

A New Subspecies of the Snakeneck Turtle *Chelodina mccordi* from Timor-Leste (East Timor) (Testudines: Chelidae)

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ABSTRACT. – A new subspecies of *Chelodina mccordi* is described from Timor-Leste (East Timor). The nominate subspecies *Chelodina m. mccordi* is endemic to the small island of Roti to the southwest of Timor. The new subspecies has a very limited distribution in the area of Lake Iralalaro in Lautém District near the eastern tip of Timor-Leste and is endemic to that nation. In some morphological characters, the new subspecies is intermediate between *C. m. mccordi* from Roti and *Chelodina novaeguineae* from the island of New Guinea, but, in supporting its subspecific taxonomic status, the new taxon shows more similarities to the nominate form than to *C. novaeguineae*. The nominate form *C. m. mccordi* on Roti Island was nearly extirpated by commercial trade in the recent past and has been listed as critically endangered in the IUCN Red List since 2000. *Chelodina mccordi* is the only species of the genus listed in CITES Appendix II. As a subspecies of *C. mccordi*, the new taxon from Timor-Leste is automatically included in CITES Appendix II, meaning that any international export of this new taxon to a CITES signatory country requires an export permit from the government of Timor-Leste. This legal requirement will hopefully spare the new subspecies from Timor-Leste the fate of the nominate subspecies from Roti Island, to be nearly driven onto the cusp of extinction through commercial trade shortly after its description as a new taxon.

KEY WORDS. – Reptilia; Testudines; Chelidae; *Chelodina mccordi timorlestensis* ssp. nov.; taxonomy; systematics; conservation legislation; Timor-Leste; East Timor

The chelid freshwater turtle genus *Chelodina* sensu stricto (subgenus *Chelodina*) includes 7 currently recognized species, 3 of which are found in Australia (*Chelodina longicollis*, *Chelodina canni*, and *Chelodina steindachneri*); 3 on New Guinea (*Chelodina novaeguineae*, *Chelodina pritchardi*, and *Chelodina reimanni*); and 1 endemic to the small Indonesian island of Roti to the southwest of Timor (*Chelodina mccordi*). Other taxa placed in *Chelodina* sensu lato are in the subgenus *Macrochelodina* (previously *Chelodina* subgeneric group B) and *Chelodina* subgeneric group “C” (*Chelodina oblonga*, Burbidge et al., 1974).

The presence of the genus *Chelodina* in Timor-Leste was first discovered in February 2003 when one of us (CRT) examined and photographed a live specimen in Malahara hamlet, Muapiting village near Lake Iralalaro, Lautém District, Timor-Leste. On the basis of these photographs, the turtle was preliminarily identified by Arthur Georges of the University of Canberra as belonging to the species *C. mccordi* (Rhodin 1994b), previously only known from the island of Roti west of Timor. Based on this preliminary identification, the occurrence of *C. mccordi* at Lake Iralalaro was mentioned in 2 reports that dealt with the geology and biodiversity of this region (EPANZ Services 2004; Middleton et al. 2006). However,

no critical evaluation and justification for the inclusion of this population in the species concept of *C. mccordi* has yet been published.

We made 3 subsequent site visits to Timor-Leste in November 2005, May 2006, and December 2006, and documented 10 additional specimens of this taxon, as well as obtained preliminary information on its distribution and conservation prospects. We examined and compared these 10 specimens of *Chelodina* from Timor-Leste to published information and preserved specimens of *C. mccordi*, *C. novaeguineae*, *C. canni*, and *C. reimanni* (*C. novaeguineae* species complex as defined by McCord and Thomson 2002). The external morphology demonstrates that the population of *Chelodina* in Timor-Leste is a new and distinct taxon, closely related to *C. mccordi*, and we here describe it as a new subspecies of *C. mccordi*, endemic to Timor-Leste.

Taxonomy

Chelodina mccordi timorlestensis ssp. nov.

Holotype. — WAM 165888 (Figs. 1 and 2), formalin and alcohol-preserved adult male of 164.6-mm carapace length (CL) (Table 1). Originally collected in the area of



Figure 1. Dorsal view of holotype of *Chelodina mccordi timorlestensis*, adult male (WAM 165888). Photograph by GK.

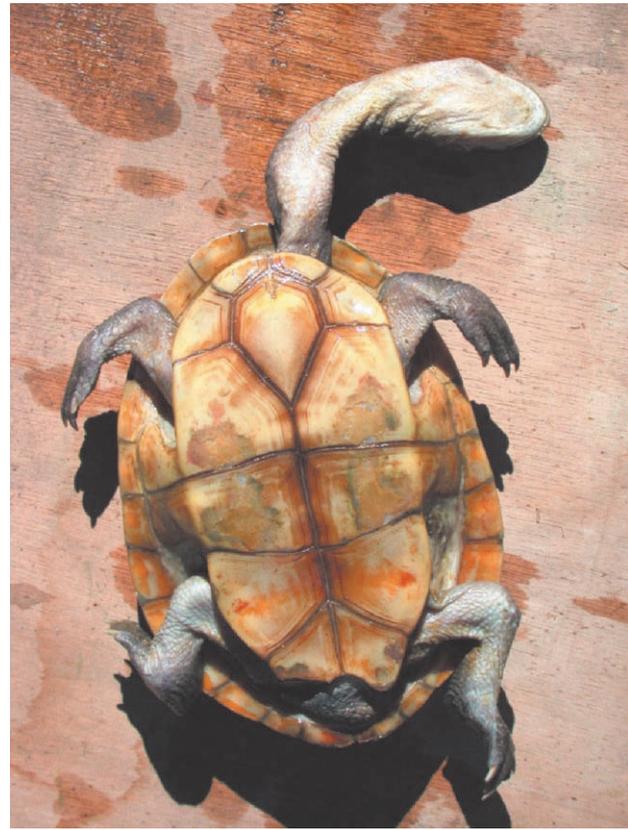


Figure 2. Ventral view of holotype of *Chelodina mccordi timorlestensis*, adult male (WAM 165888). Photograph by GK.

Lake Iralalalo and privately kept in Lospalos (= Los Palos), Timor-Leste. Specimen donated to GK by its local owner for the provision of a type specimen on 23 May 2006.

Referred Specimens. — Three live individuals found together with the type specimen in an outdoor basin of a private dwelling in Lospalos (west of Lake Iralalalo) (field ID numbers: GK 1, GK 2, GK 4) on 21 May 2006 were measured and photographed (GK) but not collected. Five additional live specimens and 1 shell were measured and photographed (BRI) in Malahara (southwest of Lake Iralalalo) (BRI 1) on 26 November 2005, in Lospalos (BRI 2, BR 4) on 27 November 2005, in Poros (northwest of

Lake Iralalalo) (BRI 3) on 28 November 2005, and in Lospalos (BRI 5, 6) in December 2006 (see Table 1).

Distribution. — Only known from Lautém District, at the eastern tip of Timor-Leste in the Lesser Sunda Islands (Fig. 3). The primary area of distribution of *C. m. timorlestensis* is the highland plain around Lake Iralalalo (= Lagoa Ira Lalaro) (elev. ca. 334 m). The surface area of Lake Iralalalo fluctuates between about 10 and 55 km². The plain of the lake has an area of about 100 km², and its catchment an area of about 400 km². According to local people, the new subspecies also occurs in the lowland Irabere River to the southwest of Lospalos in Iliomar subdistrict.

Table 1. Basic external shell and head dimensions of *Chelodina mccordi timorlestensis*, all measurements are straight line (in mm).^a

Specimen	Sex	CL	CW	CD	PL-M	PL-T	PW	HW
WAM 165888	M	164.6	117.0	55.2	127.8	136.8	71.1	29.1
GK 1	M	200.3	139.7	69.5	153.2	166.3	84.3	31.8
GK 2	M	159.4	113.2	57.0	125.3	133.2	71.8	27.8
GK 4	F	146.1	102.5	50.1	118.8	125.4	65.2	26.5
BRI 3	M	175.8	133.0	61.7				29.5
BRI 2	F	220.0	168.5	75.2				34.5
BRI 5	F	233.0	167.0	76.0				35.0
BRI 6	F	143.0	109.0	50.0				25.0
BRI 1	J	82.0	63.0	31.3				17.8
BRI 4 (shell)	F?	212.8	163.5	81.3	172.1	182.2		

^a CL = carapace length, total; CW = carapace width, greatest; CD = carapace depth, greatest; PL-M = plastron length, midline; PL-T = plastron length, total; PW = plastron width, at axillary notch; HW = head width, tympanic; WAM = Western Australian Museum, Perth; GK = specimens examined by Gerald Kuchling; BRI = specimens examined by Bonggi R. Ibarondo.



Figure 3. Map of the distribution (red polygons) of *Chelodina mccordi*, including the new subspecific taxon from Timor-Leste. *Chelodina mccordi mccordi* is endemic to the island of Roti, west of Timor, Indonesia, *C. m. timorlestensis* is endemic to Timor-Leste at the eastern tip of the island of Timor. Map by AGJR.

Vernacular Name. — The local name of *Chelodina mccordi timorlestensis* is “*beo*”.

Type Locality. — The exact collection locality of the holotype is not known, but all specimens examined in Lospalos were said to originate from the high plain of Lake Iralalaro. The type locality of *C. m. timorlestensis*, therefore, is restricted to the plain of Lake Iralalaro (= Lagoa Ira Lalaro) (ca. 08°28'E; 127°07E, elev. ca. 334 m), east of Lospalos, Lautém District, Timor-Leste.

Diagnosis. — A medium-sized snake-necked chelid turtle (to 233-mm CL) with (relative to other *Chelodina* sensu stricto species) medium-wide carapace, medium-wide plastron, and relatively narrow first marginal, belonging to the species *C. mccordi* in the *C. novaeguineae* complex (as defined by McCord and Thomson [2002], containing in addition to *C. mccordi*, the species *C. novaeguineae*, *C. canni*, and *C. reimanni*) within the genus *Chelodina* sensu stricto (subgenus *Chelodina*, previously *Chelodina* subgeneric group “A” or *C. longicollis* group; not subgenus *Macrochelodina* or previously *Chelodina* subgeneric group “B”; not *Chelodina* sub-

generic group “C” [*C. oblonga*; Burbidge et al. 1974]). The carapace of *C. m. timorlestensis* is moderately rugose, with some longitudinal vertebral ridging on vertebrals 2–4 and sometimes 5. The plastron is oval in general shape, the anterior plastral lobe shows a slight expansion at posterior edge of humeral scutes, the anal notch is moderately deep. The head is relatively wide and robust, similar to *C. m. mccordi*.

In some morphological characters, *C. m. timorlestensis* is intermediate between *C. m. mccordi* and *C. novaeguineae*, but, in supporting its subspecific taxonomic status, it shows more similarities to *C. m. mccordi* than to *C. novaeguineae*. With a slight readjustment of the variability and range of some characters defined by Rhodin (1994b), *C. m. timorlestensis* shares with *C. m. mccordi*, the principal diagnostic features distinguishing *C. mccordi* from the other species of the genus *Chelodina* sensu stricto (*C. longicollis* group or subgeneric group A) generally and from *C. novaeguineae* particularly (Rhodin 1994b). These shared characteristics between *C. m. timorlestensis* and *C. m. mccordi* include the most narrow

Table 2. Differential diagnosis between *Chelodina mccordi mccordi* and *Chelodina mccordi timorlestensis* ssp. nov.

	<i>C. m. mccordi</i>	<i>C. m. timorlestensis</i>
Carapace width in % of length	77.9% ^a or 79% ^b	72.6%
Medial width medial 1 in % of medial width medial 2	ca. 50% ^a or 47% ^b	62.5%
Ridging on vertebrae 2–4	No ^a	Yes
Nuchal scute projecting anterior to carapace margin	No ^a	Yes
Shallow carapace midline furrow in larger specimens	Females only ^a	Males and females
Pectoral-abdominal sutures end at marginal	5, rarely at suture between 5 + 6 ^c	6, rarely at suture between 5 + 6

^a According to Rhodin (1994b).

^b According to McCord and Thomson (2002).

^c Four specimens measured in this study, plus measurements from Figs. 2 and 5 in Rhodin (1994b).

first marginal scute of the whole genus (although slightly wider in the new subspecies than in the nominate form) and a similar plastral scute medial length formula.

Differential Diagnosis. — The new subspecies *C. m. timorlestensis* is differentiated from the nominate taxon *C. m. mccordi* in a number of morphological features (Table 2). Its carapace width is slightly narrower (ca. 72% of CL) than in *C. m. mccordi* (ca. 78% of CL), its first marginal width is relatively wider (ca. 63% of width of second marginal) than in *C. m. mccordi* (ca. 48% of width of second marginal), its vertebrae 2–4 tend to be ridged, the nuchal scute sometimes extends slightly beyond the anterior carapace, and the pectoral-abdominal plastral suture generally contacts the sixth marginal scute rather than the fifth.

The medial width (along the seam with V1 and C1) of marginal 1 in relation to the medial width of marginal 2 distinguishes *C. m. timorlestensis* from all other taxa of the genus *Chelodina* sensu stricto (subgenus *Chelodina*): it is 62.5% in *C. m. timorlestensis* but about 50% (Rhodin 1994b) or 47% (McCord and Thomson 2002) in *C. m. mccordi*, 71% in *C. canni*, 77% in *C. steindachneri*, 80% in *C. novaeguineae*, 90% in *C. reimanni*, 103% in *C. longicollis*, and 109% in *C. pritchardi* (data from McCord and Thomson 2002).

Etymology. — The subspecific epithet refers to the country where the only known population of this subspecies occurs, the young nation of Timor-Leste (previously known as East Timor).

Related Taxa. — Apart from the nominate taxon *C. m. mccordi* to which it is most closely related, *C. m. timorlestensis* is most similar to the other members of the *C. novaeguineae* complex (as defined by McCord and Thomson [2002], containing in addition to *C. mccordi* the species *C. novaeguineae*, *C. canni*, and *C. reimanni*) within the *C. longicollis* group.

Description

Carapace. — The carapace of *C. m. timorlestensis* is moderately rugose and oval, with slight expansion of marginals 6–8, widest posteriorly at marginal 7, averaging 72.6% ($\pm 2.8\%$ SD, $n = 7$) of the CL. There is slight lateral marginal recurving from marginal 4 through 7 in

specimens larger than a 164-mm CL, no recurving in smaller specimens. There is slight supracaudal ridging, with very slight adjacent concavity of marginal 11. There is some longitudinal vertebral ridging on vertebrae 2–4 and sometimes 5, vertebral 1 without ridges. Slight vertebral flattening and shallow midline furrow in larger specimens of both sexes (male of 200.3-mm and females of 220- and 233-mm CL), smoothly convex in smaller specimens. Nuchal scute is long and broad dorsally (except in specimen BRI 4, in which it is reduced to a small triangle anterior to a midline seam formed by the first marginals), projecting slightly anterior to carapace margin (not projecting anteriorly in the nominate taxon *C. m. mccordi*: Rhodin 1994b). Of 4 specimens with normal sets of carapace scutes (no fused or missing scutes), 2 (including the holotype) have vertebral 1 as the widest, then 2, 3, 5, and 4 in descending order of width; in one, the descending order is vertebral 1, 5, 2, 3, 4; and, in one, the descending order is vertebral 2, 1, 3, 4, 5.

One of the 9 specimens (GK 4) has only 3 symmetrical costals on each side, and one (GK 2) has 3 costals on the right side and 4 on the left side. This deformity creates a very wide fifth vertebral, indicating a fusion of one or both fourth costals with V5. This condition has also been described for several specimens of *C. m. mccordi* (Rhodin 1994b).

The width of marginal 1 in relation to marginal 2 along the V1–C1 scute border is 62.5% ($\pm 6.2\%$) in *C. m. timorlestensis* and about 50% (Rhodin 1994b) or 47% (McCord and Thomson 2002) in *C. m. mccordi*. The respective relationships within the other members of the *C. novaeguineae* complex are 71% in *C. canni*, 80% in *C. novaeguineae*, and 90% in *C. reimanni* (McCord and Thomson 2002).

Plastron. — The plastron of *C. m. timorlestensis* is oval in general shape, axillary width 56.82% ($\pm 2.06\%$) of midline plastral length (PL); width at the gular-humeral seams 51.25% ($\pm 2.35\%$); inguinal width 53.17% ($\pm 2.54\%$); width at the femoral-anal seams 34.78% ($\pm 0.76\%$) of the midline PL. Slight expansion of anterior plastral lobe at the posterior edge of humeral scutes. Anal notch is moderately deep, no sexual dimorphism is noted. There are no axillary or inguinal scutes. The plastral scute medial length formula in all specimens is Inter-

gular > Abdominal > Anal > Femoral > Pectoral > Gular. According to Rhodin (1994), *C. m. mccordi* usually has Anal \geq Abdominal, but according to McCord and Thomson (2002) and according to the 4 specimens we examined in this study, the plastral scute medial length formula of *C. m. mccordi* is also Intergular > Abdominal > Anal > Femoral > Pectoral > Gular and, therefore, similar to that of *C. m. timorlestensis*. *Chelodina pritchardi* has Pec1 \geq Fem, *C. novaeguineae* either Pect > Fem or Fem > Pec, and *C. canni* An > Abd (Rhodin 1994a, McCord and Thomson 2002).

In 9 *C. m. timorlestensis*, 71% of the Pec-Abd seams end at the sixth marginal, 23% at the seam between the fifth and sixth marginal, and 6% at the fifth marginal. In the 4 *C. m. mccordi* examined, 100% of the Pec-Abd seams end at the fifth marginal. In the holotype of *C. mccordi* (according to Fig. 2 in Rhodin 1994b), the left Pec-Abd seam ends at the 5th marginal, and the right seam ends at the seam between the fifth and sixth marginal. In the *C. mccordi* paratype RMNH 10187 (according to Fig. 5 in Rhodin 1994b), both the left and right Pec-Abd seams end at the fifth marginal.

Head and Soft Parts. — Head and soft parts are very similar to the nominate form. The head has small irregular scales covering temporal skin, smooth over nasal, interorbital and parietal roof (Fig. 4). The head is relatively wide and robust, similar to *C. m. mccordi*, slightly wider than *C. novaeguineae* (Fig. 5). The neck has low soft tubercles. The soft parts are light-to-dark gray dorsally, whitish ventrally. The iris is light-to-dark brown, merging gradually to a yellow border around the pupil (Fig. 4). Hands and feet are with 4 claws each.

Size and Sexual Dimorphism. — The largest female (BRI 5) measured 233-mm CL (female range 146–233 mm, $n = 5$), the largest male (GK 1) had a CL of 200 mm (male range 159–200 mm, $n = 4$). Males had somewhat larger tails than females. A single juvenile with CL 82 mm could not be sexed.

Habitat

Geology. — The geology of the eastern part of Timor-Leste is dominated by limestone. Lake Iralalero is Timor-Leste's largest lake and wetland area, situated in a high plateau depression (elev. ca. 334 m) formed by a huge polje (karst formation) in the Iralalero-Paitchau Mountains area. Its catchment is virtually entirely within the karst. Associated with the polje are a number of dolines, sinkholes, and blind valleys that contain standing water for various periods mainly during the wet season. The only surface outlet from Lake Iralalero is the Irasiquero River, which disappears underground into a sinkhole at Mainina (Middleton et al. 2006). According to local people, *C. m. timorlestensis* can be found in many of these seasonal wetlands, as well as in the creeks running into the lake and the river (Figs. 6 and 7).



Figure 4. **Top:** Head of *Chelodina mccordi timorlestensis* adult male from Poros (BRI 3). **Bottom:** Adult female from Lospalos (BRI 2). Photographs by BRI.

Climate. — The eastern part of Timor-Leste has a highly seasonal tropical monsoonal climate characterized by a distinct wet season (November to July) and a dry season. There are 2 wet season peaks on the south coast, firstly in December and secondly with the South-east Trade winds in April-June, with a total of 7–9 months of rain (more than 2000 mm per year). The central mountain regions and the Fuiloro plateau about Los Palos are also wet (more than 2000 mm per year) with highest rainfall totals in May and June, when much of the rest of the island is in drought (Regional Physical Planning Project for Transmigration 1989). The July to November dry season has little rain and low humidity. Lospalos has a mean annual rainfall of 1921 mm, monthly average temperatures range from 18.8°C in August to 28.9°C in November. Evaporation exceeds rainfall from August to November (Middleton et al. 2006).

Vegetation. — The Iralalero/Paitchau area contains the single largest area of tropical forest remaining in Timor-Leste, and a large portion of this area is currently included within the Nino Konis Santana National Park. The main vegetation in the Iralalero plain is grassland and sedgeland interspersed with some bushes and trees. This area is

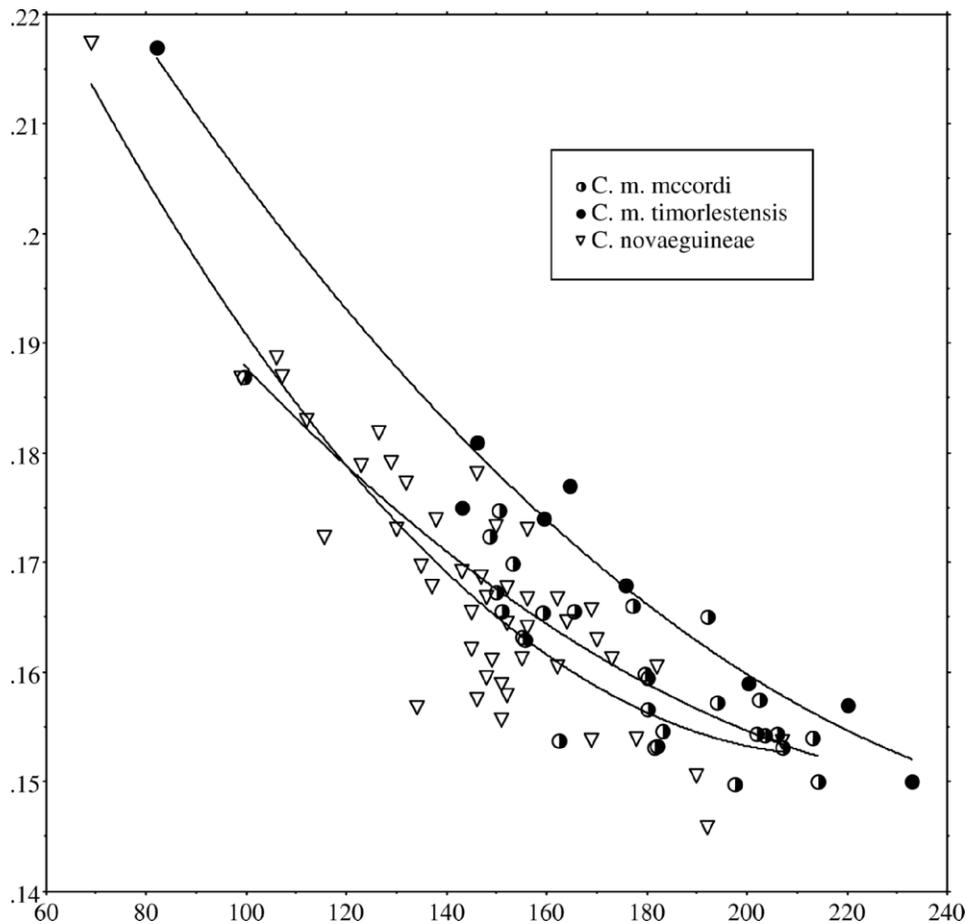


Figure 5. Relationship of head width/carapace length vs. carapace length for *Chelodina mccordi mccordi*, *C. m. timorlestensis*, and *Chelodina novaeguineae* (sensu stricto from New Guinea). Polynomial regression curves for the 3 taxa included. Graph by AGJR.

extensively used to graze cattle, water buffaloes, and horses. The surrounding limestone ranges are covered in tropical dry forest, tropical semi-evergreen forest, and a small area of tropical evergreen forest. An ongoing study of the aquatic ecology of the area by the Environmental Research Institute of the Supervising Scientist, Darwin (EPANZ Services 2004) found an unusually high diversity of aquatic plants in the Irasiqero River (compared with other rivers on Timor).



Figure 6. Alleged habitat of *Chelodina mccordi timorlestensis* on the plain of Lake Iralalaro. Shallow wetland in grasslands at Malahara. Photograph by GK, May 2006.

Sympatry. — Although *Cuora amboinensis* reportedly occurs over much of Timor (B.R. Ibarondo, *pers. obs.*), according to local people, this species is not found in the area of Lake Iralalaro, the main habitat of *C. m. timorlestensis*. However, *C. amboinensis* allegedly occurs in the Irebere River in the lowlands of Iliomar Subdistrict where *C. m. timorlestensis* is reportedly also found. The distribution and possible sympatry of these species should be further investigated.

The biodiversity value of Lake Iralalaro is incompletely known, but it is significant for resident and migrant waterbirds (Trainor 2005), has a resident population of estuarine crocodile *Crocodylus porosus*, and a diverse macroinvertebrate fauna (57 families) and fish fauna (21 species), including at least 1 newly described fish that is endemic to the area (EPANZ Services 2004; Larson et al. 2005).

Discussion

The islands of Roti and Timor are part of the Banda Arc collision zone of the Indo-Australian tectonic plate to the south and the Asian plate to the north. Geologically, Roti and Timor are splintered components of the Gondwanan Sahul Shelf tectonic plate (Audley-Charles



Figure 7. Alleged habitat of *Chelodina mccordi timorlestensis* on the plain of Lake Iralalaro. **Left:** Small slow-moving stream near Lospalos. **Right:** Irrigation ditch in grasslands near Lospalos. Photographs by BRI, November 2005.

1988). Zoogeographically, the occurrence of a population of chelid snakeneck turtles on Timor is not surprising, given that the genus *Chelodina* is already known to occur on Roti Island just to the southwest of Timor and on New Guinea to the east. The island of Timor represents a link between those areas. For this reason it is also not surprising that the new taxon belongs to the *C. novaeguineae* species complex, given that it is found close to the geographic center of this species group, with *C. m. mccordi* to the southwest (Roti), *C. canni* to the southeast (northern Australia), and *C. reimanni* and *C. novaeguineae* to the east (southern New Guinea).

Until the 1990s, all known populations of what is now known as the *C. novaeguineae* species complex (from New Guinea, northern Australia, and Roti Island) were considered to represent a single species, *C. novaeguineae* (e.g., Iverson 1992). This concept had operated for over a century but did not reflect the genetic and morphological diversity of these populations. Since then, Philippen and Grossman (1990) described *C. reimanni*, Rhodin described *C. pritchardi* (1994a) and *C. mccordi* (1994b), and McCord and Thomson (2002) *C. canni*. *Chelodina mccordi timorlestensis* is now the fifth separate taxon described from what used to be known as *C. novaeguineae*.

Rhodin's (1994b) morphologically based phylogenetic concept placed *C. mccordi* as the closest relative of *C. pritchardi* because of shared partial reduction in parietal

roof width and slightly widened triturating surfaces. The skull of *C. novaeguineae* is more robust. Georges et al. (2002) used allozyme electrophoresis to delineate the species boundaries within the genus *Chelodina*. They interpreted a lack of skull robusticity as a shared primitive character and placed *C. mccordi* as sister taxon to the *C. novaeguineae/reimanni/canni* clade from which it differed by 3 fixed differences (loci where they share no alleles). According to their results, *C. pritchardi* is the sister group to the *C. novaeguineae* species group (*C. novaeguineae/reimanni/canni* clade plus *C. mccordi*). Even though no fixed differences could be found between *C. novaeguineae* and the phenologically different *C. reimanni* and only one fixed difference between those forms and *C. canni*, even *C. reimanni* was retained as a separate species by Georges et al. (2002).

There is no universally accepted species concept (phylogenetic, evolutionary, biological), and it is debatable if the subspecies category has a place outside the biological species concept. We believe that in some cases of allopatry and parapatry, the subspecies category, although describing morphological differences among populations, better reflects close relationships among taxa where the notion of reproductive incompatibility is unlikely. For example, because *C. reimanni* presumably occurs in parapatry with *C. novaeguineae* and both forms share common alleles at all loci (Georges et al. 2002),

reproductive incompatibility is unlikely and they may not represent separate species.

We add the new subspecies from Timor into the concept of *C. mccordi* rather than describe it as a separate species. Because it is an addition to and an expansion of the concept of *C. mccordi*, the original definition of *C. mccordi* (Rhodin 1994b) remains valid for the nominate taxon, and it is not necessary to redescribe it. Morphology clearly separates *C. m. timorlestensis* from *C. m. mccordi* and the other species of the *C. novaeguineae* group but also demonstrates its close relationship to the taxon from the geographically close Roti Island. Even though the other 4 recently described taxa have been given species status, we suggest that the current position and relationship of the Timor-Leste form inside this group is best reflected by considering it as a subspecies of *C. mccordi*. Genetic studies will clearly need to be pursued to determine whether this taxon deserves to be recognized at subspecific or perhaps specific status.

The type locality of *C. m. mccordi* was restricted by Rhodin (1994b) to Danau Nalোক near Busalangga on central Roti Island, based on where one of the paratypes was originally collected by Ten Kate in 1891, but the holotype and 2 of the 3 paratypes were actually purchased during the late 1980s and early 1990s by an animal dealer in Kupang, West Timor, from native villagers. Although the animal dealer reported that those specimen of *C. m. mccordi* were originally collected on Roti Island, our discovery of a population of *C. mccordi* on Timor itself may raise questions on the reliability of this information: could the type material of *C. m. mccordi* have been collected on Timor? We consider this possibility unlikely for 3 reasons. First, Kupang is at the western tip of Timor and is much closer to Roti Island than to Lautém District near the eastern tip of Timor where the new taxon was discovered (see Fig. 3, Kupang = Kupano). Second, in the late 1980s and early 1990s when the type material of *C. m. mccordi* was purchased, Lautém District was the main stronghold of the Falantil freedom fighters against the Indonesian rule in East Timor. Turtle trade from there to Kupang would have been much more unlikely than trade from Roti to Kupang. Third, the turtles from Lautém District are morphologically different from the type series of *C. m. mccordi* and from all other specimens of *C. m. mccordi* subsequently collected on Roti. Even if the original trade-obtained type material of *C. m. mccordi* could have originated from some still unknown other populations on western Timor, the new subspecies we describe here is still a different taxon.

Currently *C. m. timorlestensis* does not seem to be particularly rare within its limited habitat, although no population data or status assessments are available and the area of distribution is very small. Information related by local people that has been uncritically published in 2 reports is that up to 30 turtles per day have been caught by the people of Malahara village alone (EPANZ Services 2004; Middleton et al. 2006). Although we do not dispute

the possibility that at a particular time (e.g., end of the dry season when turtles may concentrate in a shrinking water body) and on a particular day, this may have happened, our own experience at Malahara is that it is difficult and often impossible to find a local who can produce a turtle on demand, and all people claim it would take several days or weeks (depending on the time of the year) to find one or a few. Experience with interview-based status assessments of turtle populations (e.g., Kuchling 1997; Kuchling et al. 2006) suggests that, without a rigorous interview protocol, it is unlikely that any reliable information can be obtained by these types of anecdotal reports. The statement that 30 turtles per day were caught by the people of Malahara village seems to be a dramatic exaggeration and probably reflects neither present abundance nor recent past exploitation patterns for *C. m. timorlestensis*.

Some exploitation of *C. m. timorlestensis* for food takes place, primarily on the local subsistence level. Occasionally during the dry season the turtles can be found at the food market in Lospalos for sale, with prices between US\$ 2 and 4. Although some people eat the turtles, all turtles we observed at restaurants in Lospalos were reportedly kept as pets rather than for consumption. Currently exploitation and local trade seems to be opportunistic and unorganized. It may, however, have already reduced some populations close to population centers like Lospalos: people reported that many years ago, after big rains and after flooding in Lospalos, the turtles were even found in the streets. Today this no longer happens.

Lake Iralalero and its surroundings are included within the “Tutuala Beach” protected wild area recognized by regulation 2000/19 (UNTAET 2000) and is being established by the Timor-Leste government and international counterparts as Nino Konis Santana National Park (680 km²) with a formal declaration in August 2007. Thus, some of the known range of *C. m. timorlestensis* is now inside a protected area, but local communities are permitted to continue a range of traditional practices.

The nominate form of *C. mccordi* from Roti, with its restricted range and habitat on this small island (Rhodin 1996), has been driven nearly into extinction by the legal and illegal international pet trade within a decade after its description in 1994 (Samedi and Iskandar 2000; Shepherd and Ibarrondo 2005). The species has been listed as critically endangered on the IUCN Red List since 2000 (IUCN/SSC TFTSG and ATWG 2000; IUCN 2000). In addition, *C. mccordi* has the distinction of being the only species of the genus *Chelodina* listed on CITES Appendix II, in an attempt to monitor and regulate international trade in the species to ensure trade occurs at sustainable levels. Although the island of Timor is much larger than Roti, the new subspecies *C. m. timorlestensis* is restricted to a small area of suitable habitat near the eastern tip of the island. It has a very limited range, and international trade would quickly doom the population. Vigilance will be needed to protect this species from the potential ravages of the

international pet trade; experiences from the global trade in *C. m. mccordi* and other newly described reptile species suggest that this new taxon is at extremely high risk for rapid exploitation and extirpation (Stuart et al. 2006).

Even though Timor-Leste is not yet a signatory of the CITES convention, *C. m. timorlestensis* is automatically included in CITES Appendix II as a subspecies of *C. m. mccordi*. This means that any international export of *C. m. timorlestensis* to a CITES signatory country requires an export permit from the government of Timor-Leste that is equivalent to a CITES export permit. This legal requirement, in combination with the protection of the main habitat of *C. m. timorlestensis* in a national park, may hopefully spare the new subspecies the fate of the nominate form from Roti Island to be nearly extirpated through commercial trade shortly after its description as a new taxon.

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NOTE ADDED IN PROOF

In 2003, Arthur Georges forwarded Colin Trainor's original photographs of the *Chelodina* from East Timor to W.P. McCord (but without revealing any locality data) to confirm his identification of this turtle as *C. mccordi* (A. Georges in litt. to GK 9 June 2006). McCord (in litt. to GK 18 July 2006) stated regarding *Chelodina*: "I have yet to find them on Timor. I have had several people look, and even have two people living there constantly looking to this day. . . . If you found Timor *Chelodina* and want me to back away from the island, then get me blood/tissue from a few and if they are *mccordi*, I have no reason to look further? If you haven't found them, assuming you looked thoroughly, and my people failed so far, then I doubt they are there." At the Turtle Survival Alliance meeting in August 2006, GK informed McCord that he had secured a type specimen and tissue of three additional individuals of this new Timor taxon (and had prepared a description), and offered McCord collaboration and coauthorship to compare *Chelodina* tissues from Timor with other *Chelodina* sp. McCord declined this invitation despite his previous request for exactly this collaboration.

In December 2006, BRI learned from locals in Los Palos that money had recently been offered to them by an American to collect *Chelodina* in the area of Lake Iralalero (included within the legally protected "Tutuala beach" wild area, recognized since 2000 by regulation 2000/19 [UNTAET 2000]), and that the American took 3 specimens with him. In June 2007, a description of the *Chelodina* from Timor as a new species was published by McCord and colleagues in a non-peer-reviewed hobbyist magazine (McCord, W.P., Joseph-Ouni, M., and Hagen, C. 2007. A new species of *Chelodina* (Testudines: Chelidae) from eastern Timor Island (East Timor). *Reptilia* (GB) 52: 53-57).

McCord et al. (2007) recorded that coauthor C. Hagen had personal observations regarding *Chelodina* in East Timor "at the present time" and two of his photographs of *Chelodina* habitat at Lake Iralalero are included in the article. McCord et al. did not provide a collection date for their material, but stated: "after many years working with *Chelodina* specimens from eastern Timor, we present here an original description of the isolated East Timor species". For the holotype AMNH R160135 of *Chelodina timorensis* and two other collected specimens McCord et al. recorded "Lake Ira LalaroTutuala" without a collection date, but the American Museum of Natural History catalog where they deposited the type specimen records "Tutuala" as the collection locality and "1997" as the collection date (<http://entheros.amnh.org/db/emuwebamnh/logon.php>; D. Dickey in litt. to GK 30 November 2007).

Despite its very close morphologic similarity to *C. mccordi* from Roti Island, McCord et al. concluded that the new taxon was a full species, and not a subspecies of *C. mccordi*. In view of the lack of any as-yet published data on the genetic relationships of these taxa, we disagree with this conclusion. Unfortunately, as a new species, this taxon will fall outside current CITES international trade regulations, which would have applied if it had been described as a subspecies of *C. mccordi*. Given the well-documented near-extinction of *C. mccordi* due to the international pet trade, this lack of CITES protection may dramatically reduce the survival prospects of this new island turtle taxon with a very limited distribution, and we therefore urge heightened vigilance for possible international pet trade pressures on the species. In addition, apart from the disturbing discrepancy of the stated collection date in the AMNH catalog and the historical events, we are disappointed by the lack of professional courtesy shown by McCord and his colleagues to quickly acquire specimens (and to possibly circumvent protected-area regulations to do so) and then to rush their new species into print in a non-peer reviewed magazine after being informed by us that we had already described it based on acquired material. In our opinion, this type of conduct is unprofessional among scientific colleagues, and we consider it uncollegial. For a multifaceted discussion concerning professional issues and recommended guidelines for turtle collecting, specimen vouchering, and taxonomic descriptions, see multiple chapters in Shaffer et al., 2007 (Shaffer, H.B., FitzSimmons, N.N., Georges, A., and Rhodin, A.G.J. (Eds.). *Defining Turtle Diversity: Proceedings of a Workshop on Genetics, Ethics, and Taxonomy of Freshwater Turtles and Tortoises*. Chelonian Research Monographs No. 4, 200 pp.).