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INTERACTIONS BETWEEN BOTTLENOSE DOLPHIN AND MIDWATER PAIR TRAWLS: EFFECT OF PINGERS ON DOLPHIN BEHAVIOUR

INTERAZIONI TRA TURSIOP E RETI DA TRAINO SEMI-PELAGICHE "VOLANTI A COPPIA": EFFETTO DEI PINGERS SUL COMPORTAMENTO DEI DELFINI

Abstract - EC Regulation 812/2004 imposes to EU Member States to monitor the commercial fishing vessels for the evaluation of by-catch of cetaceans and its mitigation. In order to reduce the interactions with fishing vessels and to minimise the risk of incidental catch of cetaceans, acoustic pingers were tested on commercial midwater pair-trawlers in Central Adriatic Sea. A reduced number of sightings in presence of pinger was registered, even if the effect of this device was not statistically significant.

Key-words: cetaceans, semi-pelagic trawl fishery, GIS mapping, pinger, dolphin-fishery interaction.

Introduction - By-catch during fishing operations represents one of the major threats to the survival and to the decline of endangered species (Fortuna *et al.*, 2010a). All cetaceans and most sea turtles are protected by European legislation (Fortuna *et al.*, 2010a). EC Regulation 812/2004 imposes that EU Member States establish a system to monitor accidental captures. Cetaceans interactions with trawling are complex and usually happen in areas of high prey density; within such areas, humans and dolphins compete for the same resource (Fertl and Leatherwood, 1997). Within the study BY-CATCH III (Fortuna *et al.*, 2010b), the feasibility of the use of dolphin acoustic deterrents on semi pelagic fishery was investigated in the central Adriatic Sea.

Materials and methods - The activity of 16 pelagic trawlers was monitored in the Central Adriatic Sea, from June 2009 to July 2010, for a total of 158 hauls. A particular pinger (Dolphin dissuasive Devices DDD 03H) was tested. This acoustic deterrent is characterized by a variable emission frequency (1-500 KHz), and a working depth between 10 and 200 m. It was mounted in 37 hauls directly by the observer on the headrope of one of the two net wings with the aid of snap-hooks, without any hindrance to usual fishing operations. Interaction events were defined when a sighting of at least one dolphin within 500 m of the net, was detected. Data collected on board have been subsequently mapped by GIS Arch View GIS 3.2a software.

Results - *Tursiops truncatus* was the only cetacean sighted, and no individuals were caught. The majority of interaction events was registered at the end of the hauling operation. Dolphins followed the cod end of the trawl within a distance of 100-200 m and sometimes much closer. A higher concentration of sighting (57%) was observed in the northern-western part of the surveyed area. Among the total of 29 sightings recorded, only one was during fish schools searching operation and therefore was not considered in the statistical analysis, and in the mapping. When the pinger was mounted on the net, only 4 sightings were recorded, corresponding

to 11% of the hauls monitored with pinger. For the remaining 121 hauls monitored without pinger, 24 sightings were registered (about 20% of the monitored hauls without pinger, Tab. 1).

Tab. 1 - Resuming of the total monitored hauls and related sightings.

Sintesi delle cale monitorate e dei relative avvistamenti.

PINGER		SIGHTINGS	
		No	Yes
No	121	97	24
Yes	37	33	4
Tot	158	130	28

Statistical analysis revealed that the influence of pinger on the interaction events is not significant. *Chi-square* test (1.582, $p=0.208$) showed that the proportion of hauls without sightings and without pinger (0.802) was not statistically different from those without sightings with pinger (0.892). The odds that a haul without sightings is registered, is two times more likely in presence of pinger than without it. For each interaction events an average number of 3 individuals was detected and different types of behavior have been observed in relation to their reaction to the boat and the net.

Conclusions - Bottlenose dolphins remain the only regular cetaceans in the surveyed region (Northern Central Adriatic), according to Bearzi *et al.*, 2004, with a higher sighting concentration in the north-western area as revealed by the GIS mapping. A reduced number of sightings in presence of pinger was observed, encouraging several fishermen to the voluntary use of this device. However, different studies revealed that dolphin might become sensitized to pingers, phenomenon also known as “dinner bell” effect (Richardson *et al.*, 1995; Cox *et al.*, 2003), compromising pinger efficiency and driving to the opposite reaction.

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