

Intra-Island Differences in Lizard Physiology on Guana

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Over the years that Professor Razi Dmi'el, Tel Aviv University, and his wife Ofra came to Guana, large amounts of data were collected on resistance to water loss in the reptiles of this dry island. Razi was the Principal Investigator and set up and performed all the experiments in Upper Camanoe, which was transformed into a laboratory. Ofra was his lab assistant. Gad was in charge of data analysis and also worked as a field assistant, catching the reptiles. I was just a field assistant. Together we assayed reptiles of at least six species from many BVI sites, from the dunes of Anegada to the wet forest of Sage Mountain. Not surprisingly, we found striking (and highly significant) differences between, not only various species, but between populations of the same species.

Back in 1985, the late Bill MacLean, University of the VI, St. Thomas, had found major, significant differences in water loss rates between the two species of little ground geckos -- "sphaeros" -- and also similar differences between populations of the common one that lives on Guana. It was not surprising that the Anegada population was different from that on Sage Mountain, Tortola, but Bill found the geckos from sea level on Guana were different from the ones on Guana Peak: This implied a real physiological difference within the 3km-square, 246m high, area of Guana Island. But Bill's Guana samples were small and suggestive, not proof. We of Razi's team set out to replicate and expand on Bill's work.

We chose three species that are abundant all over Guana so we could be sure of getting statistically significant sample sizes: the sphaero gecko (that Bill worked on), the crested anole (that Razi's team has published lots on already), and the common snake. There are several basic hypotheses: First, for differences to be demonstrable, there must be major physiological differences between animals that can resist water loss well and those in the same species that cannot resist well. Second, the ability to resist must be expensive to the animals or it would not be relaxed in moist habitats; that is, if you don't really need it you are much better off without it; or, we say, drier habitats exert a strong selection pressure for water loss resistance. Third, there must be a real and major distinction between moisture availability at sea level and at the Peak. This latter factor is evident in the vegetation found at the Peak, like ferns, and that at sea level, like cacti. Not only do we believe there is more rainfall and humidity at the Peak, but we also believe salt spray at sea level dessicates the land.

We got the predicted difference in water loss resistance for both the gecko and the anole, but not for the snake. This is the first time that intraspecific differences in water loss rates have been demonstrated on such a small geographical and altitudinal scale. But why not for the snake? We hypothesize that the snakes, being much larger than either lizard, are much better able to resist water loss: their surface area is proportionately much less than their body mass, so they evaporate less. Also, our snakes are very mobile and great travellers: they can zip around from one habitat to another, and go tank up on water a long way from where they are hunting. So we have generated more hypotheses to test.... That's Science!

We are planning to submit our paper to the journal *Biotropica* very soon.

Should we have a meeting in Rye in May to make plans for our October interactions?

All the Best, and Best to All, Skip