



PROOF

SHORT PAPER

Abnormal *Raja clavata* (Rajidae) in the Aegean Sea: a Ghost Fishing Effect

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Abstract

The paper reports the capture of an abnormal specimen of *Raja clavata* Linnaeus, 1758 measuring 400 mm DW and weighing 987 g. This cartilaginous fish was caught from Çandarlı Bay (Izmir) by a commercial trawler. This specimen has nose and tail deformities due to caught with a piece of trammel net (i.e. ghost fishing effect) and this phenomenon was discussed and commented.

Keywords: *Raja clavata*, anomaly, derelict fishing gear, Çandarlı Bay, Aegean Sea.

Introduction

'Ghost fishing' refers to lost or abandoned fishing gear, also called 'derelict fishing gear' (DFG), that continues to capture fish and other marine animals after the gear is no longer under the control of a fisherman (NOAA, 2015). DFG causes substantial ecological and socio-economic problems. There are numerous causes, both intentional and unintentional, for fishing gear to be abandoned, lost or discarded (FAO, 2016).

Active and passive fishing gears may be lost due to entanglement with bottom obstructions such as wrecks and reefs, whereas passive fishing gears may also be lost due to rough weather or accidentally damaged or dragged away by active fishing gear or by vessels (Ayaz, Acarli, Altınağaç, Özekinci, Kara, & Ozen, 2006). Ghost fishing phenomenon can occur from 2 months up to 8 years after the gear has been lost depending on the materials, bottom topography, depth, and hydrodynamics (Ayaz, Ünal, Acarlı, & Altınağaç, 2010).

DFG can catch the fish continuously if not retrieved and ghost fishing is common in the certain fishing areas in the Turkish Aegean Sea. Few substantial studies indicated that plenty of DFG has been determined in Izmir and Gökova Bays (Ayaz, Ünal, & Özekinci, 2004; Ayaz et al., 2006, 2010; Gülşahin, Filiz, & Bilge, 2015). All of the observations, mentioned above were on the small scale fisheries, including gill/trammel set nets and

bottom longlines. Though the marine animals, caught with ghost fishing in Izmir Bay were 22 teleost fishes, 5 crustaceans, 1 cephalopod and 1 gastropod (Ayaz et al., 2006), any cartilaginous fish has not been caught.

This ichthyologic note presents an abnormal *Raja clavata* specimen, which caused by a piece of DFG. Such an event was observed for the first time in the Aegean Sea.

Materials and Methods

On 29 January 2016, one specimen of *Raja clavata* (Figure 1) were captured by a commercial trawler, targeting hakes and red mullets off Çandarlı Bay, Izmir (coordinates: 38°54'N and 26°46'E) at a depth of 85 m. Morphometric measurements were recorded to the nearest millimetre on fresh specimens weighed to the nearest gram. The specimens were preserved in 10% buffered formaline and deposited in the Ichthyological Collection of Fisheries Faculty, Ege University, Turkey, under the catalogue number, ESFM-PIS/2016-01.

Results and Discussions

The measurements were recorded in the present specimen, and they were: Disc width (DW) (400 mm), eye diameter (15 mm), preorbital length (86 mm) and interorbital distance (26 mm). Total length (TL) and weight were also measured; it reached 470 mm, and 987 g.

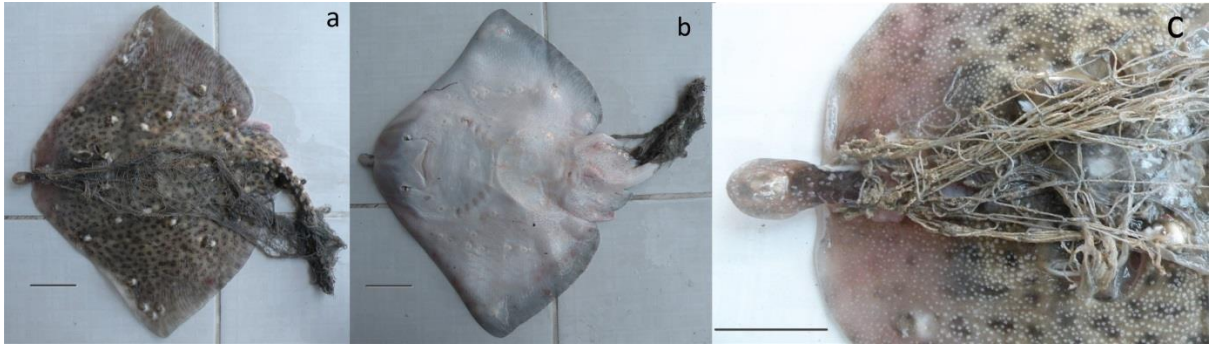


Figure 1. Abnormal *Raja clavata*, entangled with gillnet in Çandarlı Bay, northern Aegean Sea. (a) Dorsal view (horizontal bar: 50 mm), (b) ventral view (horizontal bar: 50 mm), (c) tip of snout (horizontal bar: 30 mm) (Photographs: O. Akyol).

The piece of the net, which entangled of the fish (see, Figure 1c) was a trammel net, targeting prawn (*Penaeus kerathurus*) with 38 mm mesh size. The net fastened on the dorsal side of the fish from snout to tail. This fish must have grown with piece of the net. As a fish grows, the net getting more stretched and it caused the deformity of its nose and tail. Tail of the fish was shorter than normal length. TL of this specimen must be 653 mm instead of 470 mm according to equation in Demirhan, Engin, Seyhan, and Akamca (2005)'s study. Thus, this difficult life might be set forward the swimming disorder and malnutrition. This fish was very weak with only 987 g. Whereas, nominal weight must be 1429 g for 400 mm DW according to a recent length-weight relationship study (İlkyaz, Metin, Soykan, & Kınacıgil, 2008) in Izmir Bay, Aegean Sea. In fact, while the fish was seeking out the shrimp, it might be entangled a prawn net in the fishing area owing to the crustaceans is the main food preference of *R. clavata* in the Turkish Aegean Sea (Eronat & Özeydin, 2015). This situation can be explained why the fish was caught by a prawn net.

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