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Xanthic Creek Chub, Semotilus atromaculatus, from West Virginia

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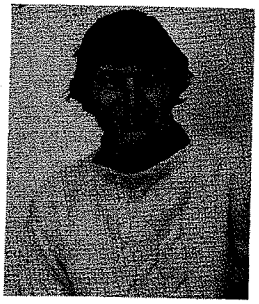

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Photo Not Available

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Introduction

Three xanthic specimens of the creek chub, *Semotilus atromaculatus,* were collected in April 1976 from a farm pond, tributary to Glady Fork, Monongahela River drainage in Randolph County, West Virginia (latitude 38° 50′, longitude 79° 42′ 30″). They were taken by seine from a school of several hundred creek chub, along with 84 typical specimens. The pond consisted of 2.4 ha of open water, was 6 m in depth and had one small tributary. The bottom was mud with no obvious vegetation. Brook trout, *Salvelinus fontinalis* and rainbow trout, *Salmo gairdneri,* were stocked in the pond. Creek chubs may have entered via the tributary or been introduced with the trout. No creek chub was seen in the tributary for 50 m upstream.

The xanthic specimens were readily visible among the typical creek chub from a distance of 20 m. When first captured, they were kept alive, photographed, then preserved in 10 percent formalin. Additional photographs of recently killed typical and xanthic specimens were taken. The live and freshly killed xanthic specimens were essentially the same in size and chromatophore pattern to the typical creek chub. The striking difference was the distinctly orange chromatophores where melanophores are normally found. The spot in the dorsal fin was decidedly orange, the dorsal half of the body and head light orange, and the caudal fin a light orange. The eyes appeared normal, and a few scattered micromelanophores could be seen along the lateral band and at the caudal base on one specimen.

Methods and Results

After transfer from formalin to 40 percent isopropanol, the color of the xanthic specimens faded as occurs with xanthophils and carotinoids in alcohol (Fugii, 1969, and personal experience). In a few days they appeared opaque white and without chromatophores. In contrast, the typical specimens continued to possess a melanophore pattern characteristic of the species. The following description was made from the preserved specimens (Figure 1): melanophores were absent from all fins on the xanthic form. Under 10X magnifications, scattered micromelanophores were visible along the lateral band (faintly visible with the naked eye) and widely scattered micromelanophores were present on the dorsal half of the body and upper lip. There was no pattern to the micromelanophores on scales or elsewhere and no intermyomere lines. Typical specimens (viewed with the naked eye) had a distinct lateral band, dark spot in the anterior base of the dorsal fin, dark upper body, black upper lip and chin, and diagonal intermyomere lines above the lateral band. Under 10X magnifications, micromelanophores were visible along the rays of the dorsal, anal and caudal fins.

Several measurements (standard length, head length, body depth, predorsal length and preanal length) and counts (lateral line scales, scales above the lateral line, scales below the lateral line, and anal rays) following Hubbs and Lagler (1958) were made on the xanthic and 10 typical specimens. The xanthic specimens (49.0 to 50.7 mm s.l.) were similar in morphometrics and meristics to the normal specimens. All (xanthic and typical) were of the I^+ age group and ranged from 40.0 to 80.0 mm s.l.

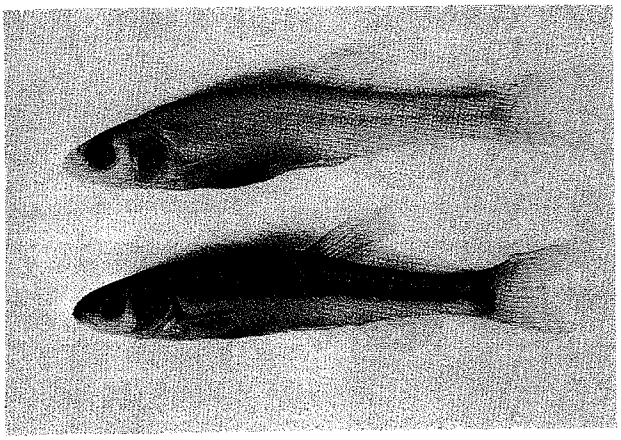

FIG. 1—Xanthic specimen (top) and normally colored specimen (bottom) of the creek shub, *Semotilus atromaculatus,* after preservation and loss of orange pigment in alcohol.

Conclusions

Xanthic freshwater fishes from the natural waters of the United States are rare. Dawson (1964, 1966, 1971) lists many occurrences of albinism, but only one freshwater xanthic reference: Allen and Neil (1953) who reported a xanthic largemouth bass, *Micropterus salmoides.* Denoncourt, Robbins and Stauffer (1976) reported seven xanthic specimens of tessellated darter, *Etheostoma olmstedi.* Xanthic trout are common in hatcheries and rearing ponds in many states. However, this distinctly orange form, similar to some "golden" trout, had not been described for any freshwater minnow. They are believed the result of genetic variation similar to that found in "golden" and "blue" trout. Gordon (1957) demonstrated the occurrence of golden coloration in the guppy, *Lebistes reticulatus,* as being a recessive mutant trait which reduced melanophore characteristics by 50 percent. Mating a golden specimen with a wild type resulted in F_1 offspring colored like the wild parent. Sibling (F_1) crosses produced a wild to golden ratio of 3:1, as expected for simple Mendelian recessive traits. Sibling (F_1) crosses of offspring from wild x albino stock, yielded a wild to albino ratio of 53:1, indicating that albinism is a recessive, semilethal mutation. Survival of this xanthic or "golden" strain in the creek chub and possible increase in numbers of the xanthic forms remains to be investigated.

All specimens have been cataloged into the Appalachian Environmental Laboratory Museum, University of Maryland, at Frostburg State College, Frostburg, Maryland (AEL 61).

Addendum—Additional specimens were observed in summer 1977.

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