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Depredation. Improvement of the information flow within IOTC. 1. Draft IOTC information sheet, reporting form, and webpage.

by

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ABSTRACT

An information sheet aimed to expand knowledge of non-scientific community in the IOTC region on the depredation on pelagic longline gears is presented. An approach to increase information flow between local fishermen and IOTC through commission' website is discussed. Draft voluntary depredation reporting form for small-scale fisherman is proposed.

Introduction

Depredation is usually defined as "*the partial or complete removal of hooked fish or bait from fishing gear…*" by predators like cetaceans, sharks, bone fish, birds, squids, crustaceans and others" distinguishing it from predation, i.e. "*the taking of free swimming fish (or other organisms)…*" (Donoghue et al., 2003; Gilman et al., 2007, 2008). In broader aspect depredation could be attributed to *removal or damage* of the catch (fish, cephalopods, crustaceans, etc.) or bait (if applicable) from *any* fishing gear or stocking facility by predators. It should be distinguished from scavenging on animals escaped from fishing gears non-damaged, injured or dead or on discards form fishing vessels. However both types of behaviour may appear simultaneously or sequentially: attracted by fishing gears scavengers may alternate their behaviour and learn to become depredators (Romanov et al., 2009 in preparation).

Although this problem attracts special attention of the Indian Ocean Tuna Commission (IOTC, 1999, 2000a, 2007) general public awareness about this phenomenon, about mitigation measures against it and statistics of depredation events are at very low level especially among small-scale semi-industrial fisheries of coastal countries.

Furthermore although IOTC developed Resolution 00/02 proposed by Japan on survey of predation on longline caught fish (IOTC, 2000b), which was carried out by several member states from 2000 to 2005 volume of collected information about depredation is insufficient and coverage of fisheries operation is irregular. Workshop on depredation held by IOTC at Seychelles clearly stated lack of depredation statistics for major fisheries in the region (IOTC, 2007).

More feedback from fisherman both small-scale and distant-water is necessary to understand extent of depredation in the Indian Ocean, to improve our knowledge on the depredation level and severity for fisheries and to develop better measures of prevention or mitigation.

IOTC as a regional fisheries body responsible for management of tuna resources logically could be the best coordinator of such activities. This working paper aimed to propose use of IOTC information resources such as IOTC webpage to distribute more information about this phenomenon and to obtain feedback form the fisheries community to initialize voluntary reporting of depredation especially from

small-scale fishermen not covered by logbooks and not communicated with IOTC on regular basis through their national authorities or non-governmental organizations.

Depredation information sheet

We propose to Working Party attention a draft of IOTC depredation information sheet – a summary of information on depredation in pelagic longline fisheries and some information on mitigation measures (Appendix I). If this version or modified one of the information sheet will be accepted we propose keep this information sheet at the special IOTC depredation webpage (a part of IOTC website) and to develop a poster for wider distribution within IOTC coastal countries and distant-water fleets operating in the region. Poster copy could be also available through IOTC website.

Depredation reporting form and webpage

Voluntary depredation reporting form for small-scale artisanal and semi-industrial operations is presented in Appendix II. Simple idea of the webpage development is to present links to the information sheet, reporting form and to make possible submission of the filled forms to IOTC database without direct interaction with IOTC staff or with limited interaction in order to not increase workload on limited manpower of IOTC.

Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien

IOTC Information Sheet [DRAFT]

Depredation in pelagic fisheries

1. What is a depredation?

Depredation is a common term for removal or damage of the catch (bait) from fishing gear or cultured animals in stocking facilities. Depredation is a particular manifestation of the interaction between fisheries or aquaculture and non-target species such as marine mammals, elasmobranch and teleost fish, birds, molluscs or crustaceans.

2. How to identify depredation?

Damage of the catch or damage of the bait (LL)

3. Which fishing gears affected in IOTC area?

Pelagic longlines – often,
Driftnet – no data, probably often,
Purse seine – rarely,
Pole and line – no data, probably rarely.

4. How to identify causes of depredation (species responsible)?

Direct observations of depredation events are rare. Predators responsible for damage are usually identified on the basis of traces left on bitten fish remains and on the basis of the depredation pattern

Character/pattern of the damage and traces of predator

Damage pattern:

Heavy damage (high percentage **of the catch** or **all fish caught** are damaged) usually corresponds to ***cetacean*** damage

Heavy damage of individual fish (heads only or even maxillary parts with operculums only) usually corresponds to ***cetacean*** damage. Single crushing and tearing off bite.

Sporadic damage with **several visible bites** on the fish body fish usually corresponds to sharks or other non-cetacean predators.

If you have signs of shark depredation most probably one of the next fish caught will be shark.

Traces on fish caught or on bait:

Clear crescent-like cuts are sign of the large pelagic **shark** depredation. All **pelagic shark** species **involved in depredation** have blade-like, very sharp teeth, situated in several rows in jaws forming crescent-like mouth. Such teeth morphology and mouth shape allow them to make clear cuts of fish flesh. Even mako sharks, with incomplete cutting edges on jaws (Compagno, 2001) can clearly bite piece of fish caught.

Shark left crescent-shaped cuts in the body of fish with sharply cut edges of wounds and overall damage to the fish caught very often represented by one or several single bites (see also Chapman et al., 2006, Gilman et al., 2008).
Ragged wounds, tear off (instead of cut) pieces of flesh, traces of conical teeth are signs of **cetacean** depredation.
Cetaceans involved in depredation (toothed whales) have sparsely-settled conical teeth. Jaws shape is rather conical or oval than crescent-like.
Edges of wounds left by toothed whales on fish usually ragged, with traces of conical widely spaced teeth. Toothed whales often eat fish completely up to the position of the hook in the fish body. In many cases toothed whales left only jaws and operculums of mouth-caught tuna.
Predation pattern of cetaceans suggest that toothed whales are able to identify position of metallic hooks inside fish body by their organs of sonic location (Romanov et al., 2007).
Small (up to 5-8 cm in length) oval or circular clean cuts are depredation by **cookie-cutter shark**.
(Chapman et al., 2006)(Chapman et al., 2006).
Squid or birds damage is occurred more rarely than other types of depredation.

5. How to avoid depredation?

Do not feed cetaceans;
Do not discard fish or offal in the presence of cetaceans; same measures are useful to avoid shark attraction to fishing gears;
Do not set or haul gear when cetaceans are around;
Change fishing area;
Set you longline deep

Deep setting decrease longline interactions with sharks and bring additional benefits: decrease interaction with endangered species like sea turtles and increase catch of highly valuable species like bigeye tuna;

Avoid depredation hotspots

Avoid setting in the hotspots of sharks: seamounts, oceanic shoals, and shelf edge;

Control soaking time

Do not increase soaking time. Decrease soaking time if you faced depredation;

Report depredation

Mitigation of depredation need joint effort of fishers, researchers and managers.
Report depredation will help to monitor depredation in your region and to develop mitigation measures; Take a photographs if it possible…

6. How to report depredation?

If your vessel is over 24 m long record in the vessel logbook all fish individuals depredated, specifying to the extend possible fish species and identification of predator. You can report also depredation visiting **IOTC website (www.iotc.org/xxx/xxx)**.
If your vessel is smaller than 24 m long, please report depredation in special form available at **IOTC website** or your local fisheries office.

Do not forget: Indian Ocean is international cetacean sanctuary (established by International Whaling Commission IWC): do not make any harm to cetaceans even if they do harm to you.

Useful references:

Chapman, L., P. Sharples, D. Brogan, A. Desurmont, S. Beverly, and W. Sokimi. 2006. Marine species identification manual for horizontal longline fishermen/Manuel d'identification des especes marines destine aux pecheurs a la palangre horizontale. SPC, Noumea (New Caledonia) 152 p.

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Identification of predators, sheet 1

Shark bites

Colour plate I. Traces of shark bite on yellowfin tuna *Thunnus albacares*. Photo: Michel Potier.

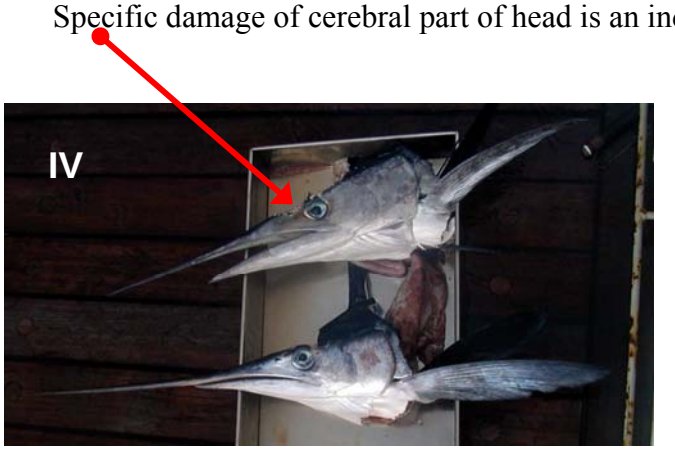
Colour plate II. Traces of shark bite on blue shark *Prionace glauca*. Photo: Pascal Bach.

Colour plate III. Traces of shark bite on sailfish *Istiophorus platypterus.* Photo: Pascal Bach.

Identification of predators, sheet 2

Cetacean bites

Specific damage of cerebral part of head is an indicator of cetacean attack

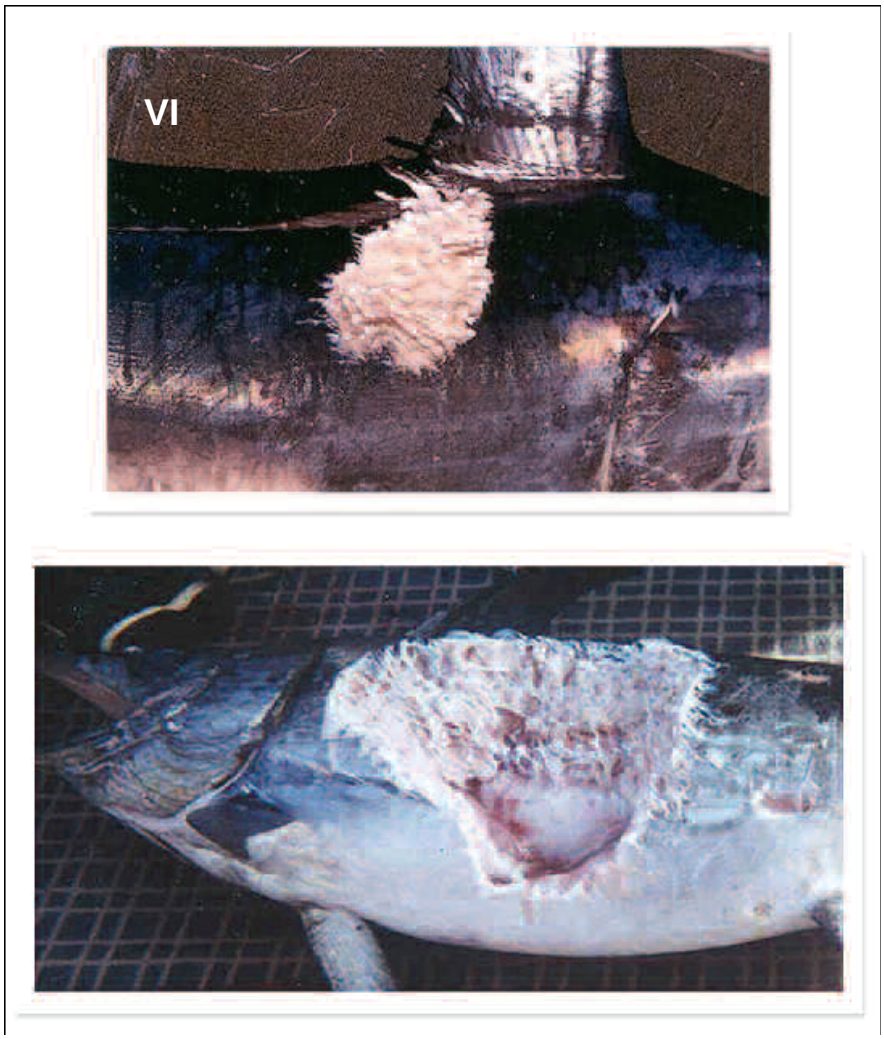


Colour plate IV. Spearfish *Tetrapturus* sp. damaged by cetaceans. Photo: Olivier Maury RV Shoyo Maru (NRIFSF) in the Tropical Atlantic Ocean in December 2000.

Colour plate V. Spearfish *Tetrapturus* sp. with characteristic damage by cetaceans in the frontal area of the head. Photo: Olivier Maury RV Shoyo Maru (NRIFSF) in the Tropical Atlantic Ocean in December 2000.

Identification of predators, sheet 3

Birds' damage

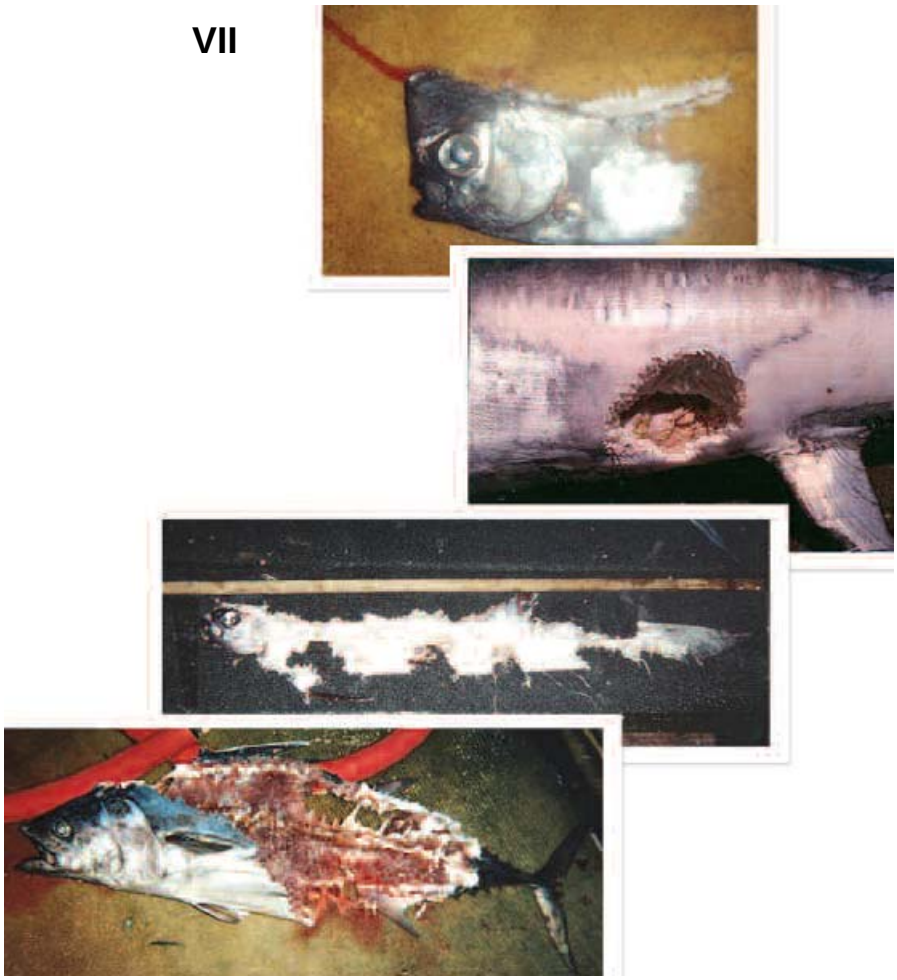


Colour plate VI. Swordfish *Xiphias gladius* damaged by birds. Photos from Chapman, L., et al., 2006.

Identification of predators, sheet 4

Squids' damage

VII



Colour plate VII. Squids' damage. Photos from Chapman, L., et al., 2006.

Appendix II

DRAFT voluntary reporting form for depredation

Confidential data
For statistical purposes only
None of the fields are obligatory

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Tuna Statistics in the Indian Ocean

IOTC Form 99:
Voluntary reporting form for depredation and other non-target species for small-scale fisheries

Page		of	

Vessel name	
Vessel length, m	
Fishing area	
Landing site	
Country/flag	

Observation type	
Single operation	☐
Several operations	☐
No of operations	

Position/area	
Lat DD°MM' S/N	**Long** DDD°MM' E

Type of Gear			**Effort**				**Operation details**			
							Fishing type		**Bait**	
Longline	**Pelagic drifting**	☐		**Hooks**			**Night fishing**	☐	**Fish whole**	☐
	Pelagic statinary	☐		**Hooks**			**Day fishing**	☐	**Fish parts**	☐
	Bottom	☐		**Hooks**			**Soaking time, h**		**Squid**	☐
Gillnet	**Pelagic drifting**	☐		**Sections of**		**m length**	**Target species**		**Attractant used**	
	Pelagic statinary	☐		**Sections**		**m length**	**Tuna**	☐		
	Bottom	☐		**Sections**		**m length**	**Swordfish**	☐	**Lightsteaks**	☐
Purse seine		☐		**Sets**	**Length/height**	/	**Sharks**	☐	**Fish/fish blood**	☐
Ring net		☐		**Sets**	**Length/height**	/				

Catch details		
Catch, no	**Non-damaged**	**Damaged**
Total		
Tuna		
Swordfish		
Other billfish		
Sharks		
Other fish		

Damage details				**Sightings**								**Catch/bycatch species involved in depredation**			
				Along the gear				Along the vessel							
Damage done by	**Damage of**			Numbers				Numbers				Numbers			
	Catch	Bait	Gear	n/a	1-5	5-50	>50	n/a	1-5	5-50	>50	n/a	1-5	5-50	>50
Cetaceans	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Big sharks	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cookiecutter shark	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Squid	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Seabirds	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Seaturtles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Crustaceans	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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