Mugil curema (White Mullet)

Family: Mugilidae (Mullets)
Order: Mugiliformes (Mullets)
Class: Actinopterygii (Ray-finned Fish)

Fig. 1. White mullet, *Mugil curema.*

[http://www.biolib.cz/IMG/GAL/225661.jpg, downloaded 1 November 2016]

TRAITS. The white mullet, *Mugil curema*, is a short fusiform (spindle-shaped), silvery schooling fish with the dorsal surface having either blue, green or olive colour (Puglisi and Lott, 2008). The body is wide and so is the head which is dorsally flattened between the eyes. White mullets have 4-5 dorsal spines with 8-9 dorsal soft rays, and 3 anal spines with 9-10 anal soft rays (Luna, 2016). They have a thick upper lip with 2-3 rows of flattened teeth and an outer row of inwardly curved teeth (Luna, 2016). The size of a fully grown adult is about 35-36cm. A region of yellow or gold colour anterior to the operculum in juveniles (Puglisi and Lott, 2008). Characteristic of the family Mugilidae, *Mugil curema* usually lacks a lateral line and possesses gill rakers and an unusually long alimentary canal (Harrison and Senou, 2016).

DISTRIBUTION. White mullets like open waters and can be mainly found in coastal areas from California to Chile in the Pacific Ocean; the United States from Massachusetts south through the Central American coast all the way to southern Brazil (Fig. 2). *Mugil curema* is native to many Caribbean islands and is also found along the western coastline of Africa (Puglisi and Lott, 2008; Castro et al., 2015).

HABITAT AND ECOLOGY. White mullets are littoral feeders, preferring to feed and dwell within 20 m of the water surface and often inhabit bays, lagoons, muddy areas and especially

places with underwater flora such as coral reefs. They are sometimes found up rivers as they move with the tide (Castro et al., 2015; Luna, 2016). This species thrives best in freshwater conditions as increasing salty conditions require more energy expenditure for osmoregulation which subtracts from its growth rate. Their preferred mode of feeding involves eating mud off the bottom, which means they are detritus feeders in addition to feeding on various forms of algae, while juveniles are omnivorous and mainly feed on plankton (Luna, 2016; Castro et al., 2015).

REPRODUCTION. Reproductive maturity for this dioecious species is achieved when either gender of the fish has grown to 18-21cm in total length. Males reach productive age in about two years while females take about three years, with both living up to 19 years (Castro et al., 2015). However, Aguirre and Gallardo-Cabello (2004) have reported members of *Mugil curema* participating in spawning as early as their first year. No internal fertilization in this species, both genders release their gametes to be fertilised further away from the coast and near the open ocean. The times white mullets choose to engage in reproductive activities vary by habitat. For instance, in Brazil spawning occurs around November to January and in the Mexican Gulf from February through May (Castro et al., 2015). Eggs hatch into 1.6-1.8mm larvae around 40 hours after spawning, which lack mouths and fins but quickly develop into juveniles, growing on average about 17mm per month (Anderson, 1957).

BEHAVIOUR. *Mugil curema* is a schooling fish (Fig. 3), which may be an anti-predatory behaviour as a fish is least likely to be caught by a predator when it is part of a school (de Carvalho et al., 2007). Fish 15-35mm long tend to form larger schools of about 100 and dwell mainly in shallow waters, while larger fish tend to school in groups of 80 and less and can be found in deeper regions. Young white mullets congregate in estuarine areas due to the abundance of food they find there and where they are also safer from predation. Schooling serves to increase sensitivity of each fish to the presence of predators by each fish's observation of the environment. The same pricniple applies to the location of food. At night most white mullets abandon the school and forage freely, apparently because the defence offered by the school is no longer useful (de Carvalho et al., 2007).

APPLIED BIOLOGY. *Mugil curema* is an important food commodity in some coastal states (Fig. 4), worth as much as US$38.2 million in the period 1994-1998, and can also be used as bait (Puglisi and Lott, 2008). White mullets are known to have polycyclic aromatic hydrocarbons (PAH) concentrated in their livers and gall bladders after exposure in the environment. The concentration of these pollutants in the livers strongly correlate with environmental levels and thus *Mugil curema* can serve as a viable biomonitor species (Albergaria-Barbosa et al., 2016).

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Author: Stefan Farier
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Fig. 2. Distribution of *Mugil curema*.

[http://www.iucnredlist.org/pdflink.1943129, downloaded 1 November 2016]

Fig. 3. School of white mullet.

[http://farm5.static.flickr.com/4130/4984371035_c7b16f270b_m.jpg, downloaded 1 November 2016]

Fig. 4. Catch of mullet in a commercial fisherman's net.

[https://media.apnarm.net.au/img/media/images/2015/05/05/FFC_06-05-2015_EGN_03_LIS21052014FISHING10_t620.jpg, downloaded 1 November 2016]