



Feature Article

Kidnapping the Don Juans of Guantánamo

Temporary removal of dominant males and careful manipulation of a population's social structure could help conservation behaviorists reduce the effects of inbreeding. The technique may be most effective for small genetically-compromised endangered species that show strong polygyny, with a few dominant males monopolizing territories and females. After the "Don Juans" are removed from their home ranges, new males take over their roles and females have access to a more diverse set of mates.

By Allison C. Alberts*

West Indian rock iguanas (genus *Cyclura*) are among the most endangered lizards in the world, with five of the eight species considered critically endangered by IUCN. Introduced mongooses, feral cats and dogs, and free-ranging hoofstock have decimated once teeming populations of iguanas by preying on young and degrading native vegetation. Rock iguanas, as herbivores, play a crucial role in Caribbean dry forest ecology: they promote foliage growth through cropping, provide nutrients to developing seedlings, and disperse seeds into new habitats.

In the mid-1990s, we spent a year documenting hormones and behavior in a group of iguanas inhabiting the U.S. Naval Base at Guantánamo Bay. Our behavioral observations revealed that 80% of adult males engaged in aggressive interactions with other males. We classified males winning more than 50% of encounters as high-ranking, and those winning less than 50% of encounters as low-ranking. The remaining 20% of males never participated in agonistic interactions (non-ranking).

High-ranking males exhibited higher testosterone levels and were significantly larger in body length, weight, head size, and scent gland diameter than low-ranking males. High-ranking males vigorously defended small but well-defined home ranges that overlapped the ranges of various females. Non-ranking males occupied peripheral home ranges with very limited access to females and tended to avoid movement to escape the notice of more aggressive individuals. Low-ranking males did not defend territories, instead they moved extensively throughout the study area while suffering constant chases by high-ranking males. Analysis of mean distances between pairs of individuals indicated that each of the resident females on the site was closer to a high-ranking male than to a low- or non-ranking male. Headbob displays, chases, and mouth gaping, behaviors usually performed in the context of territorial defense, were exhibited by high-ranking males significantly more often than by low-ranking males. There was also a trend for courtship to be performed more often by high-ranking males than by other males.

Although it is impossible to be certain in the absence of genetic studies, our results suggested that high-ranking males, through their more robust body morphology and behavioral dominance, had better access to mates than low and non-ranking males.

We conducted an experiment to determine whether temporary alteration of local social structure could increase the probability that sexually mature but genetically under-represented male iguanas could improve chances to mate. During the 1994 breeding season, we temporarily removed the five highest-ranked males from the study site. Removal of these "Don Juans" produced immediate and dramatic changes in male social structure. Within a few days, the five largest previously low-ranking males began to win more than half of their encounters and could be classified as high-ranking. All of the previously non-ranking males began to move throughout the study site and fight extensively with other males, behaving like low-ranking individuals. The newly dominant males showed increased rates of headbob display and chases associated with territorial defense, as well as testosterone levels typical of high-ranking males during the breeding season. Active courtship of females was seen in both the newly dominant males as well as the low ranking males. Once the previously dominant males were removed from the site, the five males that achieved high-ranking status in their absence defended territories that were strikingly spatially similar to those vacated by the removed individuals.

At the close of the breeding season, we returned the Don Juans to the study site. Our behavioral observations and home range mapping for five weeks following the release of the dominant males indicated no long-term disruption of behavior or social relationships.

These findings suggest that temporary alteration of local social structure may represent a potential management tool for small or otherwise genetically-compromised populations by enhancing the chances that a greater percentage of males will have opportunity to mate. This strategy, however, may not be equally appropriate for all species of rock iguanas, and to be fully effective will need to be combined with other measures, such as predator control, that directly counter the factors responsible for population decline. Temporary removal of dominant males is likely to be most effective for species that show strong dominance polygyny, in populations for which inbreeding has become a serious threat to genetic integrity. Because of the possibility that high variance in male reproductive success is naturally maintained through genetic or age-dependent balanced polymorphism, it is important that this strategy only be considered as an emergency interim measure until the effective population size is large enough to insure genetic viability.

* Head of Applied Conservation Division, Zoological Society of San Diego aalberts@sandiegozoo.org

(see Alberts et al. 2003 in **Interesting Articles** page 4).