

## CUORA MCCORDI, A NEW CHINESE BOX TURTLE FROM GUANGXI PROVINCE

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*Abstract.*—*Cuora mccordi* (Emydidae: Batagurinae), a new species of box turtle from Guangxi Province, China is described and compared to other members of the genus.

Recent collecting trips by Mr. Oscar Shiu to Yunnan and Guangxi provinces, China, to find the turtle *Cuora yunnanensis*, which has not been taken since 1905 (Boulenger 1906), have instead revealed two new species of the genus *Cuora*. The first, *C. chriskarannarum* from Yunnan, has been described by Ernst & McCord (1987). The second is described below.

*Methods and materials.*—Straight-line measurements of each specimen were taken with dial calipers accurate to 0.1 mm of the greatest carapace length, carapace width and depth at the level of the seam between vertebrals 2 and 3, marginal width (the difference between the carapace width and the width across the pleurals taken between the points of juncture of the marginals and pleurals at the level of the seam between vertebrals 2 and 3), greatest plastron length, greatest width and length of both plastral lobes, least bridge length, greatest width and length of vertebrals 1 and 2 and pleural 2, and the medial seam length and greatest width of all plastral scutes. Notes and drawings were made of head, neck, limb, carapace, plastron, and bridge patterns. Colors were recorded from living turtles and color transparencies. Shell proportions are expressed as ratios of one measurement to another. Sixteen ratios proved useful in discriminating between taxa of *Cuora* (abbreviations used in the text are given in parentheses): width/length of cervical scute (W/L CS), width/length of first vertebral (W/L 1st V), width/length of second vertebral (W/L

2nd V), width/length of second pleural (W/L 2nd Pl), marginal width/carapace width (MW/CW), marginal width/carapace length (MW/CL), carapace width/carapace length (CW/CL), carapace depth/carapace length (D/CL), carapace depth/carapace width (D/CW), plastron length/carapace length (PL/CL), bridge length/plastron length (B/PL), bridge length/carapace length (B/CL), length of anterior plastron lobe/plastron length (APL/PL), width of anterior plastron lobe/plastron length (APW/PL), length of posterior plastron lobe/plastron length (PPL/PL), and width of posterior plastron lobe/plastron length (PPW/PL). The number of rows of large scales at the lateral edge of the antibrachium between the claw of digit V and the first horizontal skin fold proximal to the elbow (presented in text as foreleg scale rows) was recorded.

Specimens from the following collections were examined: William P. McCord, Hopewell Junction, New York, personal collection of living turtles (WPM), National Museum of Natural History, Smithsonian Institution (USNM).

### *Cuora mccordi*, new species

*Holotype.*—USNM 281850, adult male; highland near Paise, Guangxi Province, China (23°54'N, 106°37'E); purchased from locals by Oscar Shiu, Aug 1986.

*Diagnosis.*—A moderately domed species of *Cuora* with a yellow head having a greenish crown, an orange black-bordered post-

orbital stripe, soft parts varying from yellow to orange, a reddish-brown carapace, a medial carapacial keel most pronounced on vertebrals 2-4, vertebral 1 extending laterally no farther than the seam separating marginals 1-2, a yellow plastron with a large medial black pattern, the plastron with a shallow anal notch, and the interanal seam complete.

*Description* (from twelve specimens examined).—Carapace length to 134 mm (males 131, females 134), elliptical, moderately domed (D/CL 0.38-0.46,  $\bar{x}$  = 0.418; D/CW 0.54-0.65,  $\bar{x}$  = 0.582; CW/CL 0.66-0.77,  $\bar{x}$  = 0.719); widest at marginals 8, highest at seam separating vertebrals 2-3. Carapace sides straight, posterior rim slightly to nonserrated with a very small medial notch. Anterior and posterior marginals usually flared (more in mature individuals); lateral marginals vertical with reverted rims (MW 8.9-16.3 mm,  $\bar{x}$  = 12.98; MW/CW 0.01-0.19,  $\bar{x}$  = 0.140; MW/CL 0.07-0.14,  $\bar{x}$  = 0.107). Marginal 1 widest, marginals 4-6 smallest. Scute texture rough with growth annuli. Cervical rectangular to triangular, longer than wide (W/L CS 0.44-0.87,  $\bar{x}$  = 0.621). Vertebrals 1, 3-5 wider than long, vertebral 2 longer than wide in 9 of 11 specimens (81.8%); vertebrals 4 and 5 widest, vertebral 5 posteriorly flared, vertebral 1 anteriorly flared, barely reaching seam separating marginals 1-2. Low medial keel most pronounced on vertebrals 2-4. Color reddish-brown, rim to marginals 7 or 8 yellow, seams outlined with dark brown or black. Dark posteriorly directed wedge near rim on dorsal surface of each marginal; undersides of marginals yellow laterally, orange medially.

Plastron length to 134 mm (males 123, females 134), shorter than carapace in 9(82%) specimens (PL/CL 0.90-1.03,  $\bar{x}$  = 0.950), slightly upturned anteriorly, movable hinge between pectoral and abdominal scutes. Posterior lobe longer and wider than anterior lobe (APL/PL 0.40-0.43,  $\bar{x}$  = 0.419; PPL/PL 0.56-0.61,  $\bar{x}$  = 0.580; APW/PL

0.53-0.57,  $\bar{x}$  = 0.554; PPW/PL 0.57-0.64,  $\bar{x}$  = 0.618; APW/CW 0.69-0.81,  $\bar{x}$  = 0.727; PPW/CW 0.74-0.88,  $\bar{x}$  = 0.810). Anterior lobe rounded anteriorly; posterior lobe with shallow anal notch. Sides of anal scutes taper toward midline. Bridge moderate (B/CL 0.26-0.35,  $\bar{x}$  = 0.312; B/PL 0.28-0.36,  $\bar{x}$  = 0.331); 1-2 axillaries; 1 small inguinal. Average plastral formula Abd. > Pect. > An. > Gul. > Fem. > Hum.; 5 (45% had this formula, but 4 other formulae occurred; all variation occurred in the relative lengths of Abd., Pect., and An.; Gul., Fem., and Hum. never varied in position. Interanal seam present and complete. Plastron is yellow with a distinctive black pattern (gulars totally black, humerals with posterior portion 25-50% black, other plastral scutes medially to 90% black); bridge with two black blotches.

Head narrow; snout slightly projecting; upper jaw neither hooked nor notched. Laterally yellow with an orange, black bordered postorbital stripe, and a narrow, black bordered stripe between the orbit and nostril. Crown green. Iris yellow to yellow-green; tympanum, jaws, and chin immaculate yellow. Neck yellow-orange dorsally and laterally, cream to yellow ventrally; a faint, narrow middorsal stripe may be present.

Digits partially webbed. Forelimbs with large scales (8-11 rows,  $\bar{x}$  = 9.9); outer surface reddish-brown to brown, inner surface and sockets yellow to orange. Hindlimbs with smaller scales; hindfoot brown with large scales at heel; inner surface and sockets yellow to orange. Tail yellowish orange with a black middorsal stripe.

Males with moderately concave plastra, and longer, thicker tails with the vent beyond the carapacial rim. Females with flat plastra, and smaller tails with the vent beneath the posterior marginals.

*Other material.*—WPM 1-11 (live; 3 males, 8 females); from locality of type specimen.

*Etymology.*—The name *mccordi* honors Dr. William P. McCord, who first realized the uniqueness of this turtle, and whose hus-

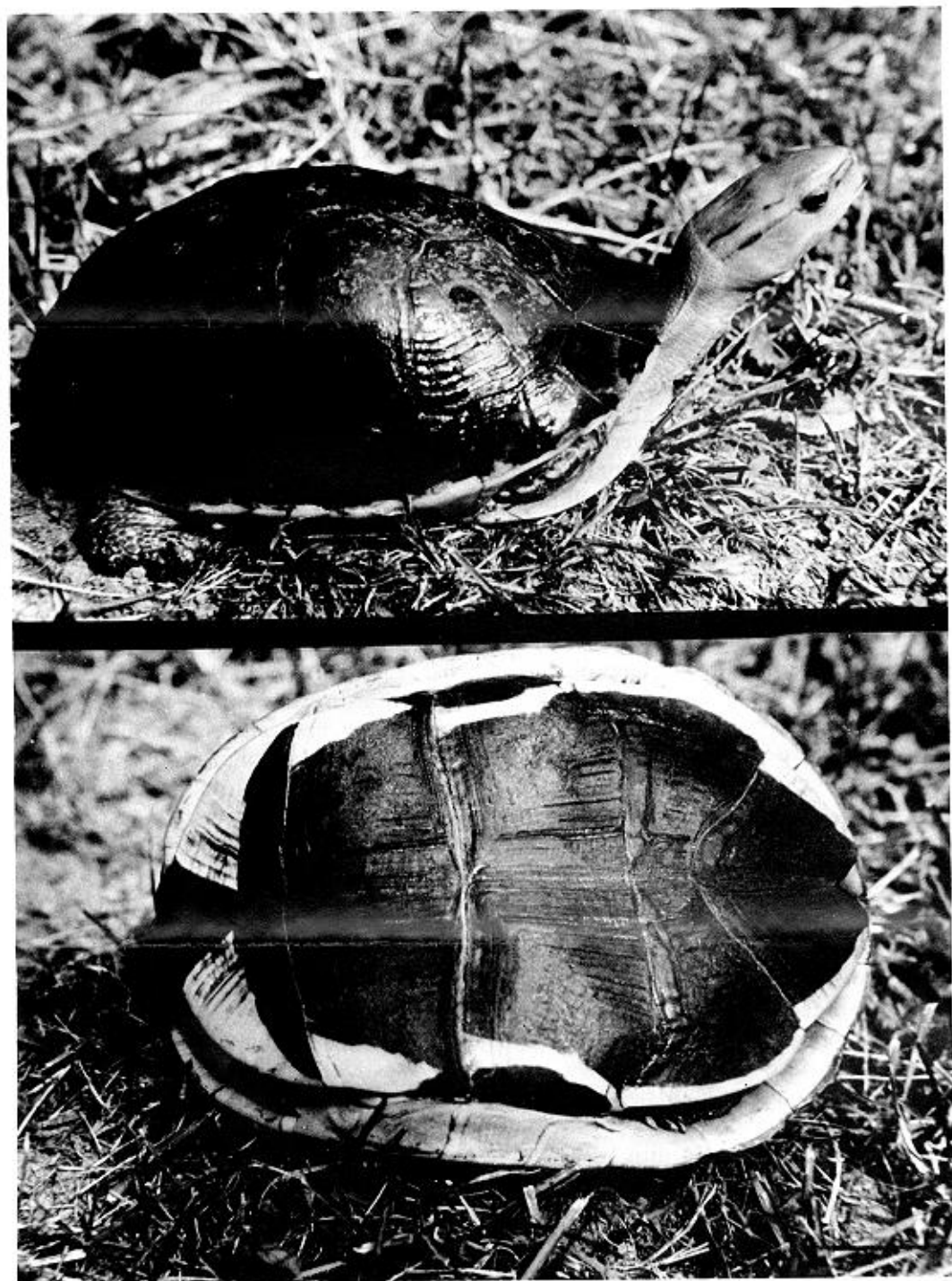


Fig. 1. *Cuora mccordi*, new species (WPM 1); carapace above, plastron below.

Table 1.—Comparison of species of *Cuora* characterized by complete interanal seams.

Character	<i>niccolodi</i>	<i>amblydermus</i> *	<i>chrysokele</i>	<i>paoli</i>	<i>refasciata</i>	<i>sumatrensis</i>
Greatest carapace length (mm)						
Male	131	206	113	120	170	126
Female	134	194	160	156	166	140
Mean depth/carapace length	0.42 (0.38–0.46)	0.45 (0.41–0.51)	0.35 (0.29–0.42)	0.35 (0.30–0.39)	0.38 (0.33–0.44)	0.35 (0.33–0.39)
Carapace keels	1	1 (3 in juvenile)	1	1	3	3
Carapace color pattern	red-brown, yellow anterior rim, dark seams	black stripe	olive-brown, dark medial vertebrals	olive-brown, red-brown vertebrals, yellow rim	brown, three black stripes	brown, dark seams
Plastron pattern	large dark medial blotch	large dark spot at outside of each scute	broad dark seam borders	large triangular shaped dark blotches	large dark medial blotch	dark seams
Head color						
Dorsal	green	olive to dark brown	olive	yellow	olive	brown
Lateral	yellow	dark brown to black	olive	yellow	black	brown
Lateral head stripes	1	3	2	2	1	1
Chin pattern	none	none	none	none	none	large cream colored blotches
Extent of 1st vertebral width	marginals 1	marginals 1	seam marginals 1–2, or marginal 2	marginal 1; occasionally marginal 2	marginals 1	marginals 1

\* = mainland Asia only.

bandry efforts involve freshwater turtles of the world.

*Remarks.*—*Cuora mccordi* (Fig. 1) belongs to the species group within *Cuora* characterized by plastrons with anal notches and complete interanal seams. The other members of this group are *C. amboinensis*, *C. chriskarannarum*, *C. pani*, *C. trifasciata*, and *C. yunnanensis* (Table 1). *Cuora mccordi* is intermediate in shell depth between the highly domed *C. amboinensis* and the four flattened species. It shares its dark plastron with *C. trifasciata*: Only *C. chriskarannarum*, *C. trifasciata*, and *C. yunnanensis* are presently known to occur in this region. *Cuora trifasciata* has been recorded 200 km downstream from the type-locality of *C. mccordi* in the Yu Jiang basin at Nanning (Fang 1930), and *C. trifasciata* is also known from the lower reaches of the Red River in Vietnam (Iverson 1986), while *C. chriskarannarum* occurs upstream in the same basin in Yunnan (Ernst & McCord 1987). *Cuora yunnanensis* has only been found in the upper Yangtze basin in Yunnan province (Boulenger 1906). *Cuora chriskarannarum* is a green species with a yellowish-green, black-bordered postorbital stripe, an oblique yellowish-green stripe extending from the upper jaw below the tympanum to the neck, the first vertebral scute extending laterally at least to the seam separating marginals 1–2, and a broad black seam-following plastral

pattern (Ernst & McCord 1987). *Cuora yunnanensis* has a brown head with a narrow yellow stripe extending from the nostril through the eye to the neck, a unique mottled chin pattern, a brown carapace with dark seams, the first vertebral not extending to the seam separating marginals 1–2, and a yellow or light brown plastron with narrow dark seams (Ernst 1988).

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