

## A widely traveled turtle: *Mauremys reevesii* (Testudines: Geoemydidae) in Timor-Leste

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**Abstract.** During a recent herpetological survey in Timor-Leste we discovered a specimen of the Chinese Pond Turtle (*Mauremys reevesii*) in the ornamental pond belonging to a hotel in Baucau, the country's second-largest city. The specimen was secured by the hotel's owner in 2008 in a banana grove at Becora near Dili, the capital city of Timor-Leste, and kept as a pet. Several other sightings and anecdotal evidence confirm that this species has lived in the eastern part of Timor Island for at least two decades. In this paper, we validate the existence of this species by reporting the first specimen and we provide some additional information on the timing and possible purpose of its introduction into the country.

**Keywords.** *Mauremys/Chinemys reevesii*, *Pelodiscus sinensis*, human-mitigated introduction, Timor-Leste.

### Introduction

Timor-Leste regained independence in 2002 after over two decades of Indonesian occupation, making it one of the world's youngest states. The country is currently experiencing rapid post-conflict economic and infrastructure development, and its political stability is safeguarded by a United Nations mission and by foreign investments of global reach (e.g., a Chinese-built Presidential Palace, Norwegian hydroelectric projects, Monaco support of health infrastructure). In this climate of nation-building, imports from abroad arrive almost daily at the harbor in Dili, the capital city. Thus, the potential for the introduction of exotic species clearly exists.

Among the more unexpected finds during our survey of amphibians and reptiles was the discovery of a turtle kept in a small concrete pond at the Albergario Planalto hotel on the outskirts of New Baucau, the newer section of Timor-Leste's second-largest city. Failure to identify the species using a key to Southeast Asian turtles (Auliya, 2007), we corresponded with colleagues and ascertained that the turtle was an adult Chinese Pond Turtle, *Mauremys reevesii*. We subsequently noted that the species was briefly mentioned by McCord, Joseph-Ouni and Hagen (2007), but without specimen-based verification, and we were made aware that photographs of the species in Timor-Leste existed (Rhodin, pers. comm.; van Dijk, pers. comm.). However, this species does not appear on the faunal list kept by the Department of Fisheries of Timor-Leste. We subsequently gathered additional, scattered reports and photographic records of this turtle from the Dili area, and it became apparent that several feral populations of *M. reevesii* exist in Timor-Leste, a distance of nearly 3700 km southeast of Hong Kong, the southernmost point of the known native range for the species.

### Materials and Methods

We secured an adult male *Mauremys reevesii* from a small concrete ornamental pond on the property of the Albergario Planalto, a hotel at the western edge of Baucau, Baucau District, Timor-Leste (S08°28' E126°27'), on 30 July 2009. We explained the potential scientific significance of this find to the turtle's owner,

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**Figure 1.** Adult male *Mauremys reevesii* (USNM 573649) from a concrete pond at the Albergario Planalto hotel in Baucau, Baucau District, Timor-Leste. Photo by Mark O'Shea.

Paul da Silva, who graciously donated the animal to our collection. The turtle was euthanized on 1 August 2009 by an injection with a 5% procaine solution (Altig, 1980) and following accepted animal care procedures (e.g., Animals for Research Act Canada, RRO 1990, Regulation 24). A skin tissue sample was taken and preserved in a 1.5-ml plastic screw-cap centrifuge tube containing 95% nondenatured ethanol. The specimen was then positioned and fixed in 10% formalin. The voucher specimen of *M. reevesii* was deposited in the Herpetology Collection of the National Museum of Natural History, Smithsonian Institution, Washington DC, USA (USNM) and is accessioned under USNM 573649. In this paper, we follow the taxonomy of *Mauremys* as presented by Feldman and Parham (2004) and Spinks *et al.* (2004) and as outlined by the Turtle Taxonomy Working Group (2007), Fritz and Havas (2007), and Rhodin *et al.* (2008).

## Results and Discussion

Even though we recovered our specimen of *Mauremys reevesii* (Fig. 1) from the pond at the Albergario Planalto hotel, according to Mr. da Silva its place of original capture was in a banana grove near Becora, on the outskirts of Dili. The turtle was caught at approximately 0700 hrs on 23 July 2008 by Mr. da Silva, who then brought the animal to the pond at the Albergario in Baucau. Previously, in May 2005 and June 2006, two other specimens had been found while foraging along the

road right at the Albergario by Adalberto Ricardo Borges. One of these was placed into the ornamental pond at the Albergario, whereas the other was taken to another pond in Baucau. Only the former was photographed, and both had escaped from their respective ponds by the time of our visit. We believe the story of how three turtles were moved around and escaped instructive and likely symptomatic for the treatment of these animals as pets. At this time, our research into the date and circumstances for the introduction of the species into Timor-Leste is inconclusive. However, an original introduction via the pet trade in the last several decades or an introduction by Chinese settlers during historic times for medical reasons are two likely scenarios. It has been amply documented that Timor Island, with its centuries-long part Dutch, part Portuguese colonial administration, also had a significant Chinese merchant presence (e.g., Arago, 1823; Freycinet, 1828). It is therefore possible that *M. reevesii* arrived in East Timor at a time when traditional Chinese medicine was a highly regarded method to fend off the various tropical ailments befalling early settlers and voyagers. *Mauremys reevesii* is the specified species of turtle in the Chinese Compendium of Materia Medica, the extensive guide to traditional Chinese medicine

produced in the 16<sup>th</sup> century during the reign of the Ming Dynasty (Wu et al., 1998; Chen, Chang and Lue, 2009). A second possibility is that these turtles arrived in the eastern part of the island, which during colonial times was politically dissociated from the Dutch western part, only after the Indonesian occupation began in the 1970s. *Mauremys reevesii* is occasionally part of the trade in Jakarta markets ( $n = 18$  turtles; Shepherd and Nijman, 2007), and Indonesia's capital is a trading focal point from which goods are transported throughout the Indonesian island archipelago, including into West Timor and occupied East Timor. However, we believe that the introduction most likely occurred before the Indonesian invasion since we have interviewed several elderly local residents who have memories of this turtle from swampy habitats near their homes at Caicoli, Dili District reaching back to at least 1969. A former reptile trader verified that the species was already present in the early 1990s (M. Auliya, in litt.).

*Mauremys reevesii* is a turtle well represented in the reptile trade (Shi et al., 2008; Chen, Chang and Lue, 2009), and as a consequence it has been able to expand its range widely from its native distribution (China, Japan, Korea, Taiwan; Lovich et al., 1985). It is not uncommon in pet stores even in North America, and escapees from careless owners or deliberate pet releases have led to encounters with these turtles as far afield as Massachusetts and California in the United States (Fuller and Foster, 2009) as well as on some of the U.S. Pacific Territories (e.g., Crombie and Pregill, 1999). A much more important trade aspect, and one much more devastating to wild turtle populations, is their sale in markets for use in traditional Chinese medicine (TCM) or as food (see reviews by van Dijk, Stuart and Rhodin, 2000; Chen, Chang and Lue, 2009). Turtles are widely traded, and China is the largest consumer for this scarce resource. Chinese traders have been very active in regional trading in Southeast Asia for centuries, and it should not be surprising that certain species of turtles would find their way from China to trade centers throughout the region, either in support of TCM or for the pet trade. *Mauremys reevesii* is a particularly important species in terms of its perceived medical value, most notably in the purported power of ground plastron to treat malaria, rheumatism, and epilepsy (Pharmacopoeia Commission of the People's Republic of China, 1995; Nguyen, 2009). As a consequence of habitat loss and collection pressure, *M. reevesii* populations have apparently been experiencing a significant skewing of their sex ratios and may have been dwindling since

the 1960s (Zhang, Hu and Xue, 1990). In China, the species is currently listed in CITES Appendix III and the species is categorized as Endangered in the IUCN Red List (as *Chinemys reevesii*; Buhlmann, Rhodin, and van Dijk, 2000a).

Another, similarly confounding import is the Chinese Soft-shell Turtle (*Pelodiscus sinensis*). This turtle has been listed as introduced in Timor by Pritchard (1979) and McKeown (1996), and it is known to have been imported into many Southeast Asian countries and elsewhere by Asian immigrants (Somma, 2009). Since overseas Chinese communities became established in many areas of Southeast Asia during the colonial period, it is quite plausible that key species of medicinal value were imported to establish self-sustaining populations with no regard for control. In the case of *Mauremys reevesii* and *P. sinensis*, such an historic method of introduction for medical reasons may be even more likely as the more recent option of the pet trade as the vehicle for introduction. *Pelodiscus sinensis* is currently listed as Vulnerable in the IUCN Red List (Buhlmann, Rhodin, and van Dijk, 2000b). It should be noted that the earliest record of *P. sinensis* (as *Trionyx cartilaginosus* var. *newtoni*) is found in Ferreira (1897), and therefore an establishment of *M. reevesii* in the 19<sup>th</sup> Century or earlier is certainly also possible.

There are several possible ecological impacts of turtle introductions, particularly given the potential for continual replenishment of the introduced populations via the pet or TCM trade. One such impact is competition with existing turtle species. This is improbable since the only native turtle on Timor Island appears to be *Chelodina timorensis*, a species restricted to Lake Ira Lalaro in far eastern Timor. However, *Cuora amboinensis* is known from neighboring Ambon and it may be possible that an unrecognized geoemydid species is present in the forests of Timor. In such an instance, competition between the native species and the intruder may be fierce (e.g., Arvy and Servan, 1998). A second problem with similar species is the potential for hybridization, which has been reported between Asian turtles in general and between *Mauremys reevesii* and *Cuora amboinensis* in particular (Buskirk, Parham, and Feldman, 2005). Even though that report is of an apparent anomaly resulting from captive turtles, an introduced species can be considered similarly anomalous vis-à-vis the native species in its habitat. We recommend that the populations of introduced turtles (*M. reevesii*, *P. sinensis*) be monitored in order to more specifically determine their size and distribution throughout Timor-Leste.

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