Anolis Newsletter VII

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Front cover: The established *Anolis* community of Miami, FL. From top; Jamaican giant anole (*Anolis garmani*), Cuban knight anole (*A. equestris*), [right] Hispaniolan bark anole (*A. distichus*), [left] American green anoles (*A. carolinensis*), Puerto Rican crested anole (*A. cristatellus*), Cuban brown anole (*A. sagrei*). Illustration generously provided by Gabriel Ugueto, Gabriel is a scientific illustrator and paleoartist whose work is second to none; contact him for commissions! www.GabrielUgueto.com

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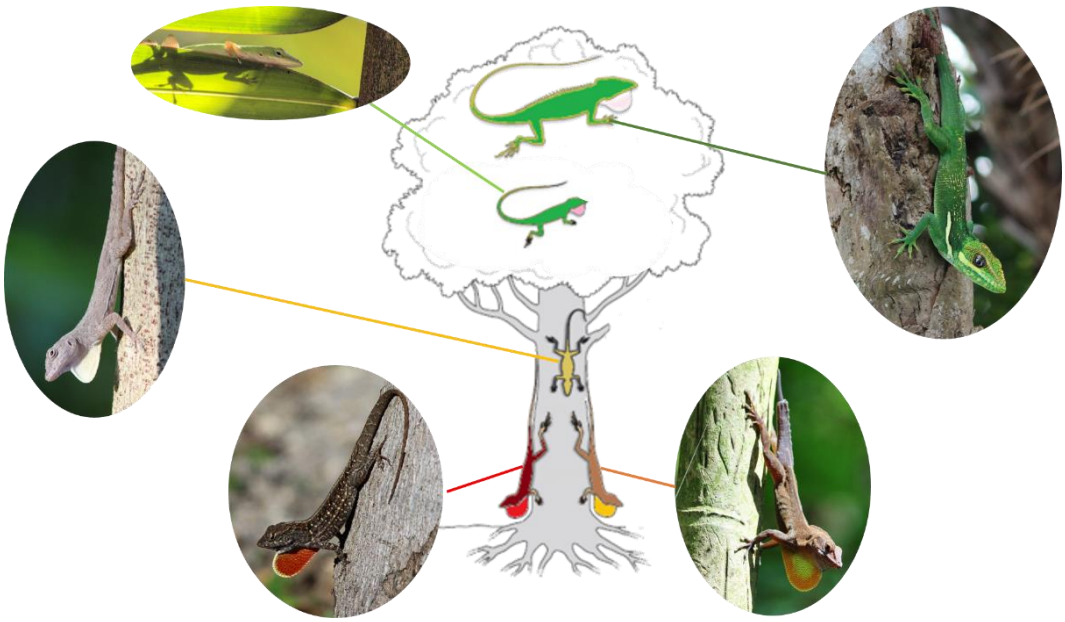
The attendees of the 7th *Anolis* Symposium.
Fairchild Tropical Botanic Gardens, Miami FL.
17-18th March 2018.

Preface

It had been nearly a decade since the previous *Anolis* symposium was held in Cambridge, MA, at the Museum for Comparative Zoology, Harvard. A reunion of anole biologists en masse was long past due and it was decided that this symposium would be slightly different – we were going to hold it somewhere with anoles! And so, on the weekend of 17-18th March, 2018, nearly 70 anole biologists traveled to sunny south Florida to attend the 7th *Anolis* Symposium held at the beautiful Fairchild Tropical Botanic Gardens in Miami. In the grounds of the botanical gardens, attendees were presented with a diverse community of six (!) species of anole, both native and non-native, representing four distinct ecomorphs.



The anole community of Fairchild Tropical Botanic Gardens, clockwise from top right; Cuban knight anoles (*Anolis equestris*; Crown-Giant), Puerto Rican crested anoles (*A. cristatellus*; Trunk-Ground), Cuban brown anoles (*A. sagrei*; Trunk-Ground), Hispaniolan bark anoles (*A. distichus*; Trunk), and – the sole native – American green anole (*A. carolinensis*; Trunk-Crown).
Photos: James Stroud.

The early Spring timing of the symposium was chosen for two reasons, (i) Miami's famous, yet unforgiving, heat is particularly sweltering in the Summer period when conferences and symposia are usually held, but more importantly, (ii) March marks the commencement of the anole reproductive season in Miami! Attendees gathered just as anoles were jostling for societal positions in the early Spring sunshine and were rewarded with a plethora of showy dewlap displays and behavioral interactions. As true royalty passed within earshot[1], attendees were

[1]At one point on Saturday, all attendees were locked inside the symposium room while personnel from both the US and Japanese Secret Service escorted the Crown Prince of Japan on a private tour of the garden…. seriously!

regaled with 34 research presentations spanning a broad range of topics on anole biology, from insightful natural history to the latest advances in genome editing.

So, what's changed in anole biology since the 6th symposium in 2009? Well, the field continues to grow at an explosive rate! Web of Science returns 1,345 "*Anolis*" articles from 2009-2018. Most notably, a lot of recent research has focused on how human stressors, such as urbanization and contemporary climate change, are affecting the lives of anoles. Similarly, the human-assisted dispersal of anoles to areas outside of their native ranges continues to yield exciting developments in ecology and evolution. Anole invasion biology led the charge in uncovering evidence for rapid evolutionary change driven by species interactions, after the introduction of brown anoles (*A. sagrei*) to spoil islands in central Florida drove native green anoles (*A. carolinensis*) to evolve larger toepads in response to an increased arboreal lifestyle; findings first presented in *AN VI*. Back in 2009 we were also excited to announce that the newest direction of anole biology was upon us; the sequencing of the *Anolis carolinensis* genome. Now, a decade later, three more species have faced the same fate, with many more underway! These accessions will continue to fuel a swathe of studies of anoles and further cement their position as a model system in ecology and evolution.

There are also now many new anoles to enjoy! A recent study, providing the most comprehensive review of *Anolis* systematics to date, put the number of species at 379, a number which might yet change as anole systematics continues to be a hotly debated topic.

While technological advances are expanding the breadth of research on anoles, we continue to echo the previous newsletter in saying that some of the most exciting results still stem from observations of basic natural history. Who knew that natural selection can act on behavior (see contribution from Lapiedra)? Or, that anole eggs hatch early when they're tickled (see contribution from Doody)? Just how important is it to still study anole behavior (see contribution from Johnson)? And what of those remarkable diving anoles, able stay submerged for up to 15 minutes while appearing to re-circulate oxygen from air bubbles attached to their nostrils (see contribution from Swierk)?

As with previous editions, we reiterate the underlying ethos of the *Anolis* Newsletter, "this newsletter is an informal forum for the presentation of data and discussion of theory relevant to anoles. It serves three functions: to allow investigators to inform others of their current and future research; to provide an outlet for speculation and theoretical musings perhaps inappropriate for publication in more formal venues; and to give an opportunity to present data and ideas that otherwise might never be distributed. As with previous newsletters, there is a general request that nothing said herein be quoted without the authors' express permission."

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Fairchild's anole (*Anolis fairchildi*)

Hosting the *Anolis* meeting at Fairchild Tropical Botanic Garden's had an added special significance to anole biologists. On a 1930 expedition to the tiny island of Cay Sal, a small remnant from a once-larger Cay Sal Bank that sits in the ocean passage between Cuba and the southern tip of Florida, malacologist Paul Bartsch came across two anoles; the ubiquitous brown anole (*A. sagrei*) and a curiously large green anole, found to sport white speckling along its flanks. Bartsch collected specimens and passed them on to the famous Caribbean herpetologist, Thomas Barbour. Upon investigating the specimens, Barbour noted that differences in dorsal and temporal scales separated this island population from two morphologically similar species; the Cuban green anole (*A. porcatus*) and the Bahamian green anole (*A. smaragdinus*). In 1935, Barbour, along with a fellow herpetologist Benjamin Shreve, published their description of this curious new lizard. The authors chose to patronize the species *Anolis fairchildi*, in honor of their good friend, expedition companion, and occasional financier, David Fairchild. Aboard a legendary research vessel owned by Allison Armour, the 1315-ton steamer *Utowana*, Barbour and Fairchild, himself a prolific botanist, had explored the flora and fauna of the Caribbean throughout much of the early 20th century.

Fairchild's anole (*Anolis fairchildi*). Cay Sal, 30 May 2012. Courtesy of Michael Sorenson.

And so, by hosting the VII *Anolis* Symposium at the Fairchild Tropical Botanical Garden, the former private botanical collection of David Fairchild – including many original collections from his Caribbean expeditions, we provided a 21st century update to the ongoing *Anolis*- Fairchild relationship. We would like to thank the current Director of Fairchild's Gardens, Dr. Carl Lewis, for his enthusiastic support of both *Anolis* research in the gardens themselves, and for providing such an exciting and historic venue for the VII *Anolis* Symposium.

Graham Reynolds provides a charming and more detailed account of the history of Fairchild's anole on *Anole Annals* and in his recent *Breviora* paper, in which he and colleagues document their own exploration of Cay Sal and, for the first time, explore the genetic relationship of *A. fairchildi* to the rest of the *carolinensis* green anole clade.

http://www.anoleannals.org/2018/06/24/anole-outpost-the-cay-sal-bank-part-ii/

Reynolds, R.G., Puente-Rolón, A.R., Castle, A.L., Van De Schoot, M. and Geneva, A.J., 2018. Herpetofauna of Cay Sal Bank, Bahamas and Phylogenetic Relationships of *Anolis fairchildi*, *Anolis sagrei*, and *Tropidophis curtus* from the Region. *Breviora*, *560*(1), pp.1-19.

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