

THE GIANT TORTOISE CONSERVATION PROGRAM

by

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Over the last two centuries an estimated 100-200,000 Galapagos giant tortoises (*Geochelone elephantopus*) were slaughtered by whalers, fur sealers and colonists for their meat or oil (MacFarland et. al. 1974a). Along with man's arrival on the islands came the introduction of black rats and domestic animals which quickly established feral populations. The presence of mammalian predators and competitors on this fragile ecosystem was devastating for many of the tortoise populations. Black rats on Pinzon Island eat all the hatchlings so that virtually no natural recruitment of young tortoises into this population occurs (MacFarland and Reeder 1974). On other islands, pigs and dogs prey on tortoise eggs and young, while goats, cattle and burros compete with the tortoises for the limited food resources and trample their nests.

Today less than 15,000 tortoises have survived. Three races of the original 14 have gone extinct and one race (*G.e. abingdoni*) has only one known survivor in existence, "Lonesome George". Of the remaining 10 races probably those from the three volcanoes on northern Isabela (Alcedo, Darwin and Wolf) have relatively stable populations under natural conditions. The others are still very much threatened by the presence of feral mammals or have a drastically reduced population.

The conservation program for the giant tortoises began in 1965 when tortoise eggs from Pinzón were brought to the Charles Darwin Research Station (CDRS) for incubation. Since 1968 the program has been a co-operative effort between CDRS and the National Park Service (GNPS). To protect those tortoise populations which have an adequate number of reproductive adults but with few or no surviving young due to predators, the park wardens make regular trips to the nesting zones. Wardens mark nests and, if pigs are a threat, build lava walls around them to protect the eggs. They return to dig up the nests just before hatching and transport the eggs to the solar incubators at the CDRS.

The tortoises from Española (Hood) Island (*G.e. hoodensis*) are a special case. A thorough search of the island in the 1960's revealed that the few surviving adults were so dispersed that no reproduction had occurred for decades (MacFarland et. al. 1974). The remaining individuals (12 females and 2 males) were therefore brought to CDRS. In 1977, a third male from the San Diego Zoo captive herd was identified and presented to the CDRS (Bacon 1978). The two corrals where the Española tortoises are housed have small nesting areas where the females lay their clutches from July through November. In order to prevent destruction, the eggs are dug up within 24 hours after they are laid and placed in solar heated incubators. Since 1971 the Española females have laid a total of 1717 eggs and 384 tortoises have hatched: a hatching success of 22%.

From July to October, the average temperature inside the solar incubators varies between 25 and 26C. When incubation is complete in March the average temperature is between 32 and 34C. We suspect the low hatching success is the result of cool incubator temperatures. During the El Niño of 1982-1983 the incubators were several degrees warmer than normal and hatching success was higher. A possible complicating factor may be that the sex of giant tortoises is temperature-dependent as is the case with marine turtles (Bull 1980). Currently, we are examining the impact of constant temperatures in electric incubators on the hatching success and sex of hatchlings.

After hatching, tortoises are placed in the rearing center for their first year. This has a cement floor to facilitate the daily cleaning. However, this artificial environment is particularly cold during the "garua" season and we have experienced a high mortality of small tortoises during their first year, e.g. 49% mortality in 1984. However this compares favourably with breeding in the wild where, owing to the rigorous environment, only a small percentage of young survive to adulthood. In January 1985, an experiment was initiated to determine whether rearing hatchlings outside on a soil surface under natural light conditions would improve growth and survival. Three races were selected (Española, Santiago, Sierra Negra); half were reared outdoors and the other half inside the center. The first year's data are now being analyzed. Preliminary results suggest that those reared outside have a faster growth rate.



Solanda Rea checking weight of young tortoise.
Part of an experiment to compare growth inside the pen and outside in the open air.
Photo by Andy Wilson

The 1 and 2 year olds are kept outside in enclosures which are covered at night to prevent rat attacks. Then at about 3 years of age they are placed in a corral with a lava floor so that they become accustomed to a more natural environment. All small tortoises kept in captivity are measured and weighed every three months in order to determine growth rates. They are raised at the CDRS until the age of 4-5 years, when they are no longer vulnerable to pigs, rats, or feral dogs.

The first captive-reared tortoises were returned to Pinzón Island in December 1970. Over the last 16 years 893 young tortoises, from 8 different races, have been released into their native habitats. After their release, the GNPS wardens monitor their growth and survival at least once a year.

LITERATURE CITED

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