

## CARIBBEAN ANOLE ECOMORPHS

Dr. Jonathan Losos, a biologist at Harvard University, has been studying the ecology and evolutionary biology of anoles for almost 30 years and has published over 125 scientific papers on this work. Much of his research focuses on the anoles that live on the larger Caribbean islands, including Puerto Rico, Jamaica, Cuba, and Hispaniola (see Figure 1).



**Figure 1: Caribbean islands are home to the anoles.** The anole species featured in the virtual lab live on the islands of Hispaniola (which comprises Haiti and the Dominican Republic) and Puerto Rico. (Reproduced with permission from Losos, J. *Lizards in an Evolutionary Tree*. UC Press, 2011).

Species of Caribbean anoles can be categorized into six groups according to their body characteristics (morphology) and the ecological niches they occupy. The groups are referred to as ecological morphotypes, or ecomorphs. For example, the grass-bush anoles live on grass and small bushes, and typically have long legs and strikingly long tails that help them balance on thin branches and blades of grass.

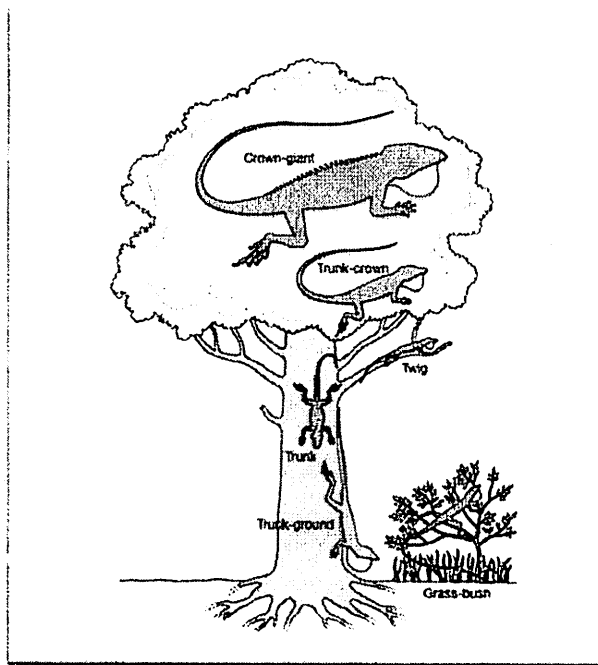
Table 1 below lists the six anole ecomorphs found on the Caribbean islands and their body features. (Note that the virtual lab only discusses four of the ecomorphs: the trunk-crown, trunk-ground, twig, and grass-bush anoles. Not all of the four larger Caribbean islands have species of lizards belonging to each of the six ecomorph categories.)

**Table 1: Six Ecomorphs of Anole Lizards Found in the Caribbean Islands.**

Ecomorph	Body length	Limb length	Toepad lamellae*	Tail length	Color	Habitat
Crown-giant (canopy)	130-191 mm	Short	Large	Long	Usually green	High trunks and branches
Trunk-crown	44-84 mm	Short	Very large	Long	Green	Trunks, branches, leaves
Trunk	40-58 mm	Intermediate	Intermediate	Short	Gray	Trunks
Twig	41-80 mm	Very short	Small	Short	Gray	Narrow twigs
Trunk-ground	55-79 mm	Long	Intermediate	Long	Brown	Lower trunk and ground
Grass-bush	33-51 mm	Long	Intermediate	Very long	Brown	Bush and grasses

\*Lamellae are scales found on the lizards' toepads. In general, the greater the number of lamellae, the larger the toepad.

The body features of the six ecomorphs are adaptations that enable the lizards to be successful in their particular habitats. (See Figure 2 for an illustration of the habitats of the different types of lizards.) For example, the long legs of the trunk-ground anoles enable them to move faster on broad tree trunks and the ground than the short-legged twig anoles. The long-legged adaptation helps the trunk-ground anoles not only catch prey on the ground but also avoid predators that live in their habitats. However, when placed in the habitat of the twig anoles, where twig anoles can move easily with their short legs, the trunk-ground anoles are clumsy.



**Figure 2: Anoles occupy a variety of ecological niches.** Different types of anole lizards have evolved adaptations that enable them to be successful in different ecological niches—different parts of trees, grasses, and bushes. The figure shows the six ecomorphs of anole lizards found on the Caribbean islands in their habitats. (Reproduced with permission from Losos, J. *Lizards in an Evolutionary Tree*. UC Press, 2011).

More than 400 species of anoles have been described worldwide, and about 150 of them are found on the Caribbean islands. In the Caribbean, the number of species on any particular island is roughly related to its size. Cuba, the largest island, has 63 species, and Hispaniola, the second largest, has 41. Many of the species on each island fall into one of the six ecomorphs listed below in Table 2. Note that not all the islands have species that belong to each of the six ecomorphs.

**Table 2: Ecomorphs Found on Each Caribbean Island.**

Ecomorph	Crown-giant	Trunk-crown	Trunk	Twig	Trunk-ground	Grass-bush
Island						
Cuba	✓	✓	✓	✓	✓	✓
Hispaniola	✓	✓	✓	✓	✓	✓
Puerto Rico	✓	✓		✓	✓	✓
Jamaica	✓	✓		✓	✓	