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The Importance of By-catch From Commercial Trawl Fisheries Off the South Coast of Portugal

by

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Abstract

Since the beginning of this century there has been an increasing concern about the by-catch and discards of by-catches resulting from commercial fisheries. Most marine fisheries are mixed fisheries directed at only a few commercial target species. Many fishing gears, such as trawls, are not very species-selective and fisheries which use such gears are bound to capture non-target species and undersized individuals of target species. By-catches are, therefore, unavoidable by the very nature of the fishing methods. The sorting and retaining of non-commercial or undersized fish is not normally associated with any commercial gain, and the landing of by-catches is, in any case, often prohibited. They are, therefore, usually discarded at sea. FAO (1996) estimated an average of 28.7 million tonnes of by-catch and 27 million tonnes of fish discarded each year in commercial fisheries worldwide. In Portugal, relatively little research has been carried out and little literature exists about this subject. However, since 1996, the importance of by-catch in the south coast of Portugal has been the subject of a study financed by the European General Directorate of Fisheries. During the sampling period, from May 1996 to December 1999, a total of 59 trips (36 crustacean trawls and 23 fish trawls) were carried out. The results point out that the percentage of by-catch changed through the years (1996-1999), the fish trawls catching a higher percentage than crustacean trawls. Concerning the capture of target species, the crustacean trawl is the *métier* more representative in terms of percentage. From 1996 there has been a decrease of by-catch quantities and an increase of target species quantities in both crustacean and fish trawls, these quantities being more pronounced in crustacean trawls.

Introduction

Since the beginning of this century there has been an increasing concern about the by-catch and discards of by-catches resulting from commercial fisheries, as well as an explosive interest in the search for solutions to the by-catch and discard problem.

By-catch is the most critical issue facing world fisheries today and a long-standing problem in global fisheries management. Defined as the incidental catch, take, or harvest of all marine life not directly targeted by fishing, by-catch has serious implications for marine life populations and the overall health and sustainability of ecosystems. Discards may constitute a small-to-significant fraction of the identified by-catch, depending on the nature of the fisheries and local customs. Fishery managers and environmental and conservation groups, have been concerned that by-catch, and discards, may be contributing to biological overfishing and altering the structure of marine ecosystems.

Most marine fisheries are mixed fisheries directed at only a few commercial target species. By-catch is not exclusive to any particular gear type or any particular region of the world, but an issue which affects all forms of fishing. However, many fishing gears, such as trawls, are not very species-selective and fisheries which use such gears are bound to capture non-target species and undersized individuals of target species. By-catches are, therefore, unavoidable by the very nature of the fishing methods.

The sorting and retaining of non-commercial or undersized fish is not normally associated with any commercial gain, and the landing of by-catches is, in any case, often prohibited. They are, therefore, usually discarded at sea.

The recent global assessment of fisheries by-catch and discards estimated an average of 28.7 million tonnes of by-catch and 27 million tonnes of fish discarded each year (annual discard range of between 17.9 and 39.5 million tonnes) in commercial fisheries worldwide. However, no estimates could be given of the mortality level of escapes from fishing gear during operations.

In Portugal, relatively little research has been carried out and little literature exists about this subject. However, since 1996, the importance of by-catch and discards in the south coast of Portugal has been the subject of a study financed by the European General Directorate of Fisheries.

Material and Methods

The study was carried out from May 1996 to December 1999 off the southern Portuguese coast (Fig. 1). During the sampling period a total of 59 fishing trips (36 crustacean trawls and 23 fish trawls) were carried out at mean depths ranging from 97 to 644 m in crustacean trawls and from 43 to 268 m in fish trawls.

The presence of observers on board the vessels allowed the identification of target species as well as the commercial by-catch species. Target species species and commercial by-catch quantities were also recorded. Estimates of the total amount of by-catch discarded by *métier*, haul and season were also made on board. Samples were taken to the laboratory where all the specimens were, whenever possible, identified to species and sampled.

Results

During the sampling period of the study (1996-1999), fish trawl had the highest bycatch percentage every year considered, as well as the lowest target species percentage. Although the number of trips, by *métier*, changed through the years, the highest percentage of by-catch and the lowest percentage of target species occurred in 1996 in both crustacean and fish trawls. The crustacean trawl had the lowest by-catch percentage (60.3%) in 1998 and the highest target species percentage (54.1%) occurred in 1999. In 1998 and 1999 the fish trawl was the *métier* with the highest percentage of target species and the lowest percentage of by-catch (Fig. 2).

Between 1996 and 1997, by-catch quantities decreased in both *métiers*, the decrease being more pronounced in crustacean trawls (43.3%) than in fish trawls (28.5%). Regarding the capture of target species, there has been a decrease of 21.9% in crustacean trawls and an increase of 49.5% in fish trawls. From 1997 to 1998, by-catch quantities decreased in both *métiers*, just 5.7% in crustacean trawls and 14.4% in fish trawls. On the contrary, the increase of target species quantities in crustacean trawls was higher (54.4%) than in fish trawls (6.7%). Between 1998 and 1999, by-catch and target species quantities decreased in each *métier*, the decrease being more significant in fish trawls (46.7% and 47.5%, respectively) than in crustacean trawls (26.1% and 2.4%, respectively). Unregarding the annual fluctuations, from 1996 to 1999, the decrease of by-catch quantities was similar in both crustacean and fish trawls (69.9% and 67.4%, respectively). Concerning the target species quantities, there was a higher increase in crustacean trawls (40.2%) and a slight increase in fish trawls (10.3%) (Fig. 3).

Discussion

The results point out that the percentage of by-catch changed through the years (1996-1999), the fish trawls catching a higher percentage than crustacean trawls. Concerning the capture of target species, the crustacean trawl is the *métier* more representative in terms of percentage.

From 1996 there has been a decrease of by-catch quantities and an increase of target species quantities in both crustacean and fish trawls, these quantities being more pronounced in crustacean trawls.

In addition to seasonal changes in availability and abundance of by-catch species, other confounding factors within each *métier* are fishing depth, area and target species. Thus, for example, within the crustacean trawl *métier*, trawlers may target *Nephrops norvegicus* at depths more than 500 m, or shrimps at shallower depths, resulting in different by-catch quantities.

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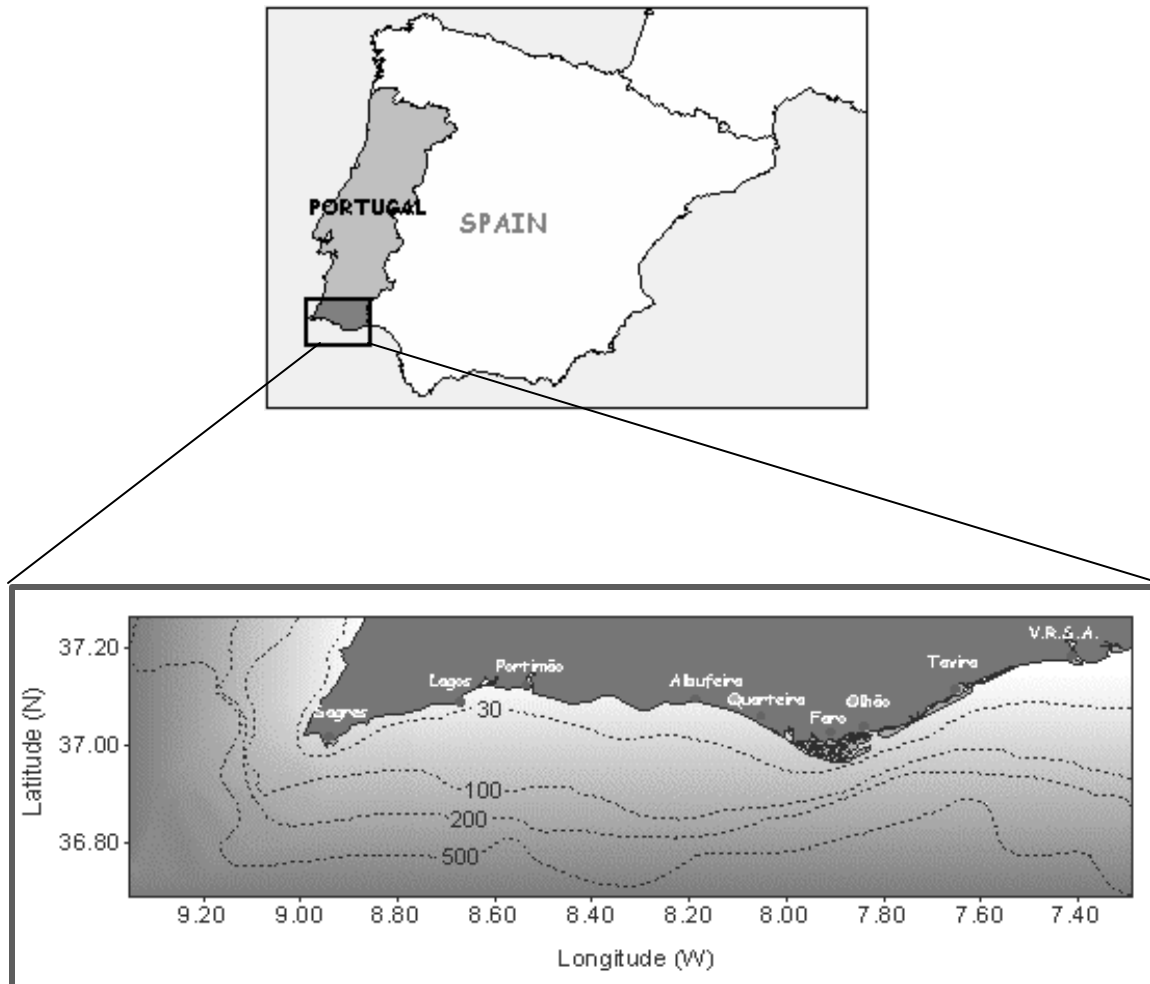
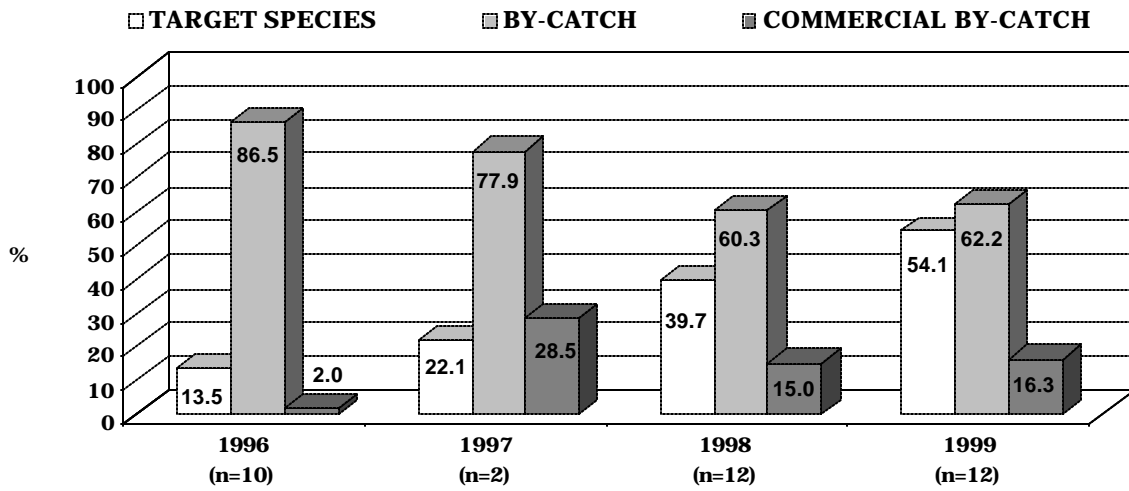


Figure 1 – Sampling area (Algarvian Coast).

-- CRUSTACEAN TRAWL --



-- FISH TRAWL --

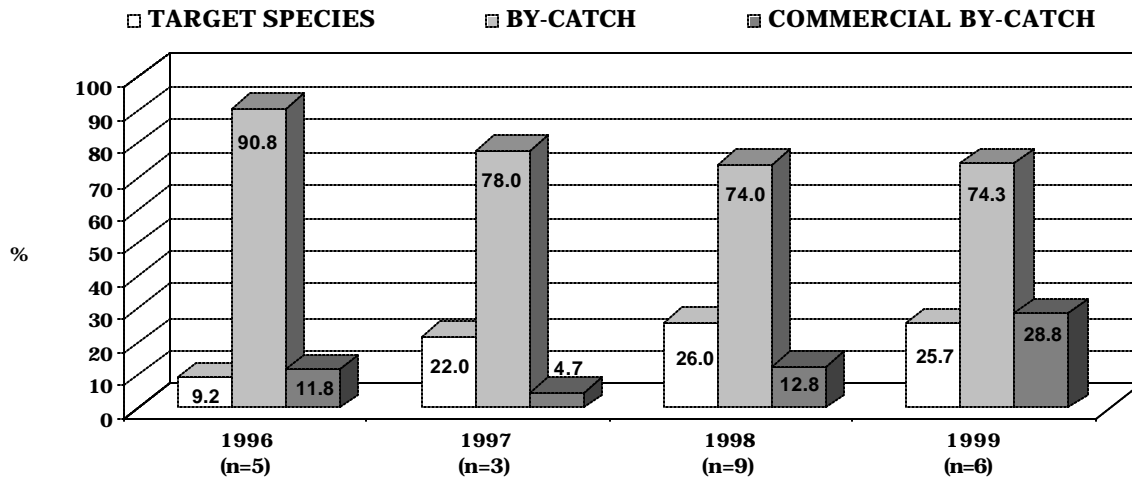


Figure 2 – Distribution of the target species, by-catch and commercial by-catch rates (in percentage) from crustacean and fish trawlers, by year (n = number of trips).

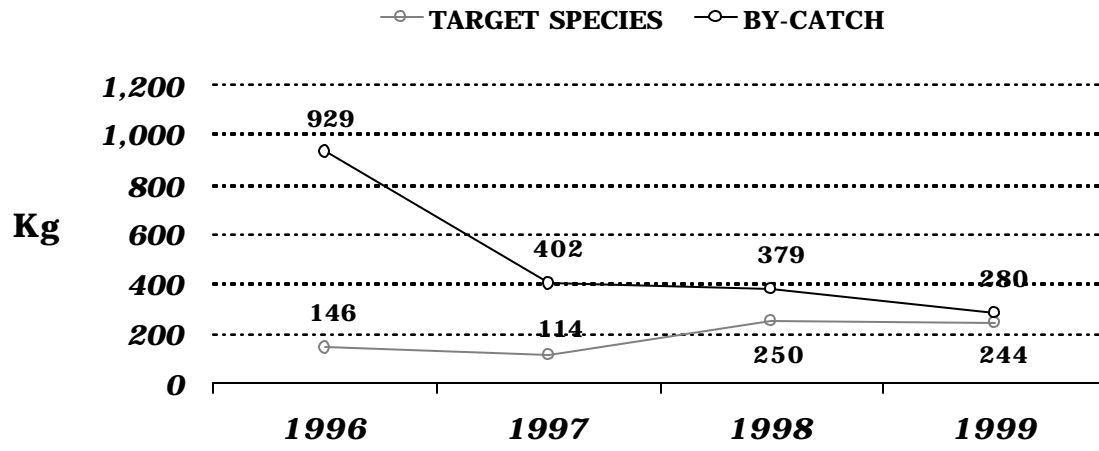
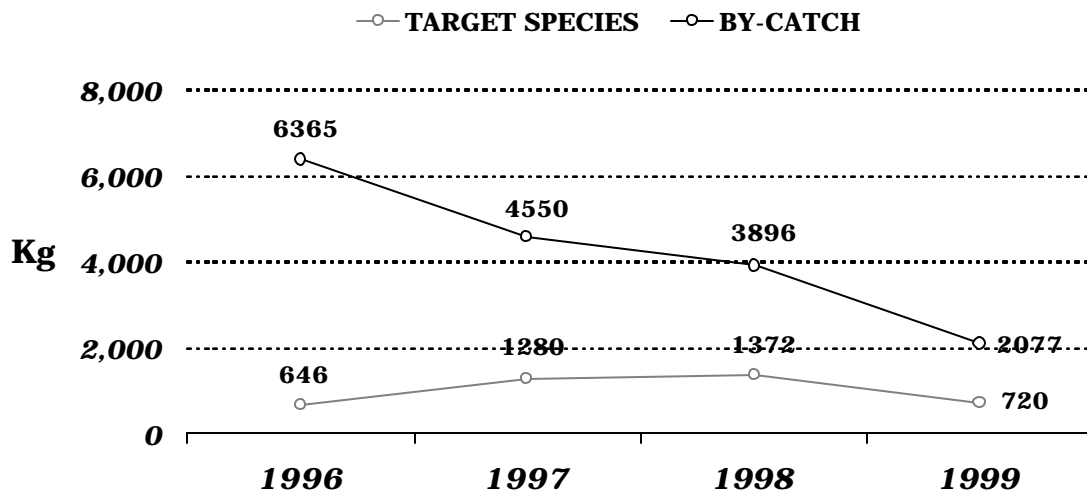
-- CRUSTACEAN TRAWL --**-- FISH TRAWL --**

Figure 3 – Evolution of target species and by-catch quantities (mean values) from crustacean and fish trawlers, by year.