The Iguanarios of the Dominican Republic
Stesha A. Pasachnik, San Diego Zoo Institute for Conservation Research
Rosanna Carreras De Leon, Mississippi State University and Grupo Jaragua

The Dominican Republic (DR) has an extensive and complicated history of “iguanarios” (iguana breeding facilities). The first one was established in 1997 at the tourist attraction known as Manati Park in the southeast portion of the DR. Given the success of this initial facility in bringing in tourists, they have now spread across most of the country (Figure 1). The original purpose for these establishments was to help conserve the endemic rock iguana, Cyclura cornuta, by creating breeding groups that would be able to supplement the diminishing wild populations, and aid in research and education efforts. As this species remains in its natural habitat within the iguanarios, breeding is extensive with very little human influence. The original stock for the Manati Park iguanario and many others was the National Zoo in Santo Domingo (ZooDom). Unfortunately the real origin, or capture site in the wild, is unknown for most individuals and once they are in ZooDom they may reproduce randomly, thus diluting any genetic signature of their capture site. In most cases iguanas end up at ZooDom because they have been confiscated from local traders, no locality data is ever recorded for these individuals, and they are not given a unique mark so that they can be tracked. Thus, there are no records associated with them when they are sent out to various iguanarios, where they again breed randomly, which again dilutes a locality signature. Further they are also traded between iguanarios at times, and hatchlings are not managed and often escape. In short, the observable situation at present is very chaotic; being nearly impossible to know what path these individuals took to get to where they are now. Though the creation of these establishments may have been initially well meaning, the result is far from that. At this point many of the iguanarios are overflowing and there is little to no plan as to what should be done with these individual animals.

Figure 1. Captive Cyclura cornuta locations throughout the Dominican Republic as of 2013. Arrows indicate trafficking or movement patterns of captive individuals to the best of our knowledge. Circles indicate zoos, squares are large-scale facilities, and triangles are small-scale facilities.
There are two main areas of concern in this situation. The first focuses on the health of these iguanas. It is often the case that iguanas within a captive situation encounter diseases. Moving them from one captive location to another only increases this possibility, and increases the spread of disease. In addition, the now common overcrowding causes individuals to fight and injure one another often. The diets provided in many places are also very poor and the basic enclosures need restoring. In short, husbandry efforts need to be vastly improved.

The second main concern is more complicated, revolving around the concept of outbreeding depression. Outbreeding depression is defined as a reduction in reproductive fitness due to the crossing of individuals from different populations. Outbreeding depression is most common when there has been a significant amount of time since contact between populations such that local adaptations have arisen. This often occurs when there are substantial barriers to migration, such as mountain ranges and bodies of water. Within the Dominican Republic there are several such barriers that have proven to affect dispersal. Thus moving and mixing individuals of any species across these barriers could have substantial negative effects on the health of the species.

Many studies have demonstrated the affect of dispersal barriers in the DR. Gifford et al. (2004) conducted an extensive evaluation of *Ameiva chrysolaema*, which demonstrated the isolating effects that the Cordillera Central and Sierra de Bahoruco can have. In their study, a 14% genetic differentiation was found, demonstrating that the northwest population has been separated from the rest for approximately 10 million years. Another example can be seen within the Hispaniolan Boa, *Chilabothrus striatus*, where a deep divergence is seen across the Enriquillo and Azua Basins (Reynolds and Pasachnik, in prep). *Cyclura ricordii* follows a similar pattern where a 23% differentiation is observed across the Bahoruco mountain range (Carreras De Leon et al., in prep). The Hutia (*Plagiodontia aedium*) also demonstrates differentiation of around 3% between populations (Brace et al. 2012), and Townsend et al. (2007) demonstrated a clear structure between the north and south populations of *Calyptophilus* species, presenting 21.9-25.7% differentiation between these populations. The central theme throughout all of the studies is that the unique geographic history of Hispaniola being formed from two paleo-islands has had a significant effect on many species, and can be predicted to have a similar affect on any species that are found throughout a substantial part of the island. In an effort to better understand the population structure of *C. cornuta* across the DR we have collected samples from numerous populations (Figure 2). These data will elucidate the levels of differentiation between populations such that we can develop a strategy for proper conservation of this species.

![Figure 2. Geographic barriers present in the Dominican Republic. Lighter circles represent mountain ranges, darker circles are basins. The dotted line represents the juncture of the paleo-islands. *Cyclura cornuta* sampling locations from the spring of 2012 and 2013 are depicted with circles indicating natural populations and triangles indicate captive samples taken from zoos and iguanarios.](image-url)
The goal of any conservation strategy needs to be to minimize the risk of extinction. In allowing and even planning for outbreeding or the crossing of individuals from distant populations (i.e. advocating translocations), that conservation goal is jeopardized. Given what we know about the distribution of *Cyclura cornuta* and the potential dispersal barriers, the cautious action is to allow these populations to remain in isolation and protect them as such, in order to conserve the species as a whole. Captive breeding and translocations programs should only be used as a last resort scenario and we are simply not at that point yet with *C. cornuta*. Though this species is threatened, there are still decent populations in certain areas and moving individuals from one location to another without a proper understanding of the genetic structure of the species could do more harm than good. Management actions to prevent trade and poaching of iguanas should be the target at this time, along with the conservation and protection of the natural habitat.

In an effort to aid iguanarios, ZooDom, and the Ministry of the Environment with this very complicated and serious problem, the International Iguana Foundation and San Diego Zoo Institute for Conservation Research held a workshop in June 2014, and will hold a second one in June 2015, in which we will bring all stakeholders and researchers together to develop a proper plan of action moving forward.

To learn more about this situation, please see the full-length article available online from the International Reptile Conservation Foundation in March 2014.

Left: Sign pointing to the iguanario located in Los Tocones, Samana. Right: Overcrowded adult Rhinoceros Iguana (*Cyclura cornuta*) pen at Manati Park. Photos by Victor Hugo Reynoso.

**Literature Cited**


