DEEP LONGLINE BYCATCH IN THE TROPICAL ATLANTIC OCEAN

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ABSTRACT

Based on the investigation on board in China longliners during 1994-1996, species of catches are presented in the tropical Atlantic ocean high seas including 27 fishes and 1 sea turtle. By-catches species generally refer to 25 species excluding bigeye tuna, yellowfin tuna and swordfish. The paper analyzes the shark hook rates and estimate the total number of individuals for each longliner. The paper also make suggestion on how to get accurate data of by-catches especially about sharks.

RÉSUMÉ

Ce document décrit les espèces présentes dans les prises hauturières de l'Atlantique tropical, dont 27 espèces de poissons et 1 de tortue de mer, d'après les recherches menées à bord de palangriers chinois de 1994 à 1996. Il analyse le taux de capture de requins par hameçon et estime le nombre total de poissons de chaque palangrier. Il offre également des suggestions sur la façon d'obtenir des données précises sur les prises accessoires, notamment de requins.

RESUMEN

En base a la investigación realizada a bordo de palangreros chinos entre 1994 y 1996, se presentan capturas por especie obtenidas en aguas de alta mar del Atlántico tropical oriental, incluyendo 27 peces y 1 tortuga marina. Las especies de captura secundaria pertenecen por lo general a 25 especies, que no incluyen patudo, rabil ni pez espada. El documento analiza las tasas de anzuelo para el tiburón y estima el número total de individuos por palangrero. También se sugiere la forma de obtener datos exactos de captura secundaria, en particular de tiburones.

INTRODUCTION

Deep longline fishery which targets bigeye tuna accounts for about 50% of bigeye total catch in the Atlantic Ocean in 1997. Much research mainly is focusing on economic species bigeye tuna but little attention is drawn to by-catch from deep longline fishing such as elasmobranchs, sea birds and sea mammals. In accordance with the conservation of fish stock and ecological system diversity in the open Atlantic Ocean, research should be underscored on by-catch from longline fishing.

Chinese deep longline fishery initiated in the early 1990s. Some technicians were dispatched on board for the purpose of tuna fishery research. Actually they played observer's role on board. The data on by-catch and its biological information were collected. Based on author's two-year collection and investigation, the paper analyzes the data on by-catch from deep longline fishing during 1994-1996.

MATERIAL AND METHODS

Investigation was carried out in Chinese longline fishing vessels Jin-Feng No. 1 and Jin-Feng No. 2 from November 1994 to October 1996. Investigated sea area generally covered in latitude between 9°00'N - 5°00'S, and longitude 18°00'W - 34°00'W in the high seas of Atlantic Ocean. Every species obtained by deep longline fishing is recorded. With respect to unclassified species, photographs are taken and main characteristics of species are recorded in detail. With the photographs and records, the unclassified species were confirmed in our university laboratory. Moreover, hooking rates of some species by-catches were calculated.

RESULT - SPECIES LIST

According to investigation, total 28 species were identified(two species unclassified). Twenty seven species are fishes and one species is sea turtle. According their value, these species are classified three groups:

1) targeted tuna species with high value including bigeye tuna, yellowfin tuna and swordfish?
2) non-target species with low value including common dolphin fish, shortfin mako, bigscale pomfret, wahoo, albacore, Atlantic sailfish, longbill spearfish, white marlin, blue marlin, opah, skipjack, escolar fish?
3) discards including crocodile shark, blue shark, oceanic whitetip shark, hammerhead shark, longfin mako, bigeye thresher, whip ray(unidentified), snake mackerel, longnose lancetfish, Oilfish, Ocean sunfish , dogfish shark(unidentified), Atlantic leatherback turtle.

By-catches here generally refer to the species in 2) and 3). Although the second low value species are recorded in logbooks, they are reported in a single category such as billfishes or sharks or miscellaneous fishes, which makes it difficult to get accurate statistics for stock assessment.

Table 1 shows species list with respect to commonly caught species or infrequent species or occasional species.

Table 1. Species caught by deep longline fishing in the tropical Atlantic Ocean

Family	*English name*	*Scientific name*
Species commonly caught		
Isuridae	Shortfin mako	*Isurus oxyrinchus* Rafinesque
Pseudocarchariidae	Crocodile shark	*Pseudocarcharias kamoharai* Matsubara
Carcharhinidae	Blue shark	*Prionace glauca* Linnaeus
Alepisauridae	Longnose lancetfish	*Alepisaurus ferox* (Lowe)
Bramidae	Bigscale pomfret	*Taractichthys longipinnis* Lowe
Gempylidae	Escolar fish	*Lepidocybium flavobrunneum*
Scombridae	Wahoo	*Acanthocybium solandri* Cuvier
	Bigeye tuna	*Thunnus obesus* Lowe
	Yellowfin tuna	*Thunnus albacares* Lowe
	Albacore	*Thunnus alaunga*
Istiophoridae	Atlantic sailfish	*Istiophorus albicans* Latreille
	Longbill spearfish	*Tetrapturus pfluegeri* Robins & de Sylva
	White marlin	*Tetrapturus albidus* Poey
	Blue marlin	*Makaira nigricans* Lacepede

Xiphiidae	Swordfish	*Xiphias gladius* Linnaeus

Infrequent species

Alopiidae	Bigeye thresher	*Alopias superciliosus* Lowe
Carcharhinidae	Oceanic whitetip shark	*Carcharinus longimanus* Poey
Sphyrnidae	Hammerhead shark	*Sphyrna lewini* Griffith
Dasyatidae	Whip rays	*Dasyatis* spp.
Coryphaenidae	Common dolphin fish	*Coryphaena hippurus* Linnaeus
Gempylidae	Snake mackerel	*Gempylus serpens* Cuvier

Occasional species

Isuridae	Longfin mako	*Isurus paucus* Guitart
Squalidae	Dogfish shark	*Squalus* spp.
Lampridae	Opah	*Lampris guttatus* Brunnich
Gempylidae	Oilfish	*Ruvettus pretiosus* Cocco
Scombridae	Skipjack	*Katsuwonus pelamis* Linnaeus
Molidae	Ocean sunfish	*Mola mola* Linnaeus

Sea Turtle

Chelonidae	Atlantic leatherback turtle	*Dermochelys coriacea coriacea*

SHARKS

Shark by-catches consist of large sharks and small sharks. Large sharks include blue shark, hammerhead shark, shortfin mako, oceanic whitetip shark, bigeye thresher and longfin mako; Small sharks include crocodile shark and dogfish shark. According to investigation from the percentage of each species in the shark by catches of tuna longliners from China, Result shows that in the large sharks 87.02% are blue sharks, 1.44% hammerhead shark, 4.81% shortfin mako, 0.48% oceanic whitetip shark, 0.96% bigeye thresher, 5.29% longfin mako.

The total hook rates of large sharks(above-mentioned six species sharks) are 3.188 sharks/1000hooks. Blue sharks are most abundant in the by-catches. After finned, the bodies of the sharks are discards. Hook rate of blue shark is 2.713 sharks/1000hooks. Shortfin mako is a species with economic value. Apart from finning, the body of the species can be sold with relative high price as compared to billfishes. So the record in the logbooks includes the number and the dressed weight (gutted, head off, fins off). Hook rate of shortfin mako is 0.22 sharks/1000hooks. Average individual dressed weight is 43.0 kg. Hook rate of bigeye thresher is 0.1649 sharks/1000hooks. Hook rate of crocodile shark is 3.120 sharks/1000hooks.

OTHER SPECIES

Longnose lancetfish is very common in the by-catches. It also can be founded in the stomach of bigeye tuna. Generally, fork length is 135cm, total length 148 cm.

Generally, total length of opah l is 110 cm and the weight is 55kg. Body hight is 72cm..

The catches of opah, oilfish snake mackerel and skipjiack are very sparse with only several individuals during 1-year longline fishing set.

DISCUSSION

The pelagic zone of the open ocean is perhaps the most monotonous living space of our planet. In the pelagic ecosystem of the tropical ocean, there are seven trophic levels and large sharks lie in level 7, marlins

and medium sharks lie in level 6, tuna and lancetfish lie in level 6(Alan R. Longhurst, Daniel Pauly. 1987, Gjosaeter I, Parin N V. 1980). Large-scale deep longliners are targeting all predatory fish and some mesopelagic fishes, which may have effect on pelagic ecosystem of the tropical ocean to some extent. As the top predators, large sharks should be stressed on the status of stock.

The amount of discarded sharks are concerned by many related scientists (Ramon Bonfil.1994).. How to get accurate information on number of sharks is crucial to assess the stock of sharks. At present, the shark statistics from FAO and regional organization such as ICCAT etc., are unable to estimate the shark situation in the high seas because of unclassified shark species and without biological information.

With the data on board, estimates of shark amount are made as following: Generally, a set of blue shark fins is approximately 2.0 kg in weight which includes 1dorsal fin, 1 caudal fin and 1 pair of pectoral fins. Each longline fishing vessels cuts about 4 tons shark fins during one year. So the discarded sharks can be calculated as 4000kg/2.0kg = 2000 if the all finned sharks are treated as blue sharks. In fact, besides blue shark, the finned sharks include shotfin shark, oceanic whitetip shark, hammerhead shark. The estimated number of longfin shark, bigeye thresher, crocodile shark and dogfish shark are excluded in above-mentioned calculation

According to hook rate of crocodile shark and total fishing hooks(720,000) from each longliner, about 2246 crocodile shark individuals can be estimated during a year.

As to longfin shark and bigeye thresher, the number of individuals may not exceed 150 during a year respectively.

In contrast to driftnet fisheries, there are no observer programmes for high seas longline fisheries in the world. This results in much the uncertainty the estimates of non-target species caught in longline fisheries.

REFERENCES

Alan R. Longhurst, Daniel Pauly. 1987. Ecology of Tropical Ocean. Academic Press, Inc. (London)LTD. 251-255.

Gjosaeter I, Parin N V. 1980. A review of the World resources of Mesopelagic Fish. FAO Fisheries Technical Paper No. 193. 1-4.

Ramon Bonfil. 1994. Overview of world elasmobranch fisheries. FAO, Fisheries Technical Paper 341., Rome. 70-106 .