SCALE DEVELOPMENT AND PATTERNS OF SQUAMATION ON THE SPRING CAVEFISH, *CHOLOGASTER AGASSIZI* (AMBLYOPSIDAE)[1]

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The appearance of scales and patterns of squamation on an amblyopsid fish are described.

METHODS

Specimens were secured from both epigean and hypogean waters near Rich Pond, Warren County, Kentucky. Fish were collected weekly, in the field, through the first 16 weeks of life and were preserved in 10% formalin. In the laboratory, specimens were examined with a binocular dissecting microscope. Drawings were made at 10X magnification.

RESULTS AND DISCUSSION

The first stages in the development of the cycloid scales on the spring cavefish, *Chologaster agassizi* Putnam, are indicated by the development of mesodermal elements, known as scleroblasts, along the lateral line on the caudal peduncle; these structures first appear between three and four weeks of life (Fig. 1). The scleroblasts spread, predominantly anteriorly along the lateral line, less rapidly dorsally and ventrally, and least rapidly caudally. At eight weeks of age, the progressive advancement of the mesodermal elements is complete over the body, and the area of first development, along the lateral line, is re-covered by scale follicles. Subsequent development is characterized by complete replacement of the scleroblasts and the presence of true scales in place of the follicles along the lateral line. Complete squamation on *C. agassizi* occurs between 11 and 12 weeks.

Specimens collected from the cave, although considerably smaller in total length, manifested development of scale formation similar to surface-dwelling cavefish (Fig. 2).

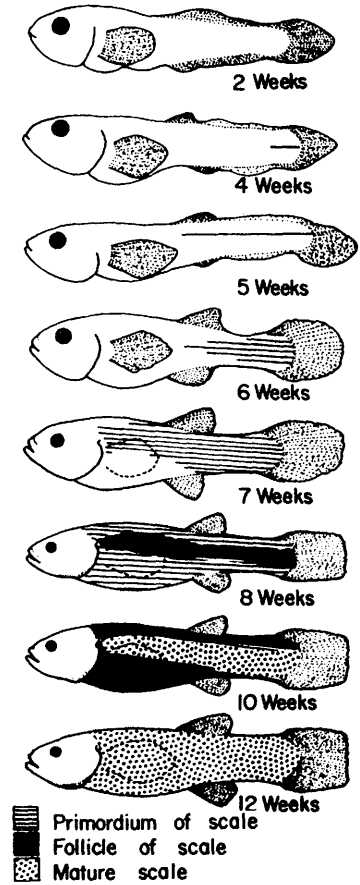

FIGURE 1. Progressive stages of scale development and patterns of squamation on *C. agassizi*.

[1] From a doctoral dissertation submitted by the author to the Department of Biology, University of Louisville, June, 1966.

The body length at the time of scale formation in fishes has been of continuing interest since Fraser (1) advocated its use as a correction factor for back-calculations of lengths. Consequently, the body length at the time of scale formation has been recorded for many fishes. Although it is not the purpose of this note to review the vast amount of literature on the subject, it is significant to point out that tremendous variation of body length-scale formation ratios exist for many species. Such a variation is clearly evident for specimens analyzed in this study. The time of appearance and the pattern of squamation of scales on cave and non-cave specimens were quite similar. The mean total-length of these specimens, however, was quite different.

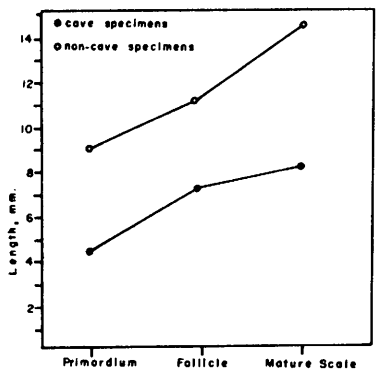

FIGURE 2. Progressive stages of scale development on cave and non-cave specimens of *C. agassizi.*

The size differences observed can, presumably, be related to the availability of food, for epigean dwelling young-of-year cavefish grow much more rapidly than do hypogean forms of comparable age (2). Although specimens used in this study were secured and analyzed directly from field collections, specimens were also maintained in the laboratory and fed small rations in an attempt to simulate cave-food conditions. Such specimens exhibited growth rates and patterns of squamation comparable to specimens collected from the cave. Such parallels suggest that specimens used in the analysis were of comparable age, although this factor cannot be fully substantiated. Other factors, such as the development of a single mode of mature ova coupled with a relatively short spawning season (3), suggest that such a supposition is probably realistic. Thus, it seems reasonable to assume that the length of a fish at the time of scale formations may be quite variable, whereas the age at which scales appear may be relatively constant for a species.

ACKNOWLEDGMENT

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