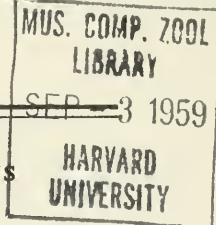


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Description of a New Softshell Turtle From the Southeastern United States

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Examination of softshell turtles allied to *Trionyx muticus* from the southeastern United States discloses the presence of an undescribed subspecies inhabiting river systems of the Gulf Coast.

The author is indebted to Mr. Roger Conant for constructive criticism of the manuscript. I am grateful also to many fellow students for assistance in field work or for other courtesies, especially William E. Brode, Franklin Sogandares-Bernal, Ernest A. Liner, Donald W. Tinkle, Paul K. Anderson, and John K. Greer. The photographs were provided through the cooperation of Roger and Isabelle Hunt Conant and John M. Legler.

Collections from which specimens were obtained are as follows: TU (Tulane University), USNM (United States National Museum), MCZ (Museum of Comparative Zoology, Harvard College), CNHM (Chicago Natural History Museum), KU (Museum of Natural History, University of Kansas), UI (Museum of Natural History, University of Illinois).

Measurements (in millimeters) were made with a Vernier caliper and a metal tape; those of the holotype were made to the nearest one-tenth millimeter. Plastral length was measured from the posterior edge of the plastron to the anteriormost edge of the ventral surface; other measurements were maximal. Depth of shell was taken only on hatchlings and an immature female. Hatchlings were arbitrarily designated as specimens having plastrons shorter than 44 mm; sex of all specimens except adult males was determined by dissection unless otherwise noted.

Trionyx muticus calvatus new subspecies

Gulf Coast Smooth Softshell

Amyda mutica (in part), Stejneger, Bull. Mus. Comp. Zool., 94(1):23-24, 1944.

Amyda muticus (in part), Cook, Jour. Mississippi Acad. Sci., 1941-1947, p. 185, 1946.

Trionyx muticus Anderson, Copeia, 3:211, August 28, 1958.

Holotype.—UI 31071, hatchling, sex undetermined, from the Pearl River, Roses Bluff, 14 miles northeast Jackson, Rankin County, Mississippi; obtained by William F. Childers on August 25, 1952 (Plate 1).

Paratypes.—A total of 20 alcoholic specimens: TU 17301, hatchling male (Plate 2). TU 17302-1, 16682, three hatchling females, and TU 13473,

adult female, from the Escambia River, 2 miles east and 1 mile north of Century, Escambia County, Florida; TU 17306, adult female, from the Pearl River, 9 miles south of Monticello, Lawrence County, Mississippi; USNM 7655, hatchling, sex undetermined, and KU 47117-19, three adult males, from the Pearl River, 1 mile south to 4 miles north of Monticello, Lawrence County, Mississippi; TU 17303-.4, 17304-.3, five hatchling males and four hatchling females, from the Pearl River, Varnado, Washington Parish, Louisiana; TU 17305, immature female, no data.

Diagnosis and definition.—A subspecies of softshell turtle most closely allied to *Trionyx muticus muticus* but differing from that subspecies in having: (1) a juvenal pattern of large, circular spots, (2) no stripes on dorsal surface of snout, and (3) postocular stripe with thick, black borders immediately behind eye in adult males. *T. m. calvatus* resembles *T. m. muticus*, and differs from the several subspecies of *Trionyx spinifer* in having: (1) no enlarged tubercles on anterior edge of carapace, (2) no ridge projecting from nasal septum, and (3) a smooth dorsal surface on carapace in adult males. *T. m. calvatus* and *T. m. muticus* resemble *T. ferox* in having a smooth dorsal surface on carapace in adult males, but differ from *T. ferox* in having: (1) no tubercles along anterior edge of carapace, and (2) no ridge projecting from nasal septum.

Description of holotype.—Carapace circular, widest at region of bridge; margin entire; dorsal surface smooth; anterior margin of carapace lacking tubercles; blunt vertebral ridge evident anteriorly; maximum length, 53.1 mm; greatest width, 46.3 mm; greatest depth, 11.5 mm.

Plastron small, extending slightly farther forward than carapace; anterior lobe truncate with slight midventral indentation; posterior lobe rounded, sides forming acute angle; certain features of bony elements of plastron visible through overlying skin; width of bony bridge, 4.5 mm; maximum length of plastron, 37.5 mm.

Head extended to level of eyes; head terminating in long, rounded, flexible snout; nostrils rounded with no ridges projecting from nasal septum; jaws closed, each covered by fleshy lips except anteriorly where horny portions of jaws are exposed; iris with dark stripe through pupil.

Forefeet and hind feet well-webbed and with five digits each; each limb with nails on first three digits; dorsal surface of each forelimb with four cornified areas, three of which have a free edge; each hind limb with two cornified areas, one smooth on posterodorsal surface and other with free edge on posteroventral surface.

Tail terminating in flexible point and not extending beyond posterior edge of carapace; anus to tip of tail, 2.6 mm; anus to posterior edge of carapace, 8.1 mm.

In preservative: Ground color of carapace dark tan having pattern of 49 brownish spots; 47 spots circular; two spots noticeably elongate, one representing fusion of two circular spots; 17 spots on carapace not exceeding 2.0 mm in diameter, whereas 32 spots range from 2.5 to 4.0 mm in diameter; periphery of carapace pale except anteriorly; maximum width of pale margin (posteriorly), 3.3 mm; junction of pale margin and dorsal ground color formed by rough-edged line composed of small, closely-set dots; pattern of fine punctations and other marks on dorsal surface of forelimbs and hind limbs.

Ground color of underparts whitish, lacking markings; top of head and snout gray, lacking markings; lower eyelids with small dark dots.

Description of paratypes.—Adult females (2 specimens). No striping on dorsal surface of snout; pale postocular stripe not distinct, dark borders obscure (head not extended in TU 13473); carapace circular, pale brown with mottled pattern; carapace lacking pattern of large spots; dark marks present in pale margin of carapace; dorsal surface of soft parts of body finely stippled, larger marks on hind limbs and on anterior surface of forelimbs near their insertions; plastron and ventral surface of soft parts of body without markings. Maximal measurements, respectively, are: length of plastron, 172 and 180 mm; length of carapace, 238 and 263 mm; width of carapace, 203 and 218 mm; width of head, 28 and ? mm.

Immature female (1 specimen). Carapace circular having juvenal pattern of large spots, some of which have borders darker than their centers and are best described as ocelli; junction of pale margin and ground color of carapace formed by ill-defined, ragged dark border; dorsal surface of forelimbs and hind limbs finely streaked and dotted, larger marks occurring toward insertions of forelimbs; lower border of pale postocular stripe in contact with upper margin of postlabial pale stripe; no stripes on dorsal surface of snout; fine markings on dorsal surface of neck. Maximal measurements are: length of plastron, 56 mm; length of carapace, 82 mm; width of carapace, 77 mm; depth of shell, 13 mm; width of head, 12 mm.

Adult males (3 specimens). No striping on dorsal surface of snout; pale postocular stripe with thick, black borders immediately behind eye; width of black borders equal to approximately one-half width of pale postocular stripe; dorsal surface of soft parts of body with indistinct markings that are larger on hind limbs; plastron and ventral surface of soft parts of body without markings; small dark spots posteriorly along ventral edge of carapace; pale margin of carapace lacking markings or having few small black spots; carapace circular with or without pattern of large spots. Maximal measurements of smallest and largest specimens, respectively, are: length of plastron, 108 and 118 mm; length of carapace, 160 and 177 mm; width of carapace, 142 and 152 mm; width of head, 21 mm.

Hatchlings (14 specimens). These paratypes resemble the holotype in all features mentioned; markings on neck tend to form longitudinal streaks in TU 17303 and 17304. There are no secondary sexual differences in hatchling turtles.

There is some variation in hatchling turtles. Four from the Escambia River have dorsal spots 3 mm or larger in greatest diameter and on three specimens the dorsal spots number 27, 37 and 37 (total number not discernable in TU 16682); none of the dorsal spots is ocellate. Maximal measurements of these three hatchlings, respectively, are: length of plastron, 35, 36 and 37 mm; length of carapace, 50, 50 and 52 mm; width of carapace, 44, 45 and 47 mm; depth of shell, 11 mm; width of head, 9 mm. Nine hatchlings from the Pearl River at Varnado have more (all small) dorsal spots, which may be ocellate. The dorsal spots and ocelli do not exceed 2 mm in their greatest diameter except that some of those of TU 17304 are 3 mm; the spots range in number from 38 (TU 17303) to 63 (TU 17304). Maximal measurements of the smallest and largest specimens, holotype excepted, are: length of plastron, 30

and 33 mm; length of carapace, 42 and 46 mm; width of carapace, 37 and 43 mm; depth of shell, 9 and 10 mm; width of head, 9 and 10 mm. The holotype resembles hatchlings from the Escambia River in having large, non-ocellate dorsal spots 3 mm in greatest diameter, and larger measurements.

One other specimen (not designated as a paratype), consisting of a head with a few attached cervical vertebrae, was obtained on a sand bank of the Escambia River, Florida. The postocular stripe, bright yellow with black borders, was especially vivid in this adult male (KU 47116).

Range.—*Trionyx m. calvatus* is known from the Pearl, Pascagoula and Escambia river drainages and is to be expected in the Tombigbee-Alabama river drainage (Fig. 1). Tinkle (1958:41, fig. 53, stippled) has indicated the probable range of *calvatus*. This subspecies is unknown from the Mississippi and Tennessee river drainages, which are inhabited by *T. m. muticus*. The

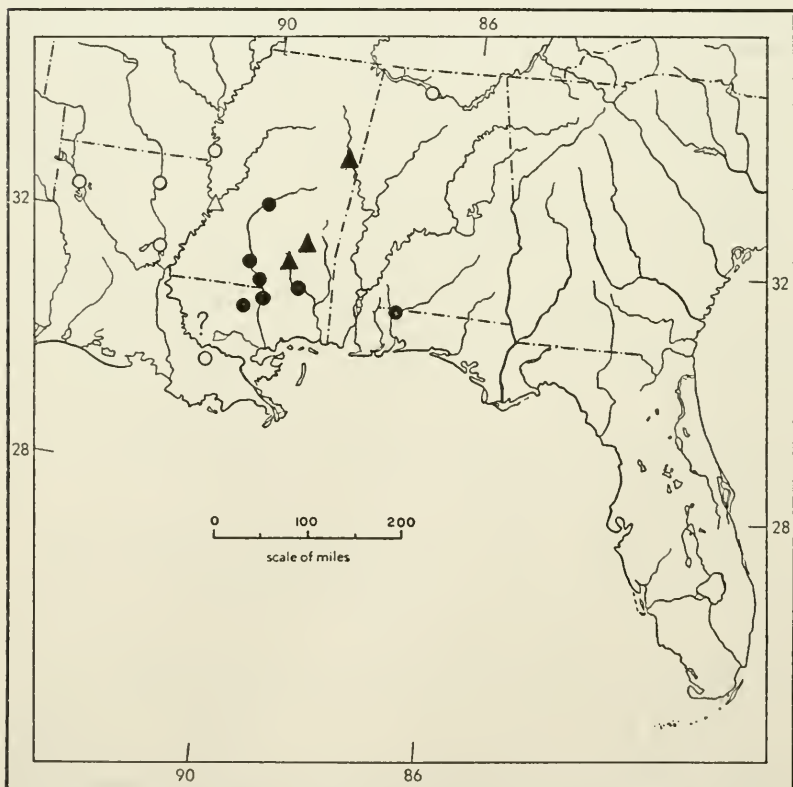


FIG. 1. Map of southeastern United States showing record stations of *Trionyx muticus calvatus* (solid symbols) and *Trionyx m. muticus* (open symbols). Circles indicate specimens examined; triangles indicate records in the literature. The question mark refers to a specimen bearing catalogue number 17236 in the collection of Tulane University (see comments on page 524 concerning No. 17236 from the Amite River).

western limit of distribution is the Pearl River drainage and probably those streams of the Florida Parishes of Louisiana that drain into Lake Ponchartrain. The most easterly record of occurrence for *T. m. calvatus* is in the Escambia River drainage; the eastern extent of geographic range is not known.

I have seen three preserved young turtles having the characteristic spotted pattern from the Pascagoula drainage in eastern Mississippi. These specimens are uncatalogued and in the collections at Mississippi Southern College, Hattiesburg, Mississippi.

There is a specimen of *T. m. muticus* labeled as from Mobile, Alabama (MCZ 1596), for which I believe the locality datum is incorrect. It is a young turtle having a well-defined pattern on the carapace and is without doubt a representative of *T. m. muticus*. Mobile is in the large drainage basin, of the Tombigbee, Black Warrior, Coosa and Alabama rivers, which is between the Escambia and Pearl rivers.

Yarrow (1882:28) reported a specimen of *Amyda mutica*, USNM 11630, from Gainesville, Florida. This record was questioned by Cahn (1937:179), and has been disregarded by subsequent authors. Stejneger (1944:23) lists this specimen number with uncertainty from Mt. Carmel, Illinois. The exact geographic provenance of this specimen is seemingly unknown.

Habitat.—I have collected eggs of *T. m. calvatus* on sand banks of the Escambia River, Florida. The Escambia River has a sand-gravel bottom, extensive sandy banks, a moderately-rapid current, and is flanked by a thick riparian forest. It is approximately 80 feet wide with fallen trees and brush intermittently emergent along the shoreline. The sand bar-habitat along the Pearl River has been mentioned by Anderson (1958:212). All records thus far are from lotic habitats.

Comparisons.—*Trionyx m. calvatus* is most closely related to *Trionyx m. muticus*. Both subspecies have the following characteristics: (1) no enlarged tubercles on the anterior edge of the carapace, (2) no ridge projecting from the nasal septum, and (3) a smooth carapace in adult males. These characters distinguish these two subspecies from the several subspecies of *T. spinifer*, and, except for the smooth carapace in adult males, from *T. ferox*. Another feature of *T. m. calvatus* and *T. m. muticus*, not known to be definitive or diagnostic but noticed on occasion, is the pale orange cast, in life, of the dorsal surface of the carapace and soft parts of the body in young of these turtles.

The spotted pattern of juveniles of *calvatus* is easily distinguished from the pattern of *muticus* (small dots, streaks and dashes) figured by Agassiz (1857, vol. 2, pt. 3, pl. 6, fig. 6), Smith (1950:154, fig. 104), Conant (1938:192, pl. 21, fig. 1; 1958, pl. 11, opposite p. 94), and Cahn (1937:177, pl. 24C).

Unfortunately, the distinctive dorsal spotting in young *calvatus* becomes obscure or absent in some adults of both sexes. Spotting in large males is not so well-defined as in juveniles; it may be absent (TU 17306.3), or indicated by two obscure spots (KU 17117), but is usually evident, at least posteriorly. The spotted pattern is absent in large females, which have a pale, mottled and blotched pattern of lichen-like figures; dorsal spots are obscure in TU 17305 (length of plastron, 56 mm).

Two additional features are, so far as known, universal in *calvatus*; these are: (1) the absence of striping on the dorsal surface of the snout, and (2)

the presence of thick, black borders of the postocular stripe in adult males. These features have also been observed in some specimens of *muticus*; their presence in *muticus* cannot be properly evaluated at this time, and is seemingly not due to individual variation. These two characters, however, coupled with the distinctive juvenile pattern of spots, serve, in combination, to distinguish *calvatus* from *muticus*.

Discussion.—The two populations are recognized as subspecies because: (1) there is close resemblance, (2) the diagnostic characters pertaining to pattern are few and superficial, and (3) the geographic ranges are allopatric, but juxtaposed. It is probable that *muticus* and *calvatus* would be capable of interbreeding if they were not spatially isolated. It should be pointed out, however, that there is no evidence of intergradation between *muticus* and *calvatus* in the lower Mississippi Valley as has been reported for the subspecies of *T. spinifer* (Conant and Goin, 1948), and that the degree of difference between *calvatus* and *muticus* is greater than that between some subspecies of *T. spinifer*.

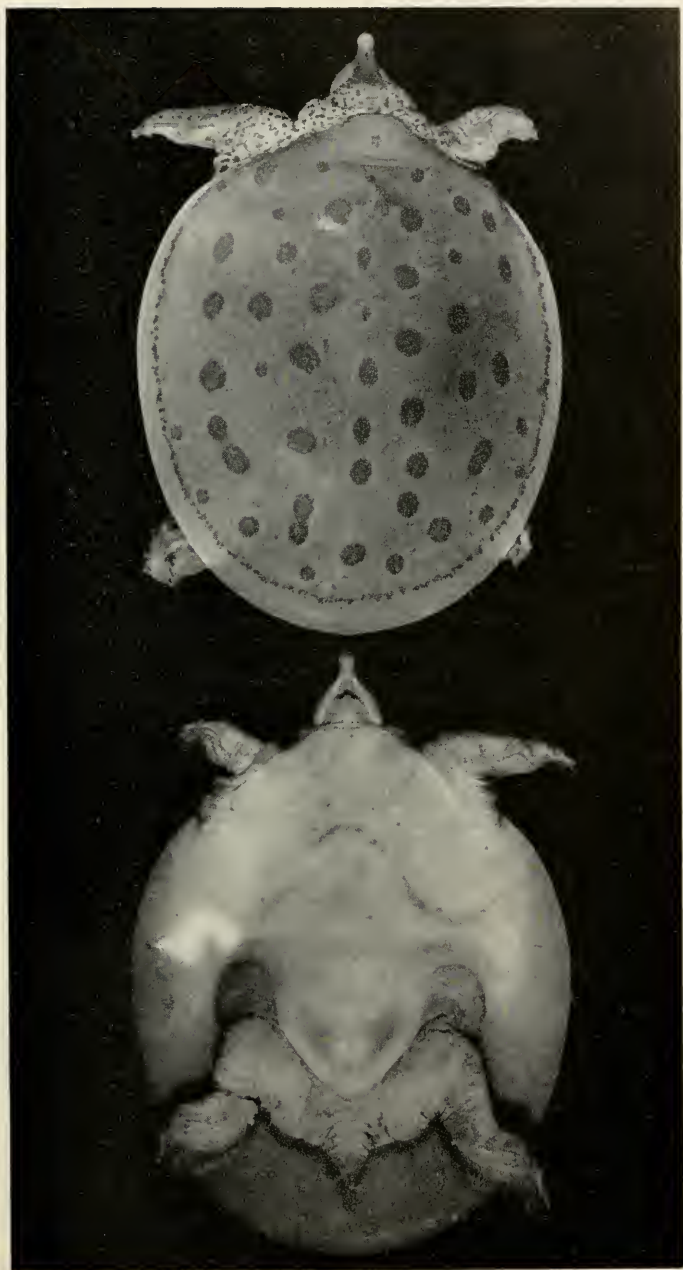
Specimens examined.—All the localities listed below are plotted on the distribution map (Fig. 1). Only those specimens of *T. muticus muticus* are listed that serve to delimit the range of *T. m. calvatus*. Fortunately, the identification of the specimens of *muticus* is certain as all show the characteristic juvenile pattern, except the large female, TU 7543, from southeastern Louisiana. USNM 95133-34 (carapaces and plastrons only) and TU 17236 are females, which lack the diagnostic spotted pattern of *calvatus*; the former are referred to this subspecies on geographic grounds (Pearl River at Columbia, Mississippi). TU 17236, from the Amite River, is dubiously relegated to *calvatus* on the supposition that this river and others in the Lake Ponchartrain drainage will yield the characteristic juveniles.

Trionyx m. calvatus (33 specimens): TU 13473, 16682, 17301, 17302-1, KU 47116 (skull only), Escambia River, 2 miles east, 1 mile north Century, Escambia Co., Florida; TU 17303-4, 17304-3, Pearl River, Varnado, Washington Par., Louisiana; TU 17306-3, Pearl River, 9 miles south Monticello, Lawrence Co., Mississippi; TU 16956, KU 47117-19, USNM 7655, Pearl River, vicinity of Monticello, Lawrence Co., Mississippi; TU 17236?, Amite River, near Baton Rouge, Louisiana; TU 13795, Bogue Chitto River, Enon, Washington Par., Louisiana; TU 17305, no data, Louisiana; USNM 95133-34, Pearl River, Columbia, Marion Co., Mississippi; UI 31071, Pearl River, 14 miles northeast Jackson, Rankin Co., Mississippi; Uncatalogued, see page 523, Leaf River, 3 miles southeast New Augusta, Perry Co., Mississippi.

Trionyx m. muticus (6 specimens): TU 5989, Ouachita River, Monroe, Ouachita Par., Louisiana; TU 7543, Vacherie, St. James Par., Louisiana; CNHM 7845, Gayles, Caddo Par., Louisiana; USNM 92605, Greenville, Washington Co., Mississippi; USNM 113228, Jonesville, Catahoula Par., Louisiana; USNM 118167, Wheeler Reservoir, Tennessee River, Alabama.

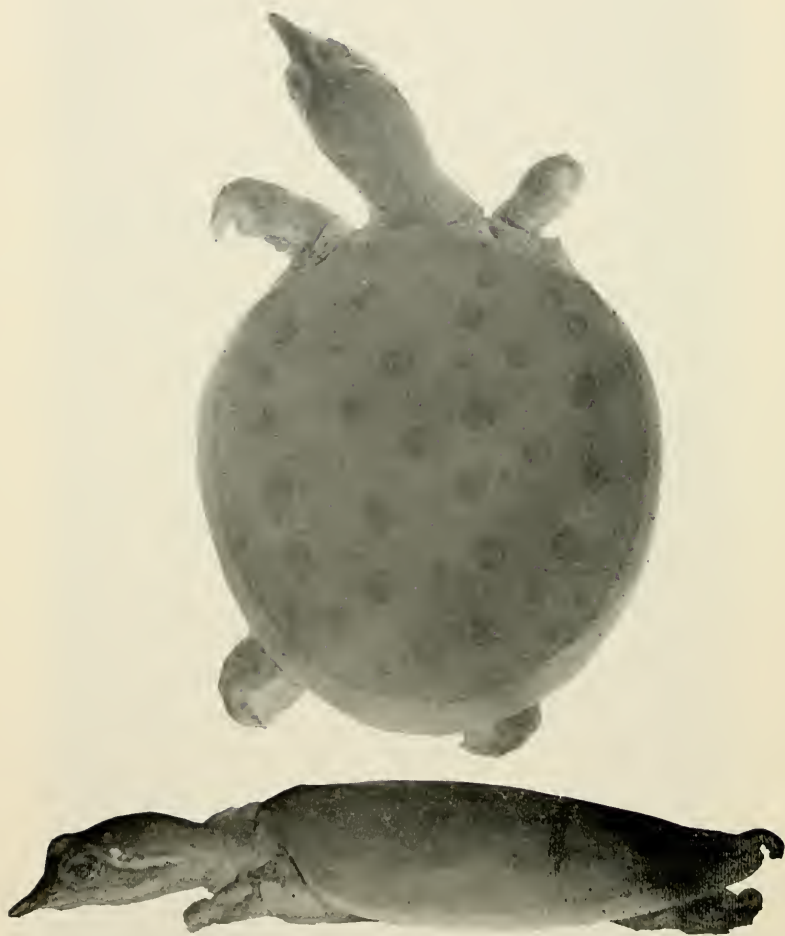
Records in the Literature.—USNM 113228, referred to above as *Trionyx m. muticus* is listed by Stejneger (1944:56) as *Amyda s. spinifera*; four of the specimens listed above (USNM 7655, 92605, 95133-34) are recorded by Stejneger (*op. cit.*:23-34) as *Amyda mutica*. Cook (1946:185) records seven specimens of the *muticus* group from Mississippi as follows: 1, no data; 1, Vicksburg, Warren Co.; 3, Forrest Co.; 1, Crawford Bridge, Jones Co.; 1, Lake Park, Columbus, Lowndes Co. I have not seen these specimens;

PLATE 13



Trionyx muticus calvatus new subspecies, hatchling, UI 31071, holotype ($\times 1.3$). Top, dorsal view. Bottom, ventral view. Photographs by John M. Legler.

PLATE 14



Trionyx muticus calvatus new subspecies, hatchling male, TU 17301, paratype ($\times 1.3$). Top, dorsal view. Bottom, lateral view of left side. Photographs by Isabelle Hunt Conant.

they are plotted on the distribution map—the one from Vicksburg as *muticus* and the others as *calvatus* on geographic grounds. The hatchlings of *Trionyx muticus* referred to by Anderson (*loc. cit.*) include the nine paratypes from Varnado, Louisiana.

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