



Abnormal Coloration of a Western Ribbonsnake, *Thamnophis proximus* (Say 1823), from Sutton County, Texas, USA

Lawrence G. Bassett, Sarah Bullard, and Michael R.J. Forstner

Department of Biology, Texas State University, San Marcos, Texas 78666, USA (lawrencebassett@gmail.com)

Color variation generally exists, albeit to varying degrees, both within populations of snakes and across the distributions of snake taxa (e.g., Carpenter 1954; Wilson 1978; Mooi et al. 2011). In many cases, such variation is likely adaptive, improving the fitness of individuals relative to the biotic and abiotic characteristics of the habitat they occupy. Examples of such adaptation include crypsis (e.g., Sweet 1985; King 1992), aposematism (e.g., Brodie 1993), Batesian mimicry (e.g., Greene and McDiarmid 1981; Rabosky et al. 2016), Müllerrian mimicry (e.g., Sanders et al. 2006), and improved homeostatic regulation (e.g., Bittner et al. 2002; Lattanzio and Buontempo 2021). The evolutionary importance of color has been documented for many ophidian taxa, and color variation within these taxa merits full characterization. Herein we work toward that goal by reporting on an aberrantly colored Western Ribbonsnake (*Thamnophis proximus*) from Sutton County, Texas, USA.

Thamnophis proximus is a slender-bodied snake native to the Americas from Costa Rica northward into the midwestern United States from Wisconsin to Nebraska (Rossman 1970; Powell et al. 2016). Four subspecies (*T. p. proximus*, *T. p. orarius*, *T. p. rubrilineatus*, and *T. p. diabolicus*) are currently recognized within the state of Texas (Tennant 1985; Dixon 2013; Powell et al. 2016; Dixon et al. 2020). Considerable variability in color exists between and among these subspecies. For example, longitudinal striping can be dark gray, brown, or black, whereas the middorsal stripe can be gold, orange, or red (Tennant 1985; Powell et al. 2016; Dixon et al. 2020).

At 2002 h on 18 August 2021, we found an abnormally colored *T. proximus* (Fig. 1) dead on County Road 310 ca. 1 km north of the intersection with Ranch to Market Road 3130 (30.4729°N, 100.1344°W; WGS 84). This individual measured 41.3 cm SVL, 16.6 cm tail length, and weighed 22.16 g. Dorsal and lateral ground color was olive-gray, the middorsal stripe was pale orange, and the longitudinal pale striping that is typically well-juxtaposed against dark longitu-

dinal stripes was barely discernable. Relative to other Western Ribbonsnakes we have encountered in Sutton County and throughout the state, the coloration of this individual was quite unusual. It was much paler than more typical Western Ribbonsnakes, regardless of subspecies (Dixon et al. 2020). The specimen was preserved and deposited in the Amphibian



Fig. 1. An aberrantly colored Western Ribbonsnake (*Thamnophis proximus*) found dead on County Road 310 ca. 1 km north of the intersection with Ranch to Market Road 3130 in Sutton County, Texas, USA. Note the overall olive-gray coloration of the snake and the absence of dark longitudinal striping, which together give the snake a pale complexion that is uncharacteristic of the species. Photograph by Sarah Bullard.

and Reptile Diversity Research Center at the University of Texas at Arlington (UTA R-65883) and its identity was verified by Gregory G. Pandelis.

Other instances of abnormal coloration from taxa within the genus *Thamnophis* include albinism (Stephenson and Drace 2014), erythrism (Gilhen 2010), and melanism (Bittner et al. 2002; Mooi et al. 2011). However, the coloration of the snake we collected does not fall into any of these categories. An instance of aberrant coloration in a *T. sirtalis fitchi* in Sutter County, California (Fulton 2018), was notably similar to our specimen from Sutton County, Texas. Both snakes had an olive-gray ground color with considerably less black coloration than would be expected from a typical representative of each taxon (Fitch 1980; Dixon et al. 2020). A mutation called “green” in the captive Burmese Python (*Python bivittatus*) population approximates the background coloration of the specimen from Sutton County. To the best of our knowledge, this is the first report documenting this particular color aberration in *T. proximus*.

Acknowledgements

All work was authorized by a Scientific Permit for Research issued to Michael R.J. Forstner by the Texas Parks and Wildlife Department (SPR-0102-191). This research was approved by the Texas State University Institutional Animal Care and Use Committee (Protocol No. IACUC 201648186).

Literature Cited

- Bittner, T.D., R.B. King, and J.M. Kerfin. 2002. Effects of body size and melanism on the thermal biology of garter snakes (*Thamnophis sirtalis*). *Copeia* 2002: 477–482. [https://doi.org/10.1643/0045-8511\(2002\)002\[0477:EBSAM\]2.0.CO;2](https://doi.org/10.1643/0045-8511(2002)002[0477:EBSAM]2.0.CO;2).
- Brodie, E.D. 1993. Differential avoidance of coral snake banded patterns by free-ranging avian predators in Costa Rica. *Evolution* 47: 227–235. <https://doi.org/10.1111/j.1558-5646.1993.tb01212.x>.
- Carpenter, C.C. 1954. The presence and variation of lateral red coloration in a population of common garter snakes (*Thamnophis sirtalis sirtalis*). *Herpetologica* 10: 89–91.
- Dixon, J.R. 2013. *Amphibians and Reptiles of Texas: with Keys, Taxonomic Synopses, Bibliography, and Distribution Maps*. 3rd ed. Texas A&M University Press, College Station, Texas, USA.
- Dixon, J.R., J.E. Werler, and M.R.J. Forstner. 2020. *Texas Snakes: A Field Guide*. 3rd ed. University of Texas Press, Austin, Texas, USA.
- Fitch, H.S. 1980. *Thamnophis sirtalis* (Linnaeus). Common garter snake. *Catalogue of American Amphibians and Reptiles* 270: 1–4.
- Fulton, A.M. 2018. *Thamnophis sirtalis fitchi* (Valley Gartersnake). Coloration. *Herpetological Review* 49: 358.
- Gilhen, J. 2010. Erythrism in the maritime garter snake, *Thamnophis sirtalis pallidulus*, in Nova Scotia. *The Canadian Field-Naturalist* 124: 99–103. <https://doi.org/10.22621/cfn.v124i2.1045>.
- Greene, H.W. and R.W. McDiarmid. 1981. Coral snake mimicry: does it occur? *Science* 213: 1207–1212. <https://doi.org/10.1126/science.213.4513.1207>.
- King, R.B. 1992. Lake Erie water snakes revisited: morph- and age-specific variation in relative crypsis. *Evolutionary Ecology* 6: 115–124. <https://doi.org/10.1007/BF02270706>.
- Lattanzio, M.S. and M.J. Buontempo. 2021. Ecogeographic divergence linked to dorsal coloration in Eastern Hog-Nosed Snakes (*Heterodon platirhinos*). *Herpetologica* 77: 134–145. <https://doi.org/10.1655/Herpetologica-D-19-00031.1>.
- Mooi, R.D., J.P. Wiens, and G.S. Casper. 2011. Extreme color variation within populations of the Common Gartersnake, *Thamnophis sirtalis*, in central North America, with implications for subspecies status. *Copeia* 2011: 187–200. <https://doi.org/10.1643/CH-10-067>.
- Powell, R., R. Conant, and J.T. Collins. 2016. *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America*. 4th ed. Houghton Mifflin Harcourt, Boston, Massachusetts, USA.
- Rabosky, A.R.D., C.L. Cox, D.L. Rabosky, P.O. Title, I.A. Holmes, A. Feldman, and J.A. McGuire. 2016. Coral snakes predict the evolution of mimicry across New World snakes. *Nature Communications* 7: 11484. <https://doi.org/10.1038/ncomms11484>.
- Rossman, D.A. 1970. *Thamnophis proximus* (Say). Western ribbon Snake. *Catalogue of American Amphibians and Reptiles* 98: 1–3.
- Sanders, K.L., A. Malhotra, and R.S. Thorpe. 2006. Evidence for a Müllerian mimetic radiation in Asian pitvipers. *Proceedings of The Royal Society B: Biological Sciences* 273: 1135–1141. <https://doi.org/10.1098/rspb.2005.3418>.
- Stephenson, B.P. and K.M. Drace. 2014. A new report of albinism in the Common Garter Snake (*Thamnophis sirtalis*), and a review of existing records: Is there a geographic bias in observations? *Herpetological Review* 45: 569–577.
- Sweet, S.S. 1985. Geographic variation, convergent crypsis and mimicry in gopher snakes (*Pituophis melanoleucus*) and western rattlesnakes (*Crotalus viridis*). *Journal of Herpetology* 19: 55–67. <https://doi.org/10.2307.1564420>.
- Tennant, A. 1985. *A Field Guide to Texas Snakes*. Texas Monthly Press, Austin, Texas, USA.
- Wilson, L.D. 1978. *Coluber constrictor* Linnaeus racer. *Catalogue of American Amphibians and Reptiles* 218: 1–4.