

Catalogue of American Amphibians and Reptiles.

IVERSON, JOHN B. 1979. *Sternotherus carinatus*.

***Sternotherus carinatus* (Gray)**
Razor-backed musk turtle

Aromochelys carinatum Gray, 1855:47. Type-locality, "Louisiana"; restricted by Schmidt (1953) to "vicinity of New Orleans [St. Bernard Parish, Louisiana]." Syntypes, British Mus. (Nat. Hist.) 1947.3.4.32 (male), 1947.3.4.64 (male, figured in original description), 1947.3.4.83 (female), and 1947.3.4.84 (male), collected by W. P. Smith, date unknown (not examined by author). A fifth syntype, a shell of a juvenile, not listed by Boulenger (1889), has presumably been lost.

Aromochelys carinata: Gray, 1856:199.

Goniochelys triquetra Agassiz, 1857:423. Type-locality, "Lake Concordia, [Concordia Parish] Louisiana." Syntypes, Mus. Comp. Zool., Harvard Univ. 15085 (male) and 15086 (male) collected in 1854 by B. Chase (examined by author).

Aromochelys carinatus: Cope, 1867:310.

Goniochelys carinata: Garman, 1884:8.

Cinosternum carinatum: Boulenger, 1889:38.

Kinosternon carinatum: Stejneger and Barbour, 1917:111.

Sternotherus carinatus: Stejneger, 1923:2. First use of present combination.

Sternotherus carinatus: Tinkle, 1958:1.

- CONTENT. No subspecies have been described.

- DEFINITION. Adults are 100 to 160 mm in carapace length. The juvenile and adult carapace has an ovate outline with a high, sharp median keel and no lateral keels. The shell is triangular in cross section; the apical angle is always less than 100°. The first vertebral scute never touches the second marginal, and at least 3 vertebrals are longer than wide (except in juveniles). The 4th pleural scute contacts the 11th marginal; the 10th and 11th marginals are elevated above those preceding. The gular scute is absent; only 10 plastral scutes are present. The axillary contacts the inguinal. The pectoral scute is rhomboidal. The nuchal bone often contacts the first neural bone. A poorly developed plastral hinge lies between the pectoral and abdominal scutes, and the plastron often has skin exposed between the scute seams. The carapace is brown to orange with dark seams. The slightly imbricated carapacial scutes are usually flecked or streaked with dark brown or black. The plastron is pink to orange with brown flecks in post-hatchlings and then becomes immaculate yellow-brown (sometimes stained dark brown). The skin is gray-brown to pink with dark brown or black markings. The dorsum of the head is marked with small dark spots on a light brown background; stripes are never present. The nasal scute is deeply posteriorly furcate. One pair of barbels is present on the chin. The jaws are tan with dark streaks. Females possess short, stubby tails, whereas males possess long, thickened tails with terminal spines and a patch of tuberculate scales on the posterior surface of the crus and thigh of each hind leg. All 4 feet are webbed.

- DESCRIPTIONS. General descriptions are in Cahn (1937), Tinkle (1958), Ernst and Barbour (1972), and Conant (1975). Hatchlings are described in Ernst and Barbour (1972) and Conant (1975). More detailed descriptions include: cervical vertebrae (Williams, 1950); carapacial seam arrangements (Tinkle, 1962); choanal structure (Parsons, 1968); osteology (Chilcutt and Jackson, 1970; Tinkle, 1958); bone histology (Enlow and Brown, 1957); cloaca (Smith and James, 1958); cranial arteries and foramina (Albrecht, 1967); karyotype (Stock, 1972; Killibrew, 1975); musk glands (Waagen, 1972); rostral pores (Winokur and Legler, 1974); and penial morphology (Zug, 1966).

- ILLUSTRATIONS. Color photographs of adults appear in Ernst and Barbour (1972). Cahn (1937), Carr (1952), and Ernst and Barbour (1972) provide black and white photos of adults; Cahn (1937) of the hatchling; Ernst and Barbour (1972), the skull; Enlow and Brown (1957), sections of the femur. Drawings of the adult are in Gray (1872) and Wermuth and Mertens (1961); the hatchling, Lampe (1901). Black and white photos in Ditmars (1907, 1936) labeled as *S. carinatus* are *S. minor*.

- DISTRIBUTION. *Sternotherus carinatus* ranges from the Brazos River Basin in Texas northward to and throughout the systems of the Ouachita Mountains of southeastern Oklahoma, and eastward to the Pascagoula River system of eastern Mississippi. It occurs sympatrically with *S. odoratus* throughout the former's range and with *S. minor* from the Pearl River east. Raun and Gehlbach (1972) discuss erroneous Texas localities. Records from Arizona (Yarrow, 1875) and Illinois (Davis and Rice, 1883) are erroneous; those from the southeastern United States are referable to *S. minor*.

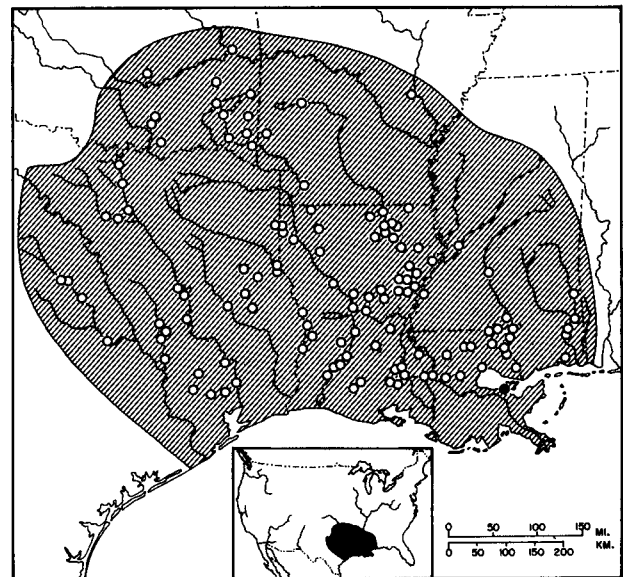
- FOSSIL RECORD. None.

- PERTINENT LITERATURE. General accounts of the biology are given in Pope (1939), Carr (1952), Tinkle (1958), Ernst and Barbour (1972), and Conant (1975). Other important references are taxonomy (Stejneger, 1923; Smith and Glass, 1947; Tinkle and Webb, 1955; Tinkle, 1958); reproduction (Mahmoud, 1967; Mahmoud and Klicka, 1972); ecology (Mahmoud, 1969); basking habits (Boyer, 1965); sex ratio (Gibbons, 1970); algal relationships (Neill and Allen, 1954; Proctor, 1958; Dixon, 1960; Ernst and Barbour, 1972; Moore et al., 1974); viral studies (Karstad, 1961); parasites (Harwood, 1932; Hughes et al., 1941, 1942; Yamaguti, 1958; Herban and Yaeger, 1969; Ernst and Barbour, 1972); longevity (Biegler, 1966); hematology (Brown, 1975); serology (Frair, 1972); color preferences (Ernst and Hamilton, 1969; Hailman and Jaeger, 1971).

- ETYMOLOGY. The name *carinatus* (Latin) means keeled and refers to the sharply keeled carapace of this species.

LITERATURE CITED

- Agassiz, Louis, 1857. Contributions to the natural history of the United States of America, first monograph. Vol. 1, part 2. North American Testudinata. Little, Brown, and Co., Boston, p. 233-452d.
- Albrecht, Philip W. 1967. The cranial arteries and cranial arterial foramina of the turtle genera *Chrysemys*, *Sternotherus*, and *Trionyx*: a comparative study with analysis of possible evolutionary implications. *Tulane Stud. Zool.* 14(3):81-99.
- Biegler, R. 1966. A survey of recent longevity records for reptiles and amphibians in zoos. *Int. Zoo. Yearb.* 6:487-493.
- Boulenger, George Albert. 1889. Catalogue of the chelonians, rhynchocephalians, and crocodiles in the British Museum (Natural History). Taylor and Francis, London. x + 311 p.
- Boyer, D. R. 1965. Ecology of the basking habit in turtles. *Ecology* 46(1/2):99-118.
- Brown, Leslie M. 1975. Some data on the hematology of turtles



MAP. Solid circle marks the type-locality; open circles are other records; shaded area estimates total range.

- with possible environmental significance. *J. Elisha Mitchell Sci. Soc.* 92(2):72-73.
- Cahn, Alvin R. 1937. The turtles of Illinois. *Illinois Biol. Monogr.* 16(1/2):1-218.
- Carr, Archie. 1952. Handbook of turtles: the turtles of the United States, Canada, and Baja California. Cornell Univ. Press, Ithaca, New York. xv + 542 p.
- Chilcutt, Ann McBride, and Crawford G. Jackson. 1970. Osteological studies of the musk turtles (Chelydridae: *Sternotherus*). *ASB Bull.* 17(2):37.
- Conant, Roger. 1975. A field guide to reptiles and amphibians of eastern and central North America. Second edition. Houghton Mifflin Co., Boston. xviii + 429 p.
- Cope, Edward D. 1867. On the Reptilia and Batrachia of the Sonoran Province of the Nearctic Region. *Proc. Acad. Natur. Sci. Philadelphia* 18:300-314.
- Davis, N. S., and Frank L. Rice. 1883. North American Batrachia and Reptilia found east of the Mississippi River. *Bull. Illinois State Lab. Natur. Hist.* 5:3-64.
- Ditmars, Raymond L. 1907. The reptile book. Doubleday, Page and Co., New York. xxxii + 472 p.
- 1936. The reptiles of North America. A review of the crocodiles, lizards, snakes, turtles and tortoises inhabiting the United States and northern Mexico. Doubleday, Doran, and Co., Garden City, New York. 376 p.
- Dixon, James R. 1960. Epizoophytic algae on some turtles of Texas and Mexico. *Texas J. Sci.* 12(1-2):36-38.
- Enlow, Donald H., and Sidney O. Brown. 1957. A comparative histological study of fossil and Recent bone tissues. Part II. *Texas J. Sci.* 9(2):186-214.
- Ernst, Carl H., and Roger W. Barbour. 1972. Turtles of the United States. Univ. Press Kentucky, Lexington. x + 347 p.
- , and Helen F. Hamilton. 1969. Color preferences of some North American turtles. *J. Herpetol.* 3(3/4):176-180.
- Friar, Wayne. 1972. Taxonomic relations among chelydrid and kinosternid turtles elucidated by serological tests. *Copeia* 1972(1):97-108.
- Garman, S. 1884. The north American reptiles and batrachians. A list of the species occurring north of the Isthmus of Tehuantepec, with references. *Bull. Essex Inst.* 16(1):1-46.
- Gibbons, J. Whitfield. 1970. Sex ratios in turtles. *Res. Popul. Ecol.* 12(2):252-254.
- Gray, John Edward. 1855. Catalogue of shield reptiles in the collection of the British Museum. Part I. Testudinata (tortoises). Taylor and Francis, London. 79 p.
- 1856. On some new species of freshwater tortoises from North America, Ceylon and Australia, in the collection of the British Museum. *Proc. Zool. Soc. London* 1855:197-202.
- 1872. Appendix to the catalogue of shield reptiles in the collection of the British Museum. Part I. Testudinata (tortoises). Taylor and Francis, London. 28 p.
- Hailman, Jack P., and Robert G. Jaeger. 1971. On criteria for color preferences in turtles. *J. Herpetol.* 5(1/2):83-85.
- Harwood, P. D. 1932. The helminths parasitic in the Amphibia and Reptilia of Houston, Texas, and vicinity. *Proc. U.S. Nat. Mus.* 81(2940):1-71.
- Herban, N. L., and R. G. Yaeger. 1969. Blood parasites of certain Louisiana reptiles and amphibians. *Amer. Midland Natur.* 82(2):600-601.
- Hughes, R. C., J. W. Higginbotham, and J. W. Clary. 1941. The trematodes of reptiles. Part II. Host catalogue. *Proc. Oklahoma Acad. Sci.* 21(1):35-43.
- , —, and — 1942. The trematodes of reptiles. Part I, systematic section. *Amer. Midland Natur.* 27(1):109-134.
- Karstad, Lars. 1961. Reptiles as possible reservoir hosts for eastern encephalitis virus. *Trans. Twenty-sixth North Amer. Wildl. Natur. Res. Conference*:186-201.
- Killebrew, Flavius C. 1975. Mitotic chromosomes of turtles. III. The Kinosternidae. *Herpetologica* 31(4):398-403.
- Lampe, Edward. 1901. Catalog der Reptilien-Sammlung (Schilddröten, Crocodile, Eidechsen und Chamäleons) des Naturhistorischen Museums zu Wiesbaden. *Jahrb. Nassau. Ver. Naturk.* 54:177-222.
- Mahmoud, I. Y. 1967. Courtship behavior and sexual maturity in four species of kinosternid turtles. *Copeia* 1967(2):314-319.
- 1969. Comparative ecology of the kinosternid turtles of Oklahoma. *Southwest. Natur.* 14(1):31-66.
- , and John Klicka. 1972. Seasonal gonadal changes in kinosternid turtles. *J. Herpetol.* 6(3/4):183-189.
- Moore, Frank L., Deborah Keammerer, and Hobart M. Smith. 1974. Symbiotic relationships between epizoophytes and herpetofauna. *Bull. Philadelphia Herpetol. Soc.* 22(1):17-26.
- Neill, W. T., and E. R. Allen. 1954. Algae on turtles: some additional considerations. *Ecology* 34(4):581-584.
- Parsons, Thomas S. 1968. Variation in the choanal structure of Recent turtles. *Canadian J. Zool.* 46(6):1235-1263.
- Pope, Clifford H. 1939. Turtles of the United States and Canada. Alfred A. Knopf, Inc., New York. xviii + 343 p.
- Proctor, Vernon W. 1958. The growth of *Basiacladia* on turtles. *Ecology* 39(4):634-645.
- Raun, Gerald G., and Frederick R. Gehlbach. 1972. Amphibians and reptiles in Texas: taxonomic synopsis, bibliography, and county distribution maps. *Dallas Mus. Natur. Hist. Bull.* (2):ii + 61.
- Schmidt, Karl P. 1953. A checklist of North American amphibians and reptiles. Sixth ed. *Amer. Soc. Ichthyol. Herpetol.* viii + 280 p.
- Smith, Hobart M., and B. P. Glass. 1947. A new musk turtle from southeastern United States. *J. Washington Acad. Sci.* 37(1):22-24.
- , and L. F. James. 1958. The taxonomic significance of cloacal bursae in turtles. *Trans. Kansas Acad. Sci.* 61(1):86-96.
- Stejneger, Leonhard. 1923. Rehabilitation of a hitherto overlooked species of musk turtle of the southern states. *Proc. U.S. Nat. Mus.* 62(6):1-3.
- , and Thomas Barbour. 1917. A check list of North American amphibians and reptiles. Harvard Univ. Press, Cambridge, Massachusetts. iv + 5-125 p.
- Stock, A. Dean. 1972. Karyological relationships in turtles (Reptilia: Chelonia). *Canadian J. Genet. Cytol.* 14(4):859-868.
- Tinkle, Donald W. 1958. The systematics and ecology of the *Sternotherus carinatus* complex (Testudinata, Chelydridae). *Tulane Stud. Zool.* 6(1):1-56.
- 1962. Variation in shell morphology of North American turtles. I. The carapacial seam arrangements. *Ibid.* 9(5):331-349.
- , and R. G. Webb. 1955. A new species of *Sternotherus* with a discussion of the *Sternotherus carinatus* complex (Chelonia, Kinosternidae). *Tulane Stud. Zool.* 3(3):53-67.
- Waagen, Gerald Norman. 1972. Musk glands in Recent turtles. M.S. thesis, Univ. Utah. 64 p.
- Wermuth, H., and R. Mertens. 1961. Schildkröten, Krokodile, Bruchenechsen. G. Fischer, Jena. 422 p.
- Williams, Ernest E. 1950. Variation and selection in the cervical central articulations of living turtles. *Bull. Amer. Mus. Natur. Hist.* 94(9):505-562.
- Winokur, Robert M., and John M. Legler. 1974. Rostral pores in turtles. *J. Morphol.* 143(1):107-120.
- Yamaguti, Satyu. 1958. *Systema Helminthum*. Volume I. The digenetic trematodes of vertebrates—Part I. Interscience Publ., Inc., New York. 979 p.
- Yarrow, Harry Crecy. 1875. Report upon the collections of batrachians and reptiles made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871 . . . 1874, p. 509-584. *In* Report upon geographical and geological explorations and surveys west of the one hundredth meridian, in charge of First Lieut. Geo. M. Wheeler . . . Govt. Printing Office, Washington, vol. V—Zoology.
- Zug, George R. 1966. The penial morphology and the relationships of cryptodiran turtles. *Occas. Pap. Mus. Zool. Univ. Michigan* (647):1-24.

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