Estimation of reporting rates for the purse sine fleet based in Seychelles through a tag seeding experiment

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I. Definition

* Tag reporting rate

"proportion of the recaptured tags that are returned"

* For all tagging experiment, not all the tags that are recovered are declared as such for several reasons:
  i. tag not detected
  ii. Tag detected but not reported

I. Definition

* For example, 278 tagged bigeye have been recovered by the longline fleets…
  * … with a reporting rate of 20%, 1390 tagged bigeye would have actually been caught by the longline fleets
  * … with a reporting rate of 4%, 6950 tagged bigeye were caught

This has an important impact on the estimation of exploitation rate and needs to be accounted for!

I. Definition

Tag-seeding: placing tags on dead fish onboard a vessel to measure the reporting rate of these tags.

- Tag seeding could only be done onboard the purse seine fleet, after the fish have been caught, to test the detection and reporting of stevedores at the moment of unloading or transhipping the fish (…in Seychelles).
- No possibility to test reporting rates for other gears

II. Methodology

TAGS

Slightly different from conventional dart tags

- Exactly similar streamer: color/length
- But, stainless steel anchor head

Fish tagged at the exact same location as conventional dart tags

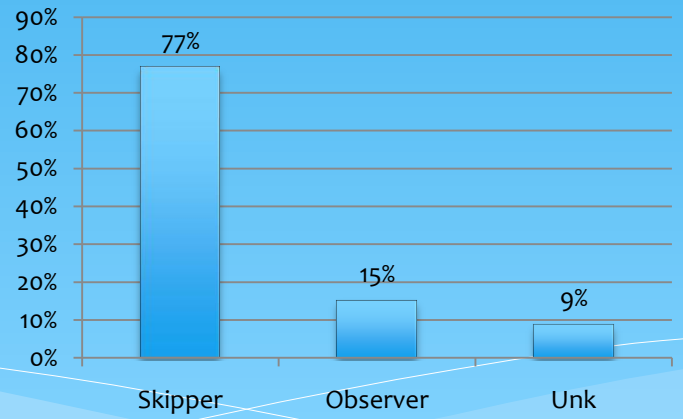
TAGGERS

Fish mainly tagged by skippers, and to a lesser extent by observers

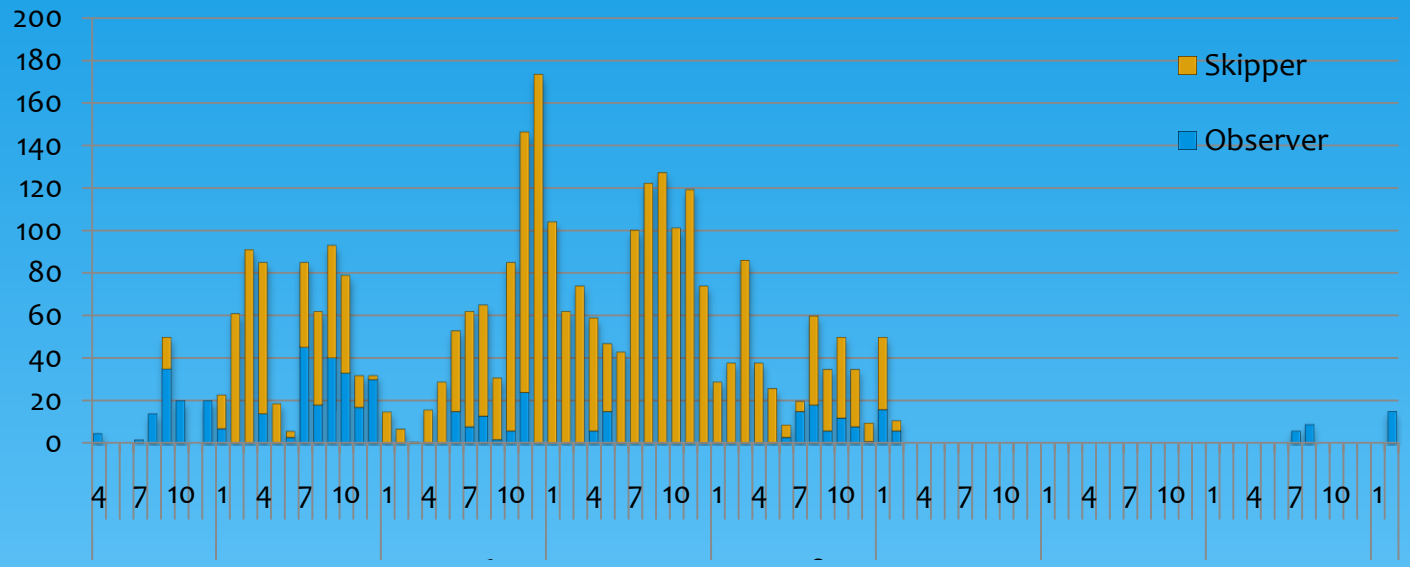
PROTOCOL

Max. of 15 tags per trip discreetly placed on the 3 species and distributed in different wells

=> 3240 tags seeded between 2004 and 2012

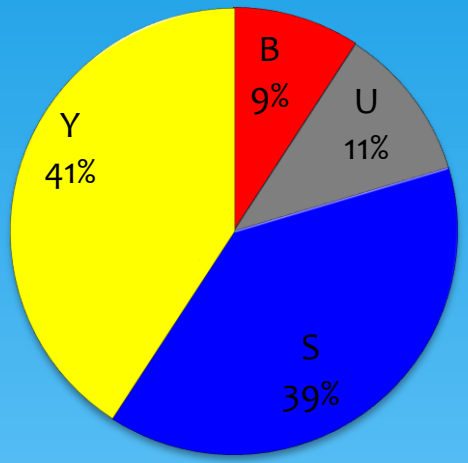


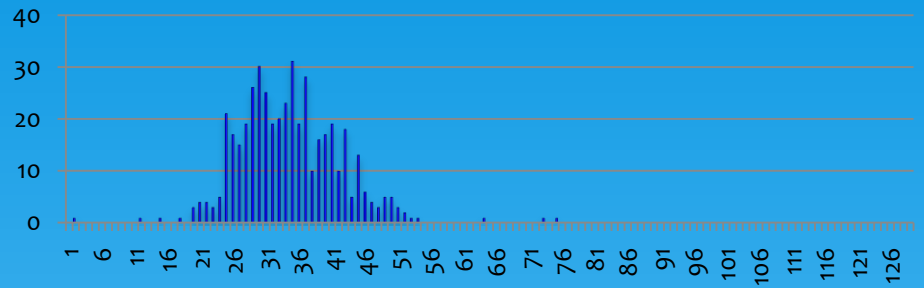
II. Methodology

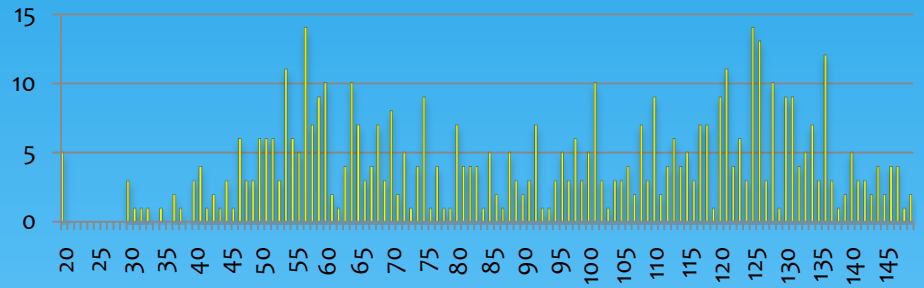


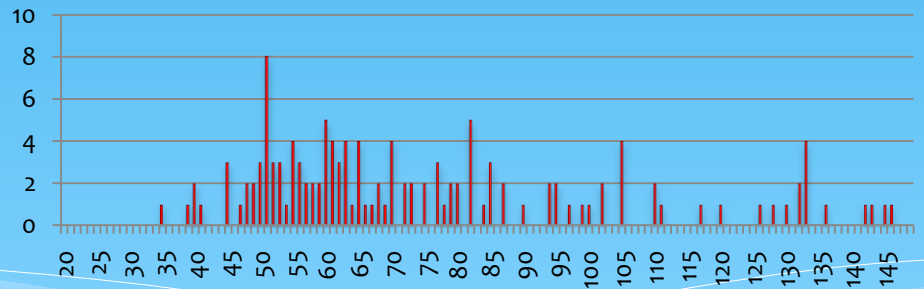
Tag seeding operations conducted between 2004 and 2009 with anecdotic seeding in 2011 and 2012

II. Methodology









Recovery protocol and reward similar to normal tags
=> 2956 seeded tags recovered

III. Analysis

- Analysis conducted in 2008 and updated in 2011
- Tag seeding information (in binomial form) ranging from 2004 to 2009 was used
- GLM techniques employed to explore the data for influential factors and to estimate a reporting rate by species, year and quarter for the tag recaptures coming through the Seychelles port.

III. Analysis

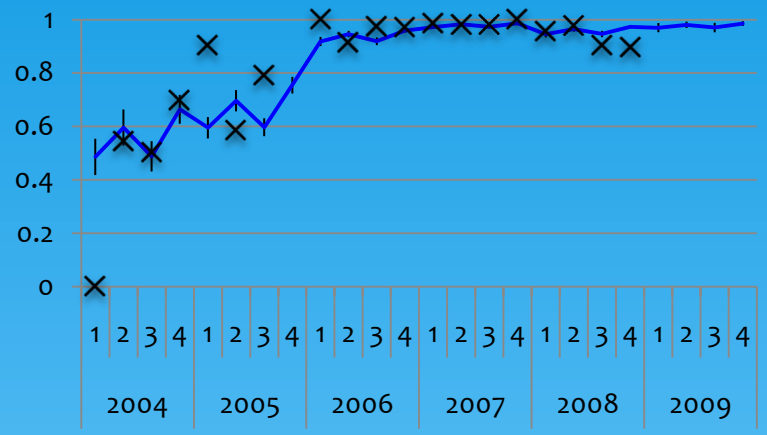
- First GLM had year, quarter, species, size category and tagger as the (non-interacting) effects

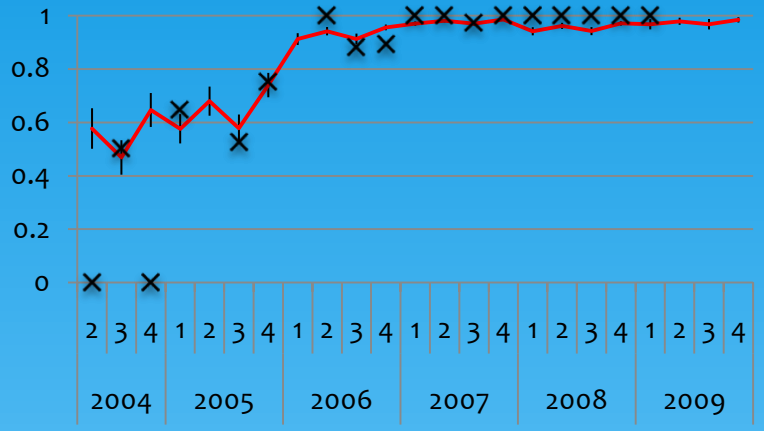
⇒ Clear evidence of significant year and quarter effects; no significant effects for species, size or tagger when using the Stevedore-only seeding information

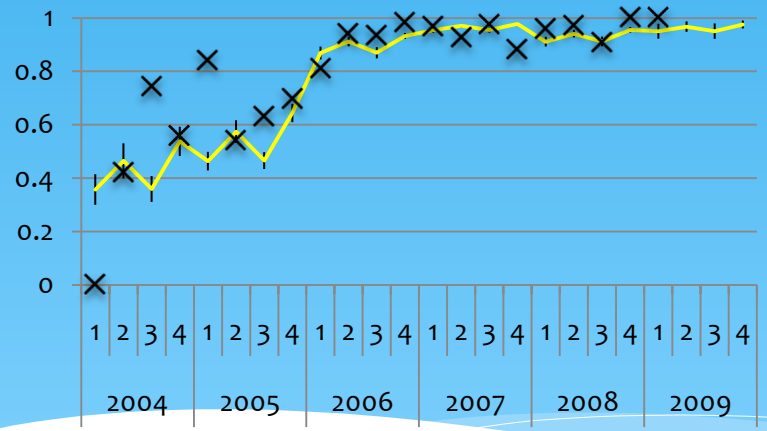
- GLM was revised to have year, quarter and year-quarter interactions only - not all interaction effects significant.

⇒ GLM structure cannot fully replicate the complex temporal structure in the reporting rates

III. Analysis







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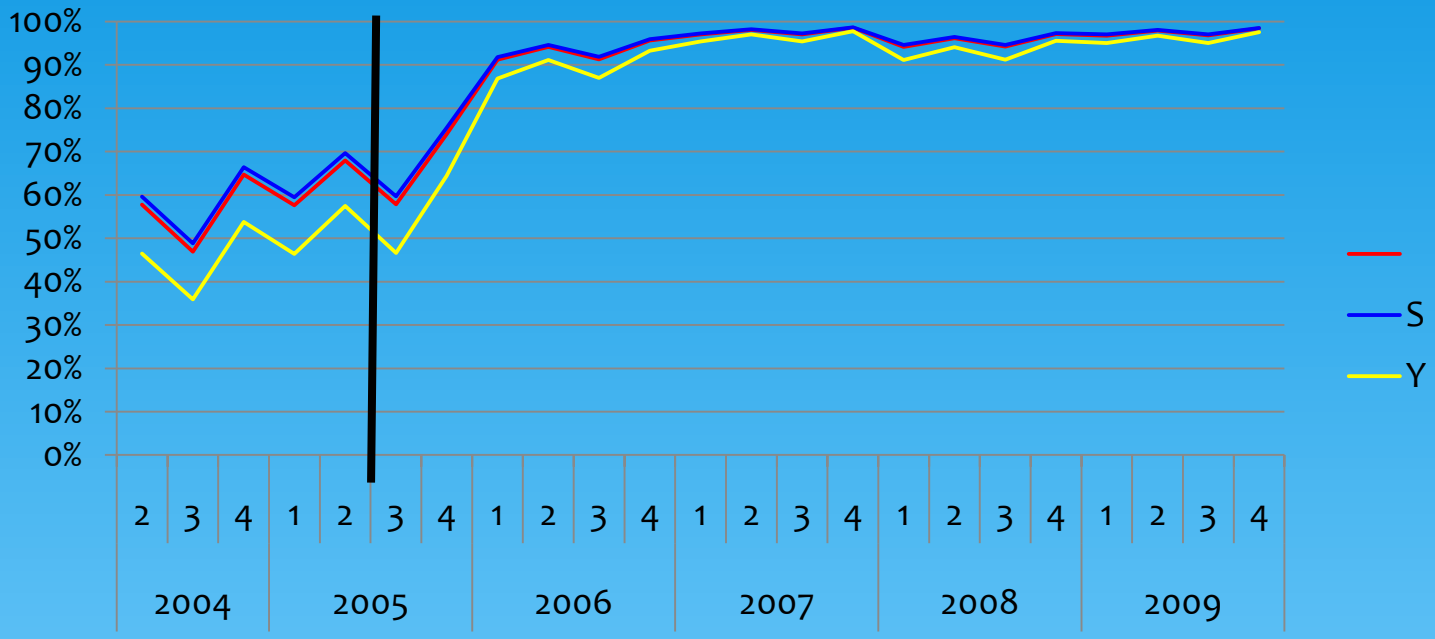

Rapid increase of the reporting rates after the start of the tagging activities reaching 90% after 2 quarters of tagging (22,000 tagged tunas)

III. Analysis

No seeding in 2010
Very low seeding in 2011 and 2012
Some tags are cut to have only 1 or 2 cm out of the fish

⇒ Could suggest that reporting rates are still high.

2011	Tagged	Recovered	RR
Y	11	11	100%
B	2	1	50%
S	2	1	50%

2012	Tagged	Recovered	RR
Y	13	10	77%
B	1	1	100%
S	1	1	100%

2011-2012	Tagged	Recovered	RR
Y	13	10	77%
B	1	0	0%

IV. Quality control

Tag seeding allowed the recovery scheme in Seychelles to be readjusted:

- return of fish for measurement at IOTC
- deployment of recovery teams in March 2007 directly onboard the vessels in port

=> To ensure that the best quality for the data associated to recoveries.

V. Conclusions

Continuing tag seeding served as a quality control and monitoring the quality of the recoveries per recovery platforms

⇒ Adaptation of the RTTP recovery scheme

⇒ Prioritization of effort directed to stevedores and not other platforms such as canneries

Re-test of a size-effect on the full dataset

Re-run the Bayesian approach developed by Hillary (2008) using the more complete set of data to estimate reporting rates and their uncertainty (see WPTT2008)