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Repatriation of Radiated Tortoises, *Geochelone radiata*, from Réunion Island to Madagascar

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The presence of large numbers of captive specimens of the Madagascar radiated tortoise, *Geochelone radiata* (Fig. 1), on Réunion Island has been documented by Gonzalez Gonzalez (1993). The species is a favorite pet on the island and is often used as a wedding or birthday present, as it is supposed to confer happiness and long life upon the recipient, as well as to reduce breathing difficulties. During our work at Parc Zoologique de Saint Denis, we questioned visitors as to whether they kept radiated tortoises in their homes and, if so, how many. About 1000 visitors reported a total of about 400 tortoises. Based on the number of visitors as a percentage of Réunion's population, we estimate that there may be as many as 40,000 tortoises kept on the island.

Between 1989 and 1993 Parc Zoologique de Saint Denis received 211 radiated tortoises confiscated by Réunion customs officials. The animals were illegally imported from Madagascar. According to the authorities more than 500 specimens were seized during this period of time. The tortoises apparently originated in southern Madagascar near Tuléar and were exported through Tamatave or Tananarive to Réunion.

In 1992 a plan was developed in conjunction with Madagascar's Direction des Eaux et Forêts, France's Ministère de l'Environnement, and the Worldwide Fund for Nature (WWF), to repatriate these confiscated radiated tortoises from Réunion to Madagascar. The plan was finally completed in 1994 when funding became available.

Initially it had been decided to repatriate the animals to a reserve at Cap Sainte Marie near Tuléar at the southern tip of Madagascar. However, closer study revealed that the proposed site was suboptimal, with inadequate vegetational cover, weather that is too dry and windy, and lacking water, fencing, and supervision. In addition, it is located in a region where the local population exploits the tortoises for meat and commercial trade.

Instead, the private Lemur Reserve of Bérenty in the Mandrade Valley of southeastern Madagascar was chosen for the repatriation site. This site, a 1.2 hectare lot with surrounding fencing and on-site supervision, offered good vegetational cover and water reservoirs. In addition, the local people consider the tortoise almost a sacred animal. No other tortoises were present on the Reserve itself prior to release of the repatriated animals, although native radiated tortoises were documented in the surrounding area.

A total of 169 radiated tortoises (107 females and 62 males) were repatriated onto the Bérenty Reserve site in May 1994. Plastral lengths ranged from 110 to 340 mm; curved carapace lengths, 350–900 mm; carapace depths, 70–220 mm; and estimated ages, 2–15 years. Release work was carried out by a group of Réunion students, local children, and supervisory personnel. There were no mortalities during the transport and release stages, and all animals were checked by a veterinarian both before and after repatriation. All animals received vermifuge and vitamins, and all holding containers were disinfected with bactericide, fungicide, and virucide.

As of the time of this report no mortalities have been recorded among the repatriated animals, and numerous matings have been observed. A second 1.0 hectare site is also being developed nearby to allow for wider distribution of the repatriated tortoises. There has been no evidence of poaching since release of the animals. Madagascar authorities have decided to use the repatriated animals at Bérenty as captive breeding stock for the purpose of eventually releasing second-generation animals back into natural habitats. Such release into the wild would require close veterinary monitoring and testing prior to implementation so as to avoid the transmission of captive-acquired diseases to natural populations of tortoises (see Jacobson et al., 1995, this volume).

Since 1992 the illegal importation of radiated tortoises into Réunion has nearly ceased, probably due to stricter controls by customs officials, especially in Madagascar. The repatriation operation has permitted students, local people, and officials of both Réunion and Madagascar to become more aware of and sensitive to the issues of protection and rehabilitation of endangered species.

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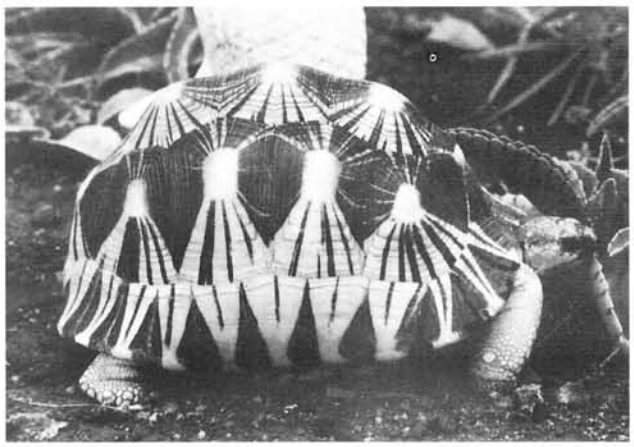

Figure 1. *Geochelone radiata* at Parc Zoologique de Saint Denis, Ile de la Réunion.

du Parc Zoologique de Saint Denis, the technicians and trainer of the Parc Zoologique de Saint Denis, the students and teachers of Lycée de Sainte Marie, the Municipalité de Saint Denis, the Direction des Services Vétérinaires, the Direction des Eaux et Forêts Malgaches, Pierre Rousselet Blanc, Maxime Allorgue, Jean De Heaulme, James Perran Ross, and Anders G.J. Rhodin.

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Observations on Feeding Habits of *Hydromedusa maximiliani* (Testudines: Chelidae) in Southeastern Brazil

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The feeding habits of South American freshwater turtles are poorly known, especially for the side-necked family Chelidae, which includes a large number of species in the Neotropical region. *Hydromedusa maximiliani* (Maximilian's snake-necked turtle; *cágado de pescoço comprido* and *cágado da serra* are Brazilian vernacular names; Fig. 1) has a geographic distribution limited to parts of southeastern Brazil, ranging from Espirito Santo to São Paulo states (Ernst and Barbour, 1989). This species lives in clear, shallow, rocky streams within montane rain forests (Fig. 2). Few natural history data are available. There are some brief reports on feeding habits by Yamashita (1990), Guix et al. (1992), and Moreira (1994). These data, based on a few specimens, describe the diet of *H. maximiliani* as "several insect orders and several unidentified insect larvae" or "Odonata larvae and tadpoles."

We studied the feeding habits of *H. maximiliani* in a 350 ha area of Parque Estadual de Carlos Botelho (24°00' – 24°15'S, 47°45' – 48°10'W) (Fig. 3A), São Paulo state, from June 1993 to June 1994. The turtles were hand-collected in a total of 8.0 km of ten small rocky streams (0.5 – 11 m wide; 0.05 – 0.60 m deep) (Fig. 3B) and marked by shell notching (Cagle, 1939). Stomach contents were sampled by flushing (Legler, 1977), fixed in 10% formaldehyde, preserved in

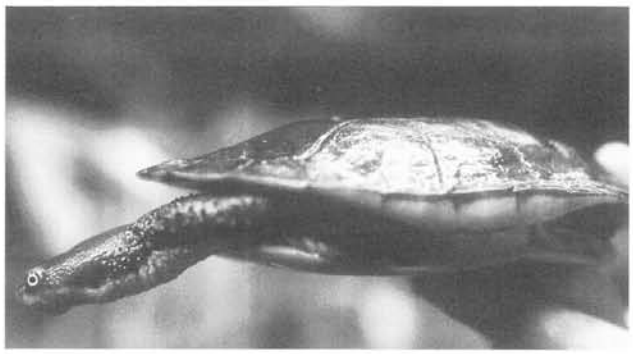

Figure 1. *Hydromedusa maximiliani* has a mean carapace length of 145 mm, and a mean weight of 365 g. The carapace has a shape similar to flat stones and the species is quite cryptic in its microhabitat. Photo by J.C. Roma.

70% ethyl alcohol, and analyzed under a stereomicroscope. Food items were sorted and identified to the lowest possible taxon. The analysis included both frequency of occurrence (percentage of individual turtles in which a given food item was found) and numeric frequency (number of individual prey of a given taxon found as a percentage of all animal food items).

The stomach contents of 113 individuals of *H. maximiliani*, including both sexes and a wide range of size classes, were examined and are listed in Table 1. This species is primarily carnivorous, consuming at least 39 prey taxa including invertebrates, vertebrates, carrion, and some plant material. The commonest prey were the small amphipod shrimp, *Hyalella pernix* (found in 35.40% of all turtles and accounting for 65.40% of all food items) and various trichopteran larvae (mainly Leptoceridae), found in 61.95% of all turtles and accounting for 13.52% of all food items. Most of the prey species were aquatic (83.30%). The presence in some individuals of typically terrestrial prey taxa, including Oligochaeta (*Fimoscolex sacii*), as well as various Araneae, Blattidae, Gryllidae, and Termitidae, also suggest opportunistic foraging. *Hydromedusa maximiliani* wanders

Figure 2. Habitat of *Hydromedusa maximiliani* in Taquaral River, Parque Estadual de Carlos Botelho. The region is characterized by hundreds of perennial and temporary shallow streams and flows with clear water and rocky bottoms (Pfeifer et al., 1986). Photo by F.L. Souza.