

Observations on Spawning and Development of the
Log-Perch, *Percina caprodes semifasciata*

The following paper is based on class work in ichthyology under Professor Creaser at the Biological Station of the University of Michigan, on Douglas Lake, Cheboygan Co., Mich. On the morning of June 28 class adjourned to the shore in front of camp, along the shoal to the right of the diving tower. The day was clear, and what wind there was was off-shore, leaving the surface of the lake unfuffled. A clear view of a number of small, elongate fish, more or less grouped in the shallows, was afforded. The behavior of the fish appeared not to be affected by ordinary conversation, but might be temporarily interrupted by sudden movement on the part of the watchers. The groups as formed, often of a dozen or more individuals, seemed to be excitedly probing in the sand, near a central point. Further observation revealed the cause for such groupings. A female (distinguished by the lack of a pronounced dark streak down the back) might be observed apart from the group. On the approach of a male, she would settle to the sand, and the male take a position over her, ~~and~~ apparently holding on by means of his pectoral and pelvic fins. There followed a vibratory movement, involving both, and most apparent at their tails, which caused a stirring up of the sand beneath the female. This position was sometimes maintained for several seconds, but very quickly a group of fishes would form about the pair, and they would separate. For the most part the groups consisted of the same species, *Percina caprodes semifasciata*, but with them were also a few minnows, like-

wise intent on eating of the eggs. According to Ellis and Roe (1917), the adhesive outer membrane of the Percina egg is quickly covered with sand and debris, affording it protection from the raids of percina adults and other fish, as the sucker. Even so, the mortality in the egg-stage must be high, according to Dr. Creaser, due to wave-action upon the exposed shoals where the log-perch spawns, all along the South Fishtail shore.

For laboratory study, adults were captured by seining, and stripped of their eggs or sperm, which were placed together in water in finger bowls. Another method sometimes employed is the so-called Russian dry method of placing roe and milt in dry containers, and adding water thereto, said to yield as high as 80% fertilization. The eggs, in the finger bowls, were studied in the laboratory under low powers of the microscope, and sketched from time to time to indicate the progress of development. Within an hour the first cleavage occurred in some instances, and by evening proliferation had occurred to an extent such that the germinal disk was a mass of small cells too small for the power of the microscope employed. By noon of the following day segmentation was well advanced, and the head was differentiated. On the third day the eye was well developed, and a regular pulsation of the heart could be seen. The embryo within the egg membranes underwent spasmodic wriggings every half minute or so, usually resulting in a change of position. On the fourth day the heart-beat was more localized, and was timed at about 70 beats a minute. A definite circulation was observable in both directions in the caudal region, though only anteriorly in the trunk region of the specimen observed. On the sixth day circulation appeared more definitely still, with an evidently delimited heart and a flowing in both directions. The

pronounced bodily movements of the third day were by now infrequent and less momentous. On the second class day (eighth day) the embryos had burst from the egg membranes, and the young fish were resting quietly or swimming about, still in the curve of the egg-stage to a considerable extent.

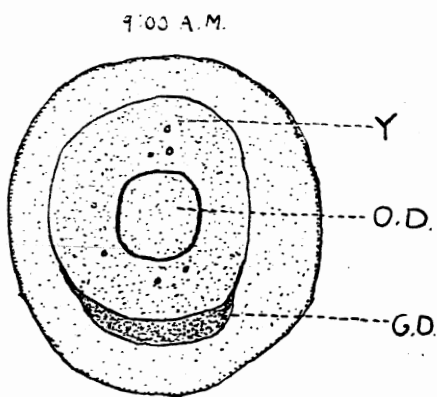
From the not considerable available literature on Percina, one or two additional items are gathered. Ellis and Roe opened several Percina females, selected at random, and found about 100 mature eggs in each, with, however, a number of undeveloped eggs also present. According to Creaser, through Edge (1929), the breeding period of Percina in Douglas Lake may last as long as a month, beginning about the 20th of June and depending on physiological conditions of the water. From the ease of laboratory rearing of the artificially fertilized eggs, their use is suggested for physiological studies (Brinley and Creaser, 1931), and their transparency and rapidity of development would seem to fit them for study material in embryological laboratories.

Literature

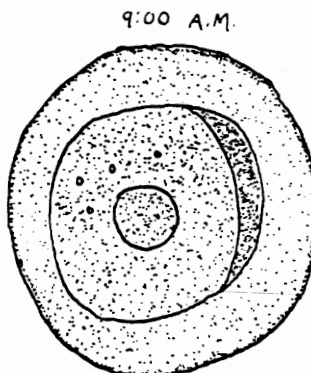
- Brinley, Floyd J., and Creaser, C.W.--Eggs of Fresh-water Fishes Suitable for Physiological Research. Science, Sept. 18, 1931, pp. 295-296.
- Edge, Elton R.--Breeding Habits and Embryology of Percina caprodes. Ms., Aug. 1, 1929.
- Ellis, M.M., and Roe, G.C.--Destruction of Log Perch Eggs by Suckers. Copeia, Aug. 24, 1917, pp. 69-71.
- Reighard, Jacob E.--The Development of the Wall-eyed Pike. Bulletin Michigan Fish Commission.--1890.

Eggs of Percina

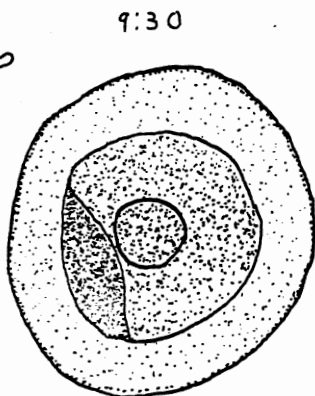
June 28



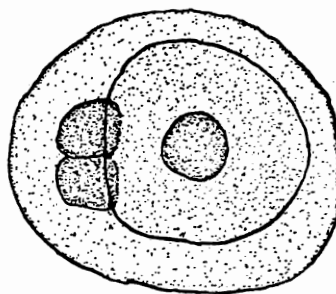
1 1/4 m.m.



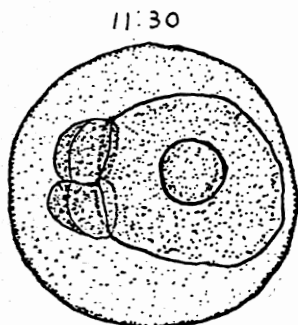
sperm



11:25



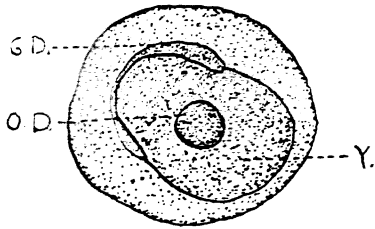
1st cleavage



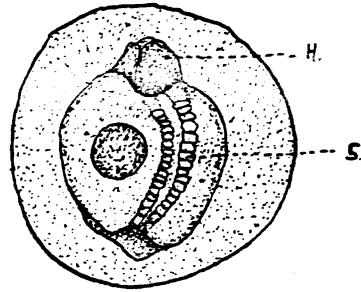
2nd cleavage

Legend
 G.D. - germinal disk
 O.D. - oil drop
 Y - yolk

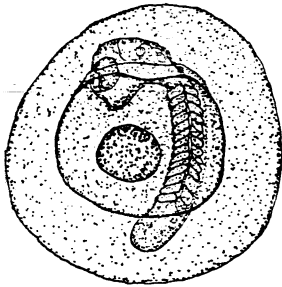
June 28
10 P.M.



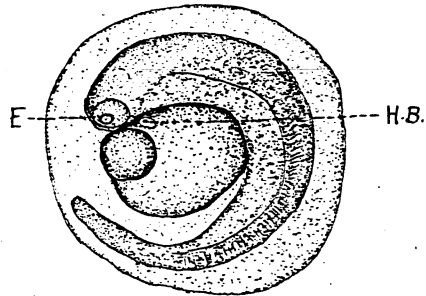
June 29
1 P.M.



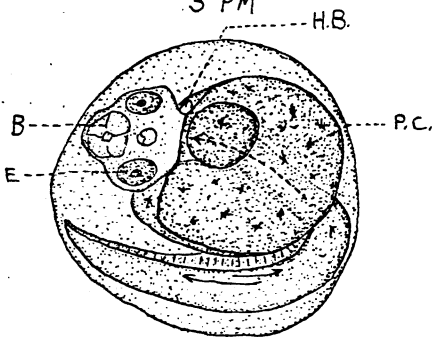
June 29
10 P.M.



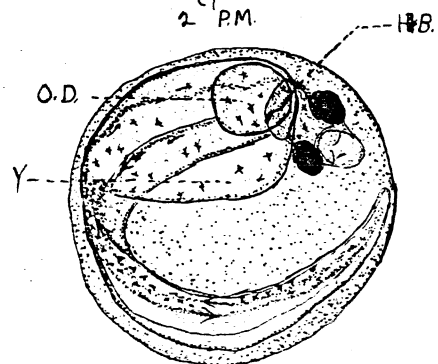
June 30
10 P.M.



July 1
3 P.M.



July 3
2 P.M.



Legend

- B - brain
- E - eye
- G.D - germinant disk
- H - head
- H.B - region of heart-beat

- O.D - oil drop
- P.C - pigment cells
- S - segments
- Y - yolk