A REINTRODUCTION PROGRAM FOR THE IGUANAS OF GUANTANAMO

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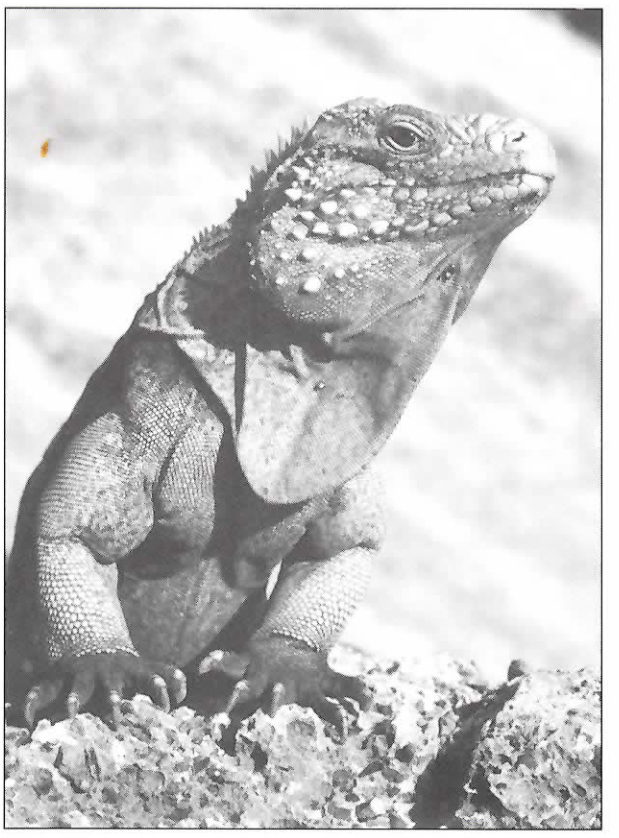
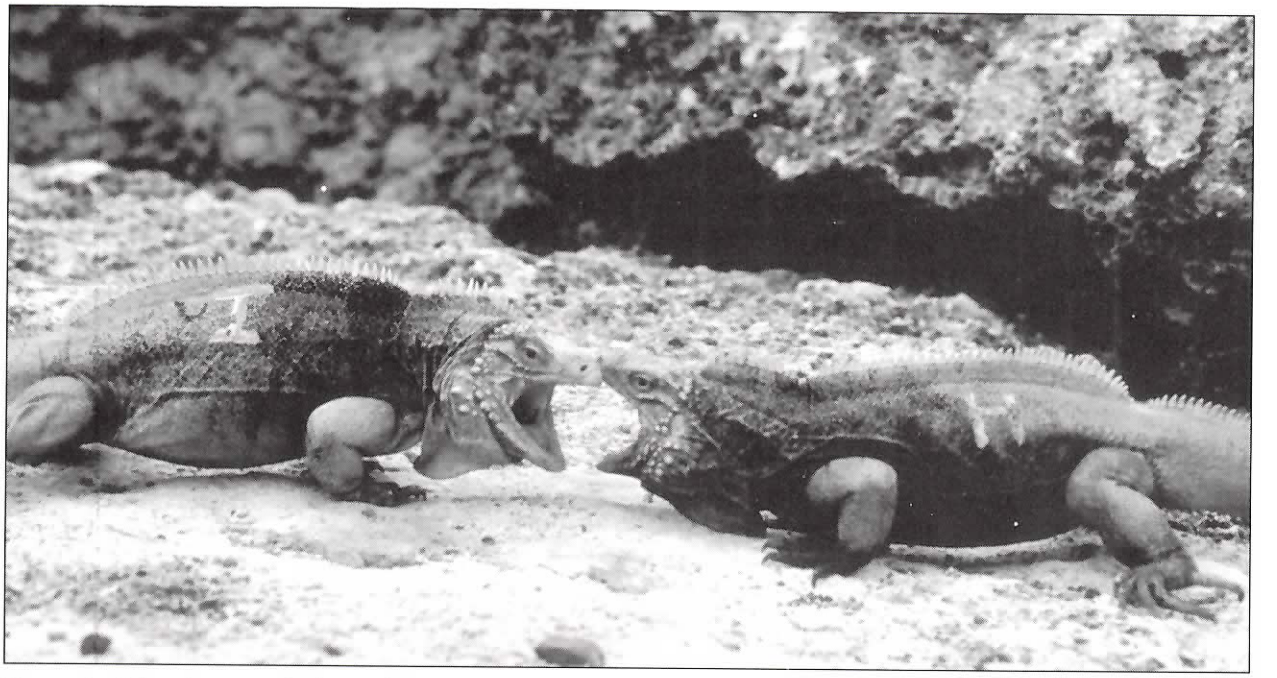
Of the approximately 3,000 species of lizards in existence, no more than 60 attain an adult body mass greater than a kilogram. Despite this, large lizards represent the majority of lizard species considered threatened or endangered. Of all large lizards, the West Indian rock iguanas, genus *Cyclura,* are the most vulnerable, primarily because much of their fragile island habitat has been eliminated by human development or severely degraded by exotic species (Case and Bolger, 1991). Mongooses, dogs, and feral cats prey heavily on juvenile iguanas, and in many areas introduced goats have denuded the native vegetation on which iguanas feed (Iverson, 1978; Carey, 1975). The Jamaican iguana, *Cyclura collei,* considered to be the rarest lizard in the world, probably numbers no more than 50 adults, and several other subspecies of rock iguanas have declined to below 500 individuals (Blair, 1991; Alberts, 1993). Because *Cyclura* are potentially important seed dispersers for native plants (Iverson, 1985), their loss has serious consequences for the ecosystems in which they live.



Male Cuban iguana. *Photograph: A.C. Alberts*

Although rock iguanas continue to decline over much of their range, we believe this trend can be slowed through a concentrated and coordinated research effort directed toward developing practical strategies for population recovery. For the past two years, Dr. John Phillips and I, assisted by field technicians Jeffrey Lemm and Andrew Perry, have been working with a single representative species of rock iguana, *Cyclura nubila,* on the U.S. Naval Base at Guantanamo Bay, Cuba. Our research will ultimately culminate in an experimental repatriation that will test whether hatchling Cuban rock iguanas retained in captivity for a headstarting period prior to release fare better in the wild than those released immediately after hatching. However, before undertaking this endeavor, we felt it was important to gather some relevant baseline data on the ecological relationships, foraging preferences, and social structure of these iguanas in their native habitat.

In the spring of 1993, we began field studies on a group of adult iguanas inhabiting rocky crevices along the windswept coastline at Guantanamo. Due to the relative lack of human disturbance, the density of iguanas at this site was quite high, substantially exceeding published results for



Two male Cuban iguanas, *Cyclura nubila*, in combat. *Photograph: A.C. Alberts*

populations elsewhere in Cuba (Perera, 1985). The daily activity pattern of rock iguanas during the breeding season consisted of a burst of vigorous social activity after morning emergence and sunning, followed by a relatively peaceable migration to nearby areas of vegetation for midday feeding, and ending with a second flurry of social interaction in late afternoon prior to entering night refuges. Dominant males defended small territories oriented around favored rock crevices that overlapped the ranges of several females. Subordinate males did not defend territories, instead roving extensively throughout the study site while suffering constant chases by higher ranking males.

We observed that approximately 80% of adult males engaged in aggressive interactions with other males. Usually these were in the form of a chase, but occasionally strenuous and prolonged stereotypical facial pushing and biting matches ensued between two dominant males in defense of a particularly desirable piece of rock. Our results suggest that dominant males, through their more robust body morphology and superior fighting ability, have better access to potential mates than subordinate males. If dominant males, which represent only about a third of the male population, contribute disproportionately to the gene pool, then the observed variability in male social behavior could have important implications for genetic structuring of local populations.

Prior to oviposition, we transported several adult females to a large outdoor holding pen containing artificial nest sites. Eggs were collected as they were laid and incubated under controlled temperature and moisture conditions. At 1 month of age, hatchlings were transported to our lizard research facility at the San Diego Zoo for a 12-month headstarting period. Since then, they have been maintained indoors as a group in a large enclosure where they have access to natural sunlight through UV-transmitting plastic roofing. The enclosure is equipped with ceramic heating elements to provide localized basking sites, as well as rocks and wood structures to simulate natural terrain.

Studies on reptiles indicate that larger individuals may survive the neonatal period better than smaller ones because they are more successful at avoiding predation and competing for food. This has led to proposals for headstarting, in which animals are raised in captivity until they reach a larger and presumably less vulnerable body size, as a conservation strategy for increasing survivorship of reintroduced or translocated individuals. Headstarting programs have not been without crit-

icism, however. In sea turtles, headstarting appears not to address the fundamental causes of population decline and may actually be harmful to the ecosystem by temporarily removing neonatal turtles, an important link in the marine food chain (Frazer, 1992). Although headstarting programs based on results of computer models have recently been recommended to address the problem of low juvenile recruitment, there has never been a rigorous experimental investigation of the potential advantages and disadvantages of this approach (Dodd and Seigel, 1991).

In a headstarting experiment, we plan to release two groups of hatchlings at our study site on Guantanamo, one that has been raised in captivity for a year and one that has recently hatched. Prior to release, all iguanas will undergo a strict health screening exam to insure against the possibility of introducing disease into the wild population. Each iguana will also receive a minute transponder tag implanted subcutaneously in the left leg for permanent identification. Subsequent surveys of the release site conducted at six month intervals over the next few years should help us evaluate any benefits headstarting may confer.

Unfortunately, the recent refugee crisis, in which Guantanamo experienced an influx of some 45,000 Haitian and Cuban migrants, has postponed initiation of our project until next year. Although significant habitat alteration has resulted from the unforeseen political crisis, officials from both the U.S. Fish and Wildlife Service and the Department of Defense Legacy Resource Management Program have been working closely with base officials and qualified biologists to insure that all biological systems negatively impacted by the refugee camps will be fully rehabilitated. Because a fair percentage of the iguana population on the base has been destroyed, our reintroduction program will take on some additional importance in helping to restore the local ecology of Guantanamo. Once underway, our studies should help us evaluate the utility of headstarting as a viable conservation strategy for increasing depleted populations of this and other species of rock iguanas. Look for updates in future issues of the *Iguana Times!*

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