

Recent records of the pink mud-eel in Singapore

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Subjects: Pink mud-eel, *Macrotrema caligans* (Teleostei: Synbranchidae).

Subjects identified by: Kelvin K. P. Lim.

Locations, date and time: Singapore - Johor Strait at western entrance, Lim Chu Kang, Pasir Ris and Singapore River estuary; between 1996 and 2018.

Habitat: Estuarine. In subtidal and intertidal mud substrates.

Observers/collectors: Comprehensive Marine Biodiversity Survey team, National University of Singapore Reef Ecology Study Team, local collector of live bait.

Observations: Six records from material deposited in the Zoological Reference Collection (ZRC) of the Lee Kong Chian Natural History Museum at the National University of Singapore.

1. One juvenile (4.5 cm total length - from snout tip to tip of caudal fin), ZRC 41645; Singapore River; collected by National University of Singapore Reef Ecology Study Team, 25 March 1996.
2. One juvenile (5.4 cm total length), ZRC 54090 / CMBS 58237; Pasir Ris eastern shore between mouth of Sungei Api Api and Sungei Tampines (MF 58); collected by the Comprehensive Marine Biodiversity Survey (CMBS), 11 May 2012.
3. One example (13.6 cm standard length - from snout tip to base of caudal fin), ZRC 54755 / SEA 4073; Johor Strait, western entrance between 1°19.911'N 103°37.657'E and 1°19.705'N 103°37.544'E (DR 286); obtained by rectangular dredge over substrate of sand, mud and fine shells, between 7.7 and 7.5 m depth; collected by CMBS, 11 February 2014.
4. One example (10.2 cm total length), ZRC 54756 / SEA 4056; Johor Strait, western entrance between 1°19.616'N 103°37.588'E and 1°19.397'N 103°37.505'E (DR 287); obtained by rectangular dredge over substrate of sand, mud and fine shells, between 7.6 and 8.7 m depth; collected by CMBS, 11 February 2014.
5. Twenty-one examples (16.2 - 25.2 cm TL), ZRC 56698; Lim Chu Kang mudflats, purchased from a bait shop in Singapore on 12 December 2017. One 24.5 cm (standard length) example is illustrated in Fig. 1, 2 and 3.
6. Fifteen examples (13.6 - 23.0 cm TL), ZRC 56811; Lim Chu Kang mudflats, purchased from a bait shop in Singapore on 9 January 2018.

Remarks: *Symbranchus caligans* was described by T. E. Cantor from the 'Sea of Pinang' in 1849 (Cantor, 1849: 1316). A specimen was later obtained at Singapore (von Martens, 1876: 405 as *Symbranchus caligans*). Regan (1912: 390) erected the genus *Macrotrema* for the species and mentions a specimen of 16 cm from Singapore in the collections of the British Museum (present Natural History Museum, London) which is also examined by Rosen & Greenwood (1976: 50). In 1937, one example of 14.8 cm was obtained from fishermen seining at a 'beach near Singapore' (Herre, 1940: 28 as *Macrotrema* [sic] *caligans*).

Macrotrema caligans is distinguished from all other synbranchid eels in having its gill membrane extending up to the side of the head to above the horizontal septum; a small caudal fin with 9-14 rays; and posterior nares anterior to the eye (Rosen & Greenwood, 1976: 50). The eyes are weakly developed and subcutaneous, and the lateral line is distinct.

According to Musikasinthorn (2013: 73), *Macrotrema caligans* attains about 24 cm, and is known from freshwater, estuarine and marine habitats of Thailand (Bang Pakong River, Songkhla Lake). He illustrates a 23.9 cm (standard length) specimen obtained in September 2009 from the Gulf of Thailand, adding that the biology of this epigean (mud-dwelling) fish, with few specimens on record, is poorly known.

Recent specimens from Singapore include two juveniles - a 4.5 cm example (ZRC 41645) from the Singapore River and a 5.4 cm specimen (ZRC 54090) that were erroneously cited as *Ophisternon bengalense* by Lim (2017: 163, note that ZRC 54090 is erroneously cited as ZRC 58237). Their identities are herein corrected as *Macrotrema caligans*. Two larger examples (ZRC 54755 and 54756) were taken at the western entrance of the Johor Strait by dredge in 2014 during the Comprehensive Marine Biodiversity Survey. In addition, a dead specimen of unspecified size was found stranded on the beach at Pasir Ris during a 'mass mortality event' in December 2009 by James Koh (Anonymous, 2012).

Most recently, the series ZRC 56698 and 56811 were purchased alive from a vendor of live bait. In life, *Macrotrema caligans*, with its richly vascularized skin, is bright pink. The vendor claims that all his specimens were obtained at the Lim Chu Kang mudflats, and had been dug from a depth of up to 1.2 m in the mud at the intertidal zone during low spring tides. He had sold the eels to anglers who found them to be an effective bait for stingrays.

Some specimens bought at the bait shop were kept alive in unaerated brackish water. In an unfurnished tank, the fish lies scarcely moving at the bottom. When introduced in a tank with soft mud, the eel would immediately burrow into the substrate head first, with its tail winding in a circular motion. Unlike *Monopterus*, *Macrotrema* does not appear to inhale air when it pokes its snout out of the water. Captive individuals buried in mud have not been observed to emerge voluntarily out of the substrate. Tubifex worms and sections of dead polychaetes introduced to bare tanks with pink mud eels have disappeared, suggesting that they have been eaten.

References:

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Fig. 1. Lateral view of entire specimen of *Macrotrema caligans* from ZRC 56698 of 24.5 cm standard length.



Fig. 2. Head and anterior body of *Macrotrema caligans* of 24.5 cm standard length from ZRC 56698. Dorsal view at top, lateral view at middle and ventral view at bottom. Note the extensive gill membrane, poorly developed subcutaneous eyes and distinct lateral line.



Fig. 3. Lateral view of the tail of *Macrotrema caligans*, of 24.5 cm standard length from ZRC 56698, showing the small caudal fin with black pigmentation.

Photographs by Tan Heok Hui