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PRICE, ANDREW H. 1986. *Cnemidophorus tesselatus.*

Cnemidophorus tesselatus (Say)
Checkered Whiptail lizard

Ameiva tesselata Say in James, 1823:50. Type-locality, "Arkansas River, near Castle Rock Creek, Colorado," restricted to the vicinity of Pueblo, Pueblo Co., Colorado by Milstead (1953). Holotype lost, collected 19 July 1820, collector unknown.

Cnemidophorus grahamii Baird and Girard, 1852:128. Type-locality, "between San Antonio and El Paso del Norte" (given as "El Paso" in U. S. Nat. Mus. catalogue), restricted to Fort Davis, Jeff Davis Co., Texas by Smith and Taylor (1950:362). Lectotype, U. S. Nat. Mus. 3046a, collected by J. H. Clark, date unknown (not examined by author).

Cnemidophorus tesselatus: Baird, 1857:18 (part); Smith and Burger, 1949:282. First use of combination, and first use *sensu stricto.*

Cnemidophorus sexlineatus grahamii: Bocourt, 1874:277 (part).

Cnemidophorus sexlineatus gularis: Bocourt, 1874:278 (part).

Cnemidophorus tessellatus tessellatus: Cope, 1875:46 (part).

Cnemidophorus sex-lineatus tessellata: Günther, 1885:26 (part).

Cnemidophorus grahamii grahamii: Cope, 1900:598.

Cnemidophorus perplexus: Gadow, 1906:369 (part).

Cnemidophorus tessellatus grahami: Minton, "1958" (1959):43.

Cnemidophorus dixoni Scudday, 1973:364. Type-locality, "Ireneo Gonzales Ranch, 24.5 mi. NW Presidio, Presidio Co., Texas." Holotype, TCWC (Texas A&M Univ.) 40691, collected by Doug Stine, 4 July 1970 (not examined by author). See Nomenclatural History.

• CONTENT. No subspecies are recognized.

• DEFINITION. A large (adults 75–106 mm snout–vent length), all-female, multiclonal *Cnemidophorus* of the *tesselatus* species group (*sensu* Lowe et al., 1970), distinguished by the following combination of characters: adult pattern tesselate, or if not, with light spots or modifications thereof in dark dorsal fields; mesoptychial scales abruptly enlarged; extreme anterior gular scales and gular scales bordering mesoptychium minute, granular; postantebrachial scales granular or slightly enlarged.

The hatchling pattern consists of 6, occasionally as many as 10, narrow light stripes on a dark ground color. There is usually a vertebral stripe, often no more than a series of irregular spots or dashes. There are six adult color pattern classes, which vary from only a slightly modified juvenile pattern (class A), to completely checkered (class F).

• DESCRIPTIONS. General descriptions are in Scudday (1973), Conant (1975), and Stebbins (1985). Zweifel (1965) identified and described the color pattern classes. Wright and Lowe (1967) and Lowe et al. (1970) described karyotypes (allodiploid, 2n = *ca.* 46; allotriploid, 3n = *ca.* 69).

• ILLUSTRATIONS. Zweifel (1965) and Scudday (1973) provide black and white photographs. Color photographs are in Behler and King (1979) and Hammerson (1982), and color illustrations in Conant (1975), and Stebbins (1985). Wright and Lowe (1967) illustrate the karyotype.

• DISTRIBUTION. *Cnemidophorus tesselatus* ranges from the vicinity of Pueblo, Colorado, southeastward through the tip of the Oklahoma panhandle to the high plains of New Mexico, with an eastward extension into the Texas Panhandle along the Canadian River, throughout central and eastern New Mexico (Rio Grande and Pecos Basins) and Trans-Pecos Texas to the Rio Grande, and south along the Río Conchos to the vicinity of La Cruz, Chihuahua, Mexico. An isolated population occurred in extreme southwestern New Mexico and southeastern Arizona: its current existence is uncertain. *Cnemidophorus tesselatus* occurs in pinyon-juniper, *Yucca*-grassland, mesquite-creosote, and cottonwood-tamarisk-willow vegetation associations, on rocky, gravelly, or sandy soils from 250 to 1829 m elevation.

• FOSSIL RECORD. None.

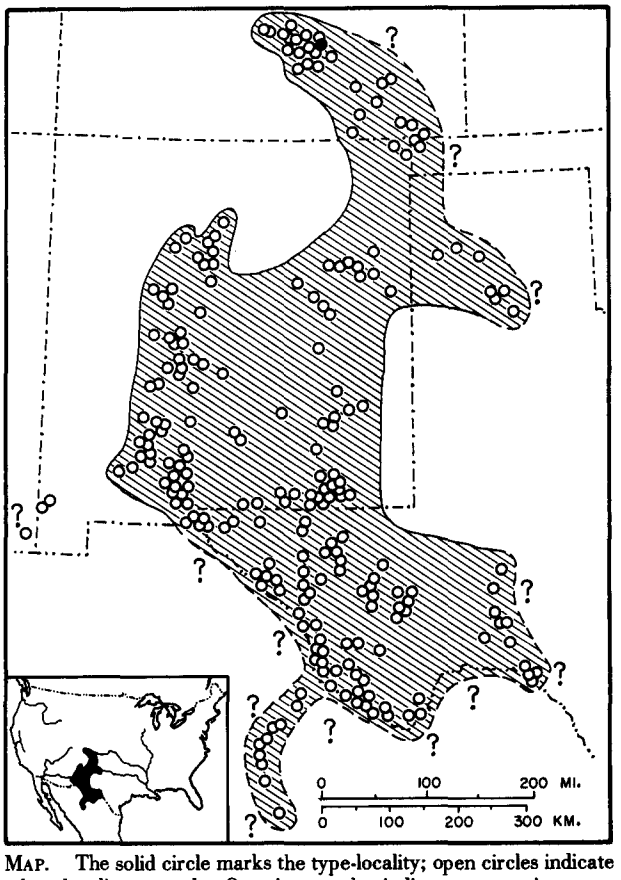
• PERTINENT LITERATURE. The classic study of distribution and variation in the species is Zweifel (1965). Behavioral studies include Neaves (1971) and Leuck (1982). Wright and Lowe (1968) and Cuellar (1977) discuss ecology, biogeography, and the evolution of parthenospecies, and ecology is discussed by Milstead (1953, 1957a, 1957b), and Schall (1977, 1978). Parker and Selander (1976), and Parker (1979a, 1979b, 1979c) consider the evolutionary significance of clonal diversity. The literature has been reviewed by Price (1983).

• NOMENCLATURAL HISTORY. *Cnemidophorus tesselatus* has had a long history of confusion with *C. tigris.* The species called *tesselatus* (or "*tessellatus*") in most literature up to 1949 is *C. tigris* Baird and Girard, and when *tesselatus* was rediscovered and recognized as a distinct species it was under the name *C. grahamii* Baird and Girard. Burt (1931) treated both *tigris* and *grahamii* as junior synonyms of "*tessellatus,*" although others such as Strecker (1910) and Schmidt and Smith (1944) were aware that *grahamii* was distinct from "*tessellatus*" (=*tigris*). The checklists of Stejneger and Barbour (1933, et seq.) carried *grahamii* as a valid species. Smith and Burger (1949) demonstrated that *tesselatus* is a senior synonym of *grahamii,* and that *tigris* is the correct name for the widespread polytypic species known for so many years as "*tessellatus.*" Morafka (1977:80, footnote) and Price (1983:2) independently considered *Cnemidophorus dixoni* Scudday synonymous with *tesselatus.*

• ETYMOLOGY. The name *tesselatus* is derived from *tessella* (L., "little square stone"), and presumably refers to the mosaic appearance of the adult color pattern.

COMMENT

Maslin (1962) initially confirmed the observations of Minton ("1958" 1959), Tinkle (1959), and others that *tesselatus,* and several other species of *Cnemidophorus,* consist of all-female populations. The thelytokous nature of these species has since been corroborated (Cuellar, 1968; Maslin, 1971; Hardy and Cole, 1981). Evidence from karyology (Lowe and Wright, 1966; Wright and Lowe, 1967), electrophoresis (Neaves, 1969; Neaves and Gerald, 1968, 1969) and mitochondrial DNA analysis (Brown and Wright, 1979) has shown that *tesselatus* originated by hybridization between sexual congeners. The parent species of diploid *tesselatus* (classes



MAP. The solid circle marks the type-locality; open circles indicate other locality records. Question marks indicate uncertain range boundaries.

C–F of Zweifel, 1965) are *C. septemvittatus* and *C. tigris marmoratus*; those of triploid *tesselatus* (classes *A* and *B* of Zweifel, 1965, and some *C* [Parker, 1979b]) are diploid *tesselatus* and *C. sexlineatus*.

Literature Cited

Baird, Spencer F. 1857. Report on reptiles collected on the survey. *In* Reports of explorations and surveys . . . for a railroad from the Mississippi River to the Pacific Ocean, Vol. 10. Report . . . route, near the 38th and 39th parallels . . . Captain J. W. Gunnison . . . near the 41st parallel . . . Lieutenant E. G. Beckwith . . . (3):17–20, pls. 17–18, 23–24.

———, and Charles Girard. 1852. Characteristics of some new reptiles in the museum of the Smithsonian Institution. Proc. Acad. Natur. Sci. Philadelphia 6:68–70, 125–129, 173.

Behler, John L., and F. Wayne King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York, 719 p.

Bocourt, Marie-Firmin. 1874. *In* A. Duméril, M.-F. Bocourt, and F. Mocquard, Etudes sur les reptiles. *In* Recherches zoologiques pour servir a l'histoire de le faune de l'Amerique Centrale et du Mexique. Mission Scientifique Mexique et dans l'Amérique Centrale, recherches Zool., Pt. 3, Sect. 1. Imprimerie au Nat., Paris.

Brown, Wesley M., and John W. Wright. 1979. Mitochondrial DNA analyses and the origin and relative age of parthenogenetic lizards (genus *Cnemidophorus*). Science 203:1247–1249.

Burt, Charles E. 1931. A study of the teiid lizards of the genus *Cnemidophorus* with special reference to their phylogenetic relationships. U.S. Nat. Mus. Bull. (154):i–viii + 1–286.

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. 1875. Check-list of North American Batrachia and Reptilia; with a systematic list of the higher groups, and an essay on geographic distribution. Based on the specimens contained in the U.S. National Museum. U.S. Nat. Mus. Bull. (1):1–104.

——— 1900. The crocodilians, lizards and snakes of North America. Rept. U.S. Nat. Mus. 1898:153–1294.

Cuellar, Orlando. 1968. Additional evidence for true parthenogenesis in lizards of the genus *Cnemidophorus*. Herpetologica 24(2):146–150.

——— 1977. Animal parthenogenesis: a new evolutionary-ecological model is needed. Science 197:837–843.

Gadow, Hans F. 1906. A contribution to the study of evolution based upon the Mexican species of *Cnemidophorus*. Proc. Zool. Soc. London 1906:277–375.

Günther, Albert C. L. G. 1885. Reptilia and Batrachia Parts 1–7, p. 1–56. *In* F. D. Godman and O. Salvin, Biologia Centrali-Americana. Dulau and Co., London.

Hammerson, Geoffrey A. 1982. Amphibians and reptiles in Colorado. Colorado Div. Wildlife, Denver. vii + 131 p.

Hardy, Laurence M., and Charles J. Cole. 1981. Parthenogenetic reproduction in lizards: histological evidence. J. Morphology 170:215–237.

James, Edwin. 1823. Account of an expedition from Pittsburgh to the Rocky Mountains, performed in the years 1819 and '20. H. C. Carey and I. Lea, Philadelphia. Vol. 2:1–8 (unnumbered), 1–422, i–xcviii.

Leuck, Beth E. 1982. Comparative burrow use and activity patterns of parthenogenetic and bisexual whiptail lizards (*Cnemidophorus*: Teiidae). Copeia 1982(2):416–424.

Lowe, Charles H., and John W. Wright. 1966. Chromosomes and karyotypes of cnemidophorine teiid lizards. Mamm. Chromosomes Newsl. (22):199–200.

———, ———, Charles J. Cole, and Robert L. Bezy. 1970. Chromosomes and evolution of the species groups of *Cnemidophorus* (Reptilia, Teiidae). Syst. Zool. 19(2):128–141.

Maslin, T. Paul. 1962. All-female species of the lizard genus *Cnemidophorus*, Teiidae. Science 135:212–213.

——— 1971. Conclusive evidence of parthenogenesis in three species of *Cnemidophorus* (Teiidae). Copeia 1971(1):156–158.

Milstead, William W. 1953. Ecological distribution of the lizards of the La Mota Mountain region of Trans-Pecos Texas. Texas J. Sci. 5(4):403–415.

——— 1957a. Observations on the natural history of four species of whiptail lizard, *Cnemidophorus* (Sauria, Teiidae) *in* Trans-Pecos Texas. Southwest. Natur. 2(2–3):105–121.

——— 1957b. Some aspects of competition in natural populations of whiptail lizards (genus *Cnemidophorus*). Texas J. Sci. 9(4):410–447.

Minton, Sherman A, Jr. "1958" (1959). Observations on amphibians and reptiles of the Big Bend Region of Texas. Southwest. Natur. 3(1–4):28–54.

Morafka, David J. 1977. A biogeographical analysis of the Chihuahuan Desert through its herpetofauna. Biogeographica, Vol. 9. W. Junk, The Hague, viii + 313 p.

Neaves, William B. 1969. Adenosine deaminase phenotypes among sexual and parthenogenetic lizards in the genus *Cnemidophorus*. (Teiidae). J. Exp. Zool. 171(2):175–184.

——— and Park S. Gerald. 1968. Lactate dehydrogenase isozymes in parthenogenetic teiid lizards. Science 160:1004–1005.

———, and ——— 1969. Gene dosage at the lactate dehydrogenase locus in triploid and diploid teiid lizards. Ibid. 164: 557–558.

Parker, E. Davis, Jr. 1979a. Ecological implications of clonal diversity in parthenogenetic morphospecies. Amer. Zool. 19: 753–762.

——— 1979b. Phenotypic consequences of parthenogenesis in *Cnemidophorus* lizards. I. Variability in parthenogenetic and sexual populations. Evolution 33:1150–1166.

——— 1979c. Phenotypic consequences of parthenogenesis in *Cnemidophorus* lizards. II. Similarity of *C. tesselatus* to its sexual parental species. Ibid. 33:1167–1179.

———, and Robert K. Selander. 1976. The organization of genetic diversity in the parthenogenetic lizard *Cnemidophorus tesselatus*. Genetics 84:791–805.

Price, Andrew H. 1983. Annotated bibliography of the genus *Cnemidophorus* in New Mexico. Smithsonian Herpetol. Inform. Serv. (58):1–92.

Schall, Joseph J. 1977. Thermal ecology of five sympatric species of *Cnemidophorus* (Sauria: Teiidae). Herpetologica 33(3):261–272.

——— 1978. Reproductive strategies in sympatric whiptail lizards (*Cnemidophorus*): two parthenogenetic and three bisexual species. Copeia 1978(1):108–116.

Schmidt, Karl P., and Tarleton F. Smith. 1944. Amphibians and reptiles of the Big Bend Region of Texas. Field Mus. Nat. Hist., Zool. Ser. 29(5):75–96.

Scudday, James F. 1973. A new species of lizard of the *Cnemidophorus tesselatus* group from Texas. J. Herpetol. 7(4):363–371.

Smith, Hobart M., and W. Leslie Burger. 1949. The identity of *Ameiva tesselata* Say. Bull. Chicago Acad. Sci. 8(13):277–284.

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

Stebbins, Robert C. 1985. A field guide to western reptiles and amphibians. Second edition. Houghton Mifflin Co., Boston. xiv + 336 p.

Stejneger, Leonhard, and Thomas Barbour. 1933. A check list of North American amphibians and reptiles. Third edition. Harvard Univ. Press, Cambridge, Mass. xiv + 185 p.

Strecker, John K., Jr. 1910. Notes on the fauna of a portion of the canyon region of northwestern Texas. Baylor Univ. Bull. (13):1–31.

Tinkle, Donald W. 1959. Observations on the lizards *Cnemidophorus tigris, Cnemidophorus tessellatus*, and *Crotaphytus wislizeni*. Southwest. Natur. 4(4):195–200.

Wright, John W., and Charles H. Lowe. 1967. Evolution of the alloploid parthenospecies *Cnemidophorus tesselatus* (Say). Mamm. Chromosomes Newsl. (8):95–96.

———, and ——— 1968. Weeds, polyploids, parthenogenesis and the geographical and ecological distribution of all-female species of *Cnemidophorus*. Copeia 1968(1):128–137.

Zweifel, Richard G. 1965. Variation in and distribution of the unisexual lizard, *Cnemidophorus tesselatus*. American Mus. Novitates (2235):1–49.

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