

Jamaican lizards' shows of strength mark territory at dawn, dusk

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Anolis lineatopus: Jamaican gray anole, observed near Discovery Bay, Jamaica.
Credit: Terry J. Ord/Harvard University and University of California, Davis

What does Jack LaLanne have in common with a Jamaican lizard? Like the ageless fitness guru, the lizards greet each new day with vigorous push-ups. That's according to a new study showing that male *Anolis* lizards engage in impressive displays of reptilian strength -- push-ups, head bobs, and threatening extension of a colorful neck flap called a dewlap -- to defend their territory at dawn and dusk.

The lizards are the first animals known to mark dawn and dusk through visual displays, rather than the much better known chirping, tweeting, and other sounding off by birds, frogs, geckos, and primates.

Terry J. Ord, a postdoctoral researcher at Harvard University's Museum

of Comparative Zoology and at the University of California, Davis, describes the *Anolis* lizards' unusual morning ritual in a forthcoming issue of the journal *American Naturalist*.

"Anoles are highly visual species, so in that sense it's not surprising that they would use visual displays to mark territory," Ord says. "Still, the finding is surprising because these are the first animals known to use non-acoustic signaling at dawn and dusk."

Ord studied four species of Jamaican forest lizard: *Anolis lineatopus*, *Anolis sagrei*, *Anolis grahami*, and *Anolis opalinus*. Female anoles establish small territories allowing access to food and other resources, while males stake out larger territories allowing them access to several females. The males spend much of the day sitting on tree trunks and displaying head motions, push-ups, and dewlap extensions, all to warn other males away from their territory.

Ord carefully located and videotaped individual males at different times of day, from before dawn to dusk. In all four species, he found distinct peaks of activity at daybreak and for about two hours afterward, and again just before dark.

"These patterns have remarkable parallels with the dawn and dusk choruses reported for many acoustically communicating animals," Ord says.

As in many species of birds, anoles leave their daytime perches at night to find safe shelter, since both birds and reptiles are frequently targeted by nocturnal predators.

"The dawn chorus may be a way of communicating having survived the night," Ord says. "If in the morning a bird doesn't hear its neighbor, or an anole doesn't see its neighbor, it may be an opportunity for the animal

to expand its territory."

While ornithologists disagree on the exact reasons why birds chorus at dawn and dusk -- competing hypotheses propose everything from territorial defense to favorable environmental conditions to manifestations of circadian rhythms -- Ord says his work suggests male anoles use their morning displays primarily to mark territory.

"All of these behaviors are displays of physical vigor," Ord says. "As in humans, if an anole can do many of these push-ups it shows that he is in prime physical condition. These displays of strength help avert actual physical confrontations between male lizards, which can be very fierce and destructive."

Ord's work may open the doors to further study by ornithologists, herpetologists, and others seeking evidence of non-acoustic dawn and dusk signaling among other species.

Provided by University of California, Davis

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