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SHORT COMMUNICATION

Record of a bull ray *Aetomylaeus bovinus* (Myliobatidae) in a sea-cage tuna farm in the Aegean coast of Türkiye (Eastern Mediterranean Sea)

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Abstract

A specimen of bull ray *Aetomylaeus bovinus* was captured dead by a diver around a tuna sea cage farm. It was female, measured 2310 mm in total length (TL) and 1460 mm in disc width (DW) with body weight estimated as about 20 kg. This case was reported from a tuna farm for the first time. The bull ray entered the sea cage about three months ago, but no attack occurred to the tuna in the cage. It was grazing on fouling organisms that attached to the nets. However, the cage nets were replaced with clean ones four days ago before the capture, and the bull ray did not find enough fouling organisms or uneaten fish feed and was starved to death.

Keywords: *Aetomylaeus bovinus*, sea-cage farm, predators, biodiversity, nutrition

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Mariculture production in Türkiye has continuously and significantly developed over the past two decades, and several fish farms have been established along the coast of the Aegean Sea since 1985 (Akyol and Ertosluk 2010). While most of the mariculture production in Türkiye is based on sea bream (*Sparus aurata*) and sea bass (*Dicentrarchus labrax*) production, there are six bluefin tuna facilities licensed by the Ministry of Agriculture and Forestry, and all these farms are located on the Aegean coast of Izmir Province (Anon. 2022).

Ceyhan *et al.* (2020) noted that sea cages of fish farms act as mega fish aggregating devices (FADs), attracting some predators such as sea birds, marine mammals, and elasmobranch species. Additionally, Akyol and Şen (2022)

reported the occurrence of a shoal of sandbar shark *Carcharhinus plumbeus* (Nardo, 1827) around the sea cages of fish farms in Iskenderun Bay. Akyol *et al.* (2022) stated a similar pattern in the same area concerning the bull ray *Aetomylaeus bovinus* (E. Geoffroy Saint-Hilaire, 1817).

The populations of *Aetomylaeus bovinus* have been decreasing due to fisheries and this species was declared as CR (critically endangered in IUCN Red List (Jabado *et al.* 2021).

On 27 March 2023, a specimen of *A. bovinus* was obtained from a tuna farm located off Karaburun, Izmir (38°30'34"N and 26°21'08"E), in the central Aegean coast of Türkiye (Figure 1). The bull ray was observed at the bottom of the cage (a diameter of 50 m and a depth of 32 m), which was used for stocking bluefin tuna *Thunnus thynus* (Linnaeus, 1758). The bull ray specimen was captured by a diver (Figure 2).

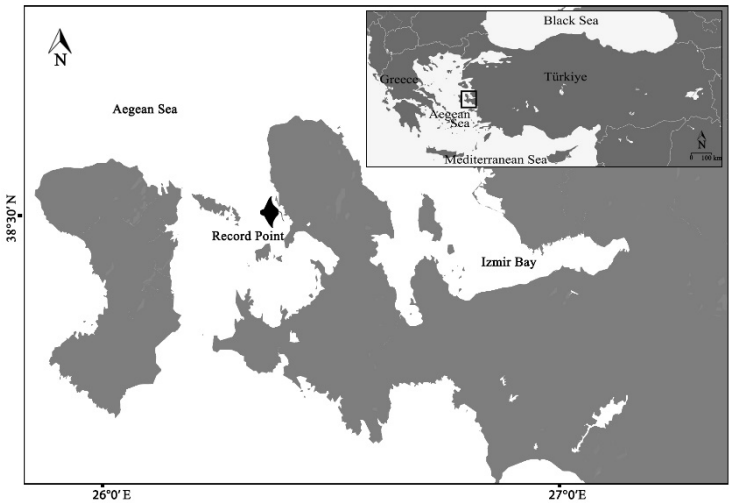

Figure 1. Map indicating the site where the specimen of *Aetomylaeus bovinus* was collected in the Aegean Sea

The bull ray was still alive on 26 March (Sami Yalçı, pers. obs.) but it is considering that it has subsequently died on 27 March. It was a female, measured 2310 mm in total length (TL) and 1460 mm in disc width (DW) with the body weight estimated as about 20 kg. It was carefully examined and identified as *A. bovinus* by the combination of main morphological characteristics, following Capapé and Quignard (1975) and Mc Eachran and Capapé (1984): pectoral fins large and strongly falcate discontinued under eye, lobe under snout quite separate, snout pointed, dorsal fin beginning behind tips of pelvic fins, colour greyish to

greenish (Figure 3). Some morphometric measurements were recorded to the nearest millimetre with percentages of DW and summarised in Table 1.

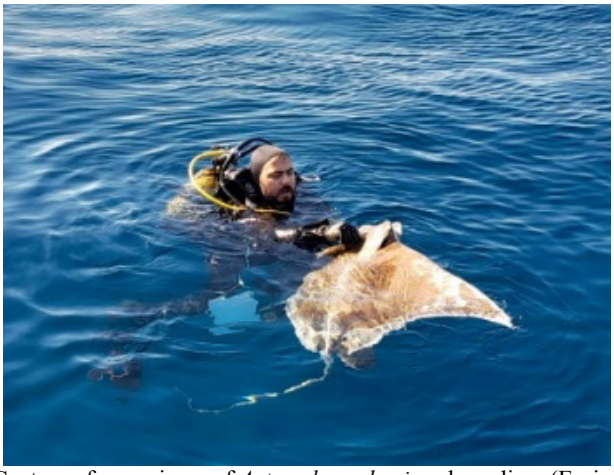

Figure 2. Capture of a specimen of *Aetomylaeus bovinus* by a diver (Evrim Kurtay) at the tuna farm, off Izmir (Aegean Sea)

Table 1. Some morphometric measurements and percentages of disc width (DW%) of *Aetomylaeus bovinus,* recorded from a tuna farm off Izmir, Aegean Sea

Morphometric measurements	**mm**	**DW%**
Total length (TL)	2310	158.2
Disc width (DW)	1460	100.0
Disc length	720	49.3
Snout to eye	198	13,6
Snout to mouth	160	11.0
Mouth width	95	6.5
Width of first-gill slit	30	2.1
Width of second-gill slit	37	2.5
Width of third-gill slit	39	2.7
Width of fourth-gill slit	35	2.4
Width of fifth-gill slit	23	1.6
Eye diameter	27	1.8
Interorbital length	200	13.7
Predorsal length	900	61.6
Estimated total body weight (kg)	20	

No attack occurred between the ray and tuna in the cage as the bull ray did not have any scars. It entered the sea cage about three months ago (Sami Yalçı, pers. obs.). Sometimes it fed on fresh fish used as feed to tuna but the tuna could not swallow, such as European pilchard *Sardina pilchardus* (Walbaum, 1792) and Atlantic chub mackerel *Scomber colias* Gmelin, 1792. The specimen of *A. bovinus* was also grazing on fouling organisms that attached to the nets. However,

the cage nets were replaced with clean nets four days before the capture, and the bull ray did not find enough fouling organisms or uneaten fish and was starved to death (Sami Yalçı, pers. comm.). Finally, it died five days after the nets were changed. The farm team reported that nobody had ever seen a bull ray getting into the cages, despite being surrounded by a shoal of *A. bovinus.* However, five specimens had entered the cages accidentally during a routine net change operation in a sea-cage farm in Iskenderun Bay (Akyol *et al.* 2022).

Figure 3. A specimen of *Aetomylaeus bovinus* collected from the tuna farm, off Izmir, Aegean Sea (Scale bar: 100 mm)

Özgül *et al.* (2023) reported that sea-cage fish farms cause wild fish to aggregate nearby and attract several fish species. Generally, bony fishes aggregate around the cages and this positively affects both professional and recreational fisheries. For example, Bacher and Gordoa (2016) determined that the commercial fishing pressure observed in farm proximity was not negligible and represented about 9% of the total reported effort of the small-scale fishery, though no data for the recreational fishery around the sea-cage farms in the Spanish Mediterranean coasts.

Akyol *et al*. (2017) reported sporadic records of *A. bovinus* in Turkish waters, especially from Iskenderun, Sığacık and Izmir Bays. A shoal of *A. bovinus* has

recently been photographed around sea-cage fish farms in Iskenderun Bay (Akyol *et al*. 2022). The small teleost species are unable to affect fish farms, whereas, large and heavy specimens such as sharks and rays can cause non-reversible damages, which was noted by Akyol *et al*. (2019) regarding predator attacks.

On the other hand, elasmobranch species are drastically declining in the Mediterranean; some of them are endangered, threatened and disappeared from several regions (Capapé *et al*. 2000). Most of the sharks, skates and rays are protected throughout the Turkish marine waters, and when caught, they are discarded at sea (Anon. 2020). Aggregations of elasmobranch species around fish farming cages present two negative effects. Firstly, these species can be injured or killed by nets, and secondly, the nets can be damaged by the same species when they enter sea cages. Such interactions should be avoided and management guidelines should be established to preserve local biodiversity and the economic sustainability of sea-farming.

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Türkiye'nin Ege Denizi kıyılarında bir orkinos çiftliği kafesinde boğa vatozu *Aetomylaeus bovinus* (Myliobatidae)'un kaydı

Öz

Ege Denizi'ndeki bir orkinos çiftliği kafesinde dalgıç tarafından bir boğa vatozu *Aetomylaeus bovinus* örneği ölü olarak bulunmuştur. Tespit edilen vatoz, toplam uzunluğu 2310 mm, toplam genişliği 1460 mm ve yaklaşık ağırlığı 20 kg olan dişi bir bireydir. Bu olay ilk kez bir orkinos çiftliğinden rapor edilmiştir. Çiftlik yetkilileri ile yapılan görüşmede, boğa vatozunun yaklaşık üç ay önce kafese girdiği ancak orkinoslar ile vatoz arasında herhangi bir saldırı vakası olmadığı öğrenilmiştir. Kafeste tespit edilen boğa vatozunun ağlardaki yapışan organizmalar ile beslendiği düşünülmektedir. Bununla birlikte, kafesin ağları boğa vatozu yakalanmadan dört gün önce temiz ağlarla değiştirilmiştir ve boğa vatozunun yeterince yapışan organizma veya yenmemiş orkinos yemlerini bulamayarak açlığa bağlı ölümü gerçekleşmiştir.

Anahtar kelimeler: *Aetomylaeus bovinus*, balık çiftliği, predatör, biyoçeşitlilik, beslenme

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