

REPTILIA: TESTUDINES: EMYDIDAE

CLEMMYS MUHLENBERGII

Catalogue of American Amphibians and Reptiles.

ERNST, CARL H. AND R. BRUCE BURY. 1977. *Clemmys muhlenbergii*.

***Clemmys muhlenbergii* (Schoepff)
Bog Turtle**

Testudo muhlenbergii Schoepff, 1801:132. Type-locality, "Pennsylvania"; restricted to "Lancaster [Lancaster Co.], Pennsylvania," by Stejneger and Barbour (1917:114). Holotype not stated and its location is unknown; collector Rev. H. Mühlenberg.

Emys muhlenbergii: Schweigger, 1812:281.

Chersine muhlenbergii: Merrem, 1820:30.

Emys biguttata Say, 1824:212. Type-locality, "United States"; restricted to "vicinity of Philadelphia [Pennsylvania]" by Schmidt (1953:92). Holotype not designated.

Terrapene muhlenbergii: Bonaparte, 1830:160.

Emys bipunctata: Gray, 1831:25. Lapsus calami for *biguttata*.

Emys fusca Gray, 1831:25. Nomen nudum.

Clemmys muhlenbergii: Fitzinger, 1835:124. First use of the combination.

Geoclemys muhlenbergii: Gray, 1855:19.

Clemmys muhlenbergii: Agassiz, 1857:443.

Klemmys muhlenburgii: Ennis, 1861:124. Spelling error.

Geoclemys muhlenbergii: Gray, 1869:188.

Chelopus muhlenbergii: Cope, 1875:53.

Clemmys muhlenbergii: Fowler, 1906:596. Emendation of ending.

Clemmys nuchalis Dunn, 1917:624. Type-locality, "side of Yonahlossee Road, about 3 miles from Linville [Avery Co.], North Carolina.... Altitude 4,200 feet." Holotype, adult male, Amer. Mus. Nat. Hist. 8430, collected by E. R. Dunn on 17 August 1916 (examined by authors).

Melanemys muhlenbergii: Shufeldt, 1919:157.

Clemmys muhlenbergii: Brimley, 1943:3. Spelling error.

- CONTENT. *Clemmys muhlenbergii* is a monotypic species.

- DEFINITION. Adults are 80–115 mm in carapace length. The elongated carapace is moderately domed, has a low keel, and may appear rough due to the build up of growth annuli on the scutes. The shell is widest posteriorly, and the posterior margin is un-

rated. Carapace color varies from light brown, through mahogany, to black with a few irregular light marks. The skin is brown and may be mottled with dull red above and orange or red below. There is a large, bright orange, yellow, or red blotch at the tympanum. Males have concave plastrons and long, thick tails with the vent beyond the carapacial margin. Females have wider carapaces, flatter plastrons, and shorter tails with the vent beneath the carapace.

- DESCRIPTIONS. General descriptions are given by Babcock (1919), Carr (1952), Ernst and Barbour (1972), and Conant (1975). Eggs and young are described by Ennis (1861), Carr (1952), and Ernst and Barbour (1972). Detailed anatomical descriptions are as follows: nasal morphology, Parsons (1960); carapacial seam contacts, Tinkle (1962); cervical vertebrae and ribs, Williams (1950, 1959); and penial morphology, Zug (1966). The karyotype is described by Bickham (1975).

- ILLUSTRATIONS. Color illustrations of adults are in Babcock (1919), Ernst and Barbour (1972), and Conant (1975); and other photographs of adults are in Surface (1908), McCauley (1945), Carr (1952), Nemuras (1967), Ernst and Barbour (1972), and Campbell (1974). Juveniles are illustrated in Carr (1952), Zovickian (1971a), and Sachsse (1974). The head is illustrated by black and white photographs or drawings in Dunn (1917), Wright (1918a), and Ernst and Barbour (1972); and the skull is shown in Ernst and Barbour (1972). The nest and eggs appear in Barton (1957); Nemuras (1967, 1969) and Zovickian (1971a) illustrate the egg. Shufeldt (1920) shows a kyphotic adult. Habitat photographs are presented in Nemuras (1967, 1969).

- DISTRIBUTION. *Clemmys muhlenbergii* has a discontinuous range extending from New York and Connecticut southward to North Carolina. Populations frequent the slow, shallow rivulets of sphagnum bogs, swamps and marshy meadows. They occur at elevations from near sea level to 1,200 m in the Appalachian Mountains. Netting (1927), Carr (1952), Barton and Price (1955), Barton (1960), Nemuras (1967), Ernst and Barbour (1972), Conant (1975), and Harris (1975) provided range maps and information on locality records of this turtle.

- FOSSIL RECORD. No fossil or archeological records have been reported for *Clemmys muhlenbergii*.

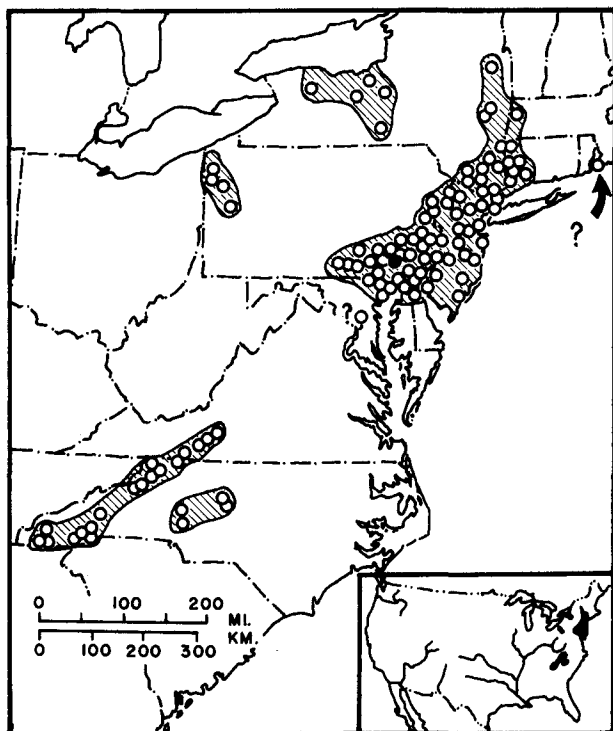
- PERTINENT LITERATURE. General accounts of the biology of *Clemmys muhlenbergii* are given by Wright (1918b), Babcock (1919), McCauley (1945), Carr (1952), Barton and Price (1955), Barton (1957), Campbell (1960), Robotham (1964), Nemuras (1967), Schwartz (1967), Ernst and Barbour (1972), and Zappalorti (1976). Other important references are listed below by topics. Taxonomy: Wright (1918a), McDowell (1964). Food: Surface (1908). Shell deformity: Shufeldt (1920). Predation: Fisher (1887). Reproduction: Zovickian (1971a), Arndt (1972), Sachsse (1974). Growth: Zovickian (1971b), Ernst (1977). Rostral and mental pores: Winokur and Legler (1974, 1975). Aestivation: McCauley and Mansueti (1943). Annual activity cycle: Nemuras (1965). Serum proteins: Merkle (1975). Karyotype: Bickham (1975). Conservation: Robotham (1964), Peters (1968), Nemuras (1969), Campbell (1974). Movements: Ernst (1977). Temperature relationships: Ernst (1977). There are also many papers listing locality data or discussing habitat and range (see DISTRIBUTION).

- ETYMOLOGY. The specific name *muhlenbergii* is for Reverend Gotthilf Heinrich Ernst Mühlenberg, an 18th Century botanist of Lancaster, Pennsylvania, who first discovered this turtle.

COMMENT

Knowledge of the life history of this species is scant and ecological studies are needed at different parts of its range. Geographic variation has been poorly studied in this species.

Ennis (1861) thought that *Clemmys muhlenbergii* was becoming extinct and this view has been held by many people ever since. Its secretive habits and the dense vegetative cover of its typical habitat hide it from casual observation. Distributional studies of the last two decades show the species to be in disjunct colonies of 30–300 individuals. Its dependence upon a constant, low-volume flow of water over a soft substrate make whole colonies vulnerable to habitat modification. Wetland drainage and urban sprawl have eradicated many of the known colonies in the past decade.



MAP. The solid circle marks the type-locality; open circles indicate other selected localities.

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