

## EDITORIAL

# Rodrigues Island: Hope thrives at the François Leguat Giant Tortoise and Cave Reserve

From this hilltop porch at sunrise, above the limestone landscape of Plaine Corail on the southwestern corner of Rodrigues Island in the middle of the Indian Ocean, I am looking out over a patchwork of small subsistence farms, awakening livestock, a sleepy airport, and a vast reef-bounded lagoon, bigger than the island itself – and something else. Something that warms the cockles of my heart. Something I have been writing and dreaming about for decades, a kind of project that gives me hope for conservation in an otherwise dark hour. Nestled in the midst of all these human landscapes is a truly prehistoric scene, the François Leguat Giant Tortoise and Cave Reserve. On this remarkable 19 hectares, Reserve Manager Aurele Anquetil André and his dedicated staff of young Rodriguans have planted over 130,000 native trees and shrubs, some virtually extinct in the wild and many quite rare otherwise, in just five years. Nearly all have survived, and with only limited maintenance despite the huge challenges posed by invasive weeds on all remote Indo-Pacific islands.

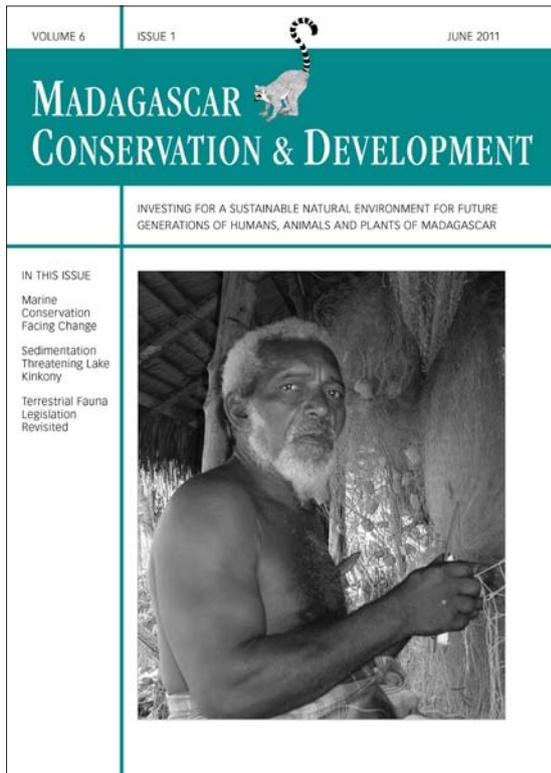
Giant tortoises, over 1,000 of them, lumber about doing the work. Fenced in and well-fed on the invasive plants that compete with the natives, introduced Aldabra Tortoises (*Aldabrachelys gigantea*) weighing up to 200 kg crop the invasive plants, and smaller Radiated Tortoises of Madagascar (*Geochelone radiata*) pull up the weed seedlings. Remarkably – and I had to see this for myself – they don't touch the native plants, which co-evolved with the extinct tortoise fauna (*Cylindraspis* spp.) that disappeared in the late eighteenth century after French colonists shipped over 280,000 of them to Reunion and other places for butchery.

These plants have defenses against tortoises and browsing birds. Notable in the latter category was the extinct Solitaire (*Pezophaps solitaria*) a giant pigeon endemic to Rodrigues that was even larger than the Dodo, the famous extinct denizen of Mauritius, Rodrigues' big neighbor 650 km to the west. Through heterophylly, the adaptation of having tough, finely dissected and presumably less edible leaves near the ground where animals can reach, as well as in some cases certain plant chemicals that the tortoises apparently don't like, and long flexible stems that tortoises seem not to trample down or chew, these plants are thriving in the midst of a high density of these hungry lumbering reptiles. A tall secure fence keeps them inside the Reserve, and keeps out the free-ranging goats, sheep, and cattle which have converted so much of the rest of this island to *Lantana* and other unpalatable invasives. Those ungulates, with their advanced teeth, love to eat the native plants, and have nearly driven them to extinction.

I have been an advocate for this approach – reintroducing the “megafauna” back to lands where they are extinct, or their



Prehuman Rodrigues. © Julian Pender Hume/François Leguat Ltd



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closest living relatives or even an ecological surrogate – for several decades. The scientific underpinnings for restoring ecological functions this way are quite sound, and there are plenty of examples of this “rewilding” already working around the world, from Siberia’s “Pleistocene Park” with reintroduced musk oxen, wild horses, and so forth, to American media mogul Ted Turner’s vast ranches in the western US with herds of many thousands of bison, elk, and yes – even a giant tortoise (Bolson’s) reintroduced to its former range from Mexico. You can read about these and others in my recent book<sup>1</sup>. Some years ago I even proposed something like this for Madagascar – starting with tortoises but under the right circumstances perhaps including living ratite birds, hippos, and crocodiles, in some fenced reserve lands. I doubt that most readers took me seriously then (perhaps even now).

Here at the Leguat Reserve, though, rewilding is not a hypothetical proposal, it is a way of life, a major tourist attraction, and a very interesting scientific experiment. Rewilding is working here, and working wonderfully. Tortoises pull the weeds, apply the fertilizer, and germinate the seeds. Regarding the latter, recently published experiments<sup>2</sup> show that passing through the slow digestive system of a giant tortoise is just what some of these hard-to-germinate seeds of rare native plants have been waiting for. The authors show conclusively that the highly endangered, large-seeded native ebony tree (*Diospyros egrettarum*) is germinating and thriving on the remarkable 25-hectare Ile aux Aigrettes Reserve, a small island off Mahebourg, Mauritius, thanks to the Aldabra tortoises reintroduced there by the Mauritian Wildlife Foundation.

At the Leguat Reserve on Rodrigues, guides lead thousands of visitors per year through huge spectacular limestone caves that have yielded the fossils of giant tortoises, Solitaires, and the other extinct biota of Rodrigues. Their tour, and the excellent museum on the Reserve, make that wonderful connection between the fossils of a remarkable extinct fauna, and the rare plants and surviving fauna of large handsome fruit bats, rare land snails, nesting White-tailed Tropicbirds, and the surviving cousins of the native giant tortoises now roaming the canyons and plateaus of the Reserve.

What am I doing here? To begin with, my wife Lida Pigott Burney and I have in recent years started our own similar rewilding project on the island of Kauaʻi, in the Hawaiian Islands. We likewise have a cave system, full of fossils of the extinct animals, as a centerpiece for restorations on worn-out farmland that feature thousands of native plants, some quite rare. Our big fossil herbivores, giant flightless ducks and geese, are all extinct, and alas, tortoises never reached Hawaii. So we laboriously pull the weeds, tons of them, with the help of the school children of Kauaʻi and hundreds of volunteers. The current question I and my colleagues are asking is, could giant tortoises give us a hand, serving as ecological surrogates for the lost birds?

In any case, the National Geographic Society funded our team, including paleontologists Julian Hume and Lorna Steel from UK, paleo-entomologist Nick Porch and speleologist Greg Middleton from Australia, and Lida and myself as the paleo-ecologists, to work on the excellent fossil deposits on Rodrigues

and compare them to our results from elsewhere. That work is going well, we’re finding plenty. But thanks to these lumbering living reptiles, I’m thinking all over again about the potential to use tortoises, and perhaps substitutes for other extinct megafauna, to try some rewilding at an appropriate place – such as a securely fenced, private reserve in western Madagascar – and such a place exists. Owen Griffiths, the biologist/entrepreneur who created the La Vanille Crocodile Park and Tortoise Reserve on Mauritius (inspiration for Ile aux Aigrettes) and the Leguat Reserve on Rodrigues, is hard at work in Madagascar on his private reserve lands, where he hopes to start rewilding with Aldabra tortoises and other appropriate creatures.

Before you dismiss this idea as crazy, you might consider that it was Charles Darwin himself who set all this in motion. He visited Mauritius on the return voyage of the H.M.S. Beagle in 1836, where he heard about the extinct giant tortoises of that island. Many years later, he suggested that the best way to see that the thousands of giant tortoises then living on uninhabited Aldabra Island (their last stand in the Indian Ocean region) didn’t go the way of the extinct giant tortoises of Madagascar, the Mascarenes, and the Seychelles, was to move some to these other islands and establish populations, and that was done on Mauritius. People took him seriously, and the tortoises’ future looks bright. Many of Darwin’s ideas were controversial then, and some still are in some quarters. Rewilding proposals like this are still being argued, but they have the potential to “jump start” evolution when it seems to have gone hopelessly off the track. After visiting the Leguat Reserve, I’m more hopeful than ever that evolution might have a second chance.

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1 Burney, D. A. 2010. Back to the Future in the Caves of Kauaʻi: A Scientist’s Adventures in the Dark. Yale University Press.

2 Griffiths, C. J., Hansen, D.M., Jones, C.G., Zuël, N. and Harris, S. 2011. Resurrecting extinct interactions with extant substitutes. Current Biology 21: 762–765 (doi:10.1016/j.cub.2011.03.042).