

An overview of current efforts to conserve the critically endangered mountain chicken (*Leptodactylus fallax*) on Dominica.

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Dominica was once the stronghold of one of the giants amongst frogs: the mountain chicken (*Leptodactylus fallax*). *L. fallax* is the largest amphibian in the Caribbean region (Fig. 1), and is currently listed as Critically Endangered by the IUCN (Fa et al., 2013). Currently, *L. fallax* is restricted to the islands of Dominica and Montserrat in the Eastern Caribbean; it was formerly far more widespread, occurring on seven Eastern Caribbean islands (Schwartz & Henderson, 1981). Island extinctions came about through a combination of habitat loss (forest and freshwater), introduced predators (especially rats and mongoose) and over-exploitation for food.



Figure 1. The mountain chicken (*Leptodactylus fallax*)

In December 2002, the presence of dead and sick *L. fallax* came to the attention of the authorities in Dominica. Over the following twelve to eighteen months, the Dominican *L. fallax* population crashed to the extent that no animals could be detected during routine surveys. The culprit was chytridiomycosis, a disease caused by the fungus *Batrachochytrium dendrobatidis* which has

been identified as one of the principal drivers of recent amphibian declines and species extinctions. (Skerratt et al., 2007). This left Montserrat as the species' last stronghold, but chytridiomycosis reached that island in 2009 and all but wiped out the *L. fallax* population there (www.mountainchicken.org). Today, the remaining wild population across both islands has been estimated to be no more than a few hundred individuals (Hudson & Cunningham, unpublished observations), making *L. fallax* one of the most threatened frogs in the Caribbean region and, indeed, one of the most Critically Endangered species in the world.

Historically, hunting has been a threat to *L. fallax* as the frogs were a popular food item in both Dominica and Montserrat. In Dominica, *L. fallax* had the dubious status of being the island's national dish (Martin et al., 2007) with annual legal harvests on Dominica estimated at between 8,000-36,000 individuals per annum (Malhotra et al., 2007). Following the outbreaks of chytridiomycosis, all hunting of *L. fallax* was banned on both islands. *L. fallax* is of cultural importance to the people of Dominica, where the frog goes by the local name of "crapaud". Apart from being the national dish, the frog is emblematic and used as a logo by the island's indigenous bank, a college and a guesthouse. It can even be found on the nation's coat of arms. *L. fallax* also features in island folklore and proverbs, Sé lanng kwapo ki twayi kwapo (it's Crapaud's tongue that betrayed his own self) and Kwapo pa ka vanté soup-yo (Crapaud don't fan their own soup) to name just a few.

It is rare that an amphibian features so prominently in the culture and identity of a country and this, coupled with the incentive to protect it as an important food source, has been extremely advantageous to the conservation of the species.

For now, the immediate future of the species is uncertain with the most realistic hope being through captive breeding and release. In the face of the chytrid epidemic, *L. fallax*

from Montserrat were air-lifted to bio-secure facilities in several European zoos, where they are now breeding. On Dominica, the Forestry, Wildlife and Parks Division with the assistance of the Veterinary Services and the Zoological Society of London (ZSL) and with funding from ZSL and the UK government's Darwin Initiative, set up an in-country captive breeding programme.

The reproductive biology of *L. fallax* was described from captive specimens at Durrell Wildlife Conservation Trust (Gibson & Buley, 2004). Eggs are laid into a terrestrial foam nest and, when they hatch, the tadpoles are guarded by the adult frogs. The tadpoles are fed infertile eggs by the female throughout their larval development. Thus, captive breeding the frogs is not quite as straightforward as it might be for many other species. Also, being large and territorial and with voracious appetites, *L. fallax* are not the easiest - or cheapest - of frogs to maintain in captivity. A captive breeding facility was constructed in 2007 at the Botanical Gardens in Roseau, the capital of Dominica.

The most important husbandry aspect to address initially was that of securing an adequate food supply. In captivity, these gargantuan frogs can consume an astonishing 100 adult field crickets a week. Invertebrate colonies were set up using native species; non-native invertebrates could not be used as there was a real risk that they could establish on the island and become a new pest species. Over the course of several years of trial and error, several species became established enough to be produced on a large scale. This element of the project took huge investments of both time and money (and we are grateful to the British Herpetological Society for helping to fund this aspect of the work), but is vital to the longer term success of the project.

Four years after the Dominican facility was constructed, and with live food cultures running successfully, preparations were in place for an in-country captive population to be established. All that was needed were some frogs. Sadly, only the occasional individual had been reported or heard since the initial population crash. Over several months in 2011, eleven frogs were found in the wild and these were brought into the breeding facility in Roseau. The frogs have acclimatised well to life in captivity and it is hoped that, over the coming years, these frogs will reproduce and their progeny will eventually be released back into the wild.

Local capacity building was, and still is, a vital component of the project. Dominican forestry staff were trained in amphibian monitoring and disease surveillance techniques and perform regular surveys across the historical range of *L. fallax*. In 2005, a molecular laboratory was built and equipped and a local molecular biologist was appointed and trained to analyse samples for the presence or absence of *Batrachochytrium dendrobatidis*. In 2006, Dominican forestry staff received intensive training on the captive husbandry of *L. fallax* at London Zoo and at the Durrell Wildlife Conservation Trust. Since 2007, Department of Agriculture and Forestry staff have been trained in live food cultivation and amphibian husbandry in-country.

It is vital that populations of *L. fallax* continue to be monitored in the wild. This work is on-going but desperately requires more funding and currently relies on volunteers.

The continued survival of the remaining frogs in the wild is far from assured, but there are some encouraging signs. In late 2011, several juvenile *L. fallax* were found in Dominica, the first evidence in recent years that the frogs are breeding in the wild and a fantastic boost for the project. We are also working on public outreach and engagement in order to build and maintain a large constituency for *L. fallax* conservation. This has included disseminating information to the Dominican public using information boards, posters, leaflets, radio and television, and giving talks to schoolchildren. We also run a campaign entitled "Have you seen me? Have you heard me?", where people are encouraged to report *L. fallax* sightings and vocalisations. This campaign included a series of public engagement events, such as a community group promoting the project in the 2012 carnival (Fig. 2), a 2014 carnival queen contestant using her talent and costume round to promote the crapaud story, an annual mountain chicken



Figure 2. The mountain chicken captive breeding facility in Roseau.

hike on the island and an annual Mountain Chicken Day.

A crucial component of the outreach campaign is the involvement of local contributors. This helps to foster a sense of local pride and ownership for saving the species and can often be a more effective form of outreach as local people are usually more in tune with local issues, opinions and values. Recently a talented local poet, Delroy N. Williams, published a poem in support of the project called the "Crapaud Story" <http://www.mountainchicken.org/blog/the-crapaud-story-a-poem-about-the-mountain-chicken-by-delroy-n-williams> and collaboration with local artists has taken place to help use local talent and business to develop interest in the project. Finally, the use of social media, such as Facebook, has proved to be a great way to provide up-to-date information and to engage with the younger generation. You can check out our Facebook page at: <https://www.facebook.com/pages/Dominican-Mountain-Chicken-Project>

As the crisis has deepened over the last few years for the *L. fallax*, UK NGOs such as the Zoological Society of London and Durrell Wildlife Conservation Trust have worked together and, with the support and involvement of the Dominican and Montserratian governments, merged their different projects on Dominica and Montserrat respectively, into a collaborative effort to develop a more cohesive *L. fallax* conservation project and the development of a long-term combined action plan. Greater governmental involvement in the project on both islands led to a species conservation action planning meeting in Montserrat in 2013 and a commitment to regular meetings to more-effectively monitor and coordinate mountain chicken conservation across the two islands. Another key aspect to the success of this project has been its foundations in scientific research which have underpinned decisions on surveys and interventions required to ensure the long term survival of this species. To continue to fulfil this requirement for research, a PhD student, funded by the Balcombe Trust, is conducting research on the emergence, epidemiology and impact of chytridiomycosis in *L. fallax* on both Dominica and Montserrat. On Dominica, this work is assessing the current size and disease status of the remnant *L. fallax* population and those of sympatric amphibian species on the island. There is still much work to do and continued support, especially financial, is required to ensure the future survival of *L. fallax*.

You can find out more and keep track of the latest project developments by visiting <http://mountainchicken.org>.

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