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THE BROAD-BANDED COPPERHEAD: A NEW SUBSPECIES OF *AGKISTRODON MOKASEN*[1]

BY HOWARD K. GLOYD AND ROGER CONANT

THAT copperheads from the extreme southwestern portion of the range of the species differ considerably in color pattern from eastern specimens has been known to herpetologists for some time. Stejneger[2] mentioned that in Texas copperheads the tip of the tail is greenish while in eastern specimens it is blackish. Ditmars[3] commented upon the wider bands of Texas examples and the tendency of copperheads from that region to retain as adults a trace of the yellow tail characteristic of the well-known juvenile coloration. In connection with a proposed study of the American forms of *Agkistrodon,* the present authors have examined 88 specimens of the copperhead from Texas and Oklahoma as well as numerous other examples from localities east of this region. From the material it is evident that the broad-banded form is a distinct geographic race and we therefore propose for it the name

[1] Contribution from the Zoological Laboratory of the University of Michigan and the Toledo Zoological Society.

[2] *Ann. Rep. U. S. Nat. Mus. for 1893,* 1895: 404.

[3] *Reptile Book,* (New York: Doubleday, Page and Co., 1907): 421, pl. CXXI; *Reptiles of the World,* (New York: The Macmillan Co., 1910): 338, pl. 81; *ibid.,* revised edition, (1933): 242, pl. 66; *Bull. New York Zool. Soc.,* 33, 1930, no. 3: 83; *Snakes of the World,* (New York: The Macmillan Co., 1931): 102.

Agkistrodon mokasen laticinctus, new subspecies

Plate I, Figs. 1 and 2

DIAGNOSIS.—Similar in scutellation to *Agkistrodon mokasen mokasen* (Beauvois) but differing in the greater width and different shape of the dorso-lateral crossbands and their relation to the ventro-lateral blotches. The crossbands range from 7 to 14 scales wide on the first row of scales and from 4 to 8 scales wide at the mid-line (Pl. I, Fig. 2); they extend downward laterally all the way to the ventrals, instead of rounding off and fading out above the first row, and become blended with the ventro-lateral pattern of three more or less distinct blotches to each dorsal band (Pl. I, Fig. 2). In *A. m. mokasen* the ventro-lateral pattern consists of a conspicuous series of distinct blotches some of which alternate with the dorsal crossbands (Pl. I, Fig. 3).

RANGE.—Western and central Texas from the Davis Mountains to the eastern edge of the Edwards Plateau, northward into western and central Oklahoma as far as Payne and Creek counties. Specimens showing intergradation with *Agkistrodon mokasen mokasen* have been examined from McLennan and Grayson counties, Texas, and Okmulgee, Tulsa, and Kay counties, Oklahoma.

TYPE SPECIMEN.—Museum of Zoology, University of Michigan, Number 75599, adult male collected 26 miles northwest of San Antonio, Bexar County, Texas, October, 1933, by W. A. Bevan and R. F. Harvey. Paratypes: Museum of Zoology, University of Michigan, Numbers 75600 and 75601.

DESCRIPTION OF TYPE SPECIMEN.—The arrangement of the shields of the top of the head is like that of *Agkistrodon mokasen mokasen* (Beauvois) except for a small azygous plate in a median position at the anterior border of the frontal. The parietals are slightly emarginate posteriorly. The scutellation of each side of the head is as follows: nasals 2, the anterior larger with the nostril entirely within it; loreal 1; preoculars 2, the lower forming with the loreal the upper border of the pit; a narrow, elongate scale, below the lower preocular but not entering the orbit, forms the postero-lateral

border of the pit; postoculars 3; suboculars 3, the most anterior one very small; supralabials 8, the fourth largest and immediately below eye; infralabials 10; temporals in 4 or 5 irregular rows. The first pair of infralabials meet at the mid-ventral line immediately behind the posterior tip of the mental. The single pair of enlarged chin shields is followed by 5 transverse rows of gular scales anterior to the first ventral scute; the first two rows of gular scales have 4 scales each, the last three, 3 each. The dorsal scale rows number 25–23–21–19; all are carinate throughout the length of the body. The ventral scutes are 143 in number; the subcaudal scales 39, the last 14 of which are divided; a small distal portion of the tail is missing. The anal plate is not divided. Total length 710 + mm.; length of tail 83 + mm.

Dorsal ground color of fresh specimen in alcohol hazel brown, somewhat lighter laterally, minutely stippled with reddish brown and black. Top of head and temporal region light chestnut brown. Rostral, nasals, loreals, oculars, and supralabials similar to ground color with reddish stippling predominating. Under side of head similar with a reddish brown longitudinal stripe running through median portion of infralabials from the fourth to the tenth, leaving the upper two thirds of each to form a light border along the lower edge of the mouth. Dorsal body pattern consisting of 11 wide transverse bands of deep chestnut brown, lighter centrally, slightly narrower at the mid-dorsal line, and extending laterally to the first row of scales on each side (Pl. I, Fig. 2); the first crossband confluent with the head color anteriorly. Width of three crossbands near the center of the body 9 to 11 scales on first row, 7 or 8 scales at mid-line. Edges of crossbands accentuated by a narrow border of dark brown with a narrow adjacent lightening of ground color to pale gray or white. Ground color of tail similar to that of body but gradually shading into gray posteriorly. Tail pattern of two chestnut crossbands followed by an irregular banding in which the brown changes to gray and finally to greenish gray toward the tip. Ventral ground color cream with minute stippling

of reddish brown and black but mostly obscured by a pattern of large, irregular blotches of reddish chestnut most conspicuous and distinct laterally where they meet the dark crossbands of the dorsal pattern in combination of three ventro-lateral blotches to each dorsal band (Pl. I, Fig. 2).

VARIATION.—Comparison of 63 specimens of *laticinctus* from Texas and Oklahoma with about 200 of *mokasen* from various parts of the range has shown that structural characters in the two forms are very similar. In *laticinctus* the scale rows number 25 or 27 in the neck region; 23 without exception at the middle of the body; 19 (66 per cent), 21 (27 per cent), or 20 (7 per cent) immediately anterior to the tail. Ventrals in females 140–154, average 148; in males 143–152, average 147. Total number of caudals in females 37–50, average 44; in males, 44–55, average 49. Divided caudals at distal portion of tail in females 2–36, average 14; in males, 11–27, average 19. Supralabials usually 8, occasionally 7 or 9, and rarely 6 or 10. Infralabials usually 10, occasionally 9 or 11. Preoculars 2. A diminutive scale that in some cases might be considered a third preocular is sometimes present. Postoculars usually 3, frequently 4. Suboculars usually 1, occasionally 2 or 3. Loreals 1 on each side; in one specimen fused with postnasal. Dorso-lateral crossbands in females 10–15, usually 13; in males, 11–16, usually 13. Width of crossbands 7–14 scales on first row and 4–8 scales at mid-dorsal line.

The ground color in life or fresh in alcohol varies from Hazel[4] or Sayal Brown to Light Drab or pale grayish brown; the dorso-lateral crossbands from Claret Brown to rich Chestnut, lighter on the sides; tail Hazel to greenish gray, with indefinite greenish gray or blackish markings on the distal portion. Terminal spine usually greenish yellow at base, brownish black at tip.

Intergrading specimens have narrower crossbands with the mid-dorsal constriction more accentuated and with tendencies

[4] Capitalized color names are those of Robert Ridgway, *Color Standards and Color Nomenclature*, Washington, D. C., 1912, published by the author. Pp. 44, 53 color plates.

toward rounding off on the second or third row of scales. In some specimens the typical pattern of *mokasen* is approached in that the ventro-lateral blotches are not continuous with the dorsal crossbands, and the latter become indistinct before reaching the first row of scales. In such cases the ventro-lateral blotches are fewer, and the most conspicuous ones alternate with the dorsal bands.

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PLATE I

FIG. 1. *Agkistrodon mokasen laticinctus*, new subspecies. Type specimen, U. M. M. Z. No. 75599, Bexar County, Texas, 26 miles northwest of San Antonio.

FIG. 2. Skin pattern of *Agkistrodon mokasen laticinctus*, type specimen.

FIG. 3. Skin pattern of *Agkistrodon mokasen mokasen* (Beauvois). U. M. M. Z. No. 75610, Ramapo Mountains, New Jersey, near Suffern, N. Y.

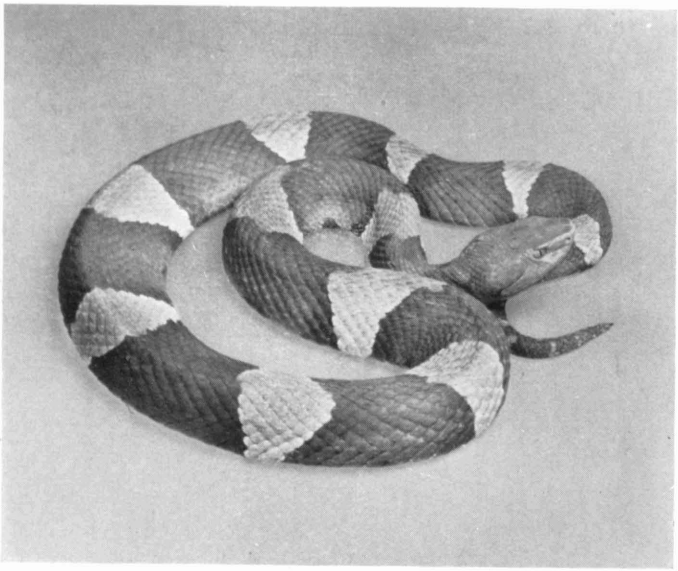

FIG. 1

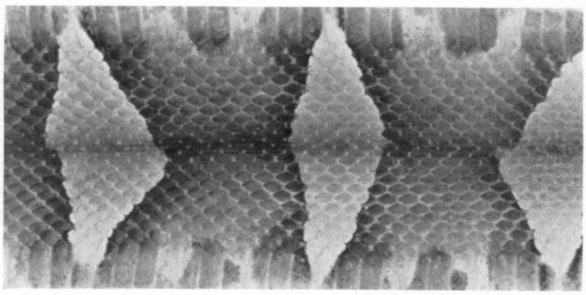

FIG. 2

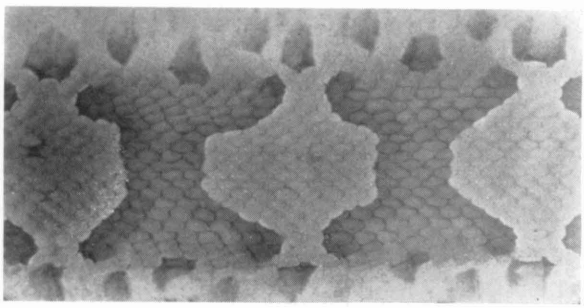

FIG. 3