Agreement on the Conservation of Albatrosses and Petrels

Eighth Meeting of the Seabird Bycatch Working Group

Wellington, New Zealand, 4 – 6 September 2017

The performance of Hookpods under commercial fishing conditions in the Brazilian pelagic longline fleet

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SUMMARY

Hookpods were evaluated under commercial fishing conditions in the Brazilian pelagic longline fleet. A total of three trips, 17 sets and 11,380 hooks deployed have been monitored to date. A total of 1,066 fish were caught (93.7 fish / 1,000 hooks), a single black-browed albatross *Thalassarche melanophris* (0.1 birds 1,000 hooks) and 26 marine turtles of two species (2.1 and 0.2 individuals / 1,000 hooks for loggerhead *Caretta caretta* and leatherback turtles *Dermochelys coriacea* respectively). A total of 65 Hookpods were returned damaged equating to 0.57% of Hookpods deployed.

1. INTRODUCTION

In 2016 the Seabird Bycatch Working Group recommended that the Advisory Committee update best practice advice for reducing the impact of pelagic longline fisheries on seabirds to include hook-shielding devices (ACAP, 2016). The text in Annex 4 of the Advisory Committee report describes hook-shielding devices as follows:

Hook-shielding devices encase the point and barb of baited hooks to prevent seabird attacks during line setting until a prescribed depth is reached (a minimum of 10 m), or until after a minimum period of immersion has occurred (a minimum of 10 minutes) that ensures that baited hooks are released beyond the foraging depth of most seabirds. The following performance requirements are used by ACAP to assess the efficacy of hook-shielding devices in reducing seabird bycatch:

(a) the device shields the hook until a prescribed depth of 10 m or immersion time of 10 minutes is reached

(b) the device meets current recommended minimum standards for branch line weighting

(c) experimental research has been undertaken to allow assessment of the effectiveness, efficiency and practicality of the technology against the ACAP best-practice seabird bycatch mitigation criteria developed for assessing and recommending best practice advice on seabird bycatch mitigation measures.

One of two available technologies that were recognised as meeting the performance standards for hook-shielding devices was the Hookpod, after experimental trials suggest seabird mortality could be reduced to of 0.034 birds/1000 hooks, some 95% less than a control treatment (Barrington, 2016; Sullivan et al., 2016).

Discussions on whether hook-shielding technology could be considered to meet best practice criteria included queries on the long-term durability of the devices, the correct use of hook-shielding technology (i.e. would crew continue to “load” the devices on deployment) and whether an increased sink rate or the effect of hook-shielding had a greater influence on seabird bycatch.

This report provides an update of initial results from a project intended to monitor long-term Hookpod use in commercial conditions in the Brazilian pelagic longline fishery. These results have not been analysed at this stage, and will be updated and presented for discussion at the next Seabird Bycatch Working Group meeting when a larger sample size is available.

2. MATERIALS AND METHODS

The main objective was to evaluate the performance of Hookpods under commercial fishing conditions in the Brazilian pelagic longline fleet. The specific objectives included comparing the catch rate of target fish species and seabirds, and monitoring the durability of Hookpods and LED lights (ProGlow[1]), as an alternative to disposable chemical lights sticks.

The fishing vessel used for trials was a 22 m steel vessel, powered by a 325 hp motor with maximum torque of 1800 rpm. The single propeller was centrally positioned and rotated in a clockwise direction. The vessel had capacity for a crew of 11.

The vessel normally employs American system pelagic longline fishing gear, including a 4.0 mm monofilament main line to which branch lines are attached at approximately 50 m intervals. A buoy is attached every 8 branch lines. Six radio buoys are attached along the longline. A standard branch line consists of a snap (crocodile clip) followed by 20 m of 2.5 mm monofilament and a 60 or 75 g weighted swivel. Below the swivel there is 3 m of 2.5 mm monofilament line, a 50 cm wire tracer and a 16/0 Circle hook. Branch lines for the Hookpod trials were configured the same, but replaced the 75 g swivel for a non-weighted swivel plus Hookpods according to the treatments detailed below.

2.1. Experimental treatments

Two experimental treatments were designed to compare Hookpods deployed with an LED light and Hookpods without the LED light. As the LED light weighed 17 g in water, a 15 g weight was added to the Hookpod only treatment (Figure 1):

Treatment 1: 500 x branch lines set with Hookpods placed at 3.5 m from the hook, a 15 g weight and a non-weighted swivel placed directly below the pod;

[1] www.fishtekmarine.com/proglow/

Treatment 2: 500 x branch lines set with Hookpods placed at 3.5 m from the hook, 17g Proglow light and a non-weighted swivel placed directly below the pod;

Metrics used to measure the efficacy of the Hookpod included catch rate (fish / 1,000 hooks), seabird bycatch rate (birds / 1,000 hooks), and Hookpod durability - release mechanism (returned open / closed), damage (returned damaged / undamaged) and entanglements with fishing gear (entangled / untangled).

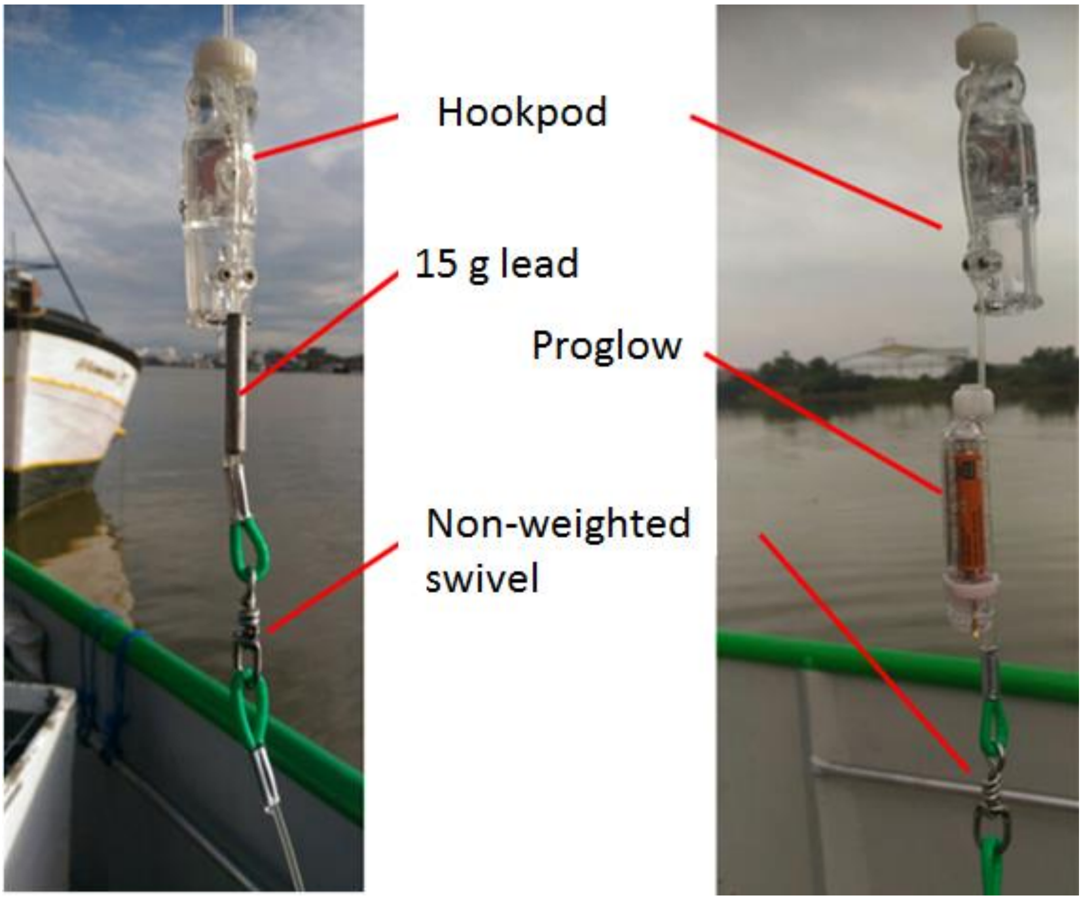

Figure 1: The configuration of branchline treatments used during Hookpod trials in the Brazilian pelagic longline fishery

3. PRELIMINARY RESULTS

To date, a total of three trips, 17 sets and 11,980 hooks have been monitored. Of the hooks monitored, 3,880 were from Treatment I (no light)[2] and 7,500 were from Treatment II (LED).

3.1. Fish catch

[2] A further 3,708 hooks were set but to improve catch rate the crew began to attach battery powered lights via crocodile clips to a some hooks during the third trip (~50-90% per set) which were removed from the dataset

A total of 1,066 fish were caught over the three trips, at a catch per unit effort (CPUE) of 93.6 fish / 1,000 hooks including 126 (32.5 fish / 1,000) hooks on treatment I and 940 (125.3 fish / 1,000 hooks) on treatment II. For the target species, a total of 780 blue shark *Prionace glauca* and 159 swordfish *Xiphius gladius* were caught at catch rates of 68.5 and 13.9 fish / 1,000 hooks respectively. By treatment *Prionance glauca* were caught at a CPUE of 32.5 on treatment I and 125.3 on treatment II. *Xiphius gladius* had a CPUE of 6.7 on treatment I and 95.1 on treatment II. In addition, 34 long-fin tuna *Thunnus alalunga* were caught at a CPUE of 3.0 fish / 1,000 hooks, 0.8 on treatment I and 4.1 on treatment II (Table 1).

3.2 Bycatch

A single black-browed albatross *Thalassarche melanophris* was caught on treatment II at a bycatch rate of 0.1 birds 1,000 hooks. A total of 26 marine turtles of two species were caught at a bycatch rate of 2.1 and 0.2 individuals / 1,000 hooks for loggerhead *Caretta caretta* (n=24) and leatherback turtles *Dermochelys coriacea* (n=2) respectively.

Table 1: CPUE / BPUE (individuals / 1,000 hooks) of all fish, seabirds and marine turtles on branch lines deployed with Hookpods with and without lights in the Brazilian pelagic longline fishery

Species	Treatment I (No lights)	Treatment II (LED lights)	TOTAL
All fish	32.5	125.3	93.7
P. glauca	17.3	95.1	68.5
X. gladius	6.7	17.7	14.0
T. alalunga	0.7	4.1	3.0
C. caretta	1.8	2.3	2.1
D. coriacea	-	0.3	0.2
T. melanophris	-	0.1	0.1

3.3 Durability

A total of 65 Hookpods were returned damaged equating to 0.57% of Hookpods deployed. Five (0.04%) had either damage to the wings or gate, eight (0.07%) returned with the collar missing and 46 (0.40) did not open while six (0.05%) were not possible to close (Table 2, Figure 2).

Table 2: Summary of damaged Hookpods

Damage	Number	% of deployments
Broken	5	0.04
Collar missing	8	0.07
Does not close	6	0.05
Does not open	46	0.40
Total	65	0.57

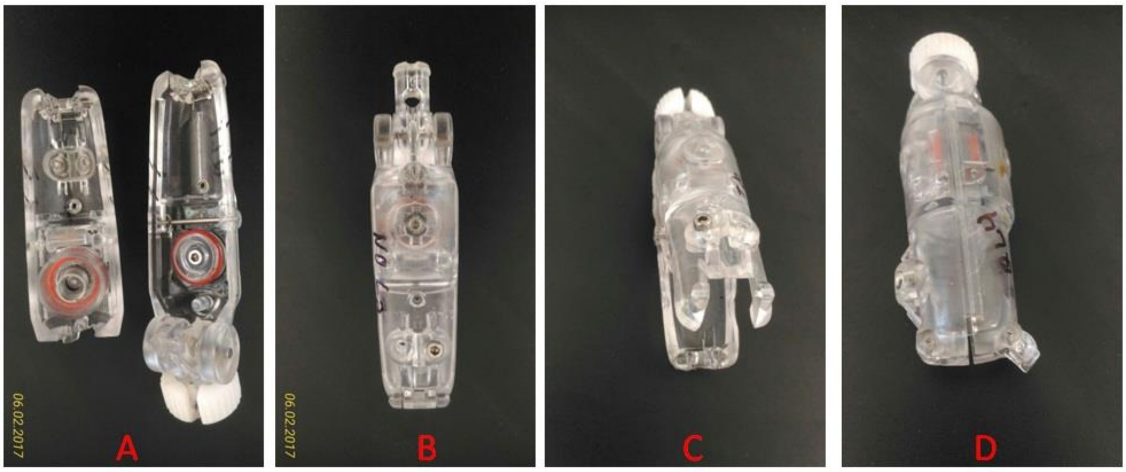

Figure 2: Damaged Hookpods during monitoring in the Brazilian pelagic longline fishery. a, c and d) Hook pod broken; b) collar missing

4. DISCUSSION

Previous trials conducted in Brazil, South Africa and Australia, comparing Hookpod vs control treatments, demonstrated the Hookpod is highly efficient preventing seabird bycatch without affecting the catch rate of target species (Barrington 2016, Sullivan et. al 2016). Here, we present preliminary results of ongoing monitoring of Hookpod performance in commercial fishery conditions in southern Brazil. This is important, not only for monitoring performance and durability of the Hookpod, but also to demonstrate the advantages for fisherman and to provide an incentive to widescale adoption.

4.1. Fish catch

There were visual differences in catch rates between treatment 1 and 2 on the two first trips,, corroborating the use of lights can increase the catch rate of target species, and the captain decided to include other battery powered lights on the lines without ProGlow LED lights during the third trip.

4.2 Bycatch

The single albatross captured is believed to have been caught during the soak. There were no albatross recorded attending the vessel during the set and the bycatch occurred during a set with unusually high numbers of sharks captured (CPUE =399.2). This hook was the first after the radio buoy and five sharks were captured on consecutive hooks. The captain commented that sharks actively swim to the surface and can sometimes raise the mainline.

4.3 Durability

The 0.57% rate of damage to Hookpods (broken pods, missing collars, pods not closing and not open) represents an acceptable loss related to the wear and tear of fishing gear. Pods that no longer closed had all been crushed, which may indicate interaction with sea turtles, other marine fauna or with the vessel. Taking into account that missing collars (0.07% of losses) can be replaced easily with spare collars, actual loss is even lower (0.5%).

4.4 General observations

When the branch lines were being built, the first impressions that crew members gave on the new gear were not positive. They are experienced building standard branch lines and the necessary changes to fit Hookpods and lights did not interest them. Furthermore, they had concerns that Hookpods may not open to release the hook and that Hookpods, Proglow lights and 15 g weights could increase entanglements. Despite these concerns, after the first day the crew noted that the new gear was stowed perfectly within hook bins, and the Hookpod fitted easily into setting and hauling operations. The Hookpod therefore was readily accepted by the crew and skipper, and did not interfere with or delay the fishing operations.

Hookpods are more easily fitted when the branch line is being built, prior to the hook being crimped onto the branch line, rather than by retro-fitting the device onto existing branch lines or when replacing damaged Hookpods.

On the third trip, the captain decided to use another brand of battery powered lights on treatment 1 (no lights) they realized that the attachment mechanism of the Hookpod and Proglow light was much better than the new lights that were attached to each branch line during the setting operation with a snap. Furthermore they needed to remove the lights with snaps during the hauling, which was not necessary for ProGlow lights and Hookpods.

In General, the Hookpod is performing well, with a high level of acceptance by captain and crew, with no complaints on catch rates of target species. We encourage other fleets to start to adopt and monitor the performance of hook shielding devices.

These results will be updated and presented for discussion at the next Seabird Bycatch Working group when a larger sample size is available.

REFERENCES

ACAP. 2016. Report of the Seabird Bycatch Working Group, AC9 Doc 10 Rev 1. La Serena, Chile.

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