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## *Lepomis megalotis*

(longear sunfish)

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By *Mary Mullaney*

Kingdom: [Animalia](#)  
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 Class: [Actinopterygii](#)  
 Order: [Perciformes](#)  
 Suborder: [Percoidei](#)  
 Family: [Centrarchidae](#)  
 Genus: [Lepomis](#)  
 Species: ***Lepomis megalotis***

### Geographic Range

The native territory of the longear sunfish, *Lepomis megalotis*, is exclusive to North America; it is found primarily in the Mississippi and Great Lakes watersheds. The species ranges from Minnesota east to Ontario, Ohio, and western Pennsylvania southward through the Mississippi Basin to the Gulf states of Mexico and east to the Apalachicola River. (Huck and Gunning, 1967; Trautman, 1957)

**Biogeographic Regions:** nearctic (native .

### Habitat

Longear sunfish, like other members of the sunfish family [Centrarchidae](#), are freshwater fishes. In the warmer months of spawning season longear sunfish are generally found in shallower, warmer headwaters of streams which have numerous pools with permanent or semi-permanent flow. They prefer waters with a hard bottom of clay or gravel with clear waters and usually in or near aquatic vegetation. Although more abundant in headwaters, they can be found in streams and

rivers of all sizes and are also found in lakes. Compared to other members of the sunfish family *Centrarchidae*, longear sunfish are better at obtaining food in moving waters than still waters. This may explain why longear sunfish are more abundant in streams than lakes compared to other members of the family, most of which are common within its geographic range. They are intolerant to turbid waters. Throughout the 20th century their populations have been reduced in areas where their native streams have suffered increased turbidity. (Becker, 1983; Berra and Gunning, 1972; Gerking, 1953; Page and Burr, 1991)

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


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

## Physical Description

Members of the family *Centrarchidae* are strongly compressed, brightly colored, 'pan-fish'. The most distinguishing characteristic of longear sunfish is their elongated opercular flap, giving an appearance of a 'long ear'. They are relatively small sunfish with individuals rarely reaching a total length of more than 12 cm, although one 24 cm fish was found in Michigan. Females are generally slightly smaller than males. Mature males are generally brighter and have a more pronounced opercular flap than females, up to 230 mm long.

Becker (1983) describes longears as having: "2 dorsal fins, but broadly joined and appear as 1; base of dorsal fins about twice the length of anal fin base; first dorsal fin with 10 spines, second with 10-11 soft rays. Anal fin with 3 spines, and 9-11 soft rays; pelvic fin thoracic with 1 spine and 5 rays; pectoral fin short, bluntly pointed to rounded, and when laid forward across cheek barely reaching posterior edge of eye; caudal fin slightly forked. Scales ctenoid, in lateral line 34-38; lateral line complete. Back olive to rusty brown; sides lighter; breast and belly yellow to orange-red. Back and sides with specks of yellow, orange, emerald, and blue; 8-10 vertical bars conspicuous to absent. Cheeks orange with wavy blue streaks radiating back from the mouth and eye. Ear flap black, narrowly edged with pale red to yellow (white in immature and all preserved specimens). Dorsal and anal fins olive, often with rusty orange wash; in preserved specimens, soft dorsal fin with parallel rows of light dots. Pectoral fins clear to lightly pigmented. Breeding male iridescent green above and bright orange below; the vertical fins a deep rusty orange; and pelvic fins blue-black. Scale pockets with dark pigmented crescents pointing anteriorly. Breeding females less brilliantly colored."

Longear sunfish are most easily confused with several of the other sunfish of the genus *Lepomis* including: the pumpkinseed, *L. gibbosus*; the bluegill, *L. macrochirus*, the redear sunfish, *L. microlophus*; and the orangespotted sunfish, *L. humilis*.

More *Lepomis megalotis* images can be found at:  [http://www.nativefish.org/cgi-bin/cgiwrap/nativefish/gallery.pl?MODE=FISH\\_VIEW&ID=735](http://www.nativefish.org/cgi-bin/cgiwrap/nativefish/gallery.pl?MODE=FISH_VIEW&ID=735) (Becker, 1983; Page and Burr, 1991; Trautman, 1957)

**Some key physical features:** bilateral symmetry .

**Sexual dimorphism:**  male larger, male more colorful.

## Development

The number of larvae that successfully hatch may range from 52 to 1,132. In nature, the eggs hatch in 3 to 5 days, in aquaria they can hatch in 2 days. Swimming up to the water surface and feeding can begin 7 days after hatching in aquaria.

## Reproduction

Goddard and Mathis (1997b) found that female longear sunfish prefer male longears with longer opercular flaps, and they found that opercular flaps grew significantly faster than pelvic fins in males, both of which they argue indicate flap length serves as sexual ornamentation.

Goddard and Mathis (2000) also performed experiments where they artificially manipulated the lengths of male flaps. If a male with long flaps had his artificially shortened, he still archived dominance over males with naturally short flaps. If opercular flaps were artificially lengthened, the abnormally long-flapped males were dominant significantly more often than the 'normal' males. They argue that these results indicate that opercular flap length of male longear sunfish may

serve as an honest indicator of male quality and may be used to assess the resource holding power of rival males without risking injury from combat.

When a breeding female enters a nesting colony, a male longear sunfish will attempt to lead her to its nest. Leading involves behavior where the male spreads its fins, swims directly toward the female and then returns directly to his nest. If a female follows the male to his nest, they begin a circular spiral of the nest with the female always toward the center. Direction of movement is dependant on which direction the male is going when he reenters the nest after chasing out an intruder. Both will circle the nest in an upright position, every 50 to 60 seconds the female will turn over on her side at a 20° to 30° angle and bring her vent close to his and both fish will shudder, releasing his sperm and her eggs. Several spawning events will occur and then the female is chased from the nest. In one study, the total number of eggs deposited in a nest varied from about 137 to 2,836 eggs.







Immediately after the female leaves, the male begins to fan the nest with his paired and caudal fins. He then assumes a near vertical position over the nest and fans with his tail. The fanning is vigorous enough to dislodge small pebbles. He will fan the nest up to an hour after the spawning event. This behavior may aid in the mixing of eggs and sperm and help drive the eggs deep into the gravel. The female, after being chased from the nest, will enter the nests of other males for additional spawning events. (Goddard and Mathis, 1997b; Goddard and Mathis, 2000)

#### Mating systems: polyandrous

Like most other members of *Lepomis*, longear sunfish are colonial nesters, although in low-density populations individuals will build solitary nests. Colony size and proximity of the nests vary. In crowded conditions the colonies can be quite large with the nests so close together their rims almost touch. In dense conditions the male fish only defends the nest itself. In less dense conditions, the nests are further apart and the male will guard a territory slightly larger than the nest.

Male longear sunfish, like other members of *Lepomis* build the nest without aid from the female. In late spring or early summer, males move into relatively shallow water (20 to 60 cm deep) and establish territories in which they build nests. Preferred substrate is gravel if available; otherwise, they will build in sand or hard mud. The nest is a mostly circular excavation created by the vigorous sweeping of the male's tail (called tail-wags) across the substrate while the fish is oriented at a 45° angle to the bottom. This action excavates a circular depression that is about 35 to 45 cm in diameter, 3 to 7 cm deep, with rims 7 to 9 cm wide. During the construction of one nest, a male was observed making 145 tail-wags in the center of the nest, 128 tail-wags along the edge, and 22 tail-wags across the nest. In addition, the male circled the nest 14 times, circled back to deep waters 39 times, chased off other longear sunfish 36 times, and chased off other species 3 times. Water temperatures in the nest area are relatively warm and vary from approximately from 23° to 31° C. They will reoccupy nests abandoned by other sunfish.

Male longear sunfish also exhibit an interesting alternative reproductive strategy to nest building. Some males are *sneakers*. The sneaker male is generally younger and less colorful than a nest building (dominant) male. The sneaker male mimics the appearance of a female longear sunfish. The sneaker will hide near an active nest and dash into the nest and release sperm while the dominant male is spawning with a female. The *satellite* male is similar in age and appearance to the *sneaker* male, but instead of dashing into the nest, he will hover over a nest, acting the part of a non-threatening female, and slowly descend into the nest containing a courting pair of sunfish and, like the sneaker, release sperm during the spawning event. Male longear sunfish that build solitary nests have better success defending their nests from sneaker and satellite males than males with nests in colonies. Colonial nesting is believed to favor the existence of sneaker and satellite males because it allows these males access to breeding females.

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

A male longear sunfish guards the nest territory during all phases of reproduction. He will continuously chase both his own and other species out of his nesting territory. He seems most territorially responsive to potential predators of himself or his young and to potential intruding spawners like the sneaker and satellite males discussed above. The males are less responsive to non-threatening fish like topminnows (family *Fundulidae*). During one 20 minute spawning event, a male was observed to leave the nest 15 times to chase after other longear sunfish. When the defending male leaves the nest while eggs are present, young longear sunfish, 5 to 10 cm in length, will invade the unguarded nest and eat the eggs. Aggressiveness of the nesting male has been shown to be highest when eggs and young are present and lowest before and after. The male will continue to guard the nest even after all the young have left. (Becker, 1983; Huck and Gunning, 1967; Jennings and Philipp, 1992a; Keenleyside, 1967; Miller, 1963; Moyle and Cech Jr., 1988)

**Parental investment:** pre-fertilization (protecting: male, female); pre-hatching/birth (protecting: male).

## Lifespan/Longevity

Most longear sunfish do not live beyond four years, although one individual found in the wild in Michigan was nine years old. (Becker, 1983; Berra and Gunning, 1972; Cooper, 1983)

## Behavior

In general, longear sunfish are active during the day and inactive at night, although they have been observed to surface feed under bright moonlight during the summer. These fish are less active during the mornings and evenings and spend this time in darker waters and/or closer to cover. This may be predator avoidance, or preference to move about and feed during the warmer part of the day.

Non-nesting longear sunfish are social and associate with other longears and a variety of other fishes. Associates of the longear sunfish vary by locality and usually can be found listed in a state's preeminent fish book.

Larger longear sunfish are dominant over smaller longear regardless of gender. In the wild, dominance behavior generally consists of displays and chasings but little physical contact. In aquaria, longear sunfish interact very aggressively with other longear sunfish. If two longear sunfish are placed together in a 5 gallon tank the larger fish will become dominant and will chase and nip the subordinate fish until the subordinate fish dies. If placed in a large enough tank, longear sunfish can co-exist in aquaria. (Becker, 1983; Berra and Gunning, 1972; Gerking, 1953; Goddard and Mathis, 1997a; Huck and Gunning, 1967; Keenleyside, 1967)

## Home Range

During the spawning season a longear sunfish's home range is relatively small and discrete. Individuals occupy an area of 30 m to 60 m of a particular stream. If moved from their home range, they will quickly return, apparently through the use of smell. During the winter larger individuals move away to deeper waters downstream. Although many do, individual fish do not necessarily return to the same spawning waters each year.

Longear sunfish appear to desert their spawning home range in winter. Mark and recapture studies have shown fewer individuals present in the spawning home ranges in the winter than summer.

**Key behaviors:** natatorial ; diurnal ; motile ; territorial ; social ; colonial ; dominance hierarchies .

## Communication and Perception

Longear sunfish exhibit a number of behavioral display postures that are probably used in communication such as when the male the turns on his side and displays his bright orange ventral surface, frontal display (orienting toward another fish and erection of the opercula and accompanied by sigmoid bending of the body), biting, courtship circling, and so on. Male longear sunfish are also known to make a distinctive grunting sound during courtship and spawning. (Jenkins and Burkhead, 1993; Keenleyside, 1967; Miller, 1963)

**Communicates with:** visual ; tactile ; acoustic .

**Perception channels:** visual ; tactile ; acoustic ; chemical .

## Food Habits

Longear sunfish feed nearer to the surface than other sunfish. They mostly eat aquatic insects, microcrustaceans, fish eggs (including those of its own species), young bass, and young sunfish. They have been observed eating dragonflies and other insects, which touch the surface of the water.

Longear sunfish have also been observed follow northern hognose suckers, *Hypentelium nigricans*. As a northern hognose sucker moves along the bottom shoving pebbles around and picking them up with its mouth, longear sunfish will move along beside the sucker, picking around and feeding in the gravel after the sucker stirs it up.

Foods eaten include: aquatic insects – mostly midgeflies, microcrustaceans, fish eggs, terrestrial insects, young bass,

newly hatched sunfish, including its own species, detritus, gnat larvae, day flies, snails and leeches. (Becker, 1983; Berra, 2001; Cooper, 1983; Forbes and Richardson, 1920; Huck and Gunning, 1967; Jenkins and Burkhead, 1993)

**Primary Diet:** carnivore  (insectivore .

**Animal Foods:** fish; eggs; insects; terrestrial non-insect arthropods; mollusks; aquatic or marine worms.

**Other Foods:** detritus .

## Predation

### Known predators

- largemouth bass (*Micropterus dolomieu*)
- wading birds (*Ardeidae*)

In nature, longear sunfish have been observed to hide in aquatic vegetation near hard structures (like stumps or woody debris) or in otherwise shaded areas to avoid predation. They also will dart into deeper waters when threatened. Predators of the longear sunfish, like the largemouth bass, *Micropterus salmoides*, and wading birds, are visual predators and the brightly colored longear sunfish probably benefits by hiding where it is less likely to be spotted. Adult longear sunfish have been shown to occupy deeper, and thus darker, waters in the mornings and evenings when large predators are most active. Spawning occurs in shallow waters. The shallowness of the waters may afford longear sunfish nests and eggs some protection from larger aquatic predators.

Goddard and Mathis's (1997) laboratory studies showed that given a choice longear sunfish prefer to occupy low light intensity conditions without cover rather than submerged cover under higher light intensity conditions. The authors stated that areas with more vegetation may be harder to maneuver in and make escape from predators more difficult. In equally well lit conditions, the longear sunfish will choose the area with submerged cover, so it chooses some protection over none. (Goddard and Mathis, 1997a; Huck and Gunning, 1967; Moyle and Cech Jr., 1988; Witt Jr. and Marzolf, 1954)

## Ecosystem Roles

In general, sunfish are an essential intermediate link in the food chain, providing a continuum between higher and lower trophic levels. They are both predators and prey. (Berra, 2001; Goddard and Mathis, 1997a; Huck and Gunning, 1967; Schaefer, Lutterschmidt, and Hill, 1999)

## Economic Importance for Humans: Negative

Longear sunfish cause no known negative economic impact.

## Economic Importance for Humans: Positive

Longear sunfish have little economic importance. They are too small to be considered a food fish for humans. They are aggressive feeders and readily take bait. Anglers generally throw them back due to their small size. The species has been successfully reared in aquaria, may be kept as pets, and used for laboratory experiments. (Becker, 1983; Cooper, 1983; Cross, 1967; Forbes and Richardson, 1920; Huck and Gunning, 1967; Keenleyside, 1967; Trautman, 1957)

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

## Conservation Status

**IUCN Red List:** <http://www.redlist.org>: No special status.

**US Migratory Bird Act:** <http://migratorybirds.fws.gov/intrnltr/mbta/mbtintro.html>: No special status.

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

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

Longear sunfish are not listed federally or internationally as threatened or endangered. The species is listed as threatened (since 1979) by the state of Wisconsin. The species was not listed in any other state or province within its native range where a threatened and endangered species list (or similar) could be found on the web.

Lists checked: Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Texas, Virginia, West Virginia, and Wisconsin. Lists not found: Kansas, Louisiana, Mississippi, Oklahoma, and Ontario, Canada.

## Other Comments

### HYBRIDIZATION

Longear sunfish along with other members of *Lepomis* readily hybridize with one another in natural and artificial settings. Hybridization in sunfish occurs more readily when: (a) one species greatly out-numbers the other, (b) breeding areas are crowded, or of poor quality, and (c) two populations come in contact when they have not been previously. *Lepomis* spp. all have similar reproductive behaviors and apparently depend on subtle differences in behavior and coloration to tell its own species from others. Hybrids can make up over 75% of sunfish populations in some localities. Hybrids grow faster than either parental species and will dominate the smaller non-hybrid fish. However, when it comes time to reproduce, hybrids have very low breeding success.

### SUBSPECIES

Some authorities split the species into two subspecies. The central longear sunfish, *L. megalotis megalotis*, is generally found in the southeastern portion of the range, on the east side of the Mississippi River, and the southern half of Ohio and Pennsylvania. The northern longear sunfish, *L. megalotis peltastes*, on the other hand, is found primarily in the northwest portion of the longear's range, from Wisconsin, Minnesota, northern Ohio through Michigan and into Ontario.

Trautman (1957) distinguishes between the two subspecies by saying the northern longear sunfish, *L. megalotis megalotis*, is generally smaller, with a less pronounced opercular flap that is horizontal in orientation. The central longear, *L. m. peltastes*, is generally larger and has a longer opercular flap at a 45° angle, posterior end higher.

### GENETIC VARIATION AMONG SUBSPECIES OF LONGEAR SUNFISH

Jennings and Philipp (1992b) performed genetic analysis of the two most distinct subspecies of the longear sunfish, the northern longear sunfish, *L. megalotis peltastes*, and the central longear sunfish, *L. megalotis megalotis*. They found little genetic variation between the two. (Hubbs, 1955; Jennings and Philipp, 1992b; Keenleyside, 1967; Trautman, 1957; Williamson et al., 1993)

## Contributors

Mary Mullaney (author), University of Michigan: June, 2003.

Allison Poor (editor), University of Michigan: March, 2005.

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