

FOOD PREFERENCE OF THE OLYMPIC MUDMINNOW (*NOVUMBRA HUBBSI*)

Thomas M. Baugh

The Olympic mudminnow (*Novumbra hubbsi* Schultz) (Fig. 1) is found in limited distribution in portions of the Chehalis River watershed with spotty, severely limited occurrences in the Puget Sound watershed (Meldrim 1968, Harris 1974). *N. hubbsi* is the only member of its family (Umbridae) found west of the Rocky Mountains within the continental United States.

Due to this limited distribution and the possibility of habitat loss through modification by humankind or by natural cataclysm, it is important to amass as much information as possible about this unique species. Meldrim (1968) compiled extensive ecological information about *N. hubbsi* and Hagen et al. (1972) have described reproductive activity in closed system aquaria.

In their natural state *N. hubbsi* feed largely on live foods (Meldrim 1968). Observations in aquaria indicate that these fish are deliberate feeders (Meldrim 1968, Baugh 1978, 1979) which take up to several minutes to stalk and attack their prey. Observations with wild-caught specimens also indicate that once the live prey stops moving members of this species apparently lose interest. Meldrim noted that if the prey did not move for several minutes "*Novumbra* would not strike and would swim on." Meldrim also noted that because of this behavior "prepared foods were never successful with *Novumbra*." Hagen et al. (1972) fed their specimens chopped earthworms and tubifex worms. Such behavior and the necessity to provide living foods can severely limit the culture of this small, attractive species.

## METHODS

I recently exposed 26 specimens of this species to a variety of non-living foods including frozen brine shrimp (San Francisco Bay Brand); freeze-dried brine shrimp (Jungle Laboratories Corporation) and freeze-dried plankton (San Francisco Seamaster); and a mix of flake foods including brine shrimp (Tetra Brine Shrimp Treat), krill (Tetra Krill Flakes), and a vegetable food (Tetra Conditioning Food).

The fish were exposed to these three diets in two groups. Group I included specimens which had been acclimated to closed system aquaria for a period of about 2 years. Group II had been acclimated to closed system aquaria for about nine months. Both groups had been previously fed commercially available live brine shrimp. The first group of fish were about 2 years old and the second group were young of the year. Both groups were wild-caught fish, group I from Scatter Creek near Olympia, WA., and group II from Salmon Creek also near Olympia, WA.

Both groups were maintained for 10 days on a twice daily broadcast feeding of flake food (the amount of food was not weighed). At the end of this time all fish in both groups showed apparent weight loss; however, the younger fish in group II appeared to be the most severely affected. Although individual members of both groups were observed eating the flake food, they apparently did not eat enough to sustain them in a healthy condition.

During the second 10-day period both groups were fed a mixture of freeze-dried brine shrimp and freeze-dried plankton. The results were essentially the same. Overall condition of the specimens continued to deteriorate and although the fish sampled enough of the food to stay alive there was no improvement in their condition.

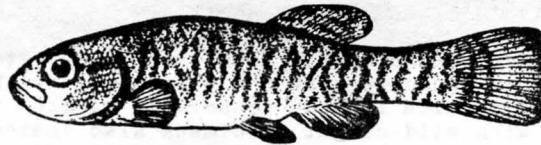
During the last 10-day period all specimens were fed frozen brine shrimp. Within a short time the condition of the specimens stabilized and then showed marked improvement. They readily consumed the frozen brine shrimp.

## DISCUSSION

During the 6-week exposure to these diets there were no mortalities in group I, the group composed of older fish acclimated to closed system aquaria for a longer period. Four fish from group II, however, had to be removed from the test tank and placed on a diet of living brine shrimp; all later died.

(continued on next page)

Two incidental observations were made during the food trials. First, in the wild, *Novumbra hubbsi* are essentially bottom feeders. They will take a position at roughly 45 degrees to the substrate (Meldrim 1968) and maintain this position for long periods of time. In aquaria, when feeding on live foods such as brine shrimp and tubifex, the fish maintain this same position. During the food trials with frozen brine shrimp about 50 percent of the fish from both groups modified their behavior and began to approach the surface of the water, striking at the small clumps of frozen shrimp before the shrimp began to sink. Second, observations in closed system aquaria indicate that size and movement appear to be the stimuli which release feeding behavior when *N. hubbsi* were fed living foods such as brine shrimp and tubifex. Of the three diets to which the test fish were exposed, none moved once they reached the substrate. Of these three diets only the freeze-dried brine shrimp showed any "lifelike" movement as it dropped from the surface to the substrate and yet the fish showed little interest in this diet and chose instead the frozen brine shrimp. This indicates that perhaps some other stimuli help trigger feeding behavior.



*Novumbra hubbsi* Schultz

#### SUMMARY

*Novumbra hubbsi* readily consumes frozen brine shrimp while rejecting all but insufficient amounts of the freeze-dried and flake foods offered. The acceptance of a readily available commercial food should aid in the culture of this species.

#### BIBLIOGRAPHY

- Baugh, Tom. 1978. The Olympic mudminnow. Freshwater and Marine Aquarium. Vol. 1, No. 11.
- Baugh, Tom. 1979. The neglected easterner: *Umbra pygmaea*. Freshwater and Marine Aquarium. Vol. 2, No. 7.
- Hagen, D.W., G.E.E. Moodie, and P.E. Moodie. 1972. Territoriality and courtship in the Olympic mudminnow (*Novumbra hubbsi*). Can. J. Zool. 50:1111-1115.
- Harris, Colin K. 1974. The geographical distribution and habitat of the Olympic mudminnow (*Novumbra hubbsi* Schultz). Unpublished information on file at the College of Fisheries, Univ. Wash., Seattle.
- Meldrim, John W. 1968. The ecological zoogeography of the Olympic mudminnow. Ph.D. Thesis, Univ. Wash., Seattle.

#### THE KORDON CORPORATION

The North American Native Fishes Association would like to thank the Kordon Corporation of Hills-Kordon and Dr. Robert Rofen for their support of the Association through advertising in AMERICAN CURRENTS. If your company wishes to advertise in AMERICAN CURRENTS please write to NANFA, William N. Scoggins, P.O. Box 88703, Emeryville, CA 94662.