



INTRODUCED SPECIES

First Recorded Introduction for the Saba Anole (*Anolis sabanus*) and an Overview of Introduced Amphibians and Reptiles on St. Eustatius

Wendy A.M. Jesse¹, Hannah Madden², Jasper Molleman¹, and Tim van Wagenveld³

¹Department of Ecological Science, Vrije Universiteit Amsterdam, 1081 HV Amsterdam, The Netherlands (w.a.m.jesse@vu.nl)

²Ecological Professionals Foundation, Rosemary Lane, St. Eustatius, Dutch Caribbean

³Stichting RAVON, Toernooiveld 1, 6525 ED Nijmegen, The Netherlands

The Lesser Antillean island of St. Eustatius harbors two native anole species, the large Panther or Statia Bank Tree Anole (*Anolis bimaculatus*; maximum SVL 123 mm) and the smaller Schwartz's or Saint Kitts Bank Bush Anole (*A. schwartzi*; max. SVL 53 mm). No exotic anoles had been reported for the island until a stray individual of the Saba Anole (*Anolis sabanus*) was discovered in the harbor of Oranjestad, St. Eustatius in April 2016, marking the first recorded introduction of the species.

The Saba Anole is a solitary anole species, endemic to the Lesser Antillean island of Saba, where it is abundant within its native range of just 13 km². The species is of intermediate size (max. SVL 69 mm) and males are easily distinguished by their striking spotted pattern (Fig. 1).

This individual was discovered next to shipping containers in the St. Eustatius harbor area by a team of local and Dutch researchers. Ships are important vectors for reptile introductions (e.g., Powell et al. 2011, 2013; Helmus et al. 2014), and, because of its location, the lizard likely was a stow-away on one of the regular container shipments between Saba

and St. Eustatius (Crowley Maritime Corporation 2016). Alternatively, the anole might have hitchhiked on a fishing boat, as local fishermen travel regularly between the islands. Other modes of introduction, such as natural dispersal or an escape or release from captivity, are highly unlikely. These lizards are rarely kept as pets, and a deep-water channel as well as 25 km of Caribbean Sea separate the two islands (Fig. 2). No other Saba Anoles have been found on St. Eustatius, so the existence of a reproductively active population is unlikely.

The individual was euthanized shortly after capture. The lizard was an adult male (SVL 58 mm). Its identity was confirmed by R. Powell from photographs (Fig. 3) and a photographic voucher has been deposited in the Milwaukee Public Museum (MPM VZP 845). The specimen is currently being kept frozen on the island, although the tip of the tail was sent to Vrije Universiteit Amsterdam in the Netherlands for possible future genetic analysis.

St. Eustatius is unusual among inhabited Lesser Antillean islands in that during the past century, only one exotic herpetofaunal species has established a viable population on the island. The parthenogenetic Flowerpot or Brahminy Blindsnake (*Indotyphlops braminus*) likely arrived on the island during the 1990s via shipments of ornamental plants originating in Florida (e.g., Powell et al. 2011, 2013). However, the time and origin of this introduction remains obscure and could date back further, as this species has a nearly cosmopolitan tropical distribution. Introduced populations of Tropical House Geckos (*Hemidactylus mabouia*; locally called Woodslaves) and Johnstone's Whistling Frogs (*Eleutherodactylus johnstonei*) have been established since at least the 19th Century. However, stray individuals of two exotic species have been recorded in recent years. A few Red-eared Sliders (*Trachemys scripta elegans*) were kept in a private ornamental pool for several years (Powell et al. 2015). In 2013, a juvenile Green Iguana (*Iguana iguana*) was discovered in the cargo shipment of a vessel that had originated from Saba. That individual was



Fig. 1. Adult male Saba Anole (*Anolis sabanus*). Photograph © Christian König (SHAPE/DCNA).

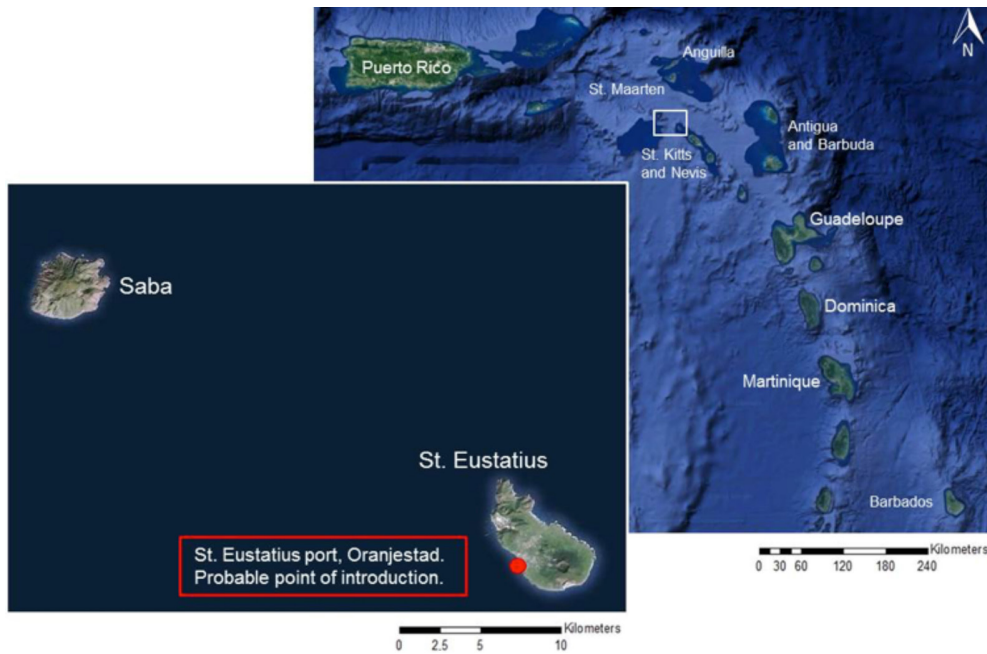


Fig. 2. Map of Saba and St. Eustatius; the probable point of introduction for the Saba Anole (*Anolis sabanus*) described herein is marked with the red dot. Regional map: © 2016 Google, Map data, sources: SIO, NOAA, U.S. Navy, NGA, GEBCO, Landsat. Zoomed map: ESRI World imagery, sources: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community.



Fig. 3. The adult male Saba Anole (*Anolis sabanus*) captured on St. Eustatius. Photographs by Hannah Madden.

immediately captured and euthanized. In February 2016, an adult female *I. iguana* was discovered in a residential area by a local resident, who alerted the St. Eustatius National Parks Foundation (STENAPA). That iguana was euthanized and preserved. Based on feedback from regional experts, the latter individual probably traced its ancestry to Central America, where Green Iguanas are farmed in large numbers for the pet trade. This is a commonly introduced species that is firmly established on neighboring St. Maarten (Powell et al. 2015) and is widely introduced throughout the Lesser Antilles (e.g., Breuil 2013). Although no one claimed ownership, based on

the area in which it was discovered, one likely explanation for its origin is that it was smuggled in from St. Maarten as a juvenile and released as an adult, possibly due to its large size. Green Iguanas are of particular concern because an established population or just a few individuals could compete or even hybridize with the critically endangered endemic population of Lesser Antillean Iguanas (*Iguana delicatissima*), as has happened elsewhere in the Lesser Antilles (e.g., Breuil 2013). At the very least, the presence of exotic Green Iguanas could confound conservation efforts focused on the superficially similar native iguanas. In sharp contrast, the arrival of a single Saba Anole is unlikely to have any deleterious consequences, although ongoing educational efforts and careful monitoring by resident naturalists, STENAPA staff, and volunteers are required to prevent the successful introduction of additional exotic species on St. Eustatius.

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