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SUBSPECIES OF SPOTTED BASS (*MICROPTERUS
PUNCTULATUS*) IN TEXASBY CARL L. HUBBS AND REEVE M. BAILEY¹

IN our recent revision of the black basses (Hubbs and Bailey, 1940: 7, 21, Map 1) the status of the subspecies of *Micropterus punctulatus* in Texas was left an open problem. Because of the lack of adequate material, the observed deviations from the usual characters of the typical subspecies were not utilized in the separation of subspecies. Since the revisionary paper was written, considerable new material from Texas, collected by Dr. Kelshaw Bonham in 1939 and by the junior author in 1940, has become available. After a study of the additional specimens we conclude that the observed peculiarities of the spotted bass in the Brazos River system (and elsewhere in eastern Texas) are not sufficiently marked or constant to justify any nomenclatorial distinction. The form inhabiting the Colorado, Guadalupe, and San Antonio systems of south-central Texas, however, is indicated as a distinct peripheral type, which may be known as *Micropterus punctulatus treculii* (Vaillant and Bocourt).

We are indebted to Dr. Kelshaw Bonham for the privilege of using in this study the series of spotted bass which he has collected in Texas, particularly those obtained in the 1939 survey of the Guadalupe River system in Kerr County, Texas.

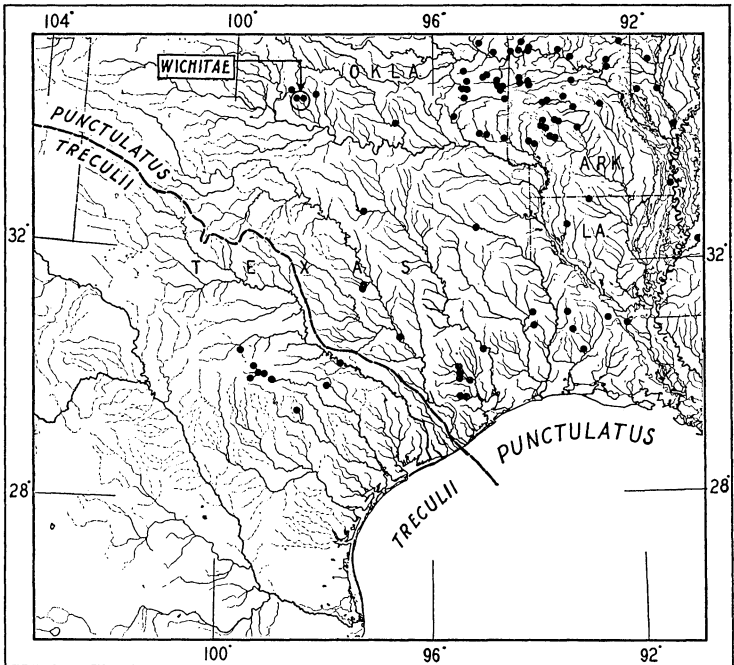
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NORTHERN SPOTTED BASS

Micropterus punctulatus punctulatus (Rafinesque)

(Pl. I, Fig. 1; Map 1)

The synonymy of this subspecies was given *in extenso* by Hubbs and Bailey (1940: 14). The Texas records were discussed and mapped by Hubbs (1927: 3, 15, Pl. 2), under the



MAP. 1. Distribution of *Micropterus punctulatus treculii* and *M. p. wichitae*, as indicated by all known record stations; also the most south-westerly records for *M. p. punctulatus*.

synonym *Micropterus pseudaplites*, and by Hubbs and Bailey (1940: 21, Map 1). In the light of the evidence now available several of the published Texas records of *punctulatus* should be referred to *M. p. treculii* and are listed in the synonymy of that subspecies.

As we previously noted, some specimens from the Brazos River system have the back somewhat spangled with light, and

the dorsal soft rays vary from 12 to 14. The light spangling is not consistent, nor is the tendency of some specimens to have a disrupted, speckled color pattern. Newly collected specimens from the system have only X-12 dorsal rays, as usual in typical *punctulatus*. However, all four specimens from one locality in the Trinity River system (Big Creek, 2 miles north-east of Shepherd, Texas), have X-13 dorsal rays, though others from the same river system have the modal number for the subspecies, X-12.

All that we may now conclude regarding the aberrancy of *Micropterus punctulatus punctulatus* in eastern Texas is that the spotted bass of the Brazos and Trinity river systems may show some local, sporadic, and inconsistent deviations from the normal. Such variations as are now apparent do not warrant the distinction of subspecies or even of well-defined local races.

The known record stations for *Micropterus p. punctulatus* in Texas, Louisiana, and parts of Arkansas and Oklahoma are plotted on Map 1.

TEXAS SPOTTED BASS

Micropterus punctulatus treculii (Vallant and Bocourt)

(Pl. I, Fig. 2; Pl. II; Map 1)

Dioplites Treculii.—Vallant and Bocourt, 1874: Pl. 4, Fig. 2 (original indication by figure; San Antonio de Bexar [the modern San Antonio], Texas).

Micropterus nuceensis var. *treculii*.—Vallant and Bocourt, 1883: 142 (original text description).

Micropterus floridanus (misidentification; not *Cichla floridana* LeSueur; see Hubbs, 1927: 3).—Cope, 1880: 31-32 (comparisons; Johnson Fork of Llano River, Kimble County, Texas).

Micropterus salmoides (misidentification; not of Lacépède; see Hubbs, 1927: 3-4).—Jordan and Gilbert, 1886: 21 (comparison; Rio Colorado, Texas); Evermann and Kendall, 1894: 113 (in part; specimens from San Marcos River at San Marcos).

Micropterus pseudaplites.—Hubbs, 1927: 15, Map 1 (in part; specimens from Rio San Marcos at San Marcos and Rio Colorado at Austin).

Micropterus punctulatus punctulatus.—Hubbs and Bailey, 1940: 15-16, 21, Map 1 (in part; redescription of type of *Dioplites Treculii* Vallant and Bocourt; comparisons).

The 31 specimens of *Micropterus punctulatus* from the Guadalupe River system in Kerr County, 6 from the Colorado River at Austin, and 3 from the San Marcos River at San Marcos, all in Texas, display color characters that are sufficiently distinctive to warrant the recognition in these waters of a subspecies of spotted bass. This form is characteristic of, although not confined to, the surprisingly clear waters of Guadalupe River and its tributaries, where these streams have cut back into the Edwards Plateau.

The coloration of *Micropterus p. treculii* strikingly recalls that of *M. p. wichitae* Hubbs and Bailey (1940: 19-22, Pl. 6), the sharply localized form of the Wichita Mountains in Oklahoma (Map 1). Much as in that subspecies the fingerlings have the lateral band only moderately to hardly at all developed, and the vertical bars somewhat to very much more developed than in typical *punctulatus*. Some specimens closely approach *Micropterus dolomieu* in the development of the bars. The contrast of the fingerling color pattern with that of *M. p. punctulatus* from other parts of Texas is usually very striking (compare Pl. I, Figs. 1 and 2), and there is probably very little overlap in the variation. Though not constant the color pattern of the young and half-grown of *treculii* is not so strikingly variable as in *M. p. wichitae*.

M. p. treculii does not approach *M. dolomieu* as definitely as does *M. p. wichitae*. The vertebrae (3 counts) remain $14 + 18 = 32$ and the dorsal soft rays usually 12 (Table I), as in typical *punctulatus* (rather than 13 as in *wichitae*). The color pattern of *treculii* apparently does not show the marked tendency toward disruption in half-grown fish that is characteristic of many specimens of *wichitae*.

To judge from our largest specimen (Pl. II) the adult Texas spotted bass are more boldly striped than those of any other *Micropterus*. The ventrolateral bands are broader and more intense and are continued up over the sides. They are still rather bold over the mid-sides, where, in the one adult at hand, definite traces remain of the discrete and moderately elevated lateral bars. When compared with typical *M. p. punctu-*

TABLE I
 FREQUENCY DISTRIBUTION OF NUMBER OF FIN RAYS IN
Micropterus punctulatus

	Number of Dorsal Spines					
	9	10	11	No.	Ave.	
<i>M. p. treculii</i>	5	34	1	40	9.90	
<i>M. p. punctulatus</i>						
Texas	6	46	3	55	9.95	
All localities	21	229	9	259	9.95	
	Number of Dorsal Soft Rays					
	11	12	13	14	No.	Ave.
<i>M. p. treculii</i>	4	30	6	.....	40	12.05
<i>M. p. punctulatus</i>						
Texas .....	.....	40	12	3	55	12.33
All localities	29	189	33	3	254	12.04
	Number of Anal Spines					
	2	3	4	No.	Ave.	
<i>M. p. treculii</i> .....	.....	39	1	40	3.025	
<i>M. p. punctulatus</i>						
Texas .....	.....	55	.....	55	3.00	
All localities	1	251	2	254	3.00	
	Number of Anal Soft Rays					
	9	10	11	No.	Ave.	
<i>M. p. treculii</i>	1	34	5	40	10.10	
<i>M. p. punctulatus</i>						
Texas	3	43	9	55	10.11	
All localities	21	211	21	253	10.00	
	Number of Pectoral Rays (Both Fins)					
	14	15	16	17	No.	Ave.
<i>M. p. treculii</i>	1	30	49	.....	80	15.60
<i>M. p. punctulatus</i>						
Texas .....	.....	66	39	.....	105	15.37
All localities	26	331	127	2	486	15.22

TABLE II
 FREQUENCY DISTRIBUTION OF NUMBER OF SCALES IN *Micropterus punctulatus*

	Number of Scales Above Lateral Line						No.	Ave.	
	7	8	9	10					
<i>M. p. treculii</i> .....	.....	11	23	4			38	8.82
<i>M. p. punctulatus</i>									
Texas	5	40	7	.....			52	8.04
All localities	15	157	52	.....			224	8.17
	Number of Scales Below Lateral Line								
	14	15	16	17	18	19	No.	Ave.	
<i>M. p. treculii</i> .....	.....	9	9	12	6	1	37	16.49
<i>M. p. punctulatus</i>									
Texas	14	17	15	3	3	.....	52	15.31
All localities	19	85	87	29	3	.....	223	15.61
	Number of Scales Around Caudal Peduncle								
	22	23	24	25	26	27	28	No.	Ave.
<i>M. p. treculii</i>	1	4	9	10	14	1	39	25.90
<i>M. p. punctulatus</i>									
Texas	7	16	16	9	4	1	53	24.81
All localities	4	50	88	86	24	12	1	265	24.44

TABLE II—(Cont.)

	Number of Rows of Scales on Cheek																No.	Ave.	
	11	12	13	14	15	16	17	18											
<i>M. p. treculii</i> .....	.....	6	20	8	1	1	.....	.....									36	13.19
<i>M. p. punctulatus</i>																			
Texas .....	.....	5	23	12	7	1	.....	.....									48	13.50
All localities	1	8	40	48	55	31	6	1									190	14.42	
	Number of Lateral Line Scales																No.	Ave.	
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70			71
<i>M. p. treculii</i>	2	2	5	7	6	5	6	5	1	39	65.13
<i>M. p. punctulatus</i>																			
Texas	1	3	3	4	2	6	14	8	7	4	2	54	63.76
All localities	1	1	5	5	12	22	24	43	45	40	25	13	11	3	1	251	63.68

latus, *treculii* appears to have, on the average, slightly smaller scales (perhaps most definitely on the sides of the abdomen), except on the cheek where they perhaps average larger (Table II). The pectoral rays are more frequently 16 than 15 (Table I), and average almost as numerous as in *M. p. henshalli*. The body averages slightly deeper and wider, and the caudal peduncle somewhat shorter and deeper (in these respects *M. p. treculii* slightly approaches *M. dolomieu*).

DESCRIPTION.—The form is elongate, becoming more robust with age; greatest depth,² 268 (249–306); least depth, 120 (108–128). The caudal peduncle is rather elongate; its length, 232 (221–246). The body is moderately compressed; greatest width, 147 (127–171). Length of head, 352 (332–369); relatively larger in young. The shortest spine at the moderately depressed emargination of the dorsal fin is 57 (48–70) thousandths of the standard length or 59.4 (49.1–73.0) per cent of the highest; the fourth and highest spine, 96 (85–103); the spinous portion becomes relatively lower with age. The rounded soft dorsal has scales on the membranes near the base; the height is about equal to the basal length; highest ray, 156 (138–177). The graduated anal spines become relatively shorter with age; the third and highest, 81 (59–97). The rounded anal fin has scales on the membranes near the base; its height, which decreases slightly with age, is about equal to that of the soft dorsal; highest ray, 155 (138–172). The pectoral fin is short and rounded and becomes relatively shorter with age; length, 184 (167–201). The pelvic fin is short and becomes relatively shorter with age; length, 170 (154–185).

Width of head, 458 (394–534) thousandths of head length, increasing somewhat with age. The almost straight frontal contour curves slightly near front of snout. Length of snout,

² Measurements were taken on 22 specimens ranging from 47.4 to 210.5 mm. in standard length. The proportions are expressed as thousandths of the standard length or, for the head parts, as thousandths of the length of the head; averages drawn from the 22 specimens are given in italics and maxima and minima appear in parentheses. The methods of counting and measuring as used in this paper are the same as those employed by Hubbs and Bailey (1940: 9–10).

279 (257-304), increasing slightly with age. The orbit becomes relatively shorter with age; length, 237 (189-282). The flat interorbital becomes relatively wider with age; least bony width, 195 (168-221). The maxilla extends slightly beyond the vertical from the pupil in the largest specimen; length of upper jaw, 451 (424-484), increasing with age. The lower jaw projects slightly; the length, increasing with age, 573 (541-608).

The glossohyal teeth form a well developed patch in all specimens. Gill-rakers 2+6 in five specimens examined. The pyloric caeca are not branched.

The largest specimen examined is 210.5 mm. in standard length and 262 mm. over all. The type (not examined by us) measures 240 mm. in standard length and 297 mm. in total length (Hubbs and Bailey, 1940: 16).

In small young the characteristic dark mid-lateral band of *punctulatus* is prominent, but in addition there are developed 10 to 12 dark vertical bands which extend well up on the dorso-lateral region and downward on the sides, occasionally to the base of the anal fin. These bars, which are the most characteristic feature of the subspecies, attain their best development at a standard length of about 50 mm., at which time the lateral stripe is faint and interrupted. In the adult the bars are less prominent, but nevertheless readily discernible. The dark ventrolateral streaks along the middle of the scale rows are evident in fish about 75 mm. in standard length and become more boldly developed with age. In the adult these streaks are broader and darker than in related forms, and produce continuous lines rather than series of isolated dark spots. The basicaudal dark spot is prominent in the young and half-grown, but becomes faint with age. The subterminal black band across the caudal lobes, which is well developed in the young (as in all other forms in the genus except *M. coosae*), fades rapidly with increased age. The basal portion of the caudal is orange in the living young; the tips of the fin are white. As usual, the posterior tip of the opercle is marked with a large dark spot, and three brownish lines radiate backward

and downward across the cheek from the eye. In life the gray background of the young is marked with greenish olive, the whole with strong blue reflections. No red or other bright color was noted on the dorsal or anal fins.

The 40 specimens of *Micropterus punctulatus treculii* examined are deposited in the University of Michigan Museum of Zoology (U.M.M.Z.) and in the United States National Museum (U.S.N.M.). The type is in the Museum d'Histoire Naturelle, Paris, and has recently been redescribed by Pellegrin (Hubbs and Bailey, 1940: 15-16). The record stations, including the type locality and Cope's report from Johnson Fork of the Llano River, Kimble County, Texas, are plotted on Map 1.

TEXAS.—Colorado River at Austin, D. S. Jordan and C. H. Gilbert: U.S.N.M. No. 36572 (6). San Marcos River at San Marcos, B. W. Evermann, December 4, 1891: U.S.N.M. No. 46260 (3). South Fork of Guadalupe River at Secor Dam, 11.5 miles above Hunt, Kelshaw Bonham, August 1, 1939: U.M.M.Z. No. 136848 (2). Guadalupe River at Hunt, Hubbs family, June 23-24, 1938: U.M.M.Z. No. 120282 (4). Guadalupe River 2 miles above Ingram, Kerr County, Bonham, November 18, 1939: U.M.M.Z. No. 136851 (1 adult). Johnson Creek, 1 mile below Mountain Home, Kerr County, Bonham, August 12, 1939: U.M.M.Z. No. 136847 (3). Guadalupe River just above Kerrville, Bonham, July 27-28, 1939: U.M.M.Z. No. 136849 (5) and 136852 (5). Guadalupe River, 0.5 mile above east boundary of Kerr County, Bonham, July 27, 1939: U.M.M.Z. 136850 (11).

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Hubbs and Bailey

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PLATE I

Color pattern of the young of the 2 subspecies of *Micropterus punctulatus* in Texas.

FIG. 1. *Micropterus punctulatus punctulatus*: 5 young, 45 to 93 mm. in standard length, from Buffalo Bayou, 6 miles west of Houston, collected September 2, 1940.

FIG. 2. *Micropterus punctulatus treculii*: 4 young, 28 to 47.5 mm. long, from Guadalupe River at Hunt, seined June 23-24, 1938, and 2 larger ones, 73 and 79 mm. long, taken in South Fork of Guadalupe River at Secor on August 1, 1939.

Fig. 1. *Micropterus punctulatus punctulatus*

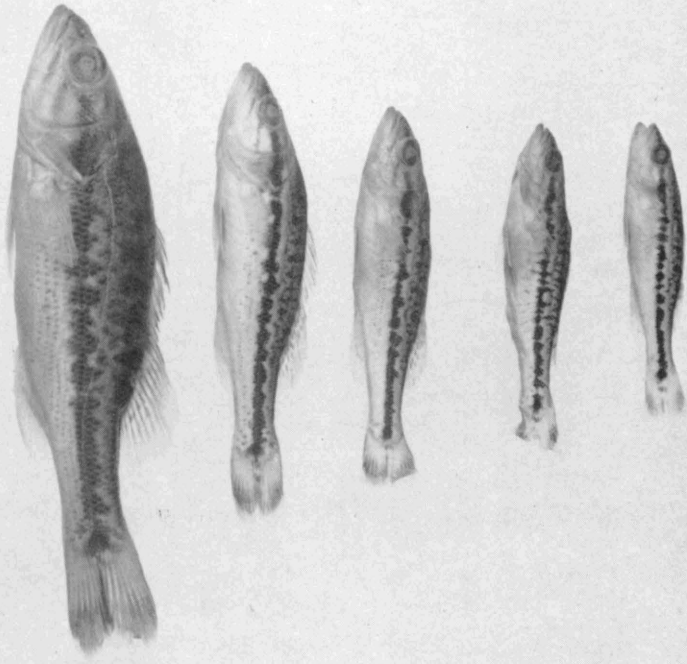
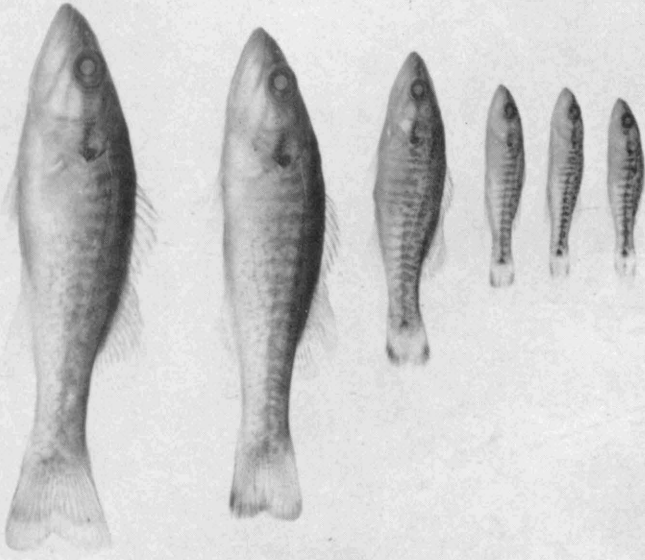


Fig. 2. *Micropterus punctulatus treculii*



Hubbs and Bailey

PLATE II

Adult specimen (210.5 mm. in standard length) of *Micropterus punctulatus treculii*, collected in Guadalupe River 2 miles above Ingram, Kerr County, Texas, on November 18, 1939.

SPOTTED BASS

PLATE II

