On the Food and Feeding Habits of the Catfish Schilbeodes exilis (Nelson) in Oklahoma

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In general, the food and feeding habits of fishes having little or no economic importance have received only slight attention. The slender madtom, *Schilbeodes exilis*, has been no exception. The literature apparently contains no information on the food of this species, and only two brief references to the food of another member of this genus have been found. Evermann and Clark (1920) investigated the stomach contents of nine specimens of *Schilbeodes gyrinus* (Mitchill) and found mainly small crustaceans and insect larvae. In regard to this same species Schrenkeisen (1938) states "Its food largely consists of animal matter, principally crustaceans, also insects, and a small amount of vegetable material."

While attending the Spring Meeting of the Oklahoma Academy of Science, May 1 and 2, 1959, near Tahlequah, Oklahoma, some general observations were made on the feeding habits of *S. exilis* and a rather large number of specimens was collected for stomach analysis. Insects were found to be the main staple in the diet of these specimens.

On the night of May 1, between 10:30 p.m. and 11:30 p.m., specimens of *S. exilis* were very numerous in the shallow water along the edges of Tyner Creek at U. S. Highway 62 near Proctor, Adair County, Oklahoma.

These specimens were observed, with the aid of a flashlight, to be "nosing" around apparently in search of food among the dead leaves and chert pebbles, frequently getting into water so shallow that they were partially exposed. Several attempts to catch them by hand were successful.

The following day between 11:00 a.m. and noon the madtoms were not observed in the shallow areas and even though the deeper water was quite clear, none were seen moving about. A few specimens were collected in water one to three feet deep with seines by kicking among the rocks, thereby disturbing their hiding places. The use of a 220 volt A.C. electric shocking device greatly facilitated the collection of more specimens from the area.

On returning to the same locality at 8:15 p.m. May 2, the slender madtoms were again very numerous in the shallow water along the shore. During the next fifteen minutes 71 specimens of *S. exilis* were collected with a 4-foot bobinnet seine and a little "kicking" in water 6 inches or less in depth. Collecting operations were then ceased because of rain.

The specimens were preserved entire in 10% formalin at the time of collection. They were later washed and transferred to 50% isopropanol. The standard length of each specimen was taken, the stomach removed and its contents washed out into a watch glass for examination under a dissecting microscope. Resistant parts of partially digested organisms were identified when possible, but the number of each kind was recorded only when remains were sufficiently whole to give a reliable count. Volumetric analyses were not made.

Of the 71 specimens collected at night only 3 were empty. Most of the contents of the remaining 68 stomachs appeared to have been recently eaten. Unidentifiable remains were encountered in only 12 stomachs (17.65%). This is in sharp contrast to the condition of the stomach contents of the 74 specimens collected during the day. Five of these were empty and 52 (75.36%) of the 69 containing food had unidentifiable remains. Organisms appearing to have been recently eaten were found in only 16 (23.19%) stomachs. The frequency of occurrence of the various food items is given in Table I.

TABLE I. Stomach contents of 69 day- and 68 night-collected *Schilbeodes exilis* from Tyner Creek, May 1 and 2, 1959. The frequency of occurrence of each item is given (% in parentheses).

Food Item	Day		Night	
Insecta	66	(95.65)	66	(97.06)
Ephemeroptera	59	(85.51)	60	(88.24)
Odonata			1	(1.47)
Plecoptera	11	(15.94)	13	(19.12)
Neuroptera	1	(1.45)		
Coleoptera	2	(2.90)	7	(10.29)
Trichoptera	27	(39.13)	22	(32.35)
Diptera	56	(81.16)	58	(85.29)
Chironomidae	56	(81.16)	54	(79.41)
Crustacea	23	(33.33)	24	(35.29)
Copepoda	4	(5.80)	4	(5.88)
Ostracoda	16	(23.19)	20	(29.41)
Isopoda	1	(1.45)		
Decapoda (Crayfish)	6	(8.69)	2	(2.94)
Arachnida (Hydracarina)	1	(1.45)	5	(7.35)
Gastropoda	2	(2.90)	2	(2.94)
Nematoda	8	(11.59)	6	(8.82)
Turbellaria	1	(1.45)	1	(1.47)

Insects constituted the most common food item, being found in nearly every stomach containing food. Almost all of these were aquatic immature forms, and no terrestrial forms were encountered. Mayfly naiads occurred most frequently and averaged 3.65 per stomach when present. Chironomid larvae and pupae were nearly as frequent and even more numerous; as many as 19 were present in a single specimen and the average was 5.46. All of the other food items were encountered much less frequently.

Crustaceans were found in about one-third of the specimens. Most of these were ostracods, but in spite of the fact that 68 were found in a single stomach, there is reason to doubt their value as food since they were present throughout the intestines of several specimens and showed no signs of digestion.

Water-mites (Hydracarina) were the only arachnids discovered. Because of their small size it seems probable that they were taken incidentally. The four snails *(Physa)* were immature with thin shells. Some or all of the nematodes may have been parasites of various food items and their significance as food is uncertain.

The stomachs of 20 specimens contained one or more rocks. These ranged in size up to 4.5 mm. in length and were usually red, pink or black in color. Two helical-type caddisfly cases composed of rocks had also been eaten. The rocks may have been taken accidentally, but the apparent selectivity of colors tends to suggest that they may have been mistaken for food. The presence of a rock about midway down the intestine indicates that at least some of them pass through the digestive tract instead of being regurgitated as might be expected.

Bailey and Harrison (1948) found plant seeds to be important in the diet of channel catfish, *Ictalurus punctatus* (Rafinesque), and McCormick (1940) found filamentous algae constituted 28% (vol.) of the diet in the same species. Although an unidentified seed and two other plant parts were in *S. exilis* stomachs, vegetable matter was not a major item in the madtom's diet at the time and place these specimens were collected.

A number of *S. exilis* were collected from the Illinois River at State Highway 51, Cherokee County, on the morning of May 3, 1959. The kinds and condition of the organisms found in their stomachs were very similar to those in the madtoms collected during the day at Tyner Creek, which is in the Illinois River drainage.

The food of *S. exilis* closely corresponds to that of channel catfish in the Illinois River (Clemens, 1952). In both species insects were the major food item, with mayflies and chironomids occurring most frequently. This is in contrast to the diet of *S. gyrinus* (Evermann and Clark, 1920) and young bullheads, *Ictalurus nebulosus* (LeSueur), which consisted of 60% (by volume) crustacea, mostly ostracods and cladocrerans (Raney and Webster, 1940).

Bailey and Harrison (1948) found the food of the channel catfish varied with their size, and the food of young specimens was very similar to that of *S. exilis*. The only variation observed in the diet of the madtoms of different sizes was that the larger fish ate larger specimens of the same type. The small dipterans did not decrease in frequency of occurrence in the larger madtoms as found for the channel catfish.

Observations of the feeding habits of *S. exilis* agree with the general statement of Bailey and Harrison that ictalurids are essentially nocturnal and probably do most of their feeding at night. Even though the exact rate of digestion in *S. exilis* is not known, the differences in the condition of stomach contents of specimens collected by day and night tend to sup-

port this statement. The occasional presence of fresh items in the day-collected madtoms indicates that they are not limited to nocturnal feeding, which is in keeping with the habits of other ictalurids.

Literature Cited

Bailey, R. M. and H. M. Harrison. 1948. Food habits of the southern channel catfish *(Ictalurus lacustris punctatus)* in the Des Moines River, Iowa. Trans. Amer. Fish. Soc., 75(1945): 110-138.

Clemens, H. P. 1952. Pre-impoundment studies of the summer food of three species of fishes in Tenkiller and Fort Gibson Reservoirs, Oklahoma. Proc. Okla. Acad. Sci., 33: 72-79.

Evermann, B. W. and H. W. Clark. 1920. Lake Maxinkuckee. Indiana Dept. Conserv., 1: 1-660.

McCormick, Elizabeth M. 1940. A study of the food of some Reelfoot Lake fishes. Rept. Reelfoot Lake Biol. Sta., 4: 64-75.

Raney, E. C. and D. A. Webster. 1940. The food and growth of the young of the common bullhead, *Ameiurus nebulosus nebulosus* (LeSueur), in Cayuga Lake, New York. Trans. Amer. Fish. Soc., 69(1939): 205-209.

Schrenkeisen, Ray. 1938. Field book of fresh-water fishes of North America. G. P. Putnam's Sons, New York., 312 pp.