES

# Two New Introduced Populations of the Cuban Green Anole (*Anolis porcatius*) in the Dominican Republic

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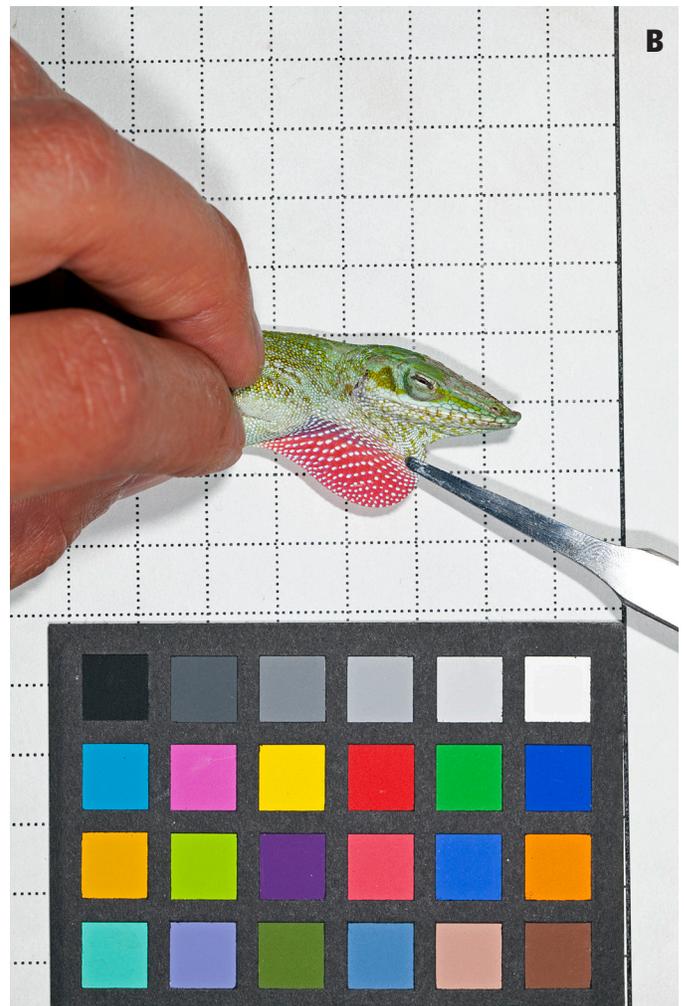
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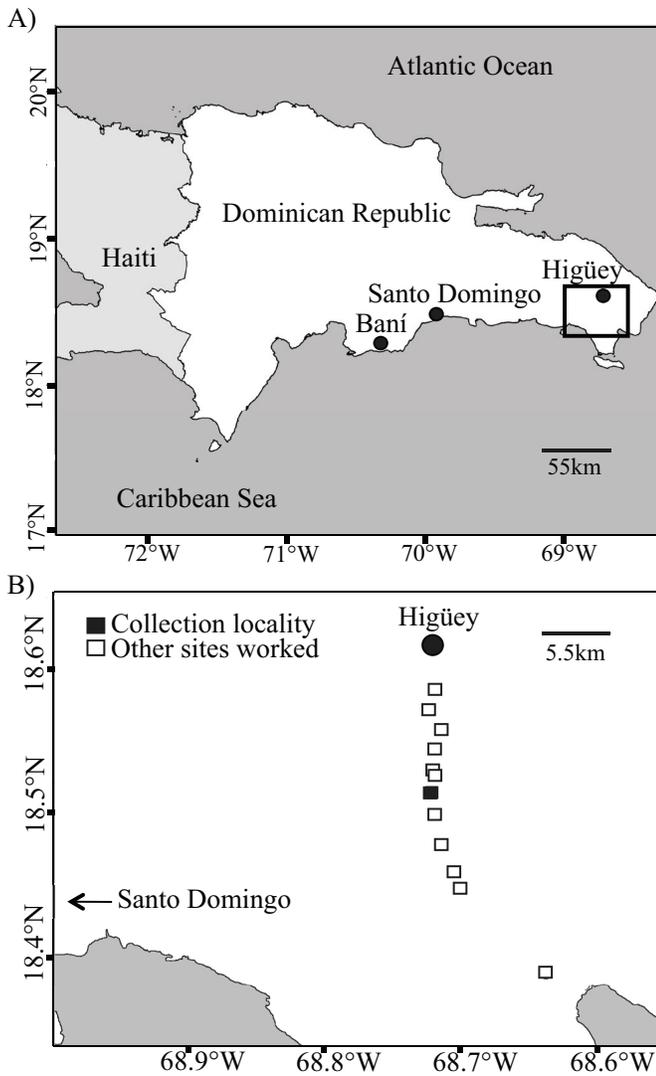
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*Anolis* is a species-rich and morphologically diverse group of Neotropical lizards (reviewed in Losos 2009). Many Caribbean island species have become human commensals and can be found abundantly in gardens, along fence posts, near buildings, and in trash piles. The ability of human-commensal species to stow away in horticultural, agricultural, and construction material shipments has led to many inadvertent anthropogenic introductions of *Anolis* to new geographic locations across the Caribbean and around the world (Williams 1969, Kolbe et al. 2004, Powell et al. 2011). Here, we report two newly established populations of the Cuban anole *A. porcatius* in the Dominican Republic that considerably expand the range of this introduced species on Hispaniola.

*Anolis porcatius* is a medium-sized (adult males to ~73 mm SVL) trunk-crown ecomorph that is native to Cuba, where it primarily inhabits tree crowns and the upper reaches of tree trunks. As is typical for trunk-crown anoles, *A. porca-*



**Fig. 1.** Adult male *Anolis porcatius* captured at the Higüey collection locality on 1 June 2011. Photographs taken on 1 x 1 cm grid paper. Photographs by D. Luke Mahler.



**Fig. 2.** Map of the Dominican Republic showing cities with known introduced populations of *Anolis porcatius*. The rectangle indicates the region enlarged in the second panel, which shows localities near Higüey where we sampled *Anolis*. We observed and collected *A. porcatius* at a single locality, which is marked by the black rectangle.

*tus* has short legs, a long tail, and large toepads relative to its body size. *Anolis porcatius* is primarily green dorsally (Fig. 1A) though it can change rapidly to dark brown. It has a pink gular fan, or dewlap (Fig. 1B).

The native range of *A. porcatius* spans much of Cuba (Schwartz and Henderson 1991), but it has been introduced to Florida (Meshaka 1997), Aruba (Odum and van Buurt 2009), and the Dominican Republic (Williams 1977). Kolbe et al. (2007) found that *A. porcatius* in Florida has been introduced from at least two source populations in the vicinity of Havana, Cuba, whereas *A. porcatius* in the Dominican Republic has a single source population near Havana.

Introduced populations of *A. porcatius* in the Dominican Republic have been reported from several localities in the

greater Santo Domingo area: The landscaped urban central and southern sections of the National District, the National Zoo to the north, and Las Américas International Airport and Boca Chica to the east (Powell and Parmerlee 1991; Powell 1992; Gifford et al. 2002; Powell and Henderson 2008; MAL, pers. obs.). *Anolis porcatius* appears to have displaced its native ecological equivalent, *A. chlorocyanus*, in some highly altered urban settings in the greater Santo Domingo area (Arias Cornielle 1975, Powell et al. 1990, Gifford et al. 2002). The new populations of *A. porcatius* reported here — near Higüey in the eastern province of La Altagracia and in Baní in the province of Peravia (Fig. 2A) — are probably the result of dispersal from Santo Domingo, although we have yet to test this hypothesis with genetic data.

On 31 May 2011, while collecting *Anolis distichus* approximately 11 km south of Higüey on the west side of Highway 4 (Fig. 2B; N18.51390, W68.72177), YES and PSV spotted a male green anole displaying a pink dewlap. Because the native *A. chlorocyanus* has a blue-and-white dewlap, we identified this pink-dewlapped individual as *A. porcatius*, although we failed to catch it. We returned to the same site the next day and opportunistically captured five male *A. porcatius* in approximately 2.5 h that were devoted primarily to sampling *A. distichus*. These *A. porcatius* averaged  $76.2 \pm 4.9$  mm and  $10.1 \pm 2.1$  g. We did not capture or definitively identify any females, possibly because they are not easily distinguished at a distance from female *A. chlorocyanus*. We observed at least one male *A. chlorocyanus* at this site. The *A. porcatius* individuals were prepared as voucher and tissue specimens and deposited in the Museo Nacional de Historia Natural, Santo Domingo (Mahler1845, 1848) and the Museum of Comparative Zoology, Harvard University (MCZ R-189079–189081).

We collected the *A. porcatius* from several large trees and a fence lining the northern edge of a roadside house and from a row of large trees extending into a sugarcane field west of the house (Fig. 3). We collected *A. distichus* with similar effort at six sites north of the *A. porcatius* collection locality and at five sites to the south, spanning about 25 km along Highway 4 (Fig. 2B – GPS coordinates for these sites available upon request). During these collections, we did not find any more *A. porcatius* even though *A. chlorocyanus* was relatively abundant (ca. 1–3 sightings per person per hour).

On 29 April 2010, MAL spotted a female *A. porcatius* on the trunk of a *Catalpa* tree (*Catalpa longissima*) planted along the sidewalk of Encarnación Echavarría City Park (N18.27939, W70.32693) near the eastern entrance into Baní on Highway 2 (Fig. 4). On a second visit on 9 January 2011, MAL, DS, AJG, and REG observed three individuals (2 males, 1 female) during an approximately 30-minute search. Tissue and voucher specimens were prepared for one individual of each sex (GLOR7805 male, GLOR7806



**Fig. 3.** The Higuëy collection locality: (A) Roadside house and yard, (B) northern fence line of the house, and (C) the line of trees to the west of the house. Photographs by Yoel E. Stuart.

female). On 16 August 2011, MAL conducted a two-hour search and found five *A. porcatius* (3 females, 2 juveniles) as well as four male *A. chlorocyanus*. A final 1.5-hour search by MAL on 27 August 2011 revealed 14 juvenile *A. porcatius* primarily in a thicket of ornamental vegetation that might serve as a refuge for juveniles.

*Anolis porcatius* has not been observed outside of this park despite search efforts by MAL throughout the year and an additional effort from AJG and REG in July 2011. *Anolis chlorocyanus* remains moderately common throughout Baní. Curiously, we have not seen any *A. cybotes* at this park, even though this species is known from elsewhere in Baní. A stocky and aggressive species, *A. cybotes* preys on juvenile anoles. The lack of *A. cybotes* at the park might be at least partially responsible for *A. porcatius* successfully establishing a breeding population. Other potential predators include the lizards *Ameiva chrysolasma* and *Leiocephalus personatus*, several of which we have seen at the park. These species forage terrestrially in open areas, whereas *A. porcatius* is nearly exclusively arboreal. Our survey efforts have not revealed any snakes in the park, an observation corroborated by landscapers and park personnel.

The discovery of *A. porcatius* in Higuëy and Baní represents the first Hispaniolan populations of this species that are clearly geographically disjunct from greater Santo Domingo and Boca Chica. Our surveys suggest that each of these introduced populations is restricted to a single, anole-favorable habitat enclave surrounded by relatively unsuitable environments. These collection localities, however, abut busy roads, making anthropogenically-aided dispersal only a matter of time. We recommend that scientists and wildlife management officials make a concerted effort to eradicate these populations before they spread.

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**Fig. 4.** The Baní collection locality: (A) Encarnación Echavarría City Park, (B) an example of dense foliage that may serve as a juvenile “nursery,” and (C) a juvenile *A. porcatius* stalking a Skipper (Hesperiidae) butterfly. This lizard was chased away by a larger juvenile. Neither lizard caught the butterfly (MAL). Photographs by R.E. Glor (A & B) and Miguel A. Landestoy (C).

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