
Vertical behavior of juvenile swordfish revealed by electronic tags

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Abstract

In the context of the MADE project (Mitigating Adverse Ecological impacts of open ocean fisheries) 14 swordfish juveniles ranging from 85 to 124 cm, were tagged with electronic tags in the Atlantic (Azores 4), central (Italy 6) and Eastern Mediterranean (Aegean Sea 4) during 2010 and 2011. Juvenile swordfish catches represent an important problem for the longline fisheries in these areas. The study of their vertical migration can provide potentially useful elements leading to the definition of fishing strategies and technical measures (line depth, fishing period and timing) reducing the undesirable juvenile catches. Elements on the vertical distribution of the fishes transmitted via satellite from the pop-upped tags and extended and detailed time series from three recovered tags (65 to 135 days, 1-2 min recording interval) are analysed. A regular diel pattern of the vertical movements appeared clearly after some days during which the fish behaviour was probably affected by the tagging action. The maximum depth reached during day time showed an important variability which also characterized the vertical movements in shallower areas. The timing of the upward and downward movements is described by a model linking the sun's angle to the vertical position of the fish. In this way the fish depth can be estimated by the geographic position and time. The recorded patterns are analysed and discussed in the context of definition of technical measures aiming at the reduction of the juvenile catches.

Keywords: swordfish, vertical distribution, electronic tags, behaviour, model, Mediterranean, Atlantic

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