Catalogue of American Amphibians and Reptiles.

ROZE, JANIS A. AND GRACE M. TILGER. 1983. *Micrurus fulvius.*

Micrurus fulvius (Linnaeus) North American Coral Snake

Coluber fulvius Linnaeus, 1766:381. Type-locality, "Carolina" United States, restricted to Charleston, South Carolina by Schmidt (1953). Holotype not located, probably female, collected by D. Garden, no date. (See REMARKS).
Elaps fulvius: Fitzinger, 1826:61.
Vipera fulvia: Harlan, 1827:364.
Micrurus fulvius: Stejneger and Barbour, 1917:106.

• CONTENT. Five subspecies are recognized: *fitzingeri, fulvius, maculatus, microgalbineus,* and *tenere.*

• DEFINITION. A medium sized coral snake averaging 60 cm but rarely attaining 130 cm in length. Body covered by a repeated sequence of black-yellow-red-yellow-black bands. Dorsal head coloration consists of a black snout followed by a yellow parietal band and by a black nuchal band. Head yellow or white ventrally but the mental and first infralabials are black and a varied amount of black spots or smudges are present on other infracephalic shields. There are 10–27 black body bands in males and 12–26 in females. There are usually one preocular, two postoculars, 1+1 temporals, seven supralabials, and seven infralabials. Males have 185–217 ventrals, females 205–232. Anal plate divided; 36–47 pairs of subcaudals in males, 26–38 in females. Dorsal scales in 15 rows throughout. Sexual dimorphism is shown in the number of ventrals and subcaudals, and black body bands.

Hemipenis 12–14 subcaudals in length, bifurcated at the 8th subcaudal; the sulcus spermaticus also bifurcated, running from the base to nearly the apex of each fork, with each fork tapering gradually toward the apex. The base of the organ naked for 2 subcaudals after which small spines and scattered spinules cover it up to the bifurcation where large spines begin. Lip of the sulcus naked for its entire length but covered on both sides with small spines. Large spines begin 1–2 subcaudals before the bifurcation of the organ and gradually diminish in size towards the apex; the area of bifurcation is without spines. Each fork of the hemipenis ends in a spinelike papilla. A large longitudinal naked fold begins almost at the base of the organ and runs approximately parallel to the sulcus, ending shortly before the bifurcation where the large spines begin. Length of the hemipenis and distribution of the spines vary slightly among the subspecies.

• DESCRIPTIONS. Descriptions of *M. fulvius fulvius* are found in Wright and Wright (1957), Duellman and Schwartz (1958), Palmer (1974), Conant (1975), and Behler and King (1979); of *M. f. maculatus* in Roze (1967); of *M. f. microgalbineus* in Brown and Smith (1942), Taylor (1949, 1950), and Brown and Brown (1967); and of *M. f. tenere* in Wright and Wright (1957), and Conant (1975).

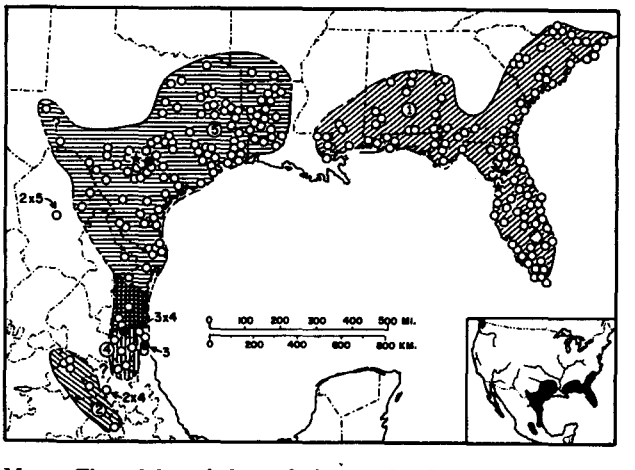
• ILLUSTRATIONS. Color illustrations of *M. f. fulvius* are in Schmidt and Inger (1957), Leviton (1972), Conant (1975), Martof et al. (1980) and Ashton and Ashton (1981); black and white illustrations in Pope (1955), Palmer (1974), and Russell (1980). Color illustrations of *M. f. tenere* are found in Conant (1975), Behler and King (1979) and black and white illustrations in Wright and Wright (1957), Werler (1964), Russell (1980). Roze (1967) has a black and white diagram of the color pattern of the holotype of *M. f. maculatus* and Taylor (1950) offered photographs of *M. f. microgalbineus.* A drawing of *M. f. fitzingeri* appears in Jan and Sordelli (1872).

• DISTRIBUTION. *Micrurus fulvius* is found in the eastern United States from southeastern North Carolina to the southern tip of Florida, westward to eastern and southern Texas and southward into eastern and central Mexico, including Coahuila, Nuevo Leon, Tamaulipas to Queretaro, Guanajuato, and Morelos. The altitudinal range is from sea level to almost 2000 meters. Clarification of distribution is offered by Mittleman (1947), Link (1951), Martin del Campo (1953), Milstead (1960), Robison (1972), and Palmer et al. (1974).

• FOSSIL RECORD. Pleistocene fossil records are given for Florida by Holman (1958, 1959a, 1959b, 1978) and Auffenberg (1963, as *M.* cf. *fulvius*), and for Texas by Hill (1971).

• PERTINENT LITERATURE. Comments on ecology and general habits of *M. f. fulvius* are found in Carr (1940), Wright and Wright (1957), Shaw (1971), Palmer (1974), Mount (1975), Conant (1975), Russell (1980), and Jackson and Franz (1981); of *M. f. tenere* in Strecker (1927), Ruick (1948), Wright and Wright (1957) and Werler (1964). Martin (1958), Hensley and Smith (1962) and Cervantes and Minton (1975) discussed intergrades of *M. f. tenere* × *M. f. microgalbineus* and *M. f. microgalbineus* × *M. f. fitzingeri.* Systematic relationships are discussed by Schmidt (1928) and Duellman and Schwartz (1958). Exceptional color patterns are described by Strecker (1935), Gloyd (1938), Duellman and Schwartz (1958), Meacham and Myers (1961), Neill (1963), and Smith et al. (1970). Clark (1967) reported on sexual dimorphism. For description of general behavior see Englehardt (1932), Ruick (1948), Neill (1951), Wright and Wright (1957), and Gehlbach (1970, 1972). Maximum size of 51 inches (1304 mm) is reported by McCollough and Gennaro (1963) for *M. f. fulvius* and of 1130 mm by Liner and Chaney (1974) for *M. f. tenere.* Predators are mentioned by Minton (1949), Clark (1949) and Jackson and Franz (1981). Harwood (1930, 1932) reported on nematode parasites. Longevity was noted by Bowler (1977). Reproduction is summarized by Wright and Wright (1957) and Shaw (1971). A thorough account of reproduction of *M. f. tenere* is offered by Quinn (1979); other works include Sabath and Worthington (1959), Werler (1970), Campbell (1973), and Tryon and McCrystal (1982). Reproduction in *M. f. fulvius* is reported by Allen and Neill (1950), Telford (1955), Neill (1957), Zegel (1975) and Jackson and Franz (1981), and Austin (1965) described the spermatozoa. Graham (1977) described the karyotype of *M. f. tenere.* Mimicry problems are discussed by Brattstrom (1955), Hecht and Marien (1956), Martin (1958), Wickler (1968), Gehlbach (1970, 1972), Greene and Pyburn (1973), Grobman (1978), and Greene and McDiarmid (1981). Food and feeding is described by Strecker (1908), Schmidt (1932), Loveridge (1938), Clark (1949), Minton (1949), Telford (1952), Curtis (1952), Kennedy (1964), Chance (1970), and Greene (1973, 1976), while cannibalism is mentioned by Loveridge (1938, 1944), Curtis (1952), Chance (1970), and Greene (1973).

Venom effects and toxicity are dealt with by Halter (1923), Cohen and Seligmann (1966), Stevan and Seligmann (1970), Weis and McIsaac (1971), Ramsey et al. (1972a, 1972b), Jimenez-Porras (1973), Fix and Minton (1976), and Possani et al. (1979). Venom neutralization and antiserum production are discussed by Allen and Maier (1941), Flowers (1966), Cohen et al. (1967), Kochalaty et al. (1967), Cohen et al. (1968), Cohen et al. (1971), and Kochalaty et al. (1971). Antivenin storage sites in the U.S. are enumerated by Ellis (1971). Envenomation and its treatment are dealt with by True (1883), Loenneberg (1894), Gloyd (1938), Werler and Darling (1950), Neill (1957), Ramsey and Klickstein (1962), McCullough and Gennaro (1963, 1970), Gennaro and McCullogh (1966), Mosely (1966), Parrish and Kahn (1967), Shaw (1971), and Russell (1980).



MAP. The solid symbols mark the type localities; open symbols indicate other records. The stars mark fossil localities. Crosses between two subspecies mark intergrades.

• REMARKS. The type specimen of *Micrurus fulvius* (Linneaeus) has not been located in any of the Swedish museums where the Linnean type-specimens are deposited nor in the Linnean Society of London.

Two additional syntypes of *M. f. tenere* in the National Museum of Natural History (NMNH 1121) from New Braunfels, Texas are missing. Thus, the only existing syntype of this subspecies comes from a locality (San Pedro of Rio Grande) other than that to which the type-locality was restricted, namely, New Braunfels, Texas.

• ETYMOLOGY. The specific name *fulvius* is derived from the Latin for orange or orangish yellow, alluding to the coloration apparently observed in a half-faded preserved specimen in which the coral red has turned yellowish. The subspecies name *fitzingeri* is dedicated to the 19th century herpetologist Leopoldo J. F. J. Fitzinger; *maculatus* (Latin, spotted) alludes to the large dorsal spots; *microgalbineus* is derived from a modern Latin adaptation of the original Greek *micro*, tiny, small, minute, and *galbineus*, Latin for greenish yellow. The name alludes to the narrow yellowish bands of this subspecies. The subspecies name *tenere*, from *tener*, Latin for tender, delicate, soft. Actually, *tenere* is used as an adverb in comparative or superlative, meaning tenderly, delicately. The name is apparently intended to denote the delicate appearance of this subspecies.

1. *Micrurus fulvius fulvius* (Linnaeus) Eastern Coral Snake

Coluber fulvius Linnaeus, 1766:381. See species synonymy.
Micrurus fulvius fulvius: Schmidt, 1928:64.
Micrurus fulvius barbouri Schmidt, 1928:64. Type-locality, "Paradise Key, Dade County, Florida." Holotype, Mus. Comp. Zool., Harvard Univ. 13658, adult male, obtained by T. Barbour in 1920 (examined by authors).

• Definition. A subspecies of *M. fulvius* in which the black nuchal band does not reach or cover the parietal tips. Males have 197–217 (mean 206.3), females 219–232 (mean 225.8) ventrals; subcaudals number 40–47 (mean 43.6) in males and 30–37 (mean 34.0) in females. Males have 11–17 (mean 13.7) and females 12–19 (mean 14.8) black body bands. The red bands range from immaculate to many small black spots or black tips on the red scales, with a tendency to form a pair of large black dorsal spots.

2. *Micrurus fulvius fitzingeri* (Jan). Coralillo de Guanajuato; Guanajuato Coral Snake.

Elaps fitzingeri Jan, 1858:516. Type-locality, "Mexico," restricted to Guanajuato, Guanajuato, Mexico by Smith and Taylor (1950). A probable syntype, Naturhist. Mus. Vienna, 18297, adult female, purchased from Baron von Karwinsky, with locality marked "Mexico" on June 8, 1834; the other syntype in the museum of Torino, Italy not found (the only known probable syntype examined by authors).
Elaps fulvius var. *fitzingeri:* Jan and Sordelli, 1872: pl 2, fig. 3.
Micrurus fitzingeri: Schmidt, 1933:38.
Micrurus fitzingeri fitzingeri: Brown and Smith, 1942:63.
Micrurus fulvius fitzingeri: Roze, 1983:183.

• DEFINITION. A subspecies of *M. fulvius* with 208–216 (mean 212.0) ventrals in males and 222–231 (mean 225.4) in females. Subcaudals range from 41–44 (mean 42.5) in males and from 31–35 (mean 33.3) in females. Males have 19–22 (mean 20.5) and females 19–26 (mean 22.7) black body bands. The red bands have irregular black tips on many scales, but without large spots.

3. *Micrurus fulvius maculatus* Roze Coralillo de Tampico; Tampico Coral Snake

Micrurus fulvius maculatus Roze, 1967:27. Type-locality, "Tampico, Tamaulipas, Mexico." Holotype, Zool. Mus. Hamburg 5685, adult male, collected by E. Kallert on February 10, 1930 (examined by authors).

• DEFINITION. A subspecies of *M. fulvius* with 185–195 (mean 190.0) ventrals in males and 205–208 (mean 206.5) in females. Subcaudals range from 43–45 (mean 44.5) in males and around 31 in females. Males have 15–17 (mean 16.0) and females 13–17 (mean 15.0) black body bands. The red bands have many irregular large black dorsal spots produced by fusion of black tips, but about half of the red dorsal scales are immaculate.

4. *Micrurus fulvius microgalbineus* Brown and Smith Coralillo Manchado; Spotted Coral Snake

Micrurus fitzingeri microgalbineus Brown and Smith, 1942:63. Type-locality, "seven kilometers south of Antiguo, Morelos, Tamaulipas, Mexico." Holotype, Bryce C. Brown private collection 27847, adult female, collected by Bryce C. Brown on June 21, 1941 (examined by authors).
Micrurus fulvius microgalbineus: Roze, 1967:29.

• DEFINITION. A subspecies of *M. fulvius* with 198–204 (mean 200.6) ventrals in males and 216–225 (mean 221.1) in females. Subcaudals range from 41–45 (mean 43.2) in males and 32–38 (mean 34.6) in females. Males have 18–22 (mean 20.8 one specimen has 27) black body bands, females 17–25 (mean 22.4). The red bands have irregular black tips that occasionally occupy an entire dorsal scale. Some red scales are without markings.

5. *Micrurus fulvius tenere* (Baird and Girard) Texas Coral Snake

Elaps tenere Baird and Girard, 1853:22, 156. Type-locality, "San Pedro of Rio Grande" and "New Braunfels, Texas." Restricted to the second locality by Smith and Taylor (1950). Lectoholotype, Nat. Mus. Natur. Hist. 1119, adult female, collected by J. D. Graham, no date, (examined by authors). (See REMARKS.)
Elaps tristis Baird and Girard, 1853:23. Type-locality "Kemper County, Mississippi," and "Rio Grande west of San Antonio" (Baxter County, Texas), restricted to the second locality by Schmidt (1953). Syntypes (cotypes) Nat. Mus. Natur. Hist. 1123, adult male, from Rio Grande west of San Antonio, collected by S. Churchill, no date; and 1124, adult male, from Kemper County, Mississippi, collected by D. C. Lloyd, no date (examined by authors). The latter specimen is actually a *M. fulvius fulvius*.
Micrurus fulvius tenere: Schmidt, 1933:40.

• DEFINITION. A subspecies of *M. fulvius* with 200–211 (mean 206.8) ventrals in males and 219–227 (mean 223.9) in females. Subcaudals range from 38–46 (mean 42.6) in males and from 26–34 (mean 31.8) in females. Males have 10–14 (mean 12.2) and females 10–15 (mean 12.7) black body bands. The scales in the red bands have irregular larger or smaller black tips or spots but usually not on all scales.

COMMENTS

The limits of distribution and areas of intergradation of the subspecies found in Mexico are not yet clearly defined. The records of *M. fulvius* from Indiana and Ohio are considered erroneous or based on specimens transported by human agents from the south.

The study of coral snakes has been aided by the PHS Grant AC 00136 and by a grant from the Research Foundation of the City University of New York to the senior author.

LITERATURE CITED

Allen, E. Ross, and Eugene Maier. 1941. The extraction and processing of snake venom. Copeia 1941(4):248–252.
———, and Wilfred T. Neill. 1950. The coral snake. Florida Wildlife, Oct. 1950:14–15, 22.
Ashton, Ray E., Jr., and Patricia Sawyer Ashton. 1981. Handbook of reptiles and amphibians of Florida. Part One, The snakes. Windward Publ. Co., Miami. 176 p.
Auffenberg, Walter. 1963. The fossil snakes of Florida. Tulane Stud. Zool. 10(3):131–216.
Austin, Colin R. 1965. Fine structure of the snake sperm tail. J. Ultrastruct. Res. 12:452–462.
Baird, Spencer F., and Charles C. Girard. 1853. Catalogue of North American reptiles in the museum of the Smithsonian Institution. Part I. Serpents. Smithsonian Misc. Coll. 2(5): xvi + 172 p.
Behler, John L., and F. Wayne King. 1979. The Audubon So-

ciety field guide to North American reptiles and amphibians. Alfred A. Knopf, New York. 719 p.
Bowler, J. Keven. 1977. Longevity of reptiles and amphibians in North American collections as of 1 November 1975. Soc. Stud. Amph. Rept. Misc. Publ., Herpetol. Circ. (6):iv + 32 p.
Brattstrom, Bayard H. 1955. The coral snake "mimic" problem and protective coloration. Evolution 9(2):217–219.
Brown, Bryce C., and Lillian M. Brown. 1967. Notable records of Tamaulipan snakes. Texas J. Sci. 19(3):323–326.
———, and Hobart M. Smith. 1942. A new subspecies of Mexican coral snake. Proc. Biol. Soc. Washington 55:63–66.
Campbell, Jonathan A. 1973. A captive hatchling of *Micrurus fulvius tenere* (Serpentes, Elapidae). J. Herpetol. 7(9):312–315.
Carr, Archie F., Jr. 1940. A contribution to the herpetology of Florida. Univ. Florida Publ. Biol. Sci. Ser. 3(1):1–118.
Cervantes, Brooks Minton de, and Sherman A. Minton. 1975. Geographic distribution: *Micrurus fulvius microgalbineus* (Tamaulipan coral snake). Herpetol. Rev. 6(4):116.
Chance, Bob. 1970. A note on the feeding habits of *Micrurus f. fulvius* (cannibalism). Bull. Maryland Herpetol. Soc. 6(3): 56.
Clark, Donald R., Jr. 1967. Notes on sexual dimorphism in tail-length in American snakes. Trans. Kansas Acad. Sci. 69: 226–232.
Clark, Robert F. 1949. Snakes of the hill parishes of Louisiana. J. Tennessee Acad. Sci. 24(4):244–261.
Cohen, Pinya, William H. Berkeley, and Edward B. Seligmann, Jr. 1971. Coral snake venoms: in vitro relation of neutralizing and precipitating antibodies. Amer. J. Trop. Med. Hyg. 20(4):646–649.
———, and John H. Dawson, and Edward B. Seligmann, Jr. 1968. Cross neutralization of *Micrurus fulvius fulvius* (coral snake) venom by anti *Micrurus carinicauda dumerilii* serum. Amer. J. Trop. Med. Hyg. 17(2):308–310.
———, and Edward B. Seligmann, Jr. 1966. Immunologic studies of coral snake venom. Mem. Inst. Butantan 33(1): 339–347.
———, ———, and William H. Berkeley. 1967. Coral snake venom: antibody responses in rabbits. Nature 213(5078):820–822.
Conant, Roger. 1975. A field guide to reptiles and amphibians of eastern and central North America. 2nd edition. Houghton Mifflin Co., Boston. xviii + 429 p.
Curtis, Lawrence. 1952. Cannibalism in the Texas coral snake. Herpetologica 8(2):27.
Duellman, William E., and Albert Schwartz. 1958. Amphibians and reptiles of southern Florida. Bull. Florida State Mus. Biol. Sci. 3(5):181–324.
Ellis, Robert J. 1971. Storage points of coral snake antivenin—USA. Clin. Toxicol. 4(3):495–499.
Engelhardt, George P. 1932. Notes on poisonous snakes in Texas. Copeia 1932(1):37–38.
Fitzinger, Leopoldo J. F. J. 1826. Neue Klassification der Reptilien nach ihren natürlichen Verwandtschaften nebst einer Verwandschaftstafel und einem Verzeichnisse der Reptilien-Sammlung des K. K. Zoologischen Museum der Wien. J. G. Heubner. Vienna. 66 p.
Fix, James D., and Sherman A. Minton, Jr. 1976. Venom extraction and yields from the North American coral snake, *Micrurus fulvius*. Toxicon 14(2):143–145.
Flowers, Herschel H. 1966. A comparison of neutralization ability of a heterologous vs. homologous coral snake *Micrurus fulvius* venom. Amer. J. Trop. Med. Hyg. 15(6):1003–1006.
Gehlbach, Frederick. 1970. Death feigning and erratic behavior in leptotyphlopid, colubrid and elapid snakes. Herpetologica 26(1):24–34.
——— 1972. Coral snake mimicry reconsidered: the strategy of self-mimicry. Forma et Functio 5:311–320.
Gennaro, Joseph G., and Newton C. McCollough. 1966. Further observations on coral snake bites in the United States: symptoms and therapy. Mem. Inst. Butantan 33(3):855–856.
Gloyd, Howard K. 1938. A case of poisoning from the bite of a black coral snake. Herpetologica 1(5):121–124.
Graham, Gary L. 1977. The karyotype of the Texas coral snake, *Micrurus fulvius tenere*. Herpetologica 33(3):345–348.
Greene, Harry W. 1973. The food habits and feeding behavior of New World coral snakes. M.A. Thesis, Univ. Texas at Arlington, 66 p.
——— 1976. Scale overlap, a directional sign stimulus for prey ingestion by ophiophagous snakes. Z. Tierpsychol. 41(2):113–120.
———, and Roy W. McDiarmid. 1981. Coral snake mimicry: does it occur? Science 213(4513):1207–1212.
———, and William F. Pyburn. 1973. Comments on aposematism and mimicry among coral snakes. Biologist 55(4): 144–148.
Grobman, Arnold B. 1978. An alternative solution to the coral snake mimic problem (Reptilia, Serpentes, Elapidae). J. Herpetol. 12(1):1–11.
Halter, C. R. 1923. The venomous coral snakes. Copeia 1923: 105–107.
Harlan, Richard. 1827. Genera of North American Reptilia, and a synopsis of the species. J. Acad. Natur. Sci. Philadelphia 5(2):317–372; 6:7–38.
Harwood, Paul D. 1930. A new species of *Oxysomatium* (Nematoda) with some remarks on the genera *Oxysomatium* and *Aplectana*, and observations on the life history. J. Parasitol. 17(2):61–73.
——— 1932. The helminths parasitic in the Amphibia and Reptilia of Houston, Texas, and vicinity. Proc. United States Nat. Mus. 81(2940):1–71.
Hecht, Max K., and Daniel Marien. 1956. The coral snake mimic problem: a reinterpretation. J. Morphol. 98(2):335–366.
Hensley, M. Max, and Philip W. Smith. 1962. Noteworthy herpetological records from the Mexican states of Hidalgo and Tabasco. Hereptologica 18(1):70–71.
Hill, William H. 1971. Pleistocene snakes from a cave in Kendall County, Texas. Texas J. Sci. 22(2):209–216.
Holman, J. Alan. 1958. The Pleistocene herpetofauna of Sabertooth Cave, Citrus County, Florida. Copeia 1958(4):276–280.
——— 1959a. A Pleistocene herpetofauna near Orange Lake, Florida. Herpetologica 5(3):121–125.
——— 1959b. Amphibians and reptiles from the Pleistocene (Illinoian) of Williston, Florida. Copeia 1959(2):96–102.
——— 1978. The late Pleistocene herpetofauna of Devil's Den Sinkhole, Levy County, Florida. Hereptologica 34(2):228–237.
Jackson, Dale R., and Richard Franz. 1981. Ecology of the eastern coral snake (*Micrurus fulvius*) in northern peninsular Florida. Herpetologica 37(4):213–228.
Jan, Georges. 1858. Plan d'une iconographie generale des ophidiens et description sommaire de nouvelles especes de serpents. Rev. Mag. Zool. ser. 2(10):438–449, 514–527.
———, and Ferdinand Sordelli. 1860–1881. Iconographie generale des ophidiens. 3 vol. Milan. Livrs. 1–50.
Jimenez-Porras, Jesús M. 1973. Reptile toxins. *In* Biology data book. Second edition. 2:697–723. Fed. Amer. Societies Exp. Biol., U.S.A.
Kennedy, J. P. 1964. Natural history notes on some snakes of eastern Texas. Texas J. Sci. 16(2):210–215.
Kochalaty, Walter F., B. D. Ashley, and T. A. Billings. 1967. An immune serum against the North American coral snake (*Micrurus fulvius fulvius*) venom obtained by photooxidative detoxification. Toxicon 5(1):43–46.
———, Ledford E. Bowles, John G. Daly, and T. A. Billings. 1971. Preparation of coral snake antivenin from goat serum. Toxicon. 9:297–298.
Leviton, Alan E. 1972. Reptiles and amphibians of North America. Doubleday and Co., New York. 252 p.
Liner, Ernest A., and Allan H. Chaney. "1973" (1974). Life history: *Micrurus fulvius tenere*. HISS News Journal 1973. 1(6):186.
Link, Goethe. 1951. Records of the coral snake *Micrurus fulvius* in Indiana and Ohio. Natur. Hist. Misc. 92:1–5.
Linnaeus, Carolus. 1766. Systema Naturae. Twelfth edition. Stockholm. 532 p.
Loennberg, Einar. 1894. Notes on reptiles and batrachians collected in Florida in 1892 and 1893. Proc. United States Nat. Mus. 17(1003):317–339.
Loveridge, Arthur. 1938. Food of *Micrurus fulvius fulvius*. Copeia 1938(4):201–202.
——— 1944. Cannibalism in the common coral snake. Ibid. 1944. (4):254.
Martin, Paul S. 1958. A biogeography of reptiles and amphibians in the Gomez Farias region, Tamaulipas, Mexico. Misc. Publ. Mus. Zool. Univ. Michigan (101):1–102.
Martin del Campo, Rafael. 1953. Contribución al conocimiento de la herpetología de Nuevo León. Universidad Nuevo León 11:113–152.
Martof, Bernard S., William M. Palmer, Joseph R. Bailey, and

Julian R. Harrison. 1980. Amphibians and reptiles of the Carolinas and Virginia. Univ. of North Carolina Press, Chapel Hill. 264 p.

McCullough, Newton C., and Joseph F. Gennaro. 1963. Coral snake bites in the United States. J. Florida Med. Assoc. 49(12):968–972.

———, and ——— 1970. Treatment of venomous snakebite in the United States. Clin. Toxicology 3(3):483–500.

Meachem, Anne, and Charles W. Myers. 1961. An exceptional pattern variant of the coral snake, *Micrurus fulvius* (Linnaeus). Quart. J. Florida Acad. Sci. 21(1):56–58.

Milstead, William W. 1960. Relict species of the Chihuahuan desert. Southwest. Natur. 5(2):75–88.

Minton, John E. 1949. Coral snake preyed upon by a bullfrog. Copeia 1949(4):288.

Mittleman, Myron B. 1947. Miscellaneous notes on Indiana amphibians and reptiles. Amer. Midland Natur. 38(2):466–484.

Moseley, Thad. 1966. Coral snake bite: recovery following symptoms of respiratory paralysis. Ann. Surg. 163(6):943–948.

Mount, Robert H. 1975. The reptiles and amphibians of Alabama. Auburn Univ. Agr. Exp. Sta., Auburn, Alabama. vii + 347 p.

Neill, Wilfred T. 1951. Notes on the natural history of certain North American snakes. Publ. Res. Div. Ross Allen's Reptile Inst. 1(5):47–60.

——— 1957. Some misconceptions regarding the eastern coral snake, *Micrurus fulvius*. Herpetologica 13(2):111–118.

——— 1963. Polychromatism in snakes. Quart. J. Florida Acad. Sci. 26(2):194–216.

Palmer, William M. 1974. Poisonous snakes of North Carolina. State Mus. Natur. Hist., Raleigh. 22 p.

———, Alvin L. Braswell, and David L. Stephan. 1974. Noteworthy herpetological records from North Carolina. Bull. Maryland Herpetol. Soc. 10(3):81–87.

Parrish, Henry, and M. S. Kahn. 1967. Bites by coral snakes: reports of 11 representative cases. Amer. J. Med. Sci. 81: 561–568.

Pope, Clifford H. 1955. The reptile world. Alfred A. Knopf, New York. xxv + 325 + xiii p.

Possani, L. D., A. C. Alagón, P. L. Fletcher, Jr., M. J. Varela, and J. Z. Juliá. 1979. Purification and characterization of a phospho-lipase A-2 Ec-3.1.1.4 from the venom of the coral snake *Micrurus fulvius microgalbineus*. Biochem J. 179(3): 603–606.

Quinn, Hugh R. 1979. Reproduction and growth of the Texas coral snake *Micrurus fulvius tenere*. Copeia 1979(3):453–463.

Ramsey, George F., and Gilbert D. Klickstein. 1962. Coral snake bite: report of a case and suggested therapy. J. Amer. Med. Assoc. 182(9):949–951.

Ramsey, Howard W., G. K. Snyder, H. Kitchen, and W. J. Taylor. 1972a. Fractionation of coral snake venom. Preliminary studies on the separation and characterization of the protein fractions. Toxicon 10(1):67–72.

———, W. J. Taylor, I. B. Boruxhow, and G. K. Snyder. 1972b. Mechanism of shock produced by an elapid snake (*M. f. fulvius*) venom in dogs. Amer. J. Physiol. 222:782–786.

Robison, H. W. 1972. Geographic distribution: *Micrurus fulvius tenere*. Herpetol. Rev. 4(5):170–171.

Roze, Janis A. 1967. A check list of the New World venomous coral snakes (Elapidae), with descriptions of new forms. Amer. Mus. Novitates (2287):1–60.

——— 1983. New World coral snakes (Elapidae): A taxonomic and biological summary. Mem. Inst. Butantan. 44:183.

Ruick, J. D., Jr., 1948. Collecting coral snakes, *Micrurus fulvius tenere* in Texas. Herpetologica 4(6):215–216.

Russell, Findlay E. 1980. Snake venom poisoning. J. B. Lippincott, Philadelphia. 562 p.

Sabath, Michael, and Richard Worthington. 1959. Eggs and young of certain Texas reptiles. Herpetologica 15(1):31–32.

Schmidt, Karl P. 1928. Notes on American coral snakes. Bull. Antivenin Inst. Amer. 2(3):63–64.

——— 1932. Stomach contents of some American coral snakes, with the description of a new species of *Geophis*. Copeia 1932(1):6–9.

——— 1933. Preliminary account of the coral snakes of Central America and Mexico. Field Mus. Natur. Hist. Zool. ser. 20:29–40.

——— 1953. A check list of North American amphibians and reptiles. Sixth edition. Amer. Soc. Ichthyol. Herpetol. viii + 280 p.

———, and Robert F. Inger. 1957. Living reptiles of the world. Doubleday and Co., New York. 287 p.

Shaw, Charles E. 1971. The coral snakes, genera *Micrurus* and *Micruroides* of the United States and northern Mexico, p. 157–172. *In* W. Buecherl and E. E. Buckley (eds.), Venomous animals and their venoms. Vol. 2. Venomous vertebrates. Academic Press, New York.

Smith, Hobart M., and Edward H. Taylor. 1950. Type localities of Mexican reptiles and amphibians. Univ. Kansas Sci. Bull. 33(8):313–380.

———, E. Ross Allen, and Richard L. Holland. 1970. A new atavistic hyperxanthic chromotype in the coral snake *Micrurus fulvius* (Linnaeus). J. Herpetol. 4(1–2):80–83.

Stejneger, Leonhard, and Thomas Barbour. 1917. A check list of North American amphibians and reptiles. Harvard Univ. Press, Cambridge. iv + 5–125 p.

Stevan, Lee J., and Edward B. Seligmann, Jr. 1970. Agar-gel and acrylamide-disc electrophoresis of coral snake venoms. Toxicon 8:11–14.

Strecker, John K., Jr. 1908. The reptiles and batrachians of McLennan County, Texas. Proc. Biol. Soc. Washington 21: 69–84.

——— 1927. Chapters from the life histories of Texas reptiles and amphibians. Part two. Contrib. Baylor Univ. Mus. 10: 38(3):3–14.

——— 1935. Notes on the zoology of Texas. Baylor Univ. Bull. 38(3):1–69.

Taylor, Edward H. 1949. A preliminary account of the herpetology of the state of San Luis Potosí, Mexico. Univ. Kansas Sci. Bull. 33, Part 1 (2):169–215.

——— 1950. Second contribution to the herpetology of San Luis Potosí. Ibid. 33, Part 2 (11):441–457.

Telford, Sam R., Jr. 1952. A herpetological survey in the vicinity of Lake Shipp, Polk County, Florida. Quart. J. Florida Acad. Sci. 15(3):175–185.

——— 1955. A description of the eggs of the coral snake *Micrurus f. fulvius*. Copeia 1955(3):258.

True, Frederick W. 1883. On the bite of the North American coral snakes (Genus *Elaps*). Amer. Natur. 17:26–31.

Tryon, Bern W., and Hugh K. McCrystal. 1982. Life history notes: *Micrurus fulvius tenere* reproduction. Herpetol. Rev. 13(2):47–48.

Weis, Robert, and Robert J. McIsaac. 1971. Cardiovascular and muscular effects of venom from coral snake, *M. fulvius*. Toxicon 9(3):219–228.

Werler, John E. 1964. Poisonous snakes of Texas and first aid treatment of their bites. Texas Parks and Wildlife Dept. Bull. 31, 62 p.

——— 1970. Notes on young and eggs of captive reptiles. Int. Zoo Yearb. 10:105–116.

———, and Donald M. Darling. 1950. A case of poisoning from the bite of a coral snake, *Micrurus f. tenere*. Baird and Girard. Herpetologica 6(7):197–199.

Wickler, Wolfgang. 1968. Mimicry in plants and animals. McGraw-Hill, New York. 255 p.

Wright, Albert Hazen, and Anna Allen Wright. 1957. Handbook of snakes of the United States and Canada. Comstock Publ. Assoc., Ithaca, New York. 2 vols. xxvii + 1105 p.

Zegel, John C. 1975. Notes on collecting and breeding the eastern coral snake, *Micrurus fulvius fulvius*. Bull. Southeast. Herpetol. Soc. 1(6):9–10.

JANIS A. ROZE, CITY COLLEGE OF NEW YORK. NEW YORK 10031 AND AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK 10024, AND GRACE M. TILGER, AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, NEW YORK 10024.

Primary editor for this account, Larry David Wilson.

Published 17 March 1983 and Copyright 1983 by the SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES.