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The Establishment of *Anolis aeneus* (Gray) in Southwestern Tobago, Trinidad and Tobago

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ABSTRACT

Anolis aeneus (Gray), a species native to Grenada, was first recorded in Tobago (The Republic of Trinidad and Tobago) in May 2007. During a survey conducted in November 2008, *A. aeneus* was found to be well established in south-west Tobago. There are no native anoles in Tobago but the exotic *A. richardii* (Duméril and Bibron), also native to Grenada, is widespread and abundant in disturbed areas. The presence of *Anolis aeneus* in Tobago recreates the competitive relationship that occurs in their original home in Grenada.

Key words: *Anolis*, *aeneus*, *richardii*, exotic species.

INTRODUCTION

The Caribbean Islands are home to about 150 species of *Anolis* lizards (Roughgarden 1995). On the smaller islands, especially in the eastern Caribbean, there are usually only one or two indigenous species and many species are restricted to a single island. These lizards serve as ideal subjects for ecological and evolutionary studies (Losos and De Queiroz 1997). Anthropogenic factors have led to the introduction of species to other islands where they compete with the indigenous or other exotic *Anolis* species. These introductions provide opportunities to test hypotheses developed from the study of the species in their natural range.

In Trinidad there are five exotic *Anolis* species: *A. aeneus* (Gray), *A. extremus* (Garman), *A. trinitatis* (Reinhardt and Lutken) (Murphy 1997) and more recently *A. wattsi* (Boulenger) (White and Hailey 2006) and *A. sagrei* (Duméril and Bibron) (Charles, in preparation). The indigenous species *Norops chrysolepis planiceps* (Troschel) (= *A. chrysolepis planiceps* (Troschel)) was previously placed in the genus *Anolis* (Murphy 2008). *Anolis aeneus* is native to Grenada but has long been naturalised in Trinidad with published records dating from as early as 1900 (Murphy 1997). It has adapted well to the suburban environment and is now the commonest *Anolis* species in Trinidad. In Grenada, *A. aeneus* exists in two colour forms, a grey form associated with dry forest and a green form associated with wet forest at higher altitude (Gorman 2003). The *A. aeneus* population in Trinidad is of the grey form (Gorman 2003). There are

no native *Anolis* species on Tobago but *A. richardii* (Duméril and Bibron) also native to Grenada, is widespread and abundant in disturbed areas (Murphy 1997). Despite the considerable movement of people and materials between Trinidad and Tobago, there have been no reports of *A. aeneus* in Tobago prior to 2007.

Lizards which appeared to be *Anolis aeneus* (Gray) were observed and photographed at Crown Point Airport on 6 May, 2007 (See Plate). Subsequently further individuals of *A. aeneus* were observed on grounds of the Tobago Hilton on 20 July, 2007 and at the Store Bay Beach Facility on 3 January, 2008. This survey was conducted to confirm the presence of, and determine the current distribution of *A. aeneus* in Tobago.

METHODOLOGY

A rapid survey was conducted to determine the distribution of *Anolis aeneus* in Tobago. The survey was conducted on 27-28 November, 2008 at 22 sites across Tobago with an emphasis on the south-west of the island. Sites with managed lawns interspersed with small trees and shrubs and/or fences were selected for the survey as this is the preferred habitat of *A. aeneus* in Trinidad. Hotel grounds were selected as they provided suitable habitat and in addition were likely locations to which plants had been transported. Few rural areas and no natural vegetation were surveyed.

At each site a fifteen minute search was conducted by two observers, both of whom were experienced with *Anolis aeneus* in Trinidad. Searches were conducted be-



Plate. *Anolis aeneus*. **Above**, female or immature male, Crown Point, Tobago, May 2007. **Below**, (male) Store Bay, Tobago, January 2008. Photos, GW and SC.

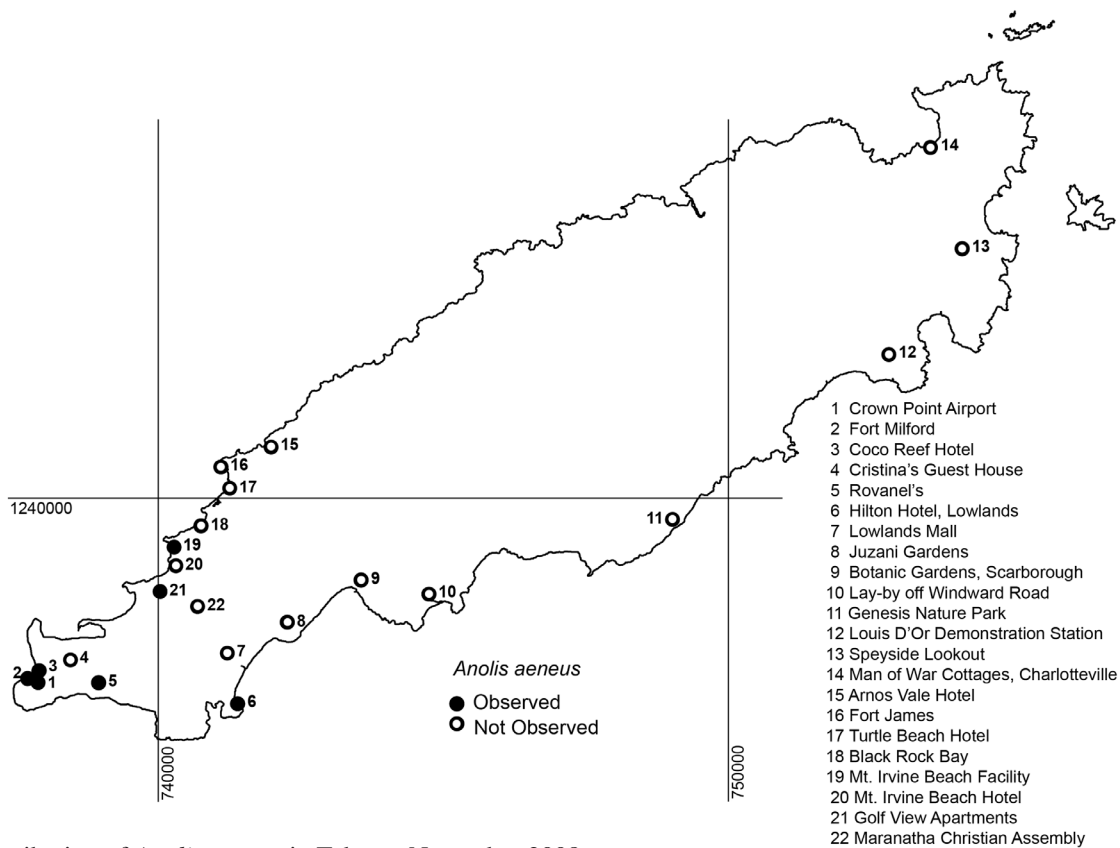


Fig. 1. Distribution of *Anolis aeneus* in Tobago, November 2008.

tween 0900 h and 1600 h when the lizards are most active. At each site the stem and main branches of small trees, shrubs and fences were examined and any *Anolis* observed, *A. aeneus* or *A. richardii*, were noted. During the survey the weather was generally sunny with about 50% cloud cover.

Specimens were photographed and their identity confirmed from the photographs by Robert Powell, Avila University, Kansas City, Missouri, USA. Specimens were lodged in the Zoology Museum at the University of the West Indies (Accession number UWITT.2011.5).

RESULTS AND OBSERVATIONS

Anolis aeneus were observed at six of the sites surveyed, all in the south-west of the island, Fig. 1. At all but two sites *A. richardii* were observed. At sites where both species were present, *A. aeneus* generally outnumbered *A. richardii*. The one exception was the Mount Irvine Beach Facility. The *A. richardii* appeared to prefer larger trees and areas of denser vegetation than the *A. aeneus*. The *Anolis aeneus* observed in Tobago, like those common in Trinidad, were of the grey colour form associated with dry scrub in Grenada.

DISCUSSION

The observed distribution and population size of *Anolis aeneus* suggests that the species is well established in southwestern Tobago. Recent development in south-west Tobago, and associated transport of building materials, household items and possibly plants from Trinidad, might have brought the lizards to Tobago. It is less likely that the introduction to Tobago came directly from Grenada as the movement of people and goods between Trinidad and Tobago is far greater than movement between Grenada and Tobago.

The presence of *Anolis richardii* was used as an indicator that the site was generally suitable for *Anolis* species. The observation that *A. richardii* appeared to prefer the larger trees and more shaded vegetation is consistent with what is observed in Grenada (Harris *et al.* 2004) where *A. richardii* is more common in densely shaded habitats and *A. aeneus* prefers, or is more tolerant of, open sunny areas.

The establishment of *Anolis aeneus* in Tobago presents an opportunity to observe any niche segregation and/or character displacement that develops as the population comes into contact with the much larger *A. richardii*. It is expected that both species will coexist in Tobago as they do in their original homeland of Grenada. However, it would be interesting to compare their precise ecological relationships to that which pertains in Grenada and to determine whether *A. aeneus* becomes established in

natural forest.

In Grenada, *Anolis aeneus* is found throughout the island irrespective of land use or level of disturbance (Germano *et al.* 2003). In Trinidad, however, *A. aeneus* is seldom if ever observed away from urban and residential habitats.

The scarcity of *Anolis aeneus* in natural vegetation in Trinidad may be related to the presence of a suite of predators and competitors of continental origin that are absent in the Antilles; and, that the Anoles of Antillean origin have not evolved the defensive and competitive strategies to succeed alongside them. Two candidate components of this suite are woodcreepers (formerly Dendrocolaptinae) and army ants (sub-family Ecitoninae).

Table 1. Distribution of *Anolis aeneus* and *A. richardii* at selected sites in Tobago, November 2008. Locations provided in Fig. 1.

Location	Grid Reference (UTM 20n)	Number of	
		<i>A. aeneus</i>	<i>A. richardii</i>
1	735792, 1233538	4	0
2	735424, 1233677	17	2
3	735045, 1233952	7	4
4	736926, 1234333	0	5
5	737916, 1233533	15	0
6	742790, 1232794	20	0
7	742428, 1234569	0	0
8	744534, 1235655	0	3
9	747122, 1237131	0	16
10	749500, 1236641	0	11
11	758045, 1239254	0	10
12	765633, 1245037	0	3
13	768204, 1248750	0	0
14	767095, 1252298	0	0
15	743966, 1241793	0	12
16	742206, 1241097	0	1
17	742515, 1240350	0	8
18	741507, 1239031	0	8
19	740563, 1238286	2	10
20	740624, 1237636	0	14
21	740072, 1236731	10	0
22	741382, 1236206	0	0

Woodcreepers are common in continental South and Central America (Restall *et al.* 2006) but are absent from the West Indian Islands from Cuba and the Bahamas through to Grenada (Raffaele *et al.* 1998). They forage on the trunks and main branches of trees and may prey upon and compete with arboreal *Anolis* lizards. There are three species of woodcreeper resident in Tobago (Kenefick *et al.* 2007), including the Plain-brown Woodcreeper *Dendrocincla fuliginosa*, a known predator of *Anolis* in Panama (Willis 1972; Poulin *et al.* 2001), especially small individuals with a mean SVL of 33.5 mm (Poulin *et al.* 2001). One author (GW) has observed a Straight-billed Woodcreeper, *Xiphorhynchus picus* preying upon *A. aeneus* in the mangrove of Caroni Swamp in Trinidad.

Four of the five new world genera of army ants are known to occur in the forests and open areas of both Trinidad and Tobago but on the West Indian Islands where *Anolis* lizards are abundant, they are largely absent (Wilson 2006). Army ants generally prey on other arthropods, especially social insects, with many species preying almost exclusively on the brood of other ants and are unlikely to prey upon healthy *Anolis*. However, there may be a level of competition.

The spread of *Anolis aeneus* in Tobago offers an opportunity to compare the survival and competition of the two Grenadian *Anolis* species in an environment which includes predators and competitors of continental origin.

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REFERENCES

Germano, J. M., Sander, J. M., Henderson, R. W. and Powell, R. 2003. Herpetofaunal communities in Grenada: a comparison of altered sites, with an annotated checklist of Grenadian amphibians and reptiles. *Caribbean Journal of Science*, 39: 68-76.

Gorman, G. C. 2003. The mule lizards of Trinidad: Jungle dreams and backyard explorations. pp. 279-293. In **R. W. Henderson** and **R. Powell**, eds. *Islands and the Sea: Essays*

on Herpetological Exploration in the West Indies. Contributions to Herpetology, Vol 20. Ithaca, New York: Society for the Study of Amphibians and Reptiles.

Harris, B. R., Yorks, D. T., Bohnert, C. B., Parmerlee Jr., J. S. and Powell, R. 2004. Population densities and structural habitats in lowland populations of *Anolis* lizards on Grenada. *Caribbean Journal of Science*, 40: 31-40.

Losos, J. B. and De Queiroz, K. 1997. Evolutionary consequences of ecological release in Caribbean *Anolis* lizards. *Biological Journal of the Linnean Society*, 61: 459-483.

Murphy, J. C. 1997. *Amphibians and Reptiles of Trinidad and Tobago*. Malabar, Florida: Krieger Publishing Company. 245 p.

Murphy, J. C. 2008. An update of the amphibians and reptiles of Trinidad and Tobago. Downloaded from http://blog.jcmnaturalhistory.com/?page_id=46 "http://blog.jcmnaturalhistory.com/?page_id=46" (4 June 2008).

Kenefick, M., Restall, R. and Hayes, F. 2007. *Birds of Trinidad & Tobago*. Christopher Helm, London. 256 p.

Poulin, B., Lefebvre, G., Ibanez, R., Jaramillo, C., Hernandez, C. and Rand, A. S. 2001. HYPERLINK "http://www.csa.com/partners/viewrecord.php?requester=gs&collection=ENV&recid=5118933" Avian predation upon lizards and frogs in a Neotropical forest understorey. *Journal of Tropical Ecology*, 17: 21-40.

Raffaele, H., Wiley, J., Garrido, O., Keith, A. and Raffaele, J. 1998. *A Guide to the Birds of the West Indies*. Princeton: Princeton University Press. 511 p.

Restall, R., Rodner, C. and Lentino, M. 2006. *Birds of Northern South America, An Identification Guide, Volume 1*. New Haven and London: Yale University Press. 880 p.

Roughgarden, J. 1995. *Anolis* lizards of the Caribbean. Ecology, evolution and plate tectonics. *Oxford Series in Ecology and Evolution*. New York: Oxford University Press. 200 p.

White, G. L. and Hailey, A. 2006. The establishment of *Anolis watsi* as a naturalized exotic lizard in Trinidad. *Applied Herpetology*, 3: 11-26.

Willis, E. O. 1972. The behaviour of Plain-brown Woodcreepers, *Dendrocincla fuliginosa*. *Wilson Bull.*, 84: 377-420.

Wilson, E. O. 2006. The Biogeography of West Indian Ants (Hymenoptera: Formicidae) p. 214-228. In **E. O. Wilson**, ed. *Nature revealed: selected writings, 1949-2006* By Edward O. Wilson. The Johns Hopkins University Press; 1st edition (February 15, 2006) 719 p.