

BY-CATCH IN THE MESOPELAGIC SWORDFISH LONGLINE FISHERY IN THE LIGURIAN SEA (WESTERN MEDITERRANEAN)

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SUMMARY

In 2010 the new mesopelagic long line was introduced in the Ligurian Sea swordfish fishery, substituting the traditional surface longline. The by-catch was greatly reduced, showing also remarkable changes in the species composition. Swordfish represent about 70% by numbers of the total commercial catches, which is mainly made up of a few species: bluefin tuna, Thunnus thynnus, albacore, T. alalunga, rudderfish, Centrolophus niger, pomfret, Brama brama, dolphinfish, Coryphaena hippurus, opah, Lampris guttatus, wreckfish, Polyprion americanus and among elasmobranchs, only blue shark, Prionace glauca and little sleeper shark, Somniosus rostratus. Discards species are sunfish, Mola mola, pelagic stingray, Pteroplatytrygon violacea, scalloped ribbonfish, Zu cristatus, ribbonfish, Trachipterus trachipterus, and the Paralepidid fish Sudis hyalina. The impact of this new gear on protected or endangered species, such as sea turtles and all other species of pelagic sharks resulted absolutely negligible.

RÉSUMÉ

En 2010, la nouvelle palangre mésopélagique a été introduite dans la pêche d'espadon de la mer de Ligurie, remplaçant la palangre de surface traditionnelle. La prise accessoire a été réduite en grande mesure, affichant également des changements remarquables de la composition par espèce. L'espadon représente environ 70% de la prise totale commerciale (en nombre), qui est principalement composée de quelques espèces : thon rouge (Thunnus thynnus), germon (T. alalunga), centrolophe noir (Centrolophus niger), castagnole (Brama brama), coryphène commune (Coryphaena hippurus), opah (Lampris guttatus), cernier commun (Polyprion americanus) et parmi les élasmobranches, uniquement le requin peau bleue (Prionace glauca) et le laimargue de la Méditerranée (Somniosus rostratus). Les rejets étaient composés de poisson lune (Mola mola), pastenague violette (Pteroplatytrygon violacea), trachyptère ventru (Zu cristatus), poisson ruban (Trachipterus trachipterus) et lussion ailé (Sudis hyalina). L'impact de ce nouvel engin sur les espèces protégées ou en danger d'extinction, telles que les tortues marines et toutes les autres espèces de requins pélagiques, s'est avéré être absolument négligeable.

RESUMEN

En 2010, se introdujo el nuevo palangre mesopelágico en la pesquería de pez espada del mar de Liguria, sustituyendo al tradicional palangre de superficie. La captura fortuita se redujo enormemente, mostrando también cambios importantes en la composición por especies. El pez espada representa aproximadamente el 70% en número de las capturas comerciales totales, que se componen principalmente de unas pocas especies: atún rojo, Thunnus thynnus, atún blanco, T. alalunga, romerillo, Centrolophus niger, japuta, Brama brama, dorado, Coryphaena hippurus, opa, Lampris guttatus, cherna, Polyprion americanus y entre los elasmobranchios, solo la tintorera, Prionace glauca y el tollo boreal, Somniosus rostratus. Las especies descartadas son pez luna, Mola mola, raya látigo-violeta, Pteroplatytrygon violacea, cardenal, Zu cristatus, cinta, Trachipterus trachipterus, y el pez paralepidido Sudis hyalina. El impacto de este nuevo arte en las especies protegidas o en peligro, como las tortugas marinas y todas las demás especies de tiburones pelágicos era absolutamente insignificante.

KEYWORDS

By-catch, Swordfish, Bluefin, Sharks, Sea turtles, Ligurian Sea

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Introduction

By-catch of pelagic species in the long line fisheries is definitely one of the main matter of concern for the conservation of some endangered or protected pelagic species. In the Mediterranean Sea high impact was recorded mainly on loggerhead sea turtle, *Caretta caretta* (Casale *et al.*, 2011), on some elasmobranch species, especially in relation to the reduced size of their populations (Ferretti *et al.*, 2008) and, in particular areas, on sea birds (Garcia-Barcelona *et al.*, 2010).

Monitoring the pelagic fishery in the Ligurian Sea, an area of great naturalistic importance as main part of the Pelagos Cetacean Sanctaury, has allowed us to evaluate the impact of the different gears used and in particular of the swordfish long line (Relini Orsi *et al.*, 1999, 2010).

Aim of this note is to report changes occurred in the Ligurian Sea in the last four years in the by-catch of the swordfish fishery as a consequence of the massive introduction in 2010 of the mesopelagic swordfish long line (Meso SWOLL) in substitution of the traditional surface long line (SWOLL).

Materials and methods

A detailed description of the new gear is reported in Garibaldi, 2015a. During the sampling period (2010-2013) data were collected both at landings and onboard the fishing vessels: in this paper we considered only data recorded by observers at sea, in order to focus on the by-catch of non-commercial or discard species. Observations were carried out on the basis of 48 trips at sea, for a total amount of 32,000 hooks. All catches were recorded and were then reported as a percentage of the total catch in number, given that for many of the non-commercial catches has not been possible to obtain the weight. Data were then compared with old data sets recorded in the past onboard fishing vessels using the traditional surface long line (SWOLL), on the basis of 187 trips and 96,000.hooks.

Results

In the Ligurian Sea the Meso SWOLL is used from May to September, although the main effort is carried out from July onwards. In **Figure 1** the composition of the total recorded catches is reported. The target species, the swordfish, represents about 70% of the total catch, by number; each other species represents less than 3 % of the total catch, except bluefin tuna (15.2%).

If we compare these results with data obtained in the past from SWOLL (**Figure 2**), changes are evident and can be summarized in the following points:

- 1) Among the bony fish, strictly epipelagic species were strongly reduced (dolphin fish, *Coryphaena hippurus* albacore, *Thunnus alalunga*.) or completely disappeared (Atlantic bonito, *Sarda sarda*, Mediterranean spearfish, *Tetrapturus belone*). The ocean sunfish *Mola mola* showed a sharp increase in the catches: anyway, all recorded specimens were released at sea still alive and apparently in healthy conditions.

On the other hand, new species, generally considered not so common, are appearing in good numbers, such as rudderfish, *Centrolophus niger*, scalloped ribbonfish, *Zu cristatus*, ribbonfish, *Trachipterus trachipterus*, and the Paralepidid fish *Sudis hyalina*.

- 2) About Elasmobranchs, there is a general reduction in the catches of blue shark, *Prionace glauca*, while all other pelagic species, such as thresher shark, *Alopias vulpinus*, porbeagle shark, *Lamna nasus* and mako shark, *Isurus oxyrinchus*, were completely absent from the records, as well as the Mediterranean devil ray, *Mobula mobular*.

The most impressive variation was the huge decrease in the catches of the pelagic stingray, *Pteroplatytrygon violacea*. In the surface SWOLL sometimes this species exceeded in number the target species and contributed for about 50% of the catches; with the new gear is reduced to about 2.3% of the total catches.

As a new entry, we recorded the presence of the little sleeper shark, *Somniosus rostratus*, a very little known species, earlier considered very rare (Garibaldi *et al.*, 2012). Catches of *S. rostratus* were recorded almost exclusively when some accident occurs and part of the gear sinks down at greater depth (> 1500m).

Finally, catches of the loggerhead sea turtles *C. caretta* are completely absent with the new gear.

In conclusion, the introduction of this new gear has highly modified the by-catch composition as we were used to know in the past: it positively cancelled or limited the impact of the swordfish fishery on sea turtles and pelagic elasmobranchs, reducing also catches of swordfish and bluefin tuna juveniles (Garibaldi 2015a and Garibaldi 2015c). On the other hand, “new” species were caught in good numbers: given that we know very little about their biology abundance and population dynamics, we need to continue monitoring this fishing activity, in order to assess the global impact of this gear on the ecosystem.

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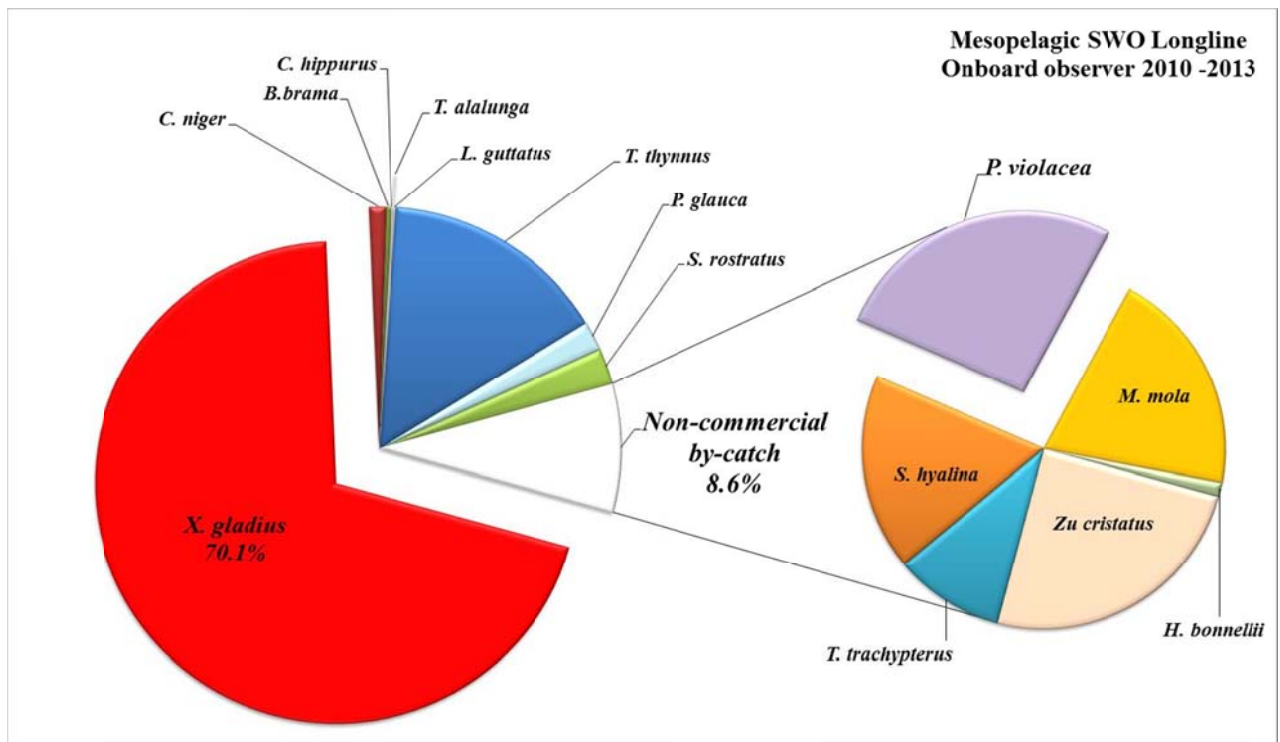


Figure 1. By-catch composition of the Mesopelagic SWO LL (% by number).

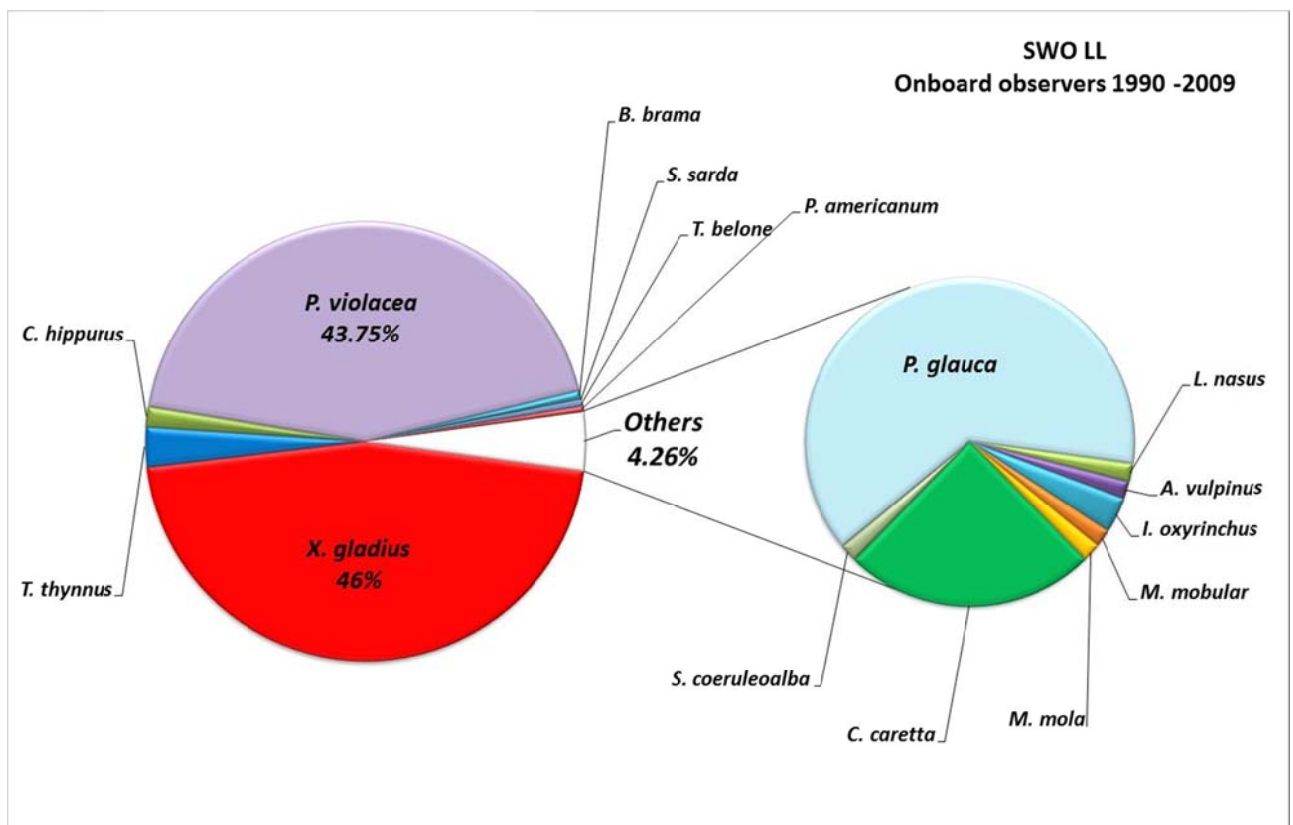


Figure 2. By-catch composition of the traditional surface SWO LL (% by number).