Observations on the Courtship and Reproduction of the Desert Pupfish (*Cyprinodon macularis*)

by Tom Baugh

Specimens of *Cyprinodon macularis* were collected from the Salton Sea area of Southern California on April 23, 1979. All specimens were fed commercially prepared frozen brine shrimp. The water from which the fish were taken was highly saline. The fish were transported by air from California to Utah where they were placed in a 20-gal aquarium with saline water. During the next two weeks the salinity of the water was decreased by drawing off the water in the aquarium and replacing it, through drip application, with fresh water. At the end of two weeks desalinization was complete and fish had adjusted to the change. With the exception of one mature male, all specimens were immature.

By the first part of July several females had attained a length of about one inch. Two of the females were placed in a separate 20-gallon aquarium with the one mature male. One of the females was apparently gravid.

On July 9, 1979 I made a partial water change (2 gal) in the 20 gallon aquarium containing the mature fish. The following day I noticed that the male was sporting courtship colors. The upper portion of his back was a metallic powder-blue. The dorsal fin was black, the posterior edge of the anal fin was edged with black and the caudal and pectoral fins were colored a light lemon-yellow. The male divided his time between nuzzling the gravid female and chasing both females. About 24 hours later the courtship pattern had changed. The gravid female was suspended about four inches from the gravel substrate. The male, resplendent in his courtship colors, tightly circled below the female in a clockwise direction. He would pause, resting close to the bottom and then return to the female, circling counter-clockwise. During this time the female hung motionless in the water. On occasion, the female would drop to the bottom where the male would nuzzle her. Also on occasion, the female would dart away pursued by the male.

Three days (July 22) following the onset of courtship I noticed the previously swollen abdominal region of the female was flat. Apparently spawning had occurred during the evening or morning hours. I removed the artificial spawning grass and noticed about ten small eggs (ca. 1/32 inch) attached to the thin plastic strips of the spawning grass.

I removed the grass from the aquarium and placed it in a one-gallon container which contained the same water as that from which the eggs were taken. An airstone was used to mildly agitate the water. The water temperature averaged 74F from the time of spawning until the first free swimming larvae was noted on July 20, 1979. The pH was 7.4.

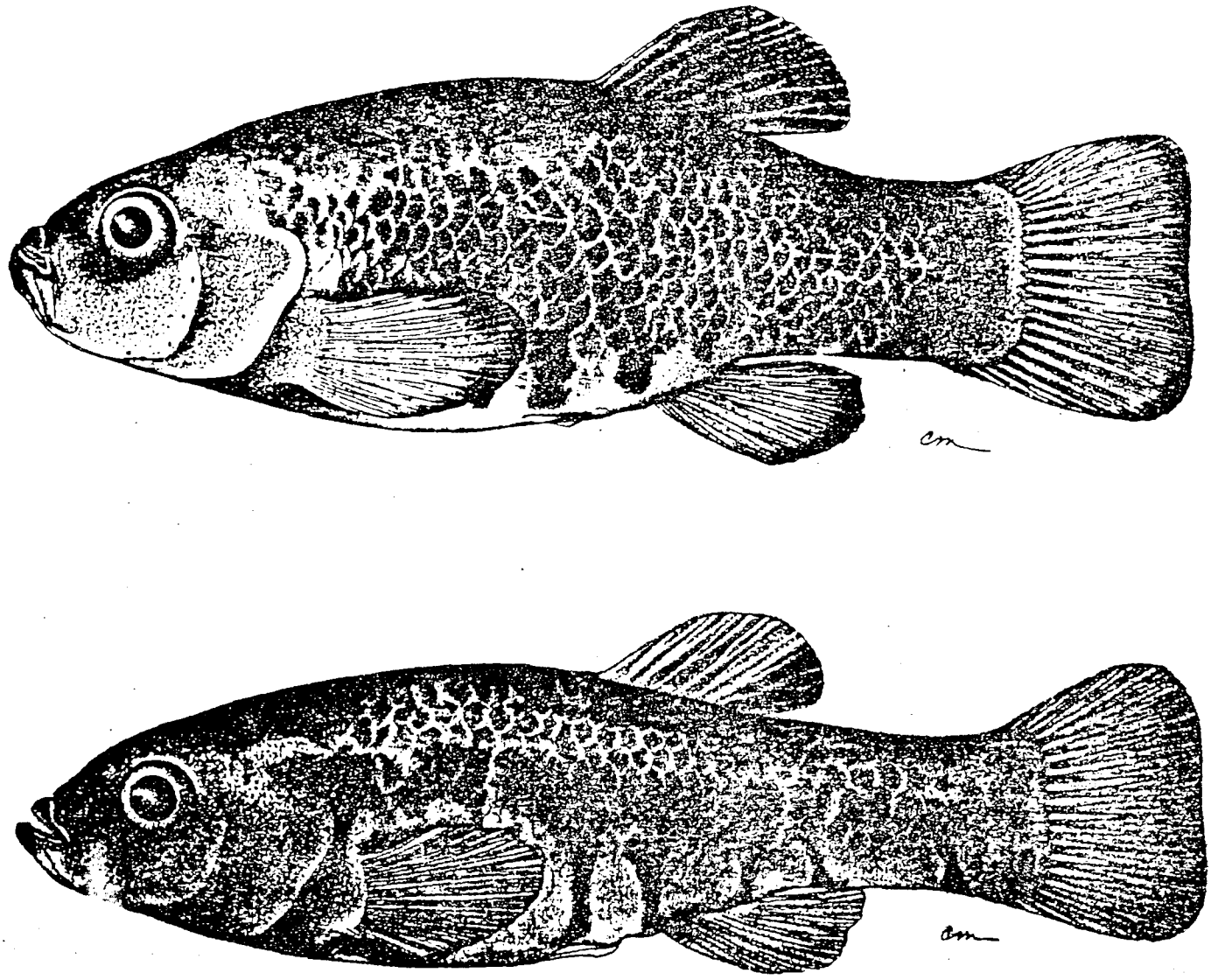
Shortly after hatching, the larvae appeared to be about 3/16 inch in overall length. It took from 2-3 days for the yolk to be absorbed. Within the first several days following hatching the larvae lay in the small amount of detritus along the bottom of the container. By the fourth day following hatching, several of the larger larvae (ca. 1/4 inch) were noted darting about the container apparently capturing brine shrimp nauplii. Twelve days following spawning all of the original eggs had hatched.

in a separate 20 gallon aquarium with the one mature male. One of the females was apparently gravid.

On July 9, 1979 I made a partial water change (2 gal.) in the 20 gallon aquarium containing the mature fish. The following day I noted that the male was sporting courtship colors. The upper portion of his body was a metallic-powder blue. The dorsal fin was black, the posterior edge of the anal fin was edged with black and the caudal and pectoral fins were colored a light lemon-yellow. The male divided his time between nuzzling the gravid female and chasing both females.

About 24 hours later the courtship pattern had changed. The gravid female was suspended about four inches from the gravel substrate. The male, resplendent in his courtship colors, tightly circled below the female in a clockwise direction. He would pause, resting close to the bottom and then return to the female circling counter clockwise. During this time the female hung motionless in the water. On occasion, the female would drop to the bottom when the male would nuzzle her. Also on occasion, the female would dart away pursued by the male.

Three days (July 22) following the onset of courtship I noticed the previously swollen abdominal region of the female was flat. Apparently spawning had occurred during



Re. ed to the Desert Pupfish is the Salt Creek Pupfish (C. salinus), shc above. The male (upper fish) and female of this species are res cted to the Salt Creek on the floor of Death Valley, California. Dra gs courtesy of the Natural History museum, Los Angeles County, Carc Mortenson, illustrator.

the evening or early morning hours. I removed the artificial spawning grass and located about ten small eggs (ca. 1/32 inch) attached to the thin plastic strips of the spawning grass.

I removed the grass from the aquarium and placed it in a one gallon container which contained the same water as that from which the eggs were taken. An airstone was used to mildly agitate the water. The water temperature averaged 74F from the time of spawning until the first free swimming larvae was noted on July 20, 1979. The pH was 7.4.

Shortly after hatching the larvae appeared to be about 5/16 inch in overall length. It took from 2 - 3 days for the yolk to be absorbed. Within the first several days following hatching the larvae lay in the small amount of detritus along the bottom of the container. By the fourth day following hatching, several of the larger larvae (ca. $\frac{1}{4}$ inch) were noted darting about the container apparently capturing brine shrimp nauplii. Twelve days following spawning all of the original eggs had hatched.