

Genetic analysis shows tortoise species thought to be extinct for 150 years still lives

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G. Becky tortoises are native to Isabela Island in the Galapagos chain and have more domed shape shell. Credit: Courtesy Yale University

Dozens of giant tortoises of a species believed extinct for 150 years may still be living at a remote location in the Galapagos Islands, a genetic analysis conducted by Yale University researchers reveals.

The analysis, published Jan. 9 in the journal [Current Biology](#), suggests that direct descendants of at least 38 purebred individuals of *Chelonoidis elephantopus* live on the volcanic slopes of the northern shore of Isabela Island — 200 miles from their ancestral home of Floreana Island, where they disappeared after being hunted by whalers.

"This is not just an academic exercise," said Gisella Caccone, senior

research scientist in the Department of Ecology and Evolutionary Biology and senior author of the paper. "If we can find these individuals, we can restore them to their island of origin. This is important as these animals are keystone species playing a crucial role in maintaining the ecological integrity of the island communities."

On his historic voyage to the Galapagos in 1835, Charles Darwin observed that the shells of tortoises living on different islands of the chain had different shapes – one of the observations that inspired his theory of natural selection. For instance, the shells of *C. elephantopus* on Floreana were saddle-shaped while tortoises on other islands had domed-shaped shells.



This tortoise is a hybrid of *G. Becky* and *C. elephantopus*, a species native to Floreana Island some 200 miles away and thought to be extinct. Genetic analysis of tortoise population on Isabela Island suggests purebred individuals of *C. elephantopus* must still be alive on Isabela. Credit: Courtesy of Yale University

On Floreana, however, the tortoises disappeared because of hunting by whalers and workers at a heating oil factory that had been established on the island.

A team of Yale researchers visiting Volcano Wolf on the northern tip of Isabela Island in 2008 took blood samples from more than 1600 tortoises and compared them to a genetic database of living and extinct tortoise species. An analysis detected the genetic signatures of *C. elephantopus* in 84 Volcano Wolf tortoises, meaning one of their parents was a purebred member of the missing species. In 30 cases breeding had taken place within the last 15 years. Since the lifespan of tortoises can exceed 100 years, there is a high probability that many purebreds are still alive, note the researchers.

"To our knowledge, this is the first report of the rediscovery of a species by way of tracking the genetic footprints left in the genomes of its hybrid offspring," said former Yale postdoctoral researcher Ryan Garrick, now assistant professor at the University of Mississippi and first author of the paper.

Intensive breeding of hybrids might allow scientists to resuscitate the *C. elephantopus* [species](#) even if sufficient numbers of purebred tortoises can not be found, Garrick said.

The team doubts that the tortoises reached Volcano Wolf on their own and theorized the [tortoises](#) were transported as food from Floreana, but were either thrown overboard by whalers or left on shore of Isabela.

More information: Garrick et al.: "Genetic rediscovery of an 'extinct' Galápagos giant tortoise species." *Current Biology*, January 10, 2012, print issue

Provided by Yale University

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