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Etheostoma blennioides

(greenside darter)

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By *Sharon Graham*

Kingdom: [Animalia](#)
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 Species: ***Etheostoma blennioides***

Geographic Range

Etheostoma blennioides, the greenside darter, is restricted to a few major watersheds of North America. Its range extends from New York and the Potomac River drainage west to Kansas and south to Oklahoma, Arkansas, Mississippi and Alabama, mostly within the Mississippi River and its tributaries. *Etheostoma blennioides* is also found in the Lake St. Clair and Thames River system in Southwestern Ontario, Canada. However, greenside darters are most common in creeks and rivers in East-Central North America. They are considered to be of "special concern" in Kansas and Mississippi and rare in Canada (Dalton, 1991). (Dalton, 1991)

Biogeographic Regions: nearctic (native .

Habitat

Greenside darters are benthic organisms and spend their lives associated with the substrate. They live in deep riffle habitats consisting of cobble and loose boulders covered by filamentous green algae, upon which they lay their eggs

(Bunt et al., 1998). These fish also prefer moderate to fast moving water of low turbidity (Dalton, 1991). (Bunt, Cooke, and McKinley, 1998; Dalton, 1991)

These animals are found in the following types of habitat: temperate ; freshwater .

Aquatic Biomes: benthic ; lakes and ponds; rivers and streams.

Physical Description

Etheostoma blennioides are small members of the perch family, first discovered by naturalist Constantine Rafenesque in 1819 (Dalton, 1991). Like all darters, greensides lack a swim bladder and live on the bottom substrate (Jenkins and Burkhead, 1993). They average 76 mm in total length, with a cylindrical body (Dalton, 1991) covered with ctenoid scales (Scott and Grossman, 1998) and a broad, triangular head (Dalton, 1991). Their eyes are large and located on each side of the apex (Discover Life in America, 2004). The snout is bluntly rounded, with a small terminal mouth (Dalton, 1991). They have two separate but closely-spaced dorsal fins (Dalton, 1991); the first dorsal fin is edged in white and has 12-14 hard spines, while the second has streaks of black and contains 13-16 soft rays and extends above the first fin (Jenkins and Burkhead, 1993; Bailey et al., 2004). There is also a small sharp spine on the posterior of the opercle. The pectoral fins are large and well-developed, the pelvic fins are located anteriorly, and the caudal fin is often slightly indented (Jenkins and Burkhead, 1993). The caudal, anal, and pelvic fins are all light green in color (Dalton, 1991). ("Discover Life in America", 2004; Dalton, 1991; Jenkins and Burkhead, 1993; Scott and Grossman, 1998)

The dorsal surface is olive-green or brown with dark red spots on the upper sides and at the base of the dorsal fins (Dalton, 1991). There are also two dark lines on the face, one extending downward from the eye to the snout and one extending from the eye to the maxillary (Scott and Grossman, 1998). The dark lateral patterning lightens to pale green down the sides, and gradually fades into a white ventral surface. The lower lateral sides have a dark green pattern of five to seven V-shaped bars. These bars are especially dark and visible on juveniles, who also have more pointed pelvic fins than adults (Scott and Grossman, 1998). Males are generally larger overall and also have larger anal, pectoral, pelvic, and first dorsal fins than females (Miller, 1986). Coloration also differs between sexes during the breeding season; males develop intense green to blue-green coloration on the lower sides, anal fins, pelvic fins, and head. The spiny dorsal fin, soft dorsal fin, caudal fins, and lower portions of the pectoral fins in male greenside darters may also become bright green, while the V-shaped lateral pattern turns into green vertical bars (Discover Life In America, 2004). ("Discover Life in America", 2004; Miller, 1968; Scott and Grossman, 1998)

There are 4 different subspecies of *Etheostoma blennioides*: *Etheostoma blennioides blennioides*, *E. b. newmanii*, *E. b. gutselli*, and *E. b. pholidotum*. The best way to tell them apart is through scale counts and number of dorsal rays. *E. b. newmanii* has the highest scale count, the most dorsal rays, a fully scaled belly, and a well-developed upper lip. *E. b. blennioides* has fewer scales and dorsal rays than *pholidotum*. They also have more lateral blotches and a naked (scaleless) belly. *E. b. gutselli* has low scale counts, an anteriorly naked belly, no upper lip tip, and lack opercle scales. *E. b. pholidotum* has lower scale counts than *E. b. newmanii* and *E. b. blennioides*, as well as a small lip tip, and a completely scaled belly. *E. b. newmanii* and *E. b. gutselli* are considered to be more primitive forms of darter (Miller, 1968). (Miller, 1968)

Greenside darters can be distinguished from other darters by their larger size, rounded snout, and coloration pattern: the rainbow darter (*Etheostoma caeruleum*) is bright blue and orange and has a pointy snout, while the johnny darter (*Etheostoma nigricans*) is brown and tan (Bailey et al., 2004). (Bailey, Latta, and Smith, 2004)

Some key physical features: ectothermic ; heterothermic ; bilateral symmetry .

Sexual dimorphism: male larger, male more colorful.

Development

At fertilization, eggs are laid on algae, close to the point of attachment with a rock. Afterwards, no more parental protection is given. The eggs will hatch 18-20 days after fertilization in water between 13 and 15 degrees celsius. The fry are pelagic, totally transparent (Muller, 2000), and live off their yolk sacs for the first six days after hatching (Dalton, 1991). Greenside darters are very delicate when they first hatch, and even very small changes in feeding or water quality can cause mortality (Muller, 2000). They begin feeding on plankton eight days after hatching (Dalton, 1991). After approximately two weeks, the fry start going to the bottom and acting like adults. Initial growth is rapid; fry attain lengths of about 50-55 mm by age 1 (Discover Life In America, 2004), at which time they also reach sexual maturity. *Etheostoma blennioides* is short lived, typically surviving for three years, though some live up to 4 or 5 years (Dalton,






1991). (["Discover Life in America", 2004](#); [Dalton, 1991](#); [Muller, 2000](#))

Reproduction

Both sexes of greenside darters reach sexual maturity and spawn in the spring one year after hatching. Breeding only occurs when the water temperature has reached and remained at least at 10.6 degrees Celsius for several days. Spawning is also restricted to riffle habitats containing boulders and rubble covered in filamentous algae. Greenside darters spawn in pairs, although both sexes are promiscuous and will spawn with many different partners over the course of one breeding season. It takes 10-12 bouts of spawning over a 4-5 week period for each female to deposit all her eggs. Males perform an elaborate ritual to establish dominance and claim territory, although the female will choose the actual spawning site (Dalton, 1991). ([Dalton, 1991](#))

Mating systems: polygynandrous (promiscuous) 

The breeding season of *Etheostoma blennioides* is from April to June; spawning activity peaks in May. Spawning will not occur until the water temperature warms to at least 10.6 degrees Celsius. Greenside darters prefer to spawn in riffle areas with large amounts of filamentous algae. However, they have been observed to spawn over substrate alone. Males select a small area (100 cm in diameter or less) to defend as their mating territory, and then proceed to initiate spawning through elaborate courtship dances (Radabaugh, 1989). The pair may also chase each other around prior to spawning (Muller, 2000). Once a pair is formed, the female selects a site in algae and takes up an angled position. The male will then mount and the two fish vibrate in unison for several seconds while the eggs are released and fertilized (Miller, 1968). Eggs are typically laid in batches of anywhere from 2 to 192 (Smith, 1985). These fertilized eggs are demersal and adhesive; the female lays them on the algae right above where it attaches to the rock, where they remain until hatching (Dalton, 1991). Males will sometimes remain in the area to guard the eggs until hatching (Smith, 1985). A pair may spawn more than once at short time intervals (Miller, 1968). Both sexes will also spawn with many different partners over the breeding season (Dalton, 1991). ([Dalton, 1991](#); [Muller, 2000](#); [Smith, 1985](#))

Key reproductive features: seasonal breeding ; gonochoric/gonochoristic/dioecious (sexes separate); sexual ; fertilization 
(external ); oviparous 

Most darters provide little or no parental care other than attaching their fertilized eggs to the bases of filamentous algae where they are less visible to predators (Dalton, 1991). The only additional parental investment observed in *E. blennioides* is the guarding of fertilized eggs by the male parent (Radabaugh, 1989). This may become more difficult over the course of the spawning season as these males continue to mate with multiple females. ([Dalton, 1991](#); [Radabaugh, 1989](#))

Parental investment: pre-hatching/birth (protecting: male).

Lifespan/Longevity

Longest known lifespan in wild

5 years (high); avg. 3 years

Expected lifespan in wild

3 years (average)

Etheostoma blennioides typically lives up to 3 or 4 years in the wild. Lack of both food and habitat can potentially limit growth and survival (Bunt et al., 1998). For example, spawning will often only occur in riffle areas with filamentous algae beds. Darters such as *E. blennioides* are also extremely sensitive to siltation and turbidity. Excessive sediment smothers eggs, and decreases the abundance of certain common prey items, such as *Ephemeroptera* (Shiels, 2003), and may also affect darter reproduction by blocking light needed for filamentous algae to grow in darter spawning habitats (Dalton, 1991). ([Bunt, Cooke, and McKinley, 1998](#); [Dalton, 1991](#); [Shiels, 2003](#))

Behavior

Greenside darters lack a swimbladder, and are therefore a benthic-dwelling organism. Fairly reclusive, they spend much of their time hovering directly above the substrate or hiding in overhanging rock caves (Katula, 2000). As the name suggests, darters have a unique ability to maneuver quickly within and around large substrate as they forage along the bottom (Shiels, 2003). This movement is accomplished by assuming a "snake-like position" in which the pelvic and

caudal fins, as well as the caudal peduncle, are rested on a rock while the head is raised and the tail held at angle to the body. Sweeping actions of the pectoral fins allow the fish to move along the substrate while the caudal serves as a holdfast. The fish rotate sideways to recede under rocks, again using the caudal fin as an anchor. To travel longer distances of several meters, they will put on a burst of speed (i.e. dart) using the caudal fin (Dalton, 1991). (Dalton, 1991; Katula, 2000; Shiels, 2003)

Greenside darters are daytime predators who rely on visual stimuli (Wynes and Wissing, 1982) to locate their benthic invertebrate prey among the rocks, gravel or sand along the stream bottom (Shiels, 2003). They in turn depend heavily on their cryptic coloration to avoid other fish predators (Radabaugh, 1989). Although they do not have a hierarchical social structure, male *E. blennioides* will claim and defend small territories during the spawning season (Radabaugh, 1989). (Radabaugh, 1989; Shiels, 2003; Wynes and Wissing, 1982)

Home Range

Greenside darters inhabit riffle runs with cobble or boulder substrate in streams and rivers on the eastern side of North America (Dalton, 1991). During the spawning season, each male will select and defend a small area 100 centimeters in diameter or less (Radabaugh, 1989). (Radabaugh, 1989)

Key behaviors: natatorial ; diurnal ; motile ; territorial .

Communication and Perception

Like many other percids, darters communicate mainly through coloration. Males use their bright body coloration to display aggression to other males and to court females. Similarly, females may signal to males through changes in body color contrast (McFarland and Strange, 2003). (McFarland and Strange, 2003)

Communicates with: visual .

Perception channels: visual ; tactile ; chemical .

Food Habits

In general, greenside darters feed on immature benthic insects in the 1-6 mm range (Wynes and Wissing, 1982), although this diet varies with season and prey availability (Gray et al., 1997). Chironomid larvae (midges/flyies) are the major prey taxon consumed, Ephemeroptera (mayflies) and Plecoptera (stoneflies) larvae are also common prey items (Hlohowskyj and White, 1983). Ephemeroptera and Simuloidii (blackflies) are a larger portion of the diet during the winter (Hlohowskyj and White, 1983). Prey size and taxa consumed also shifts from juvenile to adult; juveniles consume smaller prey and more chironomids than adults. Females also tend to consume more than males, especially during the spawning season (Gray et al., 1997). (Gray et al., 1997; Hlohowskyj and White, 1983; Wynes and Wissing, 1982)

Primary Diet: carnivore  (insectivore .

Animal Foods: insects.

Predation

Known predators

- Smallmouth bass, *Micropterus dolomieu*
- Brook trout, *Salvelinus fontinalis*
- Brown trout, *Salmo trutta*
- Rainbow trout, *Salmo gairdneri*
- Common merganser, *Mergus merganser*

There has been a lack of research on fish predators of *E. blennioides*, although both smallmouth bass and several kinds of trout (brook, brown, and rainbow) have been observed to prey on darters. A more common predator is the avian

common [merganser](#), which often stops and feeds in darter habitats during its northward spring migration (Englert and Seghers, 1983). ([Englert and Seghers, 1983](#))

Many darters avoid predation by other fish through a behavior known as "freezing" -- when a predator is present, the fish will simply stop moving for a specified amount of time, and then resumes normal activity levels again. This avoidance tactic is linked to coloration. Freezing is the best strategy for non-breeding males, whose cryptic coloration helps camouflage them against the stream bottom. However, in the breeding season, brightly colored male darters may try to flee instead of freeze. However, for *E. blennioides*, the bright green breeding color is actually further protection, as it blends in well with filamentous algae habitats preferred for spawning (Miller, 1968). ([Miller, 1968](#))

cryptic 

Ecosystem Roles

Besides serving as both predators and prey in their ecosystems, *E. blennioides* also plays an integral role in the reproductive cycle of several freshwater mussels, including endangered species (Upper Thames River Conservation Authority, 2003). Microscopic mussel larvae, also known as glochidia, attach to the gills of certain fish, including *E. blennioides*, immediately after they are released into the water. Because mussels cannot swim, the fish provides their means of transport and distribution into other areas of the stream. As a result, the continued existence of these mussels is directly linked to that of its greenside darter hosts (Shiels, 2003). ("[Upper Thames River Conservation Authority](#)", 2003; [Shiels, 2003](#))

Economic Importance for Humans: Negative

There are no known adverse effects of *E. blennioides* on humans.

Economic Importance for Humans: Positive

While *E. blennioides* has no commercial value and are not regarded as a sport fish, they are often used as aquarium species (Dalton, 1991). They are also useful for scientific investigations of food resource partitioning and habitat selectivity because they share many characteristics with other members of their genus (i.e. *Etheostoma caerulum*, *E. nigrum*, *E. flabellare*) and can be easily compared (Hlohowskyj and White, 1983). ([Dalton, 1991](#); [Hlohowskyj and White, 1983](#))

Ways that people benefit from these animals: pet trade ; research and education.

Conservation Status

IUCN Red List: <http://www.redlist.org>: Not evaluated.

US Federal List: <http://endangered.fws.gov/wildlife.html>: No special status.

CITES: <http://www.cites.org/eng/append/appendices.shtml>: No special status.

Although greenside darters are not officially listed as endangered or threatened, they are considered vulnerable in Canada and rare in Kansas and Mississippi (Dalton, 1991). ([Dalton, 1991](#))

Contributors

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