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ZOOLOGY

VARIATION IN THE RED SHINER, *NOTROPIS LUTRENSIS*, (Baird and Girard)

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Variation in the meristic characters, numbers of scales and numbers of fin rays, in fishes has been a subject of interest since the early work of Jordan (1891). Such characters are of great importance in discriminating between species and subspecies of various fish, particularly the minnows (Cyprinidae).

The literature relating to variation in meristic characters has been summarized in several excellent reviews (Hubbs 1934, 1940, Tanning 1952). The present study was undertaken to determine the nature of variation in nine meristic characters in the red shiner, *Notropis lutrensis*. The nine characters studied were, scales in the lateral line, scales above and below the lateral line, scales before the dorsal fin, circumference scales, numbers of rays in the dorsal, anal, pectoral and pelvic fins. The counts were made in the manner outlined by Hubbs and Lagler (1958).

During the years 1955 through 1958, a total of 870 specimens of the red shiner was examined. The specimens were obtained by means of a 25 foot quarter inch mesh seine in the Missouri and Vermillion Rivers in southeastern South Dakota. The means and standard errors of the samples studied are presented in Table 1. An analysis of several samples revealed no evidence of sexual dimorphism in the characters studied.

Samples taken from three different stations on the Vermillion River in 1956 (samples A, B, and C) revealed no significant differences in the averages, except in the number of scales before the dorsal fin. In respect to the latter character it is interesting to note that the sample averages of A and B do not differ significantly from one another, but that sample C differs significantly from the other two. The significance of this difference, while difficult to interpret, suggests that caution is necessary in using scales before the dorsal in interbasin comparisons. It should be pointed out, before leaving this character, that the 1957 sample from the Vermillion River also had a low average number of scales before the dorsal fin, significantly lower than all other sample averages.

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Table 1. Variation in nine meristic characters in the red shiner, *Notropis lutrensis*.

N	VERMILLION RIVER						MISSOURI RIVER		
	1955	1956			1957	1958	1956		1957
		A	B	C			D	E	
	50	67	111	165	162	68	92	86	69
Scales lateral line	34.08 0.12	33.85 0.10	33.83 0.08	33.96 0.06	33.63 0.06	34.29 0.09	33.80 0.09	33.92 0.08	34.07 0.09
Scales above lateral line	6.00 0.04	5.94 0.04	5.94 0.03	5.87 0.06	6.02 0.02	5.96 0.03	5.98 0.03	5.98 0.02	5.99 0.03
Scales below lateral line	4.20 0.06	4.21 0.06	4.10 0.04	4.28 0.04	4.26 0.04	4.24 0.06	4.15 0.04	4.16 0.04	4.26 0.06
Caudal Peduncle Scales	13.98 0.07	14.08 0.05	14.10 0.04	14.07 0.04	14.20 0.04	14.09 0.05	14.11 0.04	14.11 0.04	14.30 0.08
Scales before Dorsal	22.24 0.30	22.91 0.26	22.43 0.19	18.81 0.16	18.11 0.09	22.29 0.28	21.77 0.26	21.75 0.21	24.28 0.32
Dorsal Fin Rays	7.98 0.03	8.00 0.00	8.01 0.01	8.02 0.01	8.00 0.00	7.99 0.01	8.03 0.03	8.00 0.00	8.01 0.02
Anal Fin Rays	9.00 0.04	8.90 0.04	8.94 0.04	8.98 0.03	8.97 0.03	8.98 0.03	9.02 0.04	9.00 0.04	8.97 0.07
Pectoral Fin Rays	2.46 0.11	13.25 0.08	13.41 0.08	13.21 0.06	13.10 0.05	12.81 0.09	13.08 0.11	12.87 0.10	12.87 0.11
Pelvic Fin Rays	7.84 0.05	8.00 0.04	7.96 0.02	8.02 0.02	7.98 0.02	7.96 0.02	7.97 0.03	7.93 0.03	7.97 0.04

Except for the number of pre-dorsal scales there were no significant differences between samples taken in different years from the Vermillion River, nor in those samples taken from the Missouri River in 1956 and 1957. The number of rays in the pectoral fin was low in 1955, significantly lower than the averages for 1956 and 1957, but not significantly lower than the 1958 average (Table 1). The 1958

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average was low, but not significantly lower than the 1956 and 1957 averages.

Samples taken from the Missouri River and those from the Vermillion River did not differ significantly from one another. Sample D from the Missouri River came from an ox-bow lake at Elk Point, South Dakota, while sample E came from the main channel as did the 1957 sample. The latter sample had a significantly greater number of scales before the dorsal fin than did all other samples.

The data presented indicate that the red shiner exhibits a low level of variability as compared to that displayed by the bigmouth shiner, *Notropis dorsalis* (Underhill and Merrell, 1959). The red shiners living in the Vermillion River are exposed to a different environmental complex than shiners inhabiting the Missouri River. Those living in the ox-bow lake are exposed to markedly different environmental conditions than either the Vermillion or Missouri River inhabitants. Temperature records indicate that the Missouri River has lower and more constant temperatures than either the lake or stream habitat (Vermillion River). The lake habitat had the highest temperatures and exhibited the greatest daily fluctuations, while the stream habitat was intermediate. The Vermillion River is subject to marked fluctuations in water levels (Underhill, 1959), which is not a factor in the river or lake habitat. Seining throughout the period 1955 to 1959 revealed that the red shiner populations in the three habitats spawned at approximately the same time. At the time of spawning the lake had the highest temperature, the Missouri River the lowest, and the Vermillion River an intermediate temperature. Temperature is one of the factors which has a primary effect on the number of parts produced (Tanning, 1952). The similarity of sample averages indicates that the temperature differences between the various habitats had little influence on the meristic characters studied.

LITERATURE CITED

- HUBBS, C. L. 1940. Speciation in fishes. *Am. Nat.* 74:57-81.
HUBBS, C. L. 1934. Racial and individual variations in animals, especially fishes. *Am. Nat.* 68:115-118.
HUBBS, C. L. and LAGLER, K. F. 1958. Fishes of the Great Lakes Region. *Cranbrook Inst. Sci. Bull.* 26:1-213.
JORDAN, D. S. 1891. Relations of temperature to vertebrae among fishes. *Proc. U.S. Nat. Mus.* 14:107-120.
TANNING, A. V. 1952. Experimental study of meristic characters in fishes. *Biol. Rev.* 27:169-193.
UNDERHILL, J. C. 1959. Fishes of the Vermillion River, South Dakota. *Proc. S. D. Acad. Sci.* 38:96-102.
UNDERHILL, J. C. and MERRELL, D. J. 1959. Intra-specific variation in the bigmouth shiner (*Notropis dorsalis*). *Am. Midl. Nat.* 61:133-147.