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PLATEMYS MACROCEPHALA, A NEW SPECIES OF CHELID TURTLE FROM CENTRAL BOLIVIA AND THE PANTANAL REGION OF BRAZIL

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ABSTRACT: A new species of chelid turtle, *Platemys macrocephala*, is described from the upper Rio Mamoré of central Bolivia and the Pantanal region of the upper Rio Paraguai of Brazil. It is most closely related to *P. radiolata* and differentiated mainly by its wider head, more robust skull, and larger body size.

Key words: Testudines; Pleurodira; Chelidae; *Platemys macrocephala*, sp. nov.; Bolivia; Brazil

THE South American turtle genus *Platemys* (Pleurodira: Chelidae) contains four known species. The best-known of these is *P. platycephala*, a distinctive, common, widespread species from the greater Amazon basin and the Guianan region. The other three species, *P. radiolata*, *P. spixii* and *P. pallidipectoris*, are more poorly known. Until recently, only three specimens of *P. pallidipectoris* had been described in the literature, and the distribution and systematic relationships of *P. radiolata* and *P. spixii* remained uncertain. Wermuth and Mertens (1977) and Ernst (1983*a*) considered *P. radiolata* and *P. spixii* to be separate species, but Pritchard (1979) felt that *P. spixii* and *P. radiolata* are conspecific. Both Wermuth and Mertens (1977) and Pritchard (1979) gave the range of *P. radiolata* as all of Brazil from the Amazon to São Paulo, and that of *P. spixii* as northern Argentina and southern Brazil. The distribution of *P. pallidipectoris* has been defined as only the Chaco of Argentina (Freiberg, 1981). Recently, the distributions of these three species have been clarified and corrected (Ernst, 1983*a*,*b*; Rhodin, 1981, 1982; Rhodin et al., in press).

As part of an investigation of the systematics of the South American chelid turtles, we have examined a large sample of *Platemys* from several museums in addition to live animals from the wild and from the pet trade. Excluding *P. platycephala*, we have examined 108 specimens and obtained data on 45 others, for a series of 153 animals. Of this sample, 70 represent *P. radiolata*, 60 *P. spixii*, eight *P. pallidipectoris*, and 15 a new species of *Platemys* most closely related to *P. radiolata*. The purpose of this paper is to describe this new species.

Platemys ***macrocephala*** sp. nov.

Holotype.—NMW 1293, stuffed adult female collected by Johann Natterer on 16 April 1826 at Caiçara, Rio Paraguai, Mato Grosso, Brazil (16°03′ S, 57°43′ W). The specimen also bears an older tag labeled No. 122 and an old torn tag bearing only the specific name "*schoepfii*."

Paratype.—MHNRJ 1065, subadult female in alcohol collected by A. de Miranda Ribeiro in October, 1908 at Cáceres, Rio Paraguai, Mato Grosso, Brazil (16°03′ S, 57°40′ W).

Referred specimens.—MCZ 163790–1, TCWC 60665, 60669, AGJR L575–6, L578, P291, JRM s/n (3 specs.), near Las Estrellas and Cuatro Ojos, Rio Piray, upper Rio Mamoré, ca. 120 km N. Santa Cruz, Bolivia (ca. 16°45′ S, 63°30′ W), obtained via the pet trade; AGJR P3, Pantanal region, Mato Grosso, Brazil, photographs by P. G. Crawshaw, Jr.; AGJR P289, Pôrto Jofre, Rio São Lourenço, Mato Grosso, Brazil (17°20′ S, 56°47′ W), photographs by C. Yamashita. Field informants for locality data of pet trade animals were felt to be reliable, therefore pet trade data have been included.

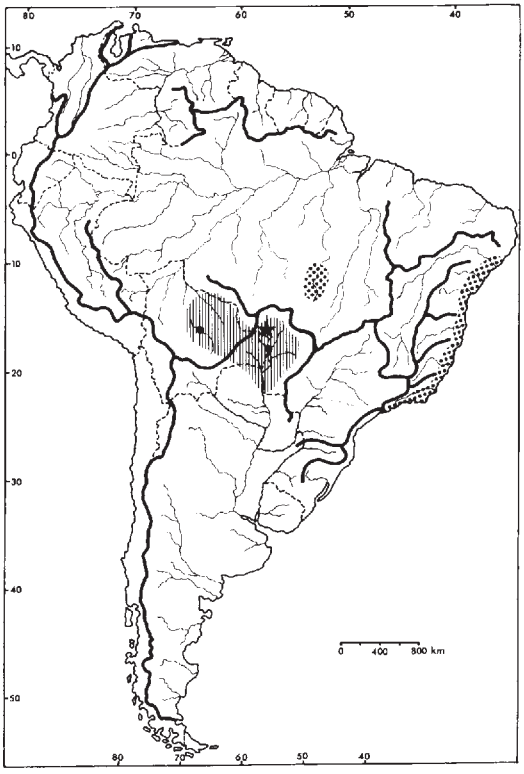

FIG. 1.—Map showing distribution of *Platemys macrocephala* (gray lined shading represents presumed range, dots known localities, and star the type locality), and *P. radiolata* (dotted shading). Note the disjunct distribution of *P. radiolata*. Dashed lines represent political boundaries, heavy black lines indicate watershed limits of major drainage basins.

Distribution.—The species inhabits the upper Rio Mamoré drainage of central Bolivia and the Pantanal region and other swamplands of the upper Rio Paraguai drainage of southwestern Mato Grosso in Brazil, and also probably southeastern Bolivia and northeastern Paraguay, and possibly the Rio Guaporé drainage of northeastern Bolivia (Fig. 1). It is apparently absent from the main Amazon basin just north of the Rio Paraguai and Rio Guaporé watershed limits, the main Rio Paraná drainage to the east, and the Gran Chaco region of the lower Rio Paraguai of central and southern Paraguay and northeastern Argentina.

FIG. 2.—Dorsal view of NMW 1293, holotype of *Platemys macrocephala*.

Diagnosis.—The largest *Platemys* (carapace length up to at least 235 mm), closely related to *P. radiolata*. Shell deeper than other *Platemys*, though similar to *P. radiolata*, with carapace length usually less than 3.0 times carapace depth. Head extremely wide, with carapace length usually less than 4.9 times head width. Skull deep, broad and robust with narrow parietal roof. Maxillary and mandibular triturating surfaces broad and robust with moderately divergent pterygoid trochlear processes. Shell without neurals. Karyotype 2N = 48. Restricted distribution in drainage basins around the upper Rios Mamoré and Paraguai.

Etymology.—The name *macrocephala* refers to the extremely large head size of this species as compared to other *Platemys*.

DESCRIPTION

External Morphology

Carapace.—Broadly oval to moderately elongate (Fig. 2), carapace length averaging 1.42 times carapace width (Table 1). Marginals 1–2 and 8–10 slightly expanded, though not flared. Marginals 3–7 often very slightly recurved, occasionally smooth. Nuchal present, usually approxi-

TABLE 1.—Dimensions of *Platemys macrocephala*, all measurements in mm. CL = straight-line carapace length, CW = carapace width (greatest), CD = carapace depth (greatest in midline), PW = plastron width (at axilla), PL = plastron length (midline), HW = head width (tympanic).

Specimen	Sex	CL	CW	CD	PW	PL	HW	CL/CW	CL/CD	CW/PW	PL/PW	CL/HW
JRM s/n	♂	132	92	47	—	—	32	1.43	2.81	—	—	4.13
MHNRJ 1065	♀	143	103	54	69	121	33	1.39	2.65	1.49	1.75	4.33
TCWC 60665	♂	157	110	58	76	133	35.8	1.43	2.71	1.45	1.75	4.39
AGJR P291	♂	159	114	59	—	—	32.5	1.39	2.69	—	—	4.89
JRM s/n	♀	168	127	65	—	—	39	1.32	2.58	—	—	4.31
AGJR L575	♂	170	116	59	76	138	36.8	1.47	2.88	1.53	1.82	4.62
AGJR L578	♀	181	127	71	91	153	42.8	1.43	2.55	1.40	1.68	4.23
AGJR L576	♂	196	140	66	93	164	43.5	1.40	2.97	1.51	1.76	4.51
NMW 1293	♀	201	149	80	100	175	46.5	1.35	2.51	1.49	1.75	4.32
JRM s/n	♀	205	138	75	—	—	46	1.49	2.73	—	—	4.46
MCZ 163790	♀	213	147	79	102	176	45.1	1.45	2.70	1.44	1.73	4.72
TCWC 60669	♀	220	168	94	108	186	59.3	1.31	2.34	1.56	1.72	3.71
MCZ 163791	♀	235	153	86	102	191	52.3	1.54	2.73	1.50	1.87	4.49

mately twice as long as broad. First vertebral very broad, fifth slightly less so. Second through fourth vertebrals narrower, either slightly longer than wide or slightly wider than long. Very shallow vertebral groove in older animals, extending along vertebrals 2–4. Subadult specimens without groove. No supracaudal notch. Concentric growth lines and indistinct radiating ridges evident on scutes in subadult animals, worn but present in adult animals as well. Shell deep, carapace length averaging 2.60 times carapace depth in females, 2.81 in males (Table 1).

Plastron.—Moderately broad (Fig. 3), plastron length averaging 1.76 times plastron width, carapace width averaging 1.49 times plastron width (Table 1). Anterior lobe either broadly truncate or somewhat oval, wider than or equal in width to posterior lobe. Anal notch relatively deep, either sharply angular or rounded. Intergular broad and long, usually roughly triangular. Mid-plastral seam contact length formula: Ig > Fem > Abd > Hum ≥ An > Pect. Axillary and inguinal scutes not present, though triangular areas of skin encroach onto bridge where these scutes are normally positioned.

Head and soft parts.—Head dark above, light below, with indistinct color demarcation extending from angle of mouth to above tympanum to mid-lateral neck. Dorsal surface of head with large distinct shields, not deeply sculpted; smaller above tympanum and behind orbit, becoming larger and irregular medially and posteriorly. Dorsal surface of neck with few scattered tubercules, rounded or somewhat conical and moderately prominent. Snout markedly blunted. Chin with two very small barbels. Moderately enlarged ischial tubercules, almost becoming spurs. Well-developed pre-tibial flaps. Five claws on forelimbs and four on hindlimbs.

Head extremely wide, carapace length averaging 4.39 times tympanic head width (Fig. 7, Table 1). Occasional older females with massively enlarged head size (Fig. 4).

Color.—The following description is based on six live adult and subadult animals (three females, three males). Carapace dark brown to blackish brown in most individuals, lighter brown in some. Faint lighter brown radiations present on costal scutes in younger specimens.

Plastron dark yellow with irregular dark to light brown pigment extending primarily along suture lines, but often irregular and occasionally covering most of scute, usually leaving central areola immaculate. Older specimens with not as much dark pigment, nearly obliterated in very large individuals.

Iris brownish tan peripherally to silvery gray centrally, with a very thin yellowish-white rim at the pupil edge. No dark horizontal bar.

FIG. 3.—Ventral view of NMW 1293, holotype of *P. macrocephala*.

FIG. 4.—Close-up of head of TCWC 60669, a large female *P. macrocephala* with extremely large head (see Table 1 for dimensions).

Head and neck dark grayish brown dorsally without pattern, yellow ventrally. Demarcation not very distinct. Ventral surface of neck occasionally with faint irregular gray vermiculations. Tympanum and posterior mandible same yellow color as ventral surface of neck, occasionally with a few faint gray blotches, and often with a few scattered, irregular, small orange blotches most prominent around the tympanum. Anterior mandible and ventral portion of maxilla light yellowish gray. Dorsal portion of maxilla gradually merging into darker gray of dorsal head color.

Soft parts of limbs gray dorsally, yellow ventrally, with indistinct demarcation. Pre-tibial flap immaculate yellow. Occasional specimens with a few scattered small orange blotches along zone of color demarcation.

Color of specimens in alcohol very similar to live animals, though orange blotches disappear and yellow fades to yellowish white. No apparent sexual dimorphism in color pattern.

Sexual dimorphism and size.—Males with slightly shallower shells than females, with carapace length averaging 2.60 times depth in females, 2.81 in males (Table 1, Fig. 8 below). Males also with a slight hint of plastral concavity posteriorly and a slightly longer and broader tail. No evident difference in depth or shape of anal notch.

The largest measured female in our series has a straight-line carapace length of 235 mm, though a female photographed by C. Yamashita (AGJR P289) next to a ruler appears to have a carapace length of ca. 270 mm. The largest male in our series measures 196 mm carapace length. This size discrepancy probably represents sexual dimorphism but may reflect the small sample size actually measured ($n = 13$). Of note is that the much larger series of *P. radiolata* examined ($n = 70$) also demonstrates sexual dimorphism of a similar nature and degree.

Osteology

Skull deep, broad and robust (Figs. 5 and 6). Prefrontals sometimes meeting in midline, sometimes narrowly separated, partially isolating anterior processes of frontals from main portion of frontals. Parietal roof narrow due to broad temporal emargination. Moderate posterior emargination with narrow parieto-squamosal arch. No horizontal supraoccipital expansion. Interorbital width broad, postorbital rim wide. Broad exoccipital contact above foramen magnum. Well-developed and moderately divergent pterygoid trochlear

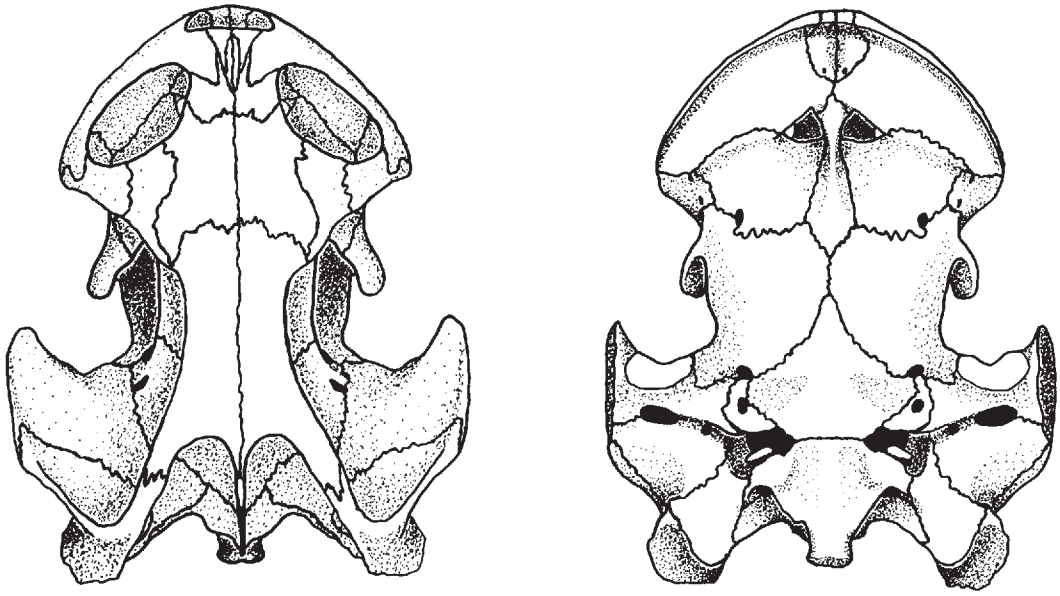

FIG. 5.—Dorsal (top) and ventral (bottom) views of skull of *Platemys macrocephala* (MHNRJ 1065).

processes. Internal choanae small. Maxillary triturating surface extremely robust and wide. Mandible correspondingly robust with rounded anterior aspect. Description of skull based on two specimens (MHNRJ 1065, MCZ 163790).

Cervical spine with central articulation pattern of (2(3(4(5)6)7(8) in one specimen examined. This is the typical pattern for chelid turtles as described by Williams (1950).

Shell without neural bones in three specimens examined.

Ecology

Habitat.—In the Rio Paraguai drainage of Brazil, *P. macrocephala* evidently inhabits the marshes and slow-flowing streams of the Pantanal and adjacent swamplands. In the Rio Mamoré region of Bolivia, it is found in shallow rivulets off the main river.

Reproduction.—The holotype, which was collected at Caiçara, Mato Grosso, on 16 April, contained large, nearly round eggs with hard shells (Siebenrock, 1904). Unfortunately, the number or size of the eggs was not recorded. The climate in the Pantanal region is seasonal, with a rainy season from December to March, and a cool, dry season from June to September (Schaller and Crawshaw, 1982). Nesting of *P. macrocephala* in the Pantanal apparently occurs in April and May as the flood waters from the rainy season begin to recede.

Diet.—In the Pantanal region, *P. macrocephala* feeds extensively on many kinds of Gastropoda, especially snails of the genera *Pomacea* and *Marisa*, whose shells they crush easily (Carlos Yamashita, personal communication). In captivity, the species is exclusively carnivorous and readily piscivorous.

DISCUSSION

The holotype of *Platemys macrocephala* (NMW 1293), collected by Natterer in 1826, was first described as a *P. radiolata* by Siebenrock (1904). Siebenrock credited Fitzinger as having earlier labeled the specimen "*Phrynops schoepffii*," though this name was never defined and must be considered a nomen nudum. The name

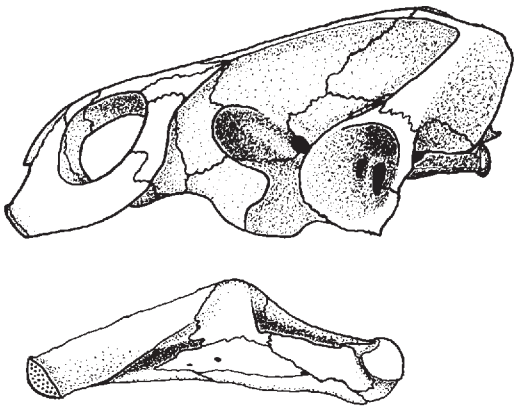

FIG. 6.—Lateral view of skull (top) and medial view of right mandible (bottom) of *Platemys macrocephala* (MHNRJ 1065).

was mentioned by Siebenrock (1904:22, 27), who noted that two specimens labeled by Fitzinger in the Vienna collection bore this designation. One of these is the present holotype of *P. macrocephala*, the other (NMW 15762, from Cuiabá, Mato Grosso, Brazil) represents a specimen of *Phrynops vanderhaegei*, originally felt by Siebenrock (1904) to be a *Phrynops gibbus*.

The second specimen of *P. macrocephala* to be discovered was the paratype from Cáceres (MHNRJ 1065), collected in 1908. Based on these two specimens, E. E. Williams and P. E. Vanzolini in the late 1950's tentatively recognized this animal as an undescribed form. However, because of the limited material available of this and other *Platemys* species, a description never materialized. In 1972, Williams and Vanzolini turned over the revision of the Chelidae to two of us (AGJR and RAM). We have since examined a large number of *Platemys* specimens. However, it was not until 1979 that other specimens of *P. macrocephala* were found. In November of that year, we received photographs of a live *P. macrocephala* collected in the Pantanal by P. G. Crawshaw, Jr., and within the next year, one of us (JRM) recognized several specimens in shipments of live chelid turtles imported by the pet trade into the United States from central Bolivia. Later, we received photographs by C. Yamashita of another live *P. macrocephala* from the Pantanal. This raised the number of known specimens of *P. macrocephala* to 15, and examination of these made it clear that we were dealing with a distinct species.

Platemys macrocephala is most closely related to *P. radiolata*. Several features, however, differentiate the two species (Table 2). *P. macrocephala* can be distinguished from *P. radiolata* primarily on the basis of its greater head width (Fig. 7). This distinction is especially notable in animals of carapace length >130 mm, where there is a marked and unmistakable dif-

TABLE 2.—Characters differentiating *Platemys macrocephala* from *P. radiolata*.

Character	*P. macrocephala*	*P. radiolata*
Head width	wide	narrow
Shell depth	very deep	moderately deep
Approx. maximum carapace length (mm)	♀: 235; ♂: 196	♀: 196; ♂: 174
Skull depth	deep	shallow
Postorbital rim	broad	narrow
Interorbital width	wide	narrow
Parietal roof width	very narrow	moderately narrow
Pterygoid trochlear processes	moderately divergent	minimally divergent
Maxillary triturating surface	broad and robust	narrow
Mandibular triturating surface	broad	narrow
Mandible shape	rounded	angular
Karyotype	2N = 48	2N = 50
Serum electrophoretic pattern	wide gap between anodal lines 1 and 2	narrow gap between anodal lines 1 and 2

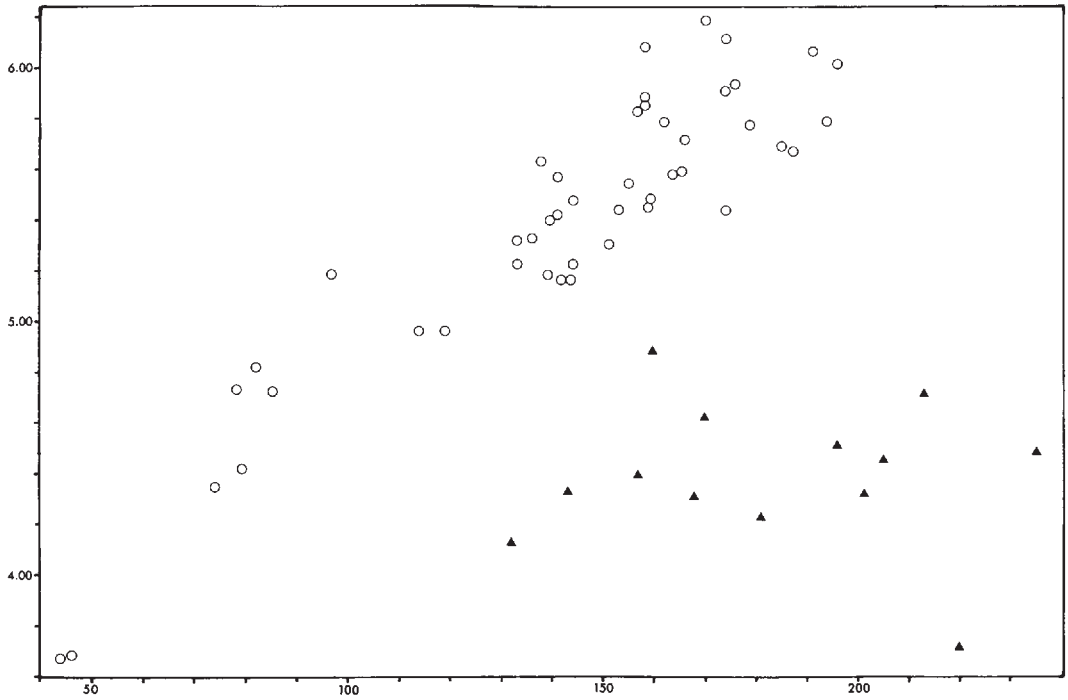

FIG. 7.—Graph plotting ratio of carapace length divided by tympanic head width (vertical axis) versus carapace length in mm (horizontal axis) for *Platemys macrocephala* (triangles) and *P. radiolata* (circles).

ference in head width. Individuals of *P. macrocephala* <130 mm have not been seen, and it is not known whether head size differences decrease in smaller animals. In general, *P. macrocephala* also has a slightly deeper shell than *P. radiolata* (Fig. 8). Whereas this distinction is subject to a great deal of overlap, males of *P. macrocephala* have notably deeper shells than males of *P. radiolata*. In females, this difference is less marked. *Platemys macrocephala* is also a larger animal than *P. radiolata*, with maximum known carapace lengths measuring 235 (or possibly ca. 270) and 196 mm respectively for females of the two species, 196 and 174 mm respectively for males.

Several features of skull osteology also differentiate the two species (Table 2). The skull of *P. macrocephala* is deep and robust with a broad postorbital rim and wide interorbital region. The skull of *P. radiolata* (based on three specimens: MCZ 3467 and 3779, Brazil; MCZ 3741, Linares, Rio Doce, Espirito Santo, Brazil) is shallower and less robust, with a narrow postorbital rim and narrow interorbital region. The parietal roof width is narrower in *P. macrocephala* than in *P. radiolata*. *P. macrocephala* has broad and robust maxillary and mandibular triturating surfaces, with moderately divergent pterygoid trochlear processes and a rounded mandible, whereas *P. radiolata* has finer, narrower maxillary and mandibular triturating surfaces, with minimally divergent pterygoid trochlear processes and a slightly angular mandible.

The karyotypes of the two species are also different, with 2N = 48 for *P. macrocephala* and 2N = 50 for *P. radiolata* (Karen McBee, John W. Bickham, AGJR, and RAM, unpublished data). Finally, the serum electrophoretic patterns are differ-

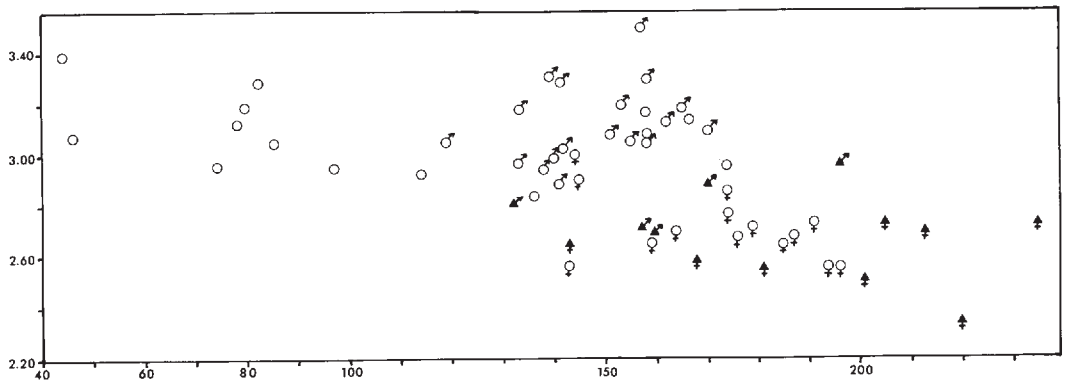

FIG. 8.—Graph plotting ratio of carapace length divided by carapace depth (vertical axis) versus carapace length in mm (horizontal axis). Symbols as in Fig. 7, except male/female symbols superimposed.

ent, as determined by Frair (1982) utilizing a *P. macrocephala* designated as *Platemys* sp.

The geographic ranges of the two species are widely allopatric. *Platemys macrocephala* is limited to the drainage basins of the upper Rios Mamoré and Paraguai, and *P. radiolata* exhibits a disjunct distribution, with the main part of its range in the coastal zone of eastern Brazil and an isolated population in the Amazonian portion of Mato Grosso of Brazil (Fig. 1; and Rhodin et al., in press). In the lower Rio Paraguai, *P. macrocephala* is replaced by *P. pallidipectoris*, which inhabits the drier Gran Chaco regions of Paraguay and Argentina (Rhodin, 1981, 1982), but whether these two species are allopatric or sympatric is not known. In the Rio Mamoré drainage, *P. macrocephala* is sympatric with several chelid turtles at the southern extremes of their Amazonian basin distribution. Our examination (AGJR and RAM) of nearly one thousand South American chelid turtles demonstrates sympatry in this region between *Platemys macrocephala* and *P. platycephala*, *Chelus fimbriatus*, *Phrynops nasutus*, and *Phrynops geoffroanus*. In the Rio Paraguai, *P. macrocephala* is sympatric with three chelid turtles, *Phrynops vanderhaegei*, *Phrynops geoffroanus*, and a new species of *Phrynops* similar to *P. vanderhaegei*. Of note is that only two chelid turtles, *Platemys macrocephala* and *Phrynops geoffroanus*, demonstrate distributions which span the watershed limit at ca. 250 m elevation between the upper Rio Mamoré of the Amazonian drainage basin and the upper Rio Paraguai of the Rio Paraná drainage basin.

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