

Catalogue of American Amphibians and Reptiles.

Iverson, J.B., C.A. Young, and J.F. Berry. 1998. *Kinosternon integrum*.

Kinosternon integrum LeConte
Mexican Mud Turtle

Kinosternon integrum LeConte 1854:183. Type locality, "Mexico;" restricted to "Acapulco, Guerrero [Mexico]" by Smith and Taylor (1950b:25). Holotype, Academy of Natural Sciences, Philadelphia (ANSP), no number (lost), an adult, collected by Mr. Pease, date of collection unknown (not examined by authors).

Thyrosternum integrum: Agassiz 1857:429.

Thyrosternon integrum: Gray 1858:288.

Cinosternon integrum: Strauch 1862:41.

Kinosternon integrum: Müller 1865:598. First use of combination.

Cinosternon leucostomum: Dugés 1869:143 (part).

Swanka integra: Gray 1870:69.

Cinosternon rostellum Bocourt 1876:390. Type locality, "Guanajuato [Mexico]." Holotype, Museum Nationale Histoire Natural, Paris (MNHN) 2112, young female in alcohol, donated by Alfredo Dugés, date of collection unknown (examined by senior author).

Kinosternon sp.: Müller 1885:716.

Cinosternum integrum: Günther 1885:16.

Cinosternum hirtipes: Günther 1885:15 (part).

Cinosternon leucostomum: Perez 1886:197 (part).

Cinosternon pennsylvanicum: Dugés 1888:104 (part).

Cinosternon guanajuatense Dugés 1888:107. Type locality, "Guanajuato [Mexico];" not "Valle de México" as indicated by Wermuth and Mertens (1977:9). Holotype, MNHN 2112, young female in alcohol (also the type of *C. rostellum* Bocourt 1876), donated by Alfredo Duges, date of collection unknown (examined by senior author). See Smith (1969) for a complete discussion of this synonymy.

Cinosternum scorpioides integrum: Siebenrock 1904:3.

Cinosternum pennsylvanicum: Gadow 1905:194 (part).

Cinosternon hirtipes: Gadow 1905:209 (part).

Cinosternon scorpioides integrum forma *mexicana*: Siebenrock 1907:579. Type locality, "Acapulco und Mazatlan;" restricted to "Mazatlan [Mexico]" by Smith and Smith (1979 [1980]:115). Syntypes possibly in Vienna Museum (e.g., NMW 1697 from "Acapulco," collected by F. Steindachner in 1874; see Grillitsch et al. 1996:93), although no types were identified by Tiedemann et al. (1994:12).

Cinosternum sp.: Gadow 1930:54.

Kinosternon scorpioides integrum: Ahl 1934:184.

Kinosternon hirtipes: Martin del Campo 1937:265 (part).

Kinosternon leucostomum: Altini 1942:154 (part).

Kinosternon cruentatum cruentatum: Schmidt and Shannon 1947:69 (part).

Cinosternum rostellum: Smith and Taylor 1950a:330.

Kinostrenon hirtipes: Malkin 1958:75. *Ex errore* (part).

Kinosternon integrum: Dixon 1960:37. *Ex errore*.

Kinosternon sp.: Brattstrom 1965:383.

Kinosternon hirtipes hirtipes: Casas-Andreu 1967:44 (part).

Kinosternon cruentatum: Dixon et al. 1972:228 (part).

Kinosternon scorpioides: Morafka 1977:83 (part).

Cinostetum integrum: Gillett 1995:26. *Ex errore*.

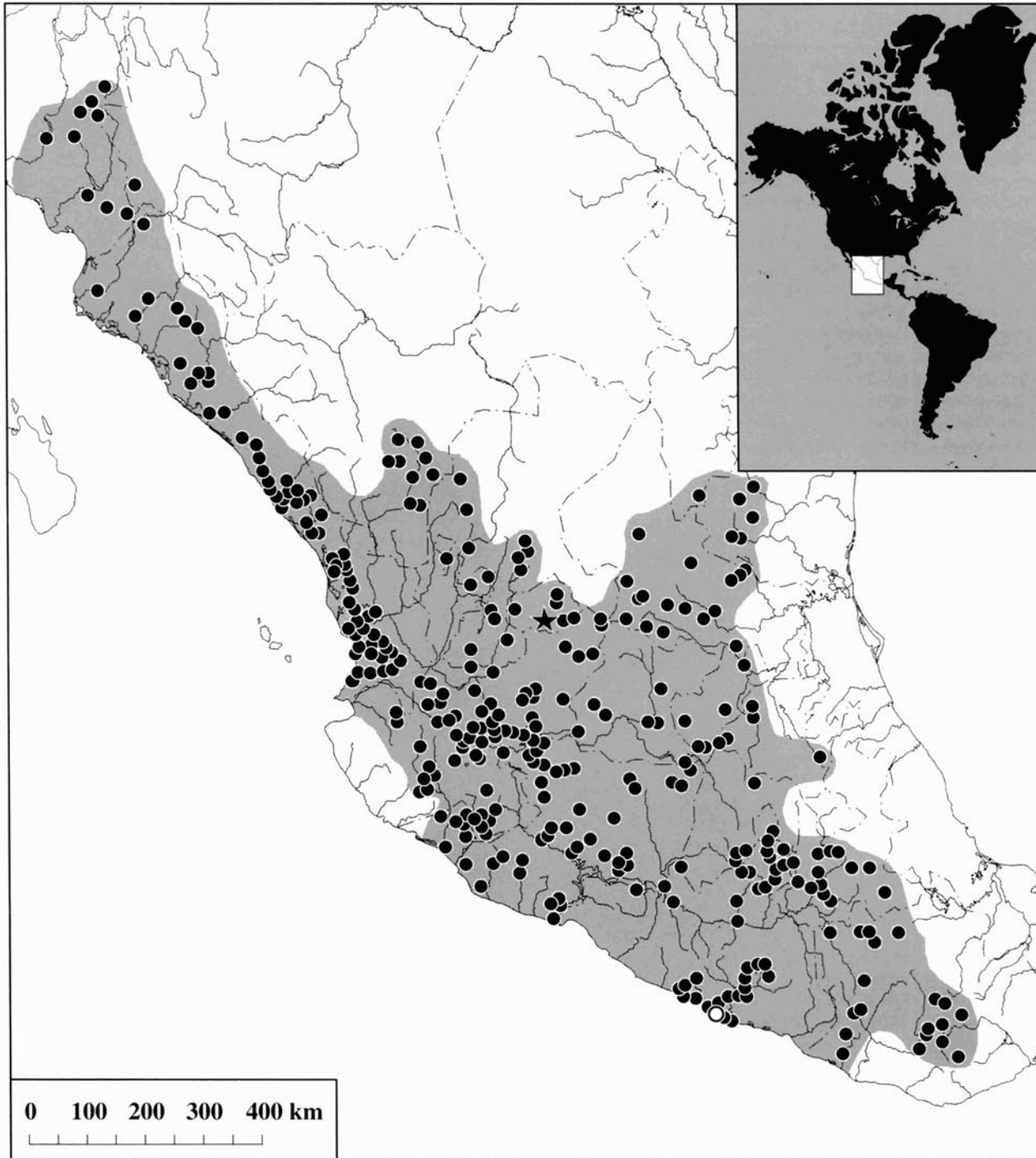
• **Content.** Although monotypic, this species is highly variable. Webb (1984) suggested that populations from the western



Figures. Female *Kinosternon integrum* from the Río Armería at Hwy 80, 11.0 mi (17.7 km) NE Unión de Tula, Jalisco, México (photographs by J.B. Iverson).

Mexican Plateau may differ from Pacific coastal plain populations at the subspecific level, although Berry's (1978) morphometric analysis seems to contradict that suggestion.

• **Definition.** Adult males reach at least 21 cm in carapace length; adult females may reach 19.5 cm. The elongate carapace is tricarinate (usually) to acarinate, very rarely unicarinate, with the keels most obvious posteriorly. The first vertebral scute usually touches the second marginal, and its width averages 21.3% (17–26%) of carapace length in males; 22.5% of carapace length (19–28%) in females. The ninth marginal is not elevated above the preceding marginals. The tenth marginal is higher than the ninth marginal, and the eleventh marginal is usually not elevated to the height of the posterior portion of the tenth marginal. The nuchal bone does not contact the first neural bone. The carapace is highly variable in color, ranging from light horn color through almost every shade of brown to nearly black; the seams are darker in light specimens. The plastron is moderately large to large in size (relative to the carapacial opening) and bears two transverse hinges, one anterior to and one posterior to the abdominal scutes. The posterior width of the plastral forelobe averages 47% (42–54%) of carapace length in



Map. Distribution of *Kinosternon integrum*. The circle marks the restricted type locality; dots indicate other records. The star marks the only known fossil locality.

males; 53% (45–57%) of carapace length in females. For medial length of plastral scutes, the most common formula is interabdominal > interanal > gular > interhumeral > interfemoral > interpectoral. Bridge length averages 26.1% (20–28%) of carapace length in males, 26.8% (20–30%) of carapace length in females, and 114% (88–151%) of first vertebral scute width in males and 115% (91–158%) of first vertebral scute width in females. Axillary and inguinal scutes often are not in contact; if touching, contact is narrow. The plastron and bridges are pale yellow to yellow-orange with seams more darkly marked. The upper tomium is not strongly hooked. The dorsal head scale of

adults is large, triangular, or bell-shaped, and the posterior margin is convex. Three or more pairs of chin barbels are typically present, each shorter than half of the orbital diameter. The head is spotted, mottled, or reticulated with cream or yellow markings on a dark brown to black background, which is darker dorsally than ventrally. Within a population, females tend to have finer head markings than males which, in addition to having coarser head markings, are darker. The skin is generally smooth, with a few small papillae or none; papillae are notably lacking on the tail. Even males lack patches of elevated scales (clasp- ing organs) on the back of the crus and thigh of the hind legs.

Both sexes have terminal tail spines, but the tail and spine are short in females. The cloacal aperture is anterior to the shell margin in adult females and at or beyond the margin in males.

• **Descriptions.** The most comprehensive account is that of Smith and Smith (1979 [1980]). Other general descriptions are in Casas-Andreu (1965), Ernst and Barbour (1989), Pritchard (1967, 1979), Rogner (1996), and Siebenrock (1904, 1907). Specific descriptions include comparisons with *K. hirtipes* (Iverson 1981), shell morphometrics (Mosimann 1956, 1958), shell kinesis (Bramble et al. 1984), neural bone patterns (Iverson 1988), musk glands (Waagen 1972), chromosomes (Bickham and Carr 1983), skull anatomy (Siebenrock 1897), choanae (Parsons 1968), cervical vertebrae (Williams 1950), visceral skeleton and muscles (Schumacher 1973), and locomotor osteology and myology (Walker 1973, Zug 1971).

• **Illustrations.** Color photographs are in Garcia and Ceballos (1994; dorsal shell) and Rogner (1996; adult male and female). Black and white photographs are in Berry (1978; dorsal, ventral, and lateral views, and head), Berry and Legler (1980; dorsal, ventral, and lateral views, head, and skull), Casas-Andreu (1967; dorsal, ventral, and lateral views), Ditmars (1910, 1933; ventral view), Ernst and Barbour (1989; lateral view), Iverson (1981; juvenile and female tail), and Parsons (1968; choanae). Black and white drawings are in Günther (1885; as *K. hirtipes*), these were reproduced in Wermuth and Mertens (1961) and Smith and Smith (1979 [1980]).

• **Distribution.** This species is widely distributed from sea level to 2200 m (Duellman 1965) in western, central, and southern México, from the Río Matape in central Sonora, the Río Mezquital (San Pedro) in southern Durango, and the Mexican Plateau portions of the Río Guayalejo in Nuevo León southward along the Pacific coastal plain and Mexican Plateau to coastal Guerrero and the upper Río Verde in Oaxaca. It does not occur in the coastal plain portions of Gulf of Mexico drainages and is replaced along the Pacific coastal plain by *K. chimalhuaca* in southwestern Jalisco and western Colima, and by *K. oaxacae* in southern and southwestern Oaxaca. *Kinosternon integrum* is broadly sympatric with *K. hirtipes* on the southern Mexican Plateau and with *K. alamosae* and *K. sonoriense* in northwestern México, but is not found sympatrically with *K. chimalhuaca*, *K. oaxacae*, or *K. scorpioides*. *Kinosternon integrum* is apparently not native to the Valley of Mexico, but has been introduced there.

• **Fossil Record.** Fossil material of *Kinosternon integrum* is known from the Pleistocene in the state of Aguascalientes, México (Mooser 1980).

• **Pertinent literature.** General reviews are found in Berry (1978) and Smith and Smith (1979 [1980]). Additional important references are: phylogenetic relationships (Berry et al. 1997; Iverson 1988, 1991; Seidel et al. 1986); geographic variation (Berry 1978, Webb 1984); comparisons with *K. hirtipes* (Berry and Legler 1980, Iverson 1981, Iverson and Berry 1979), *K. oaxacae* (Berry and Iverson 1980), *K. alamosae* (Berry and Legler 1980), *K. scorpioides* (Berry 1978), and *K. chimalhuaca* (Berry et al. 1997); scute morphometrics (McCord et al. 1990); distribution (Berry and Iverson 1979; Berry and Legler 1980; Bogert and Oliver 1945; Casas-Andreu 1965, 1967; Conant 1969; Conant and Berry 1978; Flores-Villela 1993; Hardy and McDiarmid 1969; Iverson 1981, 1986, 1992; Smith and Smith 1979 [1980]); biogeography (Berry 1978, Duellman 1965, Morafka 1977, Webb 1984); habitat (Anderson and Lidicker 1963; Bogert and Oliver 1945; Byers 1972; Castro-Franco and

Bustos Zagal 1994; Conant 1969; Davis and Dixon 1961; Davis and Smith 1953; Drake 1958; Duellman 1961, 1965; Hardy and McDiarmid 1969; Martin 1958; McCranie and Wilson 1987; Peters 1954; Webb 1984; Webb and Hensley 1959; Zweifel 1960); biomass (Iverson 1982); reproduction (Flannery 1972, Duellman 1961, Hardy and McDiarmid 1969, Rudloff 1986, Scott 1962, Webb 1984); growth (Mosimann 1956, 1958); ontogeny of scute morphometrics (Connor and Mosimann 1969); diet (Byers 1972, Malkin 1958); carapacious algae (Dixon 1960); estivation (Slevin 1926, Zweifel 1960); longevity (Slavens and Slavens 1994, Snider and Bowler 1992); sexual dimorphism (Berry and Shine 1980); predation (Scott 1962); parasites (Bravo-Hollis 1944; Bravo-Hollis and Caballero Deloya 1973; Caballero y Caballero 1938, 1940; Caballero y Caballero and Herrera Rosales 1947; Herrera Rosales 1951; Perez Reyes 1964; Yamaguti 1958); chromosome evolution (Bickham and Carr 1983); serology (Leone and Wilson 1961); hemoglobin (Sullivan and Riggs 1967a, b, c); skeletal scaling (Iverson 1984); body temperature (Brattstrom 1965); shape-behavior correlation (Schubert-Soldern 1947); anthropology (Malkin 1958); zoo holdings (Slavens 1976, Slavens and Slavens 1994); and common names (Casas-Andreu 1967, Liner 1994).

• **Etymology.** The specific name *integrum* is an adjective based on the Latin “*integra*,” meaning whole, entire, complete, or perfect, and apparently refers to the large size of the plastron relative to the carapacial opening in material available to LeConte (1854).

• **Comment.** The literature on Mexican kinosternids contains abundant errors of identification, primarily because of the difficulty in distinguishing *K. integrum* from *K. hirtipes*, especially in areas of sympatry. The majority of the mistakes have been corrected by Berry (1978), Berry and Legler (1980), Iverson (1981), and Smith and Smith (1979 [1980]). Smith and Smith (1979 [1980]) provide the most comprehensive review of the nomenclature.

Literature Cited

- Agassiz, J.L.R. 1857. Contributions to the Natural History of the United States of America. Vol. 2 (Part 2). North American Testudinata. Little, Brown and Co., Boston, Massachusetts; Trübner and Co., London
- Ahl, E. 1934. Über eine Sammlung von Reptilien und Amphibien aus Mexico. Zool. Anz. 106:184–186.
- Altini, G. 1942. I rettili dei Laghi Chapala, Patzcuara e Petèn raccolti nel 1932 dal Prof. Alessandro Ghigi e dal Prof. Alula Taibel. Atti Soc. Ital. Sci. Nat., Milan 81:153–195.
- Anderson, J.D. and W.Z. Lidicker, Jr. 1963. A contribution to our knowledge of the herpetofauna of the Mexican state of Aguascalientes. Herpetologica 19:40–51.
- Berry, J.F. 1978. Variation and systematics in the *Kinosternon scorpioides* and *K. leucostomum* complexes (Reptilia: Testudines: Kinosternidae) of Mexico and Central America. Ph.D. Diss. Univ. Utah, Salt Lake City.
- and J.B. Iverson. 1979. The mud turtle genus *Kinosternon* in northeastern Mexico. Herpetologica 35:318–324.
- and —. 1980. A new species of mud turtle, genus *Kinosternon*, from Oaxaca, Mexico. J. Herpetol. 14:313–320.
- and J.M. Legler. 1980. A new turtle (genus *Kinosternon*) from northwestern Mexico. Contr. Sci. Nat. Hist. Mus. Los Angeles Co. (325):1–12.
- , M.E. Seidel, and J.B. Iverson. 1997. A new species of mud turtle (genus *Kinosternon*) from Jalisco and Colima, Mexico, with notes on its natural history. Chel. Conserv. Biol. 2:329–337.

- and R. Shine. 1980. Sexual size dimorphism and sexual selection in turtles (Order Testudines). *Oecologia* 44:185–191.
- Bickham, J.W. and J.L. Carr. 1983. Taxonomy and phylogeny of the higher categories of cryptodiran turtles based on a cladistic analysis of chromosomal data. *Copeia* 1983:918–932.
- Bocourt, M. 1876. Note sur quelques reptiles de l'isthme de Tehuantepec (Mexique) donnés par M. Sumichrast au Muséum. *J. Zool., Paris* 5:386–411.
- Bogert, C.M. and J.A. Oliver. 1945. A preliminary analysis of the herpetofauna of Sonora. *Bull. Amer. Mus. Nat. Hist.* 83:297–425 + 8 pl.
- Bramble, D.M., J.H. Hutchison, and J.M. Legler. 1984. Kinosternid shell kinesis: structure, function and evolution. *Copeia* 1984:456–475.
- Brautstrom, B.H. 1965. Body temperature of reptiles. *Amer. Midl. Nat.* 73:376–422.
- Bravo-Hollis, M. 1944. Tremátodo parásito del intestino de *Kinosternum integrum*. *An. Inst. Biol. Univ. México* 15:41–45.
- and J. Caballero Deloya. 1973. Catalogo de la Colección Helminológica del Instituto de Biología. *Publ. Esp. Inst. Biol. Univ. Auton. México* (2):1–138.
- Caballero y Caballero, E. 1938. Algunos tremátodos de reptiles de México. *An. Inst. Biol. Univ. México* 9:103–120 + 3 pl.
- . 1940. Trematodos de las tortugas de México. *An. Inst. Biol. Univ. México* 11:559–572.
- and E. Herrera Rosales. 1947. Trematodos de las tortugas de México. *V. An. Inst. Biol. Univ. México* 18:159–164.
- Casas-Andreu, G. 1965. Estudio preliminar sobre las tortugas de agua dulce en México. *An. Inst. Nac. Inves. Biol. Pesq.* 1:365–401 + 15 pl.
- . 1967. Contribución al conocimiento de las tortugas dulceacuicolas de México. *Univ. Nac. Autó. México, Fac. Ciencias, Dept. Biol.* (7):1–96 + 19 pl.
- Castro-Franco, R. and M.G. Bustos Zagal. 1994. List of reptiles of Morelos, Mexico, and their distribution in relation to vegetation types. *Southw. Nat.* 39:171–213.
- Conant, R. 1969. A review of the water snakes of the genus *Natrix* in Mexico. *Bull. Amer. Mus. Nat. Hist.* 142:1–140 + 20 pl.
- and J.F. Berry. 1978. Turtles of the family Kinosternidae in the southwestern United States and adjacent Mexico: identification and distribution. *Amer. Mus. Nov.* (2642):1–18.
- Connor, R.J. and J.E. Mosimann. 1969. Concepts of independence for proportions with a generalization of the Dirichlet distribution. *J. Amer. Stat. Assoc.* 64:194–206.
- Davis, W.B. and J.R. Dixon. 1961. Reptiles (exclusive of snakes) from the Chilpancingo region, Mexico. *Proc. Biol. Soc. Washington* 74:37–55.
- and H.M. Smith. 1953. Lizards and turtles of the Mexican state of Morelos. *Herpetologica* 9:100–108.
- Ditmars, R.L. 1910. *Reptiles of the World: Tortoises and Turtles, Crocodilians, Lizards and Snakes of the Eastern and Western Hemispheres*. Sturgis and Walton Co., New York.
- . 1933. *Reptiles of the World: The Crocodilians, Lizards, Snakes, Turtles and Tortoises of the Eastern and Western Hemispheres*. New rev. ed. MacMillan Co., New York.
- Dixon, J.R. 1960. Epizootic algae on some turtles of Texas and Mexico. *Texas J. Sci.* 12:36–38.
- , C.A. Ketchersid, and C.S. Lieb. 1972. The herpetofauna of Queretaro, Mexico, with remarks on taxonomic problems. *Southw. Nat.* 16:225–237.
- Drake, J.J. 1958. The brush mouse *Peromyscus boylii* in southern Durango. *Publ. Michigan St. Univ. Mus., Biol. Ser.* 1:97–132.
- Duellman, W.E. 1961. The amphibians and reptiles of Michoacán, México. *Univ. Kansas Publ. Mus. Nat. Hist.* 15:1–148.
- . 1965. Amphibians and reptiles from the Yucatan Peninsula, México. *Univ. Kansas Publ. Mus. Nat. Hist.* 15:577–614.
- Dugés, A.A.D. 1869. Catálogo de animales vertebrados observados en la república Mexicana. *Naturaleza* 1:137–145, 414.
- . 1888. Erpetología del Valle de México. *Naturaleza* 1:97–146 + 2 pl.
- Ernst, C.H. and R.W. Barbour. 1989. *Turtles of the World*. Smithsonian Inst. Press, Washington, D.C. and London.
- Flannery, K.V. 1972. Vertebrate fauna and hunting patterns, p. 132–177. *In* D.S. Byers (ed.), *The Prehistory of the Tehuacan Valley*. Vol. I. Environment and Subsistence. Univ. Texas Press, Austin.
- Flores-Villela, O. 1993. Herpetofauna Mexicana: annotated list of the species of amphibians and reptiles of Mexico, recent taxonomic changes, and new species. *Carnegie Mus. Nat. Hist. Spec. Publ.* (17):iv + 73 p.
- Gadow, H.F. 1905. The distribution of Mexican amphibians and reptiles. *Proc. Zool. Soc. London* 2:191–245.
- . 1930. Jorullo. The History of the Volcano of Jorullo and the Reclamation of the Devastated District by Animals and Plants. Cambridge Univ. Press, Cambridge.
- García, A. and G. Ceballos. 1994. *Field Guide to the Reptiles and Amphibians of the Jalisco Coast, Mexico*. Fund. Ecol., Cuixmala, México.
- Gillett, L. 1995. The good old/bad old days: a survey of reptiles and amphibian species traded during the period 1948–1957. *Brit. Herpetol. Soc. Bull.* 52:26–29.
- Gray, J.E. 1858. Some observations on Prof. Agassiz's criticisms on the "Catalogue of shield reptiles in the collection of the British Museum." *Ann. Mag. Nat. Hist. Ser. 3*, 1:285–289.
- . 1870. Supplement to the Catalogue of Shield Reptiles in the Collection of the British Museum. Pt. 1, Testudinata (Tortoises). Trustees Brit. Mus. (Nat. Hist.), London.
- Grillitsch, H., E. Schleiffer, and F. Tiedemann. 1996. Katalog der Trockenpräparate der Herpetologischen Sammlung des Naturhistorischen Museums in Wien. *Stand: 31. Dezember 1995*. *Vertebrata 5. Kat. wissen. Samml. Naturh. Mus. Wien* 12:1–137.
- Günther, A.C.L.G. 1885. Reptilia and Batrachia. *In* O. Salvin and F.O. Godman (eds.), *Biologia Centrali-Americana*, v. 20. R.H. Porter and Dulau & Co., London.
- Hardy, L.M. and R.W. McDiarmid. 1969. The amphibians and reptiles of Sinaloa, Mexico. *Univ. Kansas Publ. Mus. Nat. Hist.* 18:39–252 + 8 pl.
- Herrera Rosales, C.E. 1951. Trematodes de los quelonios de México. Thesis. Univ. Nac. Autó. México, México, D.F.
- Iverson, J.B. 1981. Biosystematics of the *Kinosternon hirtipes* species group (Testudines: Kinosternidae). *Tulane Stud. Zool. Bot.* 23:1–74.
- . 1982. Biomass in turtle populations: a neglected subject. *Oecologia* 55:69–76.
- . 1984. Proportional skeletal mass in turtles. *Florida Sci.* 47:1–11.
- . 1986. A Checklist with Distribution Maps of the Turtles of the World. Priv. printed. Paust Printing, Richmond, Indiana.
- . 1988. Neural bone patterns and the phylogeny of the turtles of the subfamily Kinosterninae. *Milwaukee Pub. Mus. Contr. Biol. Geol.* (75):1–12.
- . 1991. Phylogenetic hypotheses for the evolution of modern kinosternine turtles. *Herpetol. Monogr.* 5:1–27.
- . 1992. A Revised Checklist with Distribution Maps of the Turtles of the World. Privately printed. Richmond, Indiana.
- and J.F. Berry. 1979. The mud turtle genus *Kinosternon* in northeastern Mexico. *Herpetologica* 35:318–324.
- LeConte, J. 1854. Description of four new species of *Kinosternum*. *Proc. Acad. Nat. Sci., Philadelphia* 7:180–190.
- Leone, C.A. and F.E. Wilson. 1961. Studies of turtle sera. I. The nature of the fastest-moving electrophoretic component in the

- sera of nine species. *Physiol. Zool.* 34:297–305.
- Liner, E.A. 1994. Scientific and common names for the amphibians and reptiles of Mexico in English and Spanish. Nombres científicos y comunes en Inglés y Español de los anfibios y los reptiles de México. *SSAR Herpetol. Circ.* (23):v + 113 p.
- Malkin, B. 1958. Cora ethnozoology, herpetological knowledge; a bio-ecological and cross cultural approach. *Anthropol. Quart.* 31:73–90.
- Martin, P.S. 1958. A biogeography of reptiles and amphibians in the Gomez Farias region, Tamaulipas, Mexico. *Misc. Publ. Mus. Zool. Univ. Michigan* (101):1–102 + 7 pl.
- Martin del Campo y Sanchez, R. 1937. Contribución al conocimiento de los batracios y reptiles del Valle des Mesquital. *Hgo. An. Inst. Biol. Univ. México* 8:259–266.
- McCord, R.D., R.E. Strauss, and C.H. Lowe. 1990. Morphometric variation in *Kinosternon* turtles of the western United States and adjacent Mexico. *J. Herpetol.* 24:297–301.
- McCranie, J.R. and L.D. Wilson. 1987. The biogeography of the herpetofauna of the pine-oak woodlands of the Sierra Madre Occidental of Mexico. *Milwaukee Pub. Mus. Contr. Biol. Geol.* (72):1–30.
- Mooser, O. 1980. Pleistocene fossil turtles from Aguascalientes, state of Aguascalientes. *Rev. Inst. Geol. Univ. Autó. México* 4:63–66.
- Morafka, D.J. 1977. A biogeographical analysis of the Chihuahuan desert through its herpetofauna. *Biogeographica* 9:vii + 313 p. + 9 pl.
- Mosimann, J.E. 1956. Variation and relative growth in the plastral scutes of the turtle *Kinosternon integrum* Leconte. *Misc. Publ. Mus. Zool. Univ. Michigan* (97):1–43 + 1 pl.
- . 1958. An analysis of allometry in the chelonian shell. *Rev. Can. Biol.* 17:137–228.
- Müller, J.W. 1865. Reisen in den Vereinigten Staaten, Canada und Mexiko. III. Beiträge zur Geschichte, Statistik und Zoologie von Mexiko. Dritte Abtheilung. Die Wirbelthiere Mexikos. III. Amphibia. F.A. Brockhaus, Leipzig.
- . 1885. Vierter Nachtrag zum Katalog der herpetologischen Sammlung des Basler Museums. *Verh. Naturf. Ges. Basel* 7: 668–717 + 9 pl.
- Parsons, T.S. 1968. Variation in the choanal structure of Recent turtles. *Can. J. Zool.* 46:1235–1263 + 5 pl.
- Perez, F.F. 1886. III. Reptiles, p. 182–199. In F. Ferrári-Perez (ed.), *Catalogue of animals collected by the geographical and exploring commission of the Republic of Mexico*. *Proc. U.S. Natl. Mus.* 1886:125–199.
- Perez Reyes, R. 1964. Estudios sobre protozoarios intestinales. I. Los flagelados del género *Trimitus* Alexeieff, 1910. *An. Esc. Nac. Cienc. Biol., México* 13:59–66.
- Peters, J.A. 1954. The amphibians and reptiles of the coast and coastal sierra of Michoacán, Mexico. *Occ. Pap. Mus. Zool. Univ. Michigan* (554):1–37.
- Pritchard, P.C.H. 1967. *Living Turtles of the World*. T.F.H. Publ., Inc., Jersey City, New Jersey.
- . 1979. *Encyclopedia of Turtles*. T.F.H. Publ., Neptune, New Jersey.
- Rogner, M. 1996. *Schildkröten 2*. Heidi Rogner-Verlag, Hürtgenwald, Germany.
- Rudloff, H.W. 1986. Schlammschildkröten-Terrarientiere der Zukunft. *Aquar. Terrar.* 33:166–169.
- Schmidt, K.P. and F.A. Shannon. 1947. Notes on amphibians and reptiles of Michoacan, Mexico. *Fieldiana Zool.* 31:63–85.
- Schubert-Soldern, R. 1947. Biologische Studie über Bau und Lebensweise von Süßwasser-schildkröten. *Ost. Zool. Z., Vienna* 1:275–313.
- Schumacher, G.-H. 1973. The head muscles and hyolaryngeal skeleton of turtles and crocodylians, p. 101–199. In C. Gans and T.S. Parson (eds.), *Biology of the Reptilia, Morphology D.*, Vol. 4. Academic Press, New York.
- Scott, N.J. 1962. The reptiles of southern Sinaloa, Mexico: a taxonomic and ecological study. M.S. thesis, Humboldt State College, Arcata, California.
- Seidel, M.E., J.B. Iverson, and M.D. Adkins. 1986. Biochemical comparisons and phylogenetic relationships in the family Kinosternidae (Testudines). *Copeia* 1986:285–294.
- Siebenrock, F. 1897. Das Kopfskelet der Schildkröten. *Sber. Akad. Wiss. Wien* 106:245–328.
- . 1904. Schildkröten von Brasilien. *Denkschr. Akad. Wiss. Wien* 76:1–28.
- . 1907. Die Schildkrötenfamilie Cinosternidae m. Sitzunber. *Akad. Wiss. Wien, Math. Nat. Kl.* 116:527–599 + 2 pl. + 2 maps.
- Slavens, F.L. 1976. *The Working Guide to Breeding Potential for Reptiles and Amphibians in United States Zoos*. Woodland Park Zool. Gard., Seattle, Washington.
- and K. Slavens. 1994. *Reptiles and Amphibians in Captivity: Breeding-longevity, and Inventory*. Slaveware, Seattle, Washington.
- Slevin, J.R. 1926. Expedition to the Revillagigedo Islands, Mexico, in 1925. III. Notes on a collection of reptiles and amphibians from the Tres Marias and Revillagigedo Islands, and west coast of Mexico, with description of a new species of *Tantilla*. *Proc. California Acad. Sci. 4th Ser.* 15:195–207.
- Smith, H.M. 1969. Two neglected Dugèsian nominal taxa for Mexican turtles and frogs. *J. Herpetol.* 3:110–112.
- and R.B. Smith. 1979 (1980). *Synopsis of the Herpetofauna of Mexico*. Vol. VI. Guide to Mexican Turtles: Bibliographic Addendum III. John Johnson, North Bennington, Vermont.
- and E.H. Taylor. 1950a. Type localities of Mexican reptiles and amphibians. *Kansas Univ. Sci. Bull.* 33, pt. 2:313–380.
- and —. 1950b. An annotated checklist and key to the reptiles of Mexico exclusive of the snakes. *Bull. U.S. Natl. Mus.* (199): v + 253 p.
- Snider, A.T. and J.K. Bowler. 1992. Longevity of reptiles and amphibians in North American collections. 2nd ed. *SSAR Herpetol. Circ.* (21):iii + 40 p.
- Strauch, A. 1862. Chelonogische Studien mit besonderer Beziehung auf die Schildkrötensammlung der kaiserlichen Akademie der Wissenschaften zu St. Petersburg. *Mém. Acad. Imper. Sci. St. Pétersbourg*, 7, 5(7):1–196.
- Sullivan, B. and A. Riggs. 1967a. Structure, function and evolution of turtle hemoglobins. I. Distribution of heavy hemoglobins. *Comp. Biochem. Physiol.* 23:437–447.
- and —. 1967b. Structure, function and evolution of turtle hemoglobins. II. Electrophoretic studies. *Comp. Biochem. Physiol.* 23:449–458.
- and —. 1967c. Structure, function and evolution of turtle hemoglobins. III. Oxygenation properties. *Comp. Biochem. Physiol.* 23:459–474.
- Tiedemann, F., M. Häüpl, and H. Grillitsch. 1994. Katalog der Typen der Herpetologischen Sammlung nach dem Stand vom 1. Januar 1994. Teil II: Reptilia. *Vertebrata 4. Kat. wissenschaftl. Samml. Naturhist. Mus. Wien* 10:1–102.
- Waagen, G.N. 1972. Musk glands in Recent turtles. M.S. Thesis, Univ. Utah, Salt Lake City.
- Walker, W.F. 1973. The locomotor apparatus of Testudines, p. 1–100. In C. Gans and T. Parsons (eds.), *Biology of the Reptilia, Morphology D.*, Vol. 4. Academic Press, New York.
- Webb, R.G. 1984. Herpetogeography in the Mazatlán-Durango region of the Sierra Madre Occidental, Mexico, p. 217–241. In R.A. Seigel, L.E. Hunt, J.L. Knight, L. Malaret, and N.L. Zuschlag (eds.), *Vertebrate Ecology and Systematics. A Tribute to Henry S. Fitch*. Univ. Kansas Mus. Nat. Hist. Spec.

- Publ. No. 10. Lawrence, Kansas.
- and M. Hensley. 1959. Notes on reptiles from the Mexican State of Durango. *Publ. Mus. Michigan St. Univ. Biol. Ser.* 1:249–258.
- Wermuth, H. and R. Mertens. 1961. Schildkröten, Krokodile, Brückenechsen. Gustav Fischer Verlag, Jena.
- and —. 1977. Liste der rezenten Amphibien und Reptilien: Testudines, Crocodylia, Rhynchocephalia. *Das Tierreich* 100: xxvii + 174 p.
- Williams, E.E. 1950. Variation and selection in the cervical central articulations of living turtles. *Bull. Amer. Mus. Nat. Hist.* 94:505–561.
- Yamaguti, S. 1958. *Systema helminthum*. Volume I. The Digestive Trematodes of Vertebrates - Part I. Interscience Publ., Inc., New York.
- Zug, G.R. 1971. Bouyancy, locomotion, morphology of the pelvic girdle and hindlimb, and systematics of cryptodiran turtles.

Misc. Publ. Mus. Zool. Univ. Michigan (142):1–98.

- Zweifel, R.G. 1960. Results of the Puritan-American Museum of Natural History expedition to western Mexico. 9. Herpetology of the Tres Mariás Islands. *Bull. Amer. Mus. Nat. Hist.* 119:77–128 + 4 pl.

John B. Iverson, Department of Biology, Earlham College, Richmond, IN 47374, USA; **Cameron A. Young**, Department of Biology, Earlham College, Richmond, IN 47374, USA; and **James. F. Berry**, Department of Biology, Elmhurst College, Elmhurst, IL 60126, USA.

Primary editor for this account, Michael E. Seidel.

Published 30 January 1998 and Copyright © 1998 by the Society for the Study of Amphibians and Reptiles.
