Unusual island evolution happens faster than thought

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In evolutionary circles, giant rats and miniature elephants have long been accepted as the products of accelerated evolution in isolated environments such as islands, but McGill paleontologist Virginie Millien has been the first to establish just how quickly these odd-shaped animals got that way.

In fact, island mammals evolve about three times faster than their mainland counterparts, says Dr. Millien, who based her findings on an analysis of the documented evolutionary rates of 88 island mammal species, about half of which were rodents.

The data looked at species that evolved on islands in the Mediterranean, Indonesia, the United Kingdom, California and British Columbia, among others. Dr. Millien's research paper on the topic, "Morphological Evolution Is Accelerated among Island Mammals," will appear in the October issue of the Public Library of Science (PLoS Biology).

"We know that strange things happen on islands – elephants become dwarves, for instance – but what we didn't know for sure is how fast it happens," explained Dr. Millien, curator of paleontology and zoology at the Redpath Museum. "Everybody since Darwin has assumed that it must happen very fast, because it's so shocking to see something like a one-metre-high elephant."

Isolation, climate differences, the absence of natural predators and, in some cases, adequate food sources all contribute to the unusual evolution

of island mammals such as the dwarf elephants whose fossilized remains have been found on the Italian island of Sicily, Dr. Millien noted. It is known, for instance, that mammals in cold environments grow larger than those in warmer environments, she explained, citing the difference in size between black or brown bears, which live in warmer climates, and the larger polar bears that populate the North.

Dr. Millien next hopes to study similar evolutionary differences between mammals in Quebec's southern and northern regions, and to further explore the role of climate change in evolution.

Source: McGill University