

THREE DARTERS FOUND IN MINNESOTA RIVERS
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Ammocrypta clara--the Western Sand Darter
(clara=clear)

The Western Sand Darter was once thought to be the same fish as Ammocrypta pellucida, the Eastern Sand Darter. Then, in 1959, Linder reviewed the specific status of both fishes and presented information recognizing two separate species, based on scale counts, opercle (the structure covering the gills), and pigmentation. The description and range of the western form were further clarified by Williams in 1975. [Recent practice has been to rename the species Etheostoma clarum.--Ed.]

The Western Sand Darter is a slender fish that reaches about 2½". The snout is pointed, with the lower jaw included within the upper jaw. The first dorsal fin has 10-12 spines, the second dorsal 9-12 (soft) rays. The lateral line is complete, with 69-81 scales.

Live Ammocrypta clara are almost transparent. The body is tinged with yellow along the dorsal and becomes colorless ventrally. The upper half of the head is slightly yellow with the cheek and opercle greenish yellow. Preserved, the head and body become light tan or straw-colored with a series of small square blotches along the sides and many oblong, dark-olive spots on the dorsal midline. Breeding males develop evenly spaced tubercles from late May through July. The tubercles appear first on the lowermost caudal fin rays.

The Western Sand Darter ranges from the southern half of Minnesota to Indiana and south to eastern Texas. It remains common in certain Wisconsin localities yet is reported Endangered in Illinois and Kentucky, Threatened in Iowa, Louisiana, and Tennessee, and of special concern, or whatever states call "watch" status, in several other states. Its habitat is large streams with a shifting sand bottom and a moderate current. It likes medium to large rivers over extensive sand flats at a depths of 2-9 meters (6'-27+'). It prefers clear to slightly turbid water, and, when found, it's usually the only species captured.

The breeding season for this fish is around late June through July with the height in July to early August. Actual spawning behavior is unknown. Females are usually larger and more numerous than males.

It has been observed that the fry will reach 71 percent of its total growth during its first year of life and 91 percent by the end of the second. These fish generally feed on small or immature aquatic insects such as mayflies and midge larvae.

When disturbed, sand darters enter the loose sand and become concealed from sight with nothing but eyes and mouth showing. It is thought that they do this, in part, to help conserve energy. It is, after all, easier to maintain their positions against a moderate current on a sandy bottom when buried in that sand. The under-sand habit also helps the Western Sand Darter remain concealed from predators, of course.

With its restrictive habitat and secretive habits, little is known about the life of this darter.

Percina phoxocephala--the Slenderhead Darter
(phoxocephala=tapered head)

Sexually mature individuals range from 40 to 80 mm (1½-3¼") in standard length (without the tail), with a slender, almost cylindrical body and an elongated snout. There are no scales on the female's breast except for one or two enlarged, strongly ctenoid (comb-like) scales. The posterior half of the male's breast is scaled and the anterior half is naked. The dorsal spines number 11-12 and the soft-dorsal rays 11-14. The anal fin has two spines and eight or nine soft rays. Its body is a yellowish brown with 10-12 narrow dark bands or blotches on the sides along the lateral line. The lower sides and belly are pale to lightly stippled. The green and yellow on the body of the breeding female is faintly imitative of the male. The first dorsal fin of the male has a reddish-orange submarginal band, and a pale blue or dark blue outer margin. Percina phoxocephala is the only colorful species in the subgenus Swainia.

The Slenderhead Darter ranges from northeast South Dakota to western Pennsylvania and south to Oklahoma and Tennessee. It was not until 1943, when Dr. Raymond Johnson and Dr. John Moyle collected specimens from the Root River, that ichthyologists became aware of the Slenderhead's presence in Minnesota. It is listed as "of special concern" in Arkansas, in need of management in Tennessee. Some specialists also consider it endangered in Pennsylvania, rare in Kentucky and South Dakota, and requiring special attention in Kansas; however, it is not officially listed in any of those states. The addition of this species to the federal rare and endangered fishes list has been proposed, but additional information is needed to determine its status. In Illinois it is widely distributed and generally common except in the northeast and south.

The Slenderhead Darter inhabits medium-sized creeks to large rivers with strong flow and a gravel bottom. Although sometimes taken in clear waters, it more frequently appears in slightly turbid to turbid waters. It likes gravel-bottomed raceways of medium-sized rivers with a moderate current.

The spawning season for P. phoxocephala is in late May through early July, but may be delayed for several weeks during periods of high water. Spawning occurs at 21.1°C (70°F). Mass movement of males into the spawning habitat during May, well before females, suggests that the species is territorial during the spawning season. Spawning occurs in swift riffles over gravel and rubble at water depths of about 6".

During a study done in late May to early June 1970, males were common in the shallow water along the gravel bars as early as May 29. The ratio of males to females captured in shallow water on this date was 15:1. On June 5, it was 11:2. The fish spawned during the following week, and by June 13 all adult fish had left the spawning areas.

On May 4, 1992, I went collecting for darters with a small group of other Minnesota Aquarium Society members and collected several Slenderhead Darters. We collected them along their spawning territory and even though we caught more males than females, both sexes were represented. One month later (June 12, 1992), we caught very few adult Slenderheads, but several young ones about half the size of what we had caught a month earlier. I thought then that their spawning season this year was earlier than average and that they were finished spawning by the time we came back around. After spawning, the adults return to deeper water.

Males are sexually mature and ready to spawn during the first spring following their hatching. The older the male, the darker the pigmentation. Besides the duskiess of the males, there is a pronounced color difference between the sexes in the soft dorsal fin. The dorsal rays of the males are boldly outlined with yellow and the soft dorsal fins of the females have no yellow pigment.

Egg development and growth of the young are rapid. It appears that young Slenderheads attain half their first year's growth in about two weeks. Juveniles remain in the spawning habitat 2-4 weeks after hatching before following their parents to deeper waters. Young Slenderhead Darters feed mainly on midge larvae. Page and Smith noted that as Slenderhead Darters increase in size, the composition of the diet, which had been dominated by dipteran larvae, changed to include substantially greater portions of the larger immature mayflies and caddisflies. Feeding occurs throughout the daylight hours and stops shortly after dark.

This species is short-lived, apparently not exceeding three years.

Etheostoma caeruleum, the Rainbow Darter (caeruleum=blue or a shade of blue)

The Rainbow Darter is one of the more common darters in the small rivers and streams of southern Minnesota. It adapts well to life in an aquarium despite the fact that its preferred habitat is the swift water of riffles and rapids.

As its common name implies, the Rainbow Darter is one of the more colorful darters inhabiting Minnesota waters. In fact, breeding males may display all the colors of the spectrum. The fish's body is olive-colored, with blotches of dark olive on the back and upper body. On the breeding male, there are about 12 bars of indigo blue that extend downward and backward. The spaces between the bars are brilliant orange and the chest is red-orange. The first dorsal fin has blue and orange horizontal bars. The females are a subdued brownish-gray color on their body and fins.

The body is moderately robust, and compressed laterally. The average length is 64mm (2.5"). The snout is rather pointed and the mouth almost horizontal with the lower jaw slightly included within the upper jaw. The first or spiny dorsal fin has 8-13 spines and the second dorsal fin has 10-15 rays. The anal fin has two spines and 6-8 rays. The pelvic fin is thoracic and the pectoral fin is generally slightly shorter than the head length. The lateral line is incomplete, with 20-34 pored scales.

The male is larger, and his anal fin, first dorsal fin, pectoral fin, and pelvic fins are longer than are the female's. The male's urogenital papilla is small and conical. The female's is swollen, broad, and flat-topped.

Etheostoma caeruleum typically inhabit creeks and small rivers of moderate gradient and riffles composed of coarse gravel and rubble. They are sometimes the most abundant darter under such conditions, and are captured with a greater variety of other darters than any species, with the possible exception of the Fantail Darter (Etheostoma flabellare). The Rainbow Darter ranges from southern Minnesota to eastern Ontario and south to Alabama and Arkansas. In Wisconsin the Rainbow Darter was found most frequently in clear water at depths of 0.1-0.5 meters (4"-20") over substrates of sand (25 percent), boulders (25 percent), gravel (25 percent), silt (13 percent), rubble (11 percent), clay (2 percent), and mud (2 percent). It has been collected from swift to moderate currents in streams--from riffles (40 percent) and from pools (60 percent). It was present in streams from 3 meters (9')

to more than 100 meters (39') in width, but reached its greatest numbers in streams 12-24 meters (37'-75') wide.

Breeding reaches its peak as water temperatures reach 17-18°C. Males have shifting, ill-defined territories and practice intimidation on intruding males. Females enter the spawning ground from pools downstream and lay eggs in the gravel at the foot of riffles. Several days are required for a female to deposit a maximum 800 eggs. An abrupt drop in water temperature will interrupt spawning, as will increased turbidity, since vision is the most important sense used by Rainbow Darters in spawning activities. The spawning area consists of fine gravel, large gravel, rubble, or a mixture of gravel and rubble in swift riffles about 0.3m (1') deep with a flow of 23 meters (70') per minute.

The large, brightly colored males defend territories which are generally restricted to specific areas, often where there is a large rock or a depression in the gravel, with the largest, most colorful males establishing the territories in the center of the spawning grounds.

When a female darter enters the spawning ground, a male comes up from behind and follows, swimming parallel to the female and prodding her side with his snout. When the female is ready to spawn, she will bury the ventral portion of her body and her pectoral fins, then the male will mount her to fertilize the eggs. Three to seven eggs are released with each spawning act. After the female has completed a few spawnings, she will return to the pool to rest.

Mature Etheostoma caeruleum eggs are 1.0-1.8 mm in diameter and yellow to orange in color, with a single oil droplet. They are left buried in the gravel and receive no further care from either parent. Neither the spawning pair nor other darters in the area have been observed eating their eggs in their natural setting, but they were seen eating the eggs in the laboratory. Hatching occurs in 10-11.5 days at 17-18.5°C (63-65°F).

Robert Thomas published in the October 1985 issue of American Currents an account of spawning these fish in an aquarium. He kept three pairs in a 20-gallon low tank. They spawned in spawning mops made from dark brown dacron rug yarn sunk down to the bottom of the tank, which had no gravel. He removed the eggs from the mops and placed them in a petri dish. After hatching, he moved the fry to a shoebox. The fry became free-swimming in about 4-5 days and were able to eat microworms right away.

When placed in the home aquarium, males are found to lose their bright colors gradually. In experimental tanks with controlled temperature and light cycles, the Rainbow Darter is quite responsive and undergoes considerable seasonal change.

References

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