Catalogue of American Amphibians and Reptiles.

ZUG, GEORGE R. 1986. *Sternotherus.*

Sternotherus Gray
Musk turtles

Sternotherus Gray, 1825:211. Type species, *S. odoratus* by subsequent designation (Stejneger, 1902:236).
Sternothaerus Bell, 1825:305. Type species, *S. odoratus* by subsequent designation (Stejneger, 1902:236).
Sternoteirus Gravenhorst, 1829:17. Type species, none given; apparently an orthographic emendation.
Sternotheros Gray, 1831:13. A *lapsus calami* in the synonymy of *Emys odoratum.*
Armochelys Gray, 1855:46. Type species, *A. odoratum* by subsequent designation (Stejneger, 1902:237).
Goniochelys Agassiz, 1857:423. Type species, *G. triquetra* (=*S. carinatus*) by subsequent designation (Zug, 1971:448).
Ozotheca Agassiz, 1857:424. Type species, *O. odorata* and *O. tristycha* (=*S. odoratus*) thus *S. odoratus* by monotypy.

• CONTENT. Four species are currently recognized: *Sternotherus carinatus, S. depressus, S. minor,* and *S. odoratus.*

• DEFINITION. *Sternotherus* are small turtles; adults range in carapace length from 75–160 mm. There is no apparent sexual dimorphism in shell size, although the largest individuals are commonly females. The carapace outline is oblong or ovate in adults; height of shell is species-specific from flattened to strongly peaked. Carapace of hatchlings and young juveniles is round in outline and bears a distinct mid-dorsal keel: an additional pair of lateral keels occur in young *S. minor.* The cervical scute is small, rarely absent; eleven pairs of marginals encircle the carapace, the 10th and 11th are enlarged and are nearly double the height of the 9th. The nuchal bone bears a costiform process. The plastron is small, somewhat cruciform, and does not cover the carapace opening. The anterior lobe is hinged at the hyo-hypoplastral suture, externally between the anterior humeral and posterior humeral scutes; mobility at the hinge is slight. The anterior lobe contains only epi- and hyoplastral bones. Ten or eleven epidermal scutes (an intergular—absent in *S. carinatus*—and paired gulars, anterior humerals, posterior humerals, femorals and anals) lie on the plastron and are often widely separated, exposing the epidermal covering over the plastral bones. The anterior humerals are triangular; the length of their medial seam is one-third or less that of the gulars. The narrow bridge bears a musk gland on each side; these glands give the genus its common name and its characteristic aroma.

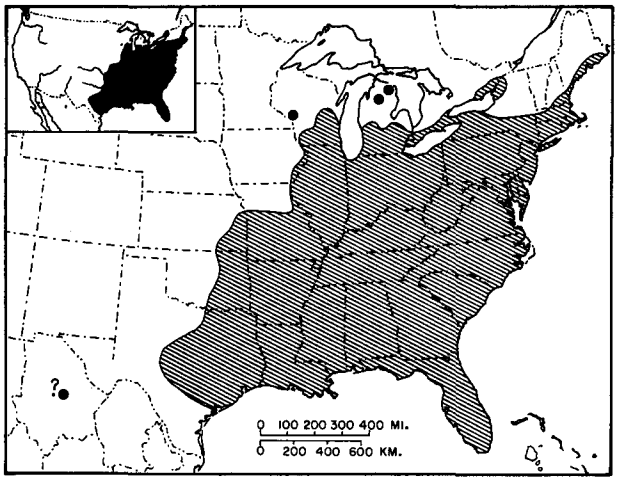
The head is proportionately larger in adults than in juveniles, apparently associated with an increasingly molluscivorous diet. Thus, the adult skull is short, broad and robust, the mandibles and masticatory surface of the maxillae and premaxillae are wide and robust, reaching their greatest development in *S. depressus* and *S. minor.* The maxilla touches the quadratojugal, and the entire crushing surface of the upper jaw lacks a ridge. A partial secondary palate is developed and strong temporal emargination provides space for large mandibular muscles.

Carapacial ground color ranges from yellowish tan to dark gray or black and may be variously marked with darker spots or streaks. The plastron is typically lighter in color than the carapace. The soft skin is commonly light gray with darker spots or mottling. A pair of large fleshy barbels project downward from the chin and the neck, limbs and tail bear numerous small tubercles or papillae. The tail is short in females but longer, heavier and with a horny claw-like tip in males (although not as well developed in *S. depressus* and *S. minor*). Males also possess patches of horny tuberculate scales on the inner surface of the thigh and crus.

• DESCRIPTIONS. See species accounts.

• ILLUSTRATIONS. Black and white photographs illustrate hatchling *S. minor minor* (Lehmann, 1984). The skull of *S. odoratus* is illustrated by Feuer (1970) and Gaffney (1979), the plastral scutes by Hutchison and Bramble (1981), and shell kinesis by Bramble et al. (1984).

• DISTRIBUTION. *Sternotherus* occurs in the eastern half of the United States from central Texas, eastern Kansas and southern Wisconsin eastward to the Atlantic coast of central Maine to southern Florida. This large range is occupied by a single species *Sternotherus odoratus.* A single Mexican record (Chihuahua, Rio Sauz) of *S. odoratus,* although unconfirmed, may be valid (Conant and Berry, 1978; Smith and Smith, 1980). The remaining three species—the *S. carinatus* complex—are largely confined to the Gulf drainages of Texas to Georgia and northern Florida.



MAP. Present distribution of the genus *Sternotherus.*

• FOSSIL RECORD. Members of this taxon are uncommon in fossil faunas. The few fossil *Sternotherus* derive from Pliocene and Pleistocene deposits and occur within the range of their Recent conspecifics. *Sternotherus odoratus* is reported from the Pliocene WaKenny local fauna, Kansas (Holman, 1975) and the Pleistocene Clear Creek fauna, Texas (Holman, 1963) and Vero fauna, Florida (also *S. minor,* Weigel, 1962).

• PERTINENT LITERATURE. The literature is largely summarized in the species accounts. The following references address the major systematic and biological studies of the genus or are articles of individual species appearing subsequent to the publication of their accounts. Bibliography: Iverson and Iverson (1980). Coloration: Marion et al. (1984). Commensals and parasites: Ernst and Ernst (1977), Gibbons et al. (1983), Reilly (1983). Development: Lehmann, (1984). Ecology: Berry (1975), Ernst (1986). Hematology and serology: Frair (1977, 1983), Friedman et al. (1985). Morphology: Bramble et al. (1984), Gaffney (1979), Hutchison and Bramble (1981), Baumgartner (1916), Reynolds and Seidel (1983). Physiology: Burggren et al. (1977), Gatten (1984), Jackson et al. (1984), McPherson and Marion (1982), Parmenter (1981), Seidel (1980), Ultsch et al. (1984). Reproduction and embryology: Bels and Libois (1983), Close and Marion (1980), Congdon and Gibbons (1985), Cox and Marion (1978), Cox et al. (1980), Ewert (1985), Ewert and Legler (1978), Gibbons (1982), Gibbons et al. (1982), Iverson (1977a, 1978), Lamb and Congdon (1985), McPherson et al. (1982), McPherson and Marion (1981a & b, 1983), Mitchell (1985a & b), Powell and Phillips (1984). Sex determination: Engel et al. (1981), Vogt et al. (1982). Systematics and evolution: Bickham and Carr (1983), Iverson (1977b), Killebrew (1975), Olmo (1984), Seidel and Lucchino (1981), Seidel et al. (1981), Sites et al. (1979), Tinkle (1958), Tinkle and Webb (1955).

• KEY TO SPECIES (account numbers shown in parentheses).

1. Head with pair of lateral light stripes on a dark background; neck, throat and thin with large fleshy tubercles; non-overlapping scutes on carapace ..... *Sternotherus odoratus* (287)
– Head with spots or mottled pattern; large fleshy tubercles on chin only; overlapping scutes on carapace 2
2. Intergular scale usually absent; carapace high and steep sided, triangular in cross-section ... *Sternotherus carinatus* (226)
– Intergular scale present: carapace neither high nor steep-sided, lateral keels present or absent 3
3. Carapace flattened; head with dark narrow reticulations on a light background ..... *Sternotherus depressus* (194)
– Carapace moderately domed; head with dark spots or spots and short lines ..... *Sternotherus minor* (195)

• NOMENCLATURAL HISTORY. The names *Sternotherus* and *Sternothaerus* appeared regularly during the past century. Both were used for the North American musk turtles, and for a time, *Sternothaerus* was used exclusively for the African side-neck turtles now in the genus *Pelusios*. This historic mixup has been summarized by Zug (1971), Smith and Larsen (1974), and Smith et al. (1980). Bour and Dubois (1984) petitioned the International Commission of Zoological Nomenclature to suppress *Sternothaerus* Bell 1825 and names derived therefrom in order to avoid nomenclatural confusion in the families of Kinosternidae and Pelomedusidae as presently defined.

• ETYMOLOGY. *Sternotherus* derives from the Greek *sternon* for breast or chest and the Greek *theros* for animal, presumably referring to the hinged plastron (breast).

COMMENT

Currently there is a controversy over the specific status of *Sternotherus depressus*: Is it a distinct species or geographic race of *S. minor*? The most recent biochemical and morphological analyses suggest a close affinity of *S. depressus* and *S. minor*, but further suggest that they are distinct species (Seidel and Lucchino, 1981).

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