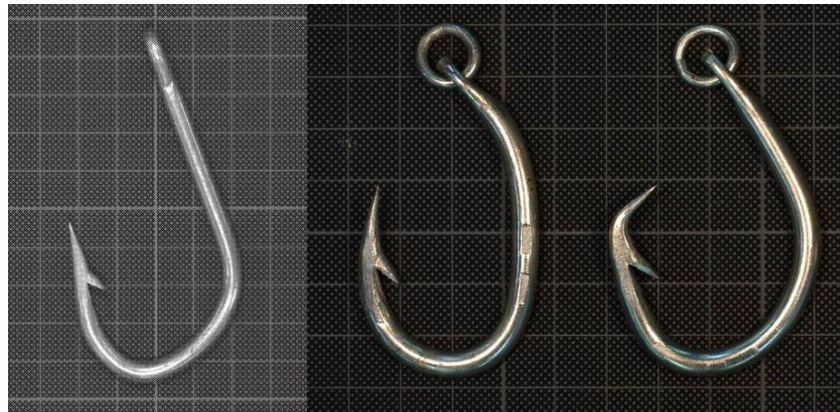


Review of studies on catch rates of commercial and bycatch species by hook type using in pelagic tuna longline fisheries



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Introduction

Main targets in pelagic longline fishery



- Bigeye (*Thunnus obesus*)
- Bluefins (*T. thynnus*, *T. orientalis* and *T. maccoyii*)
- Swordfish (*Xiphias gladius*) etc.

Bycatch is one of important issues for the pelagic longline

- Sea turtles
- Non-target sharks
- Non-target finfish etc.

It is needed to reduce bycatch
without reducing catch of target species

Introduction

Shallow and deep sets

Depends on the target species, fishermen change the setting depth

Depends on the setting depth, they are classified into 2 categories

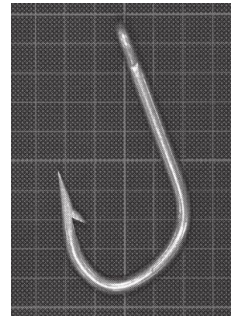
Shallow-set: Mainly targeting on billfish or sharks

Deep-set: Mainly targeting on many species of tunas

Hook type

Various sizes and shapes

Categorized into 3 types



J hook
(**J**)



Japanese
tuna hook
(**Tuna**)



Circle
hook
(**C**)

Introduction

WCPFC-CMM for sea turtles

For **shallow-set targeting** on **swordfish**, use either **finfish-bait** or **large circle hooks**

an interest to expand this to the other types of operations

Objectives for this study

Is there adequate scientific basis:

- ✓ to evaluate the effects of hook types on catch rates of target and non-target species in shallow and deep sets?
- ✓ to evaluate mitigation effect of utilization of C hooks in deep-sets?

Materials and methods

Reviewed literatures

A total of 40 study cases in 33 literatures

Categorizations

- ✓ Deep vs shallow sets

Shallow-set: 10 hooks or less in HBF

Deep-set: more than 10 hooks in HBF

(Common Oceans (ABNJ) Tuna Project 2017)

- ✓ Hook types (i.e. J vs C and Tuna vs C)

Materials and methods

The number of study cases was counted which reported significantly higher catch rate **by each species**

J vs C hooks

or non-significant (NS)

Tuna vs C hooks

or non-significant (NS)

Results: Number of study cases

Shallow and deep sets

Shallow-set: 25 cases in 21 literatures

Deep-set: 6 cases in 5 literatures

Studies for **deep-set** are **much less** than **shallow-set**

Hook type

J vs C hooks: 19 cases in 17 literatures

Tuna vs C hooks: 11 cases in 9 literatures

Both: 1 case in 1 literature

Studies for **Tuna vs C hooks** are **less** than **J vs C hooks**

Results: **Shallow-set**

J vs C hooks

Tuna vs C hooks

Species	No. of study cases				No. of study cases			
	J High	C High	NS	Total	Tuna High	C High	NS	Total
Tuna								
Bigeye		3	4	7			2	2
Yellowfin		3	3	6		1	2	3
Albacore		4	2	6				0

Reported **higher** catch rates of **large circle hook**

Results: Shallow-set

Species	No. of study cases				No. of study cases			
	J High	C High	NS	Total	Tuna High	C High	NS	Total
Shark								
Blue shark		4	5	9	1	1	1	3
Shortfin mako		1	4	5			1	1
Silky		1		1		2		2
Oceanic whitetip		1	1	2				0
Turtle								
Leatherback	4		1	5				0
Olive ridley	1		1	2	2		1	3
Loggerhead	3		3	6	1			1
Green/Black			1	1	2		1	3

Results: **Deep-set**

J vs C hooks

Tuna vs C hooks

Species	No. of study cases				No. of study cases			
	J High	C High	NS	Total	Tuna High	C High	NS	Total
Tuna								
Bigeye			1	1		1	1	2
Yellowfin			1	1	1	1		2
Albacore			1	1	2			2

The lack of studies in **deep-set**

Results: Deep-set

J vs C hooks

Tuna vs C hooks

Species	No. of study cases				No. of study cases			
	J High	C High	NS	Total	Tuna High	C High	NS	Total
Shark								
Blue shark	1			1	1	1		2
Showtfin mako			1	1	1			1
Turtle								
Leatherback							1	1
Olive ridley							1	1

Hook type reported **higher catch rate** for each species
was **not always same** among studies

Discussion

- There is inadequate information to evaluate the catch rates of target and non-target species for:
 - Deep-set
 - Tuna vs C hooks
- Using C hook resulted in significant increase of bycatch rates of shark species
- In deep-set, few studies directly compared the difference of bycatch rates of sea turtles by hook types

Need further information on catch rates for the target and non-target species of C hooks used in deep-set through experimental fishing practices

Recommendation

Considering with the results of this study,
we recommend that
the SC14 considers **further researches, focusing on deep-set longline, to evaluate catch rates of target and non-target species using J hook, Japanese tuna hook, and large circle hook**

Thank you for your attention