Joint use of echosounding, fishing and video techniques to assess the structure of fish aggregations around moored Fish Aggregating Devices in Martinique (Lesser Antilles)

From April 2003 to April 2004 monthly sea surveys were conducted around 2 fish aggregating devices (FADs) moored at 2000 and 2500 m depth in Martinique (Lesser Antilles). The use of a dual frequency splitbeam echosounder combined with an underwater camera and fishing methods allowed assessment of average space and time distribution of pelagic fish aggregated beneath the FADs, as well as identification of their overall size and species composition. At daytime, 4 fish aggregations were identified at each FAD, representing 4 distinct types: i) an aggregation of small juvenile tuna (mean fork length, FL: 30 cm) observed very close to the surface in 25% of daytime periods; ii) a small surface aggregation dominated by carangids, Caranx crysos, present in 65% of daytime periods; iii) a large sub-surface aggregation observed during all daytime periods: this aggregation appeared to be primarily comprised of 58 cm FL blackfin tuna (Thunnus atlanticus), mixed with yellowfin (Thunnus albacares) and skipjack (Katsuwonus pelamis) tunas of the same size; and iv) sub-surface scattered large predators (mainly blue marlin, Makaira nigricans) present in 10% of daytime periods. A smaller sub-surface aggregation comprised of medium tuna mixed with “extranatants” (fishes which remain within 10 to 50 m of a FAD) was observed in 75% of night-time periods, whereas unidentified scattered fishes were detected from 70 to 400 m depth. The low daytime vulnerability of medium sub-surface tunas to applied line techniques leads us to assume that their feeding motivation was low during daytime. These tunas could preferentially feed on mesopelagic organisms during night-time and transition periods around Martinican moored FADs. Local fishermen mainly targeted the large scattered predators using very small tunas as living bait. The sub-surface tuna aggregation hence appeared to be currently unexploited by local fisheries, though it represented the large majority of the pelagic biomass around the moored FADs.

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Obtenir le document : EDP Sciences
Mots clés : Fish aggregating device, Acoustics, Underwater video, Small scale fishery, Aggregative behaviour, Tuna, Lesser Antilles
Thème (issu du Text Mining) : MILIEU NATUREL, FAUNE
Date : 2008-1-23
Format : text/xml
Source : https://doi.org/10.1051/alr:2008004
Langue : Anglais
Télécharger les documents : https://www.alr-journal.org/10.1051/alr:2008004/pdf