

The ever-adaptable anole

SCIENTIFIC NAME

Anolis carolinensis

TAXONOMY

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Polychrotidae

Physical description

The green anole (also known as the Carolina or red-throated anole) is a small arboreal lizard found primarily in the southeastern US and Caribbean. It is sometimes called the American chameleon because it can change color from its usual emerald green to brown. Many lizards are capable of this trick, however, and anoles are not true chameleons, typically only changing color in response to stress or cold. Adults have a pink throat fan or dewlap, which is larger in males than in females and is used for communication such as in courtship displays.

Deficits in any of the anole's three types of pigment cells or chromatophores result in rare color mutations called phases. The blue-phased green anole lacks xanthophores, giving it a blue tone. A completely axanthic anole has a pastel or baby-blue hue. Yellow-phased green anoles, which lack cyanophores, have also been reported.

Green anoles typically have a total body length of 6–8 in, about half of which is the tail, and weigh 3–7 g.

Behavior

Like many lizards, anoles can shed their tails to escape predation. Anoles are often territorial, especially males, who become even more so during the reproductive season. Males put on elaborate displays to court females, extending their brightly colored dewlaps while bobbing up and down. Aside from reproduction, anoles are solitary animals.

Ecomorphology

Anolis includes nearly 400 species, more than any other amniote genus. The group is of great interest in

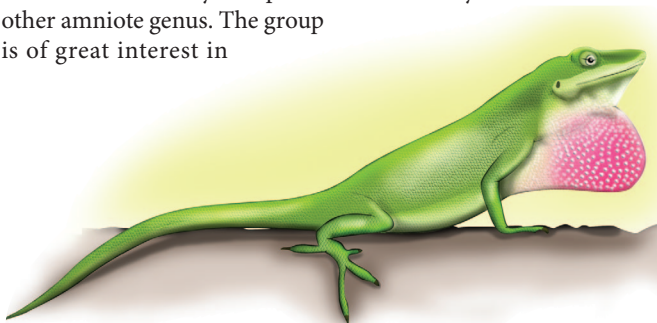
the study of evolutionary diversification, as it shows a repeated convergent pattern of adaptive radiation. Anole populations on isolated islands of the Greater Antilles diverged to occupy separate ecological niches, primarily defined by foraging location (e.g., tree-tops, trunks, underlying vegetation), and underwent morphological changes that 'specialized' them to those habitats. The same patterns emerged repeatedly on different islands: lizards in similar habitats developed similar body forms. These observations suggested that adaptive radiation could be predicted on the basis of habitat; experiments that introduced anoles onto formerly lizard-free islands have shown this to be true¹.

Research résumé

Because of the evolutionary importance of *Anolis* lizards, the green anole was chosen as the first reptile to have its complete genome sequenced. The sequence was recently published, allowing for the first genomic comparisons of reptiles with birds and mammals². The draft genome sequence is 1.78 Gb (compared with ~1 Gb for birds and ~3 Gb for mammals), 30% of which comprises mobile elements, a far greater fraction than is found in other amniotes³. Sequence analysis has also shown that the green anole has a sex-determination system similar to that of humans, suggesting that birds, with their inverse system in which females rather than males have two different sex chromosomes, are the 'odd man out' among the amniotes.

Studies continue to investigate speciation and evolution in the lizards as well, focusing on traits such as dewlap⁴, cranial⁵ and body morphology⁶. The green anole is also the subject of toxicity studies, such as one showing that the explosive HMX, which is bioaccumulative and enters eggs through soil exposure, affects hatching success at high concentrations⁷.

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