

Catalogue of American Amphibians and Reptiles.

ERNST, CARL H., AND R. BRUCE BURY. 1982. *Malaclemys, M. terrapin*.

***Malaclemys* Gray
Diamondback Terrapin**

Malaclemys Gray, 1844:28. Type-species, *Testudo concentrica* Shaw, 1802, by monotypy.

Malacoclemmys: Agassiz, 1857:437. Invalid emendation to suit etymology.

Malaclemmys: Fowler, 1906:112. Improper spelling emendation.

• CONTENT. One species, *Malaclemys terrapin*.

• DEFINITION. Adult females range from 15–23 cm in carapace length; males, 10–14 cm. The carapace is low, widest behind the bridge, and sculptured by retention of the successive growth layers of each scute. The mid-dorsal keel is variably developed, usually low and continuous; in some races, it possesses a series of dorsal knobs at posterior edge of each vertebral scute. The nuchal notch is broad, the cervical scute nearly as wide as long. The posterior margin of the carapace is smooth or only lightly serrate; the posterior peripherals may be upturned. The plastron is large, anchored to the carapace by a wide bridge, and bears a shallow notch posteriorly. The humeropectoral sulcus does not cross the endoplastron. The skull is short and broad. The frontal bone often enters the orbit, the maxilla not or narrowly in contact with quadratojugal, a large posterior process of pterygoid in contact with exoccipital. The triturating surface on the maxillae and palatines is smooth, wide in females, narrow in males. Cervical vertebrae II–VIII are subequal in length with articulation formula, 2((3((4)5))(6εε7εε8)). The carapace is gray, brown, or black; the plastron usually yellowish with dark blotches or flecks. The skin of head, neck, and limbs is gray or tan, commonly with numerous dark spots. Adult females have proportionately broader heads than males; males have longer, thicker tails.

• DESCRIPTIONS, ILLUSTRATIONS, DISTRIBUTION, FOSSIL RECORD, AND PERTINENT LITERATURE. See species account.

• REMARKS. McDowell (1964) revived Boulenger's inclusion (1889) of the map turtles, genus *Graptemys*, in *Malaclemys*. *Graptemys* was not recognized even as a subgenus, because the differences between *M. terrapin* and *G. kohni* are no greater than those between *G. kohni* and *G. geographica*. This arrangement was not widely accepted, e.g., Ernst and Barbour (1972), McKown (1972), Dobie and Jackson (1979). Wood (1977) felt that McDowell had not made a convincing case for the all inclusive *Malaclemys* and presented other evidence suggesting the origin of many, if not all, *Graptemys* from *Malaclemys*. However, Dobie (1981) showed *Malaclemys* to differ substantially from *Graptemys* in osteology, which raises serious questions about *Malaclemys* as the immediate ancestor of the *Graptemys*.

• ETYMOLOGY. The generic name *Malaclemys* (masculine) is derived from the Greek *malakos*, soft, apparently referring to their soft-bodied molluscan prey, and the Greek *klemmys*, turtle.

***Malaclemys terrapin* (Schoepff)
Diamondback terrapin**

Testudo terrapin Schoepff, 1793:64. Type-locality, "Habitat in America septentrionali . . . in foris Philadelphiae, . . . in aquis fubdulcibus Infulae Longae capto, . . ." restricted to "coastal waters of Long Island [New York]" by Schmidt (1953:95). Holotype, undesignated.

Testudo concentrica Shaw, 1802:43. Type-locality, ". . . markets at Philadelphia [Pennsylvania]." Holotype, undesignated.

Testudo centrata Latreille, in Sonnini and Latreille, 1802:145. See *M. t. centrata*.

Emys ocellata Link, 1807:52. Type-locality, "North America," restricted to "Philadelphia markets [Pennsylvania]" by Schmidt (1953:96). Holotype, undesignated.

Emys centrata: Schweigger, 1814:32. See *M. t. centrata*.

Testudo concentrata: Kuhl, 1820:78. Lapsus for *concentrica*.

Emys terrapin: Holbrook, 1842:87.

Emys macrocephalus Gray, 1844:26. Type-locality, "America(?)", restricted to "Philadelphia markets [Pennsylvania]" by Schmidt (1953:96). Holotype, undesignated; see COMMENT.

Malaclemys concentrica: Gray, 1844:28.

Malaclemys tuberculifera Gray, 1844:29. Type-locality, "California," in error; restricted to "Philadelphia market [Pennsylvania]" by Schmidt (1953:96). Holotype, British Mus. (Natur. Hist.) 1947.3.5.29 (38h), juvenile shell, collector and date unknown (not examined by authors).

Emys pileata Wied, 1865:17. See *M. t. pileata*.

Malacoclemmys terrapin: Boulenger, 1889:89.

Malaclemys terrapin: Bangs, 1896:159. First use of combination.

Malaclemmys macrospilota Hay, 1904:16. See *M. t. macrospilota*.

Malaclemmys littoralis Hay, 1904:18. See *M. t. littoralis*.

• CONTENT. Seven subspecies are recognized: *Malaclemys terrapin terrapin*, *M. t. centrata*, *M. t. pileata*, *M. t. macrospilota*, *M. t. littoralis*, *M. t. rhizophorum*, and *M. t. tuesta*.

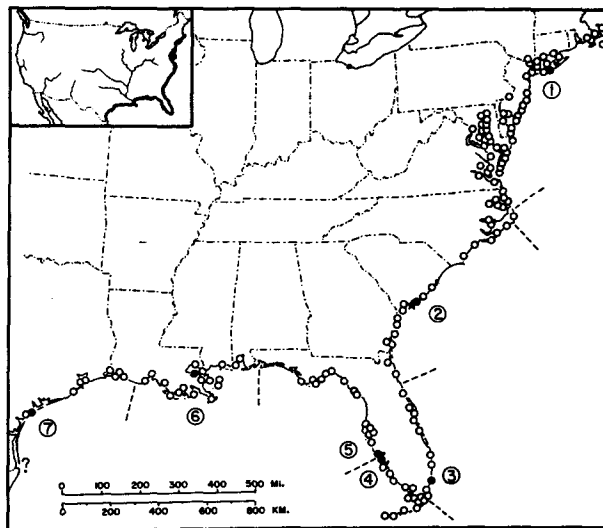
• DEFINITION. See generic account.

• DESCRIPTIONS. General descriptions are in Carr (1952), Ernst and Barbour (1972), and Pritchard (1979). Other descriptions: eggs (Ernst and Barbour, 1972; Ricklefs and Burger, 1977); juveniles (Ernst and Barbour, 1972); skull (Gaffney, 1979); pelvis (Zug, 1971; Walker, 1973); vertebrae (Williams, 1950); shell (Zangerl, 1969); carapacial seams (Tinkle, 1962); karyotype (Forbes, 1966; Stock, 1972); penis (Zug, 1966); orbital glands (Cowan, 1969); retina (Underwood, 1970); digestive tract (Parsons and Cameron, 1977); choanae (Parsons, 1968).

• ILLUSTRATIONS. Color illustrations of adults occur in Ernst and Barbour (1972) and Pritchard (1979); other illustrations of adults and young are in Carr (1952), Reid (1955), Ernst and Barbour (1972) and Pritchard (1979). Anatomical illustrations are: skull (Ernst and Barbour, 1972; Gaffney, 1979); pelvic girdle (Zug, 1971); shell growth annuli (Zangerl, 1969); penis (Zug, 1966); orbital glands (Cowan, 1969; Dunson, 1976); choanae (Parsons, 1968).

• DISTRIBUTION. Unlike other emydid turtles, *M. terrapin* frequents coastal salt and brackish waters, often with populations in estuaries, tidal marshes, and protected bays. It occurs from Cape Cod, Massachusetts, to Corpus Christi Bay, Texas. Unverified reports of the species from south Texas (to Brownsville) or Mexico include: Strauch (1890), Hay (1904), and Carr (1952); see Smith and Smith (1979) for details.

• FOSSIL RECORD. Dobie and Jackson (1979) reported Pleistocene remains from South Carolina.



MAP. The solid circles mark the type-localities; open circles other selected localities. The star marks the fossil locality.

• **PERTINENT LITERATURE.** General accounts (Carr, 1952; Ernst and Barbour, 1972). Other topics: evolution (McKown, 1972; Wood, 1977; Dobie, 1981); taxonomy (Stejneger, 1936; Mittleman, 1944, 1945; McDowell, 1964); blood protein patterns (Dessauer, 1970); circulatory physiology (Goin and Jackson, 1965; Hutchison and Szarski, 1965; Szarski and Czopek, 1966; Englebert and Young, 1970; Saint-Girons, 1970; Gilles-Baillien, 1973a; White, 1976; Frair, 1977); respiration (McCutcheon, 1943); osmotic regulation (Schmidt-Nielsen and Fange, 1958; Thorson, 1968; Cowan, 1969, 1971, 1974; Bentley et al., 1967; Gilles-Baillien, 1970, 1973a, b, c; Dunson, 1970, 1976; Dunson and Dunson, 1975; Bentley, 1976; Robinson and Dunson, 1976); artificial propagation (Coker, 1906, 1920; Hay, 1917; Barney, 1922; Hildebrand and Hatzel, 1926; Hildebrand, 1929, 1932, 1933); scute abnormalities (Coker, 1910; Hildebrand, 1930); growth (Hildebrand, 1930; Cagle, 1952; Allen and Littleford, 1955); food (Allen and Littleford, 1955); reproduction and development (Barney, 1922; Cunningham and Hurwitz, 1936; Cunningham, 1939; Cunningham et al., 1939; Reid, 1955; Burns and Williams, 1972; Burger and Montevecchi, 1975; Montevecchi and Burger, 1975; Burger, 1976a, b, 1977; Ricklefs and Burger, 1977; Seigel, 1979, 1980a, b); barnacle fouling (Jackson and Ross, 1971; Ross and Jackson, 1972; Jackson et al., 1973); populations (Cagle, 1952; Hurd et al., 1979); brumation (Lawler and Musick, 1972; Lazell, 1979); parasites (Ernst and Ernst, 1977); arboviruses (Hoff and Trainer, 1973); predation (Seigel, 1980c); orientation (Burger, 1976a); temperature relations (Hutchison et al., 1966); Strontium-90 (Jackson et al., 1974).

• **ETYMOLOGY.** The specific name *terrapin* derives from the New Latin *terrapene* (of American Indian origin) for turtle. Sub-specific names are derived as follows: *centrata*, from the Greek *kentron*, center, refers to the buildup of growth annuli on each carapacial scute; *pileata*, from the Latin *pileatus*, capped, probably refers to the black dorsal head surface; *macrospilota*, from the Greek *makros*, large, and *spilados*, spot, refers to the large yellow spot on each carapacial scute; *littoralis*, from the Latin *littoralis*, sea shore, refers to the habitat; *rhizophorarum*, Greek, meaning of the *Rhizophora* (a genus of mangrove), refers to its habitat; and *tequesta*, for the Tequesta Indians of eastern Florida.

1. *Malaclemys terrapin terrapin* (Schoepff)

Testudo terrapin Schoepff, 1793:64. See species synonymy.
Testudo concentrica Shaw, 1802:43. See species synonymy.
Emys ocellata Link, 1807:52. See species synonymy.
Emys concentrica var. *polita* Gray, 1831:27. Type-locality, unknown. Holotype, undesignated, see COMMENT.
Emys macrocephalus Gray, 1844:26. See species synonymy.
Malaclemys tuberculifera Gray, 1844:29. See species synonymy.
Malaclemys terrapin: Bangs, 1896:159.
Malaclemys centrata concentrica: Siebenrock, 1909:472. In part.
Malaclemys terrapin terrapin: Lindholm, 1929:294. First use of combination.
Malaclemys terrapin concentrica: Lindholm, 1929:294.

• **DEFINITION.** Vertebral keel does not bear terminal knobs on each scute; sides of the carapace diverge posteriorly. Carapace varies from uniform black to light brown with distinct concentric, dark rings; plastron variable, orangish to green gray.

2. *Malaclemys terrapin centrata* (Latreille)

Testudo centrata Latreille, in Sonnini and Latreille, 1802:145. Type-locality, "Carolinae," restricted to "vicinity of Charleston, South Carolina" by Schmidt (1953:96). Holotype, undesignated.
Emys centrata: Schweigger, 1814:32.
Emys concentrica var. *livida* Gray, 1831:27. Type-locality, "North America," restricted to "vicinity of Charleston, South Carolina" by Schmidt (1953:96). Holotype, undesignated; see COMMENT.
Malaclemys centrata concentrica: Siebenrock, 1909:472. In part.
Malaclemys centrata centrata: Stejneger and Barbour, 1923:131.
Malaclemmys terrapin centrata: Mittleman, 1944:248.
Malaclemys terrapin centrata: Mittleman, 1945:234. First use of combination.

• **DEFINITION.** Vertebral keel bears no terminal knobs on each

scute; sides of the carapace are nearly parallel. Marginals curl upward. Otherwise similar to *M. t. terrapin*.

3. *Malaclemys terrapin pileata* (Wied)

Emys pileata Wied, 1865:17. Type-locality, "New Orleans, Louisiana." Holotype, undesignated.
Malaclemys centrata pileata: Siebenrock, 1909:473.
Malaclemys pileata pileata: Stejneger and Barbour, 1917:116.
Malaclemys terrapin pileata: Lindholm, 1929:294. First use of combination.

• **DEFINITION.** Vertebral keel has terminal tuberculate knobs. Carapace is oval; scutes lack light centers. Top of head, upper lip, neck and limbs are black or dark brown, upturned edges of marginals orange or yellow. Plastron is yellow, often dusky.

4. *Malaclemys terrapin macrospilota* (Hay)

Malaclemmys macrospilota Hay, 1904:16. Type-locality, "Charlotte Harbor, [Charlotte County] Florida." Holotype, U.S. Nat. Mus. 33917, adult female, "secured at the Washington market" by W. P. Hay, December 1902 (examined by authors).
Malaclemys centrata macrospilota: Siebenrock, 1909:472.
Malaclemys pileata macrospilota: Stejneger and Barbour, 1917:117.
Malaclemys terrapin macrospilota: Lindholm, 1929:294. First use of combination.

• **DEFINITION.** Vertebral keel has terminal, often bulbous, knobs. Carapacial scutes have orange and yellow centers.

5. *Malaclemys terrapin littoralis* (Hay)

Malaclemmys littoralis Hay, 1904:18. Type-locality, "Rockport, [Arkansas County] Texas." Holotype, U.S. Nat. Mus. 33913, adult female, "secured at Crisfield, Maryland" by W. P. Hay, August 1904 (examined by authors).
Malaclemys centrata littoralis: Siebenrock, 1909:473.
Malaclemys pileata littoralis: Stejneger and Barbour, 1917:117.
Malaclemys terrapin littoralis: Lindholm, 1929:294. First use of combination.

• **DEFINITION.** Vertebral keel has terminal knobs. Carapacial scutes lack distinct light centers. Carapace is deeper, with the highest point more posterior than in other subspecies. Plastron is pale or white, upper lip and top of head whitish. Greenish-gray neck and legs are heavily spotted with black.

6. *Malaclemys terrapin rhizophorarum* (Fowler)

Malaclemmys littoralis rhizophorarum Fowler, 1906:112. Type-locality, "Boca Grande Key, [Lee County] Florida." Holotype, Acad. Natur. Sci., Philadelphia 16570, adult female, collected by Henry W. Fowler, 18 June 1904 (examined by authors).
Malaclemmys terrapin rhizophorarum: Carr, 1946:171.
Malaclemys terrapin rhizophorarum: Carr, 1952:163. First use of combination.

• **DEFINITION.** Vertebral keel bears terminal bulbous knobs. Shell is strongly oblong. Carapacial scutes have no light centers. Ventral seams of marginals and plastral scutes are often bordered with black. Spots on the neck fuse to form a streaked pattern. Hind legs are longitudinally striped in some individuals.

7. *Malaclemys terrapin tequesta* Schwartz

Malaclemys terrapin tequesta Schwartz, 1955:158. Type-locality, "Miami Beach, Dade County, Florida." Holotype, Univ. Michigan Mus. Zool. 108482, adult female, collected by Donald de Sylva, June 1953 (examined by authors).

• **DEFINITION.** Vertebral keel bears posteriorly facing tubercles or knobs. Carapace is dark or horn-color with no pattern of concentric light circles. Centers of large scutes may be slightly lighter than surrounding areas.

COMMENT

The types of *Emys concentrica* var. *polita* were said by Gray (A. F. Stimson of BMNH, *in litt.*) to be in the collections of the

Royal College of Surgeons and the Bell Museum. The type of *Emys concentrica* var. *livida* was also in the Bell Museum, and the type of *Emys macrocephalus* in the collection of the Zoological Society of London. These specimens have disappeared.

Geographic variation is poorly defined. Noted differences may represent clines in characters along the linear range of the species.

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