

 <p>Agreement on the Conservation of Albatrosses and Petrels</p>	<p><b>Twelfth Meeting of the Seabird Bycatch Working Group</b></p> <p><i>Lima, Peru, 5 – 7 August 2024</i></p> <p><b>Minimum standards for the ACAP advice on branch line weighting for pelagic longline fisheries</b></p> <p><b><i>Sebastián Jiménez, Igor Debski, Dimas Gianuca, Megan Tierney</i></b></p>
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### SUMMARY

Weights placed near hooks (i.e. short leaders) in pelagic longline branch lines increase sink rates of baited hooks and reduce seabird attacks and bycatch. Currently, ACAP recommends three weight regimes that are considered within ACAP's Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds:

- (a) 40 g or greater attached within 0.5 m of the hook; or
- (b) 60 g or greater attached within 1 m of the hook; or
- (c) 80 g or greater attached within 2 m of the hook.

This categorization is the result of a study on the sink rates of baited hooks in branch lines with several weighting configurations (SBWG7 Doc 07). The sink rates of these recommended branch line weighting regimes were on average equal to or above 0.5 m.sec<sup>-1</sup> under controlled experimental conditions. However, the minimum standards recommended by ACAP for this mitigation measure do not consider the materials of the weights used which can greatly influence their performance in sinking hooks beyond the reach of seabirds. Defining ACAP recommended specifications based on sink rates provide a possible mechanism to account for the variation in performance of different material. This could also provide greater flexibility for the development of weighting regimes in pelagic longline configurations where current weight specifications might pose operational challenges for implementation, However, sink rates measured under real fishing conditions can vary from those obtained under controlled experimental conditions, making implementation of such an approach challenging. Further stipulation around the use of branch line weight materials could be another option to ensure ACAP recommended only specifications that are effective at rapidly sinking hooks beyond the reach of seabirds.

### RECOMMENDATION

We recommend that SBWG consider how the minimum standards for branch line weighting in ACAP Best Practice Advice for Pelagic Longline Fisheries could be improved to ensure they describe the use of weights which will be effective at rapidly sinking hooks beyond the reach of seabirds.

## **Estándares Mínimos para las Recomendaciones de ACAP sobre los pesos en las brazoladas para las Pesquerías de Palangre Pelágico**

### **RESUMEN**

Los pesos colocados cerca de los anzuelos (i.e. reinales cortos) en las brazoladas de palangre pelágico aumentan las tasas de hundimiento de los anzuelos encarnados y reducen los ataques y la captura incidental de aves marinas. Actualmente, ACAP recomienda tres regímenes de peso que se consideran dentro de las Recomendaciones de Mejores Prácticas de ACAP para Reducir el Impacto de las Pesquerías de Palangre Pelágico en las Aves Marinas:

- (a) 40 g o más, adheridos a menos de 0.5 m del anzuelo; o
- (b) 60 g o más, adheridos a menos de 1 m del anzuelo; o
- (c) 80 g o más, adheridos a menos de 2 m del anzuelo.

Esta categorización es el resultado de un estudio sobre las tasas de hundimiento de los anzuelos encarnados en brazoladas con varias configuraciones de peso (SBWG7 Doc 07). Las tasas de hundimiento de estos regímenes de pesos recomendados para las brazoladas fueron en promedio iguales o superiores a  $0.5 \text{ m}\cdot\text{seg}^{-1}$  en condiciones experimentales controladas. Sin embargo, los estándares mínimos recomendados por ACAP para esta medida de mitigación no consideran los materiales de los pesos utilizados, lo cual puede influir significativamente en su desempeño para hundir los anzuelos fuera del alcance de las aves marinas. Un posible mecanismo para considerar la variación en el desempeño de los diferentes materiales consiste en definir las especificaciones recomendadas por ACAP en base a las tasas de hundimiento. Esto también podría proporcionar una mayor flexibilidad para el desarrollo de regímenes de peso en configuraciones de palangre pelágico donde las especificaciones actuales de peso podrían plantear desafíos operacionales para su implementación. Sin embargo, las tasas de hundimiento medidas en condiciones reales de pesca pueden variar de las obtenidas en condiciones experimentales controladas, lo que hace que la implementación de tal enfoque sea un desafío. Otra opción para asegurar que las especificaciones recomendadas por ACAP sean efectivas para hundir rápidamente los anzuelos fuera del alcance de las aves marinas consiste en especificar con mayor detalle los materiales de los pesos usados en las brazoladas.

### **RECOMENDACIÓN**

Recomendamos que el Grupo de Trabajo sobre Captura Secundaria de Aves Marinas considere cómo se podrían mejorar los estándares mínimos para los pesos en las brazoladas en las Recomendaciones de las Mejores Prácticas de ACAP para las Pesquerías de Palangre Pelágico de modo de asegurar que describan el uso de pesos que sean efectivos en hundir rápidamente los anzuelos fuera del alcance de las aves marinas.

## **Normes minimums actuellement recommandées par l'ACAP en matière de lestage des lignes secondaires pour les pêcheries pélagiques à la palangre**

### **RÉSUMÉ**

Des lests placés à proximité des hameçons (bas de lignes courts) sur les lignes secondaires des palangres pélagiques augmentent le taux d'immersion des hameçons avec appâts, réduisant ainsi les attaques par les oiseaux de mer et les captures accessoires. L'ACAP recommande actuellement trois régimes de lestage, présentés dans les conseils de l'ACAP en matière de bonnes pratiques pour réduire l'impact des pêcheries pélagiques à la palangre sur les oiseaux de mer :

- (d) 40 g ou plus attaché à moins de 0,5 m de l'hameçon ; ou
- (e) 60 g ou plus attaché à moins de 1 m de l'hameçon ; ou
- (f) 80 g ou plus attaché à moins de 2 m de l'hameçon.

Ces différentes catégories sont le résultat d'une étude sur les taux d'immersion des hameçons avec appâts sur les lignes secondaires avec plusieurs configurations de lestage (SBWG7 Doc 07). Les taux d'immersion, pour ces régimes de lestage des lignes secondaires étaient en moyenne supérieurs ou égaux à  $0.5 \text{ m}\cdot\text{sec}^{-1}$  dans des conditions expérimentales contrôlées. Néanmoins, les normes minimums recommandées par l'ACAP pour cette mesure d'atténuation ne tiennent pas compte des matériaux utilisés pour le lestage. Ceux-ci peuvent cependant avoir une grande influence sur la capacité à immerger les hameçons pour les mettre hors de portée des oiseaux. La définition de configurations recommandées par l'ACAP sur la base des taux d'immersion pourrait être un mécanisme possible pour tenir compte des variations de performance entre différents matériaux. Cela pourrait également permettre une plus grande souplesse dans le développement de régimes de lestage pour les configurations de palangre pélagique, dans les cas où les spécifications actuelles en matière de lestage sont susceptibles de poser des problèmes opérationnels au moment de leur mise en œuvre. Les taux d'immersion mesurés dans des conditions de pêche réelle peuvent cependant être différents de ceux obtenus dans des conditions expérimentales contrôlées, ce qui rend délicate la mise en œuvre d'une telle approche. Des stipulations supplémentaires sur les matériaux à utiliser pour le lestage des lignes secondaires pourraient être une autre option permettant de garantir que l'ACAP ne recommande que des configurations capables de mettre rapidement les hameçons hors de portée des oiseaux.

### **RECOMMANDATION**

Nous recommandons au GTCA d'envisager comment les normes minimums pour le lestage des lignes secondaires dans les conseils de l'ACAP en matière de bonnes pratiques pour les pêcheries pélagiques à la palangre pourraient être améliorées, pour garantir qu'elles décrivent une configuration de lestage capable d'immerger rapidement les hameçons pour les mettre hors de portée des oiseaux de mer.

## 1. INTRODUCTION

The Seabird Bycatch Working Group (SBWG) of ACAP routinely review the scientific literature dealing with seabird bycatch mitigation in pelagic fisheries. Based on this comprehensive review, ACAP recommends that the most effective way to reduce seabird bycatch in pelagic longline fisheries is to use the following three best practice measures simultaneously: branch line weighting, night setting and bird scaring lines. Alternatively, the use of an assessed hook-shielding device or underwater bait setting device is recommended as stand-alone mitigation measures (ACAP 2023).

Regarding branch line weighting, several experiments have demonstrated that weights placed near baited hooks (i.e. short leaders) increase their sink rates (Gianuca et al. 2011; Robertson et al. 2010; 2013; Barrington et al. 2016), thereby reducing the time window in which diving seabirds can attack the baited hooks. This has been shown to result in a lower rate of seabird attacks on baits (Gianuca et al. 2011; Ochi et al. 2013, Jiménez et al. 2019a) and in a reduced incidental capture (Jiménez et al. 2017; 2019; Santos et al. 2019). Studies conducted so far have not found an effect on the catch of target species (Jiménez et al. 2013; 2017; 2019; Robertson et al. 2013; Gianuca et al. 2013; Santos et al. 2019) or other bycatch species (Jiménez et al. 2019b).

This document briefly reviews the minimum standards recommended by ACAP for this mitigation measure.

## 2. MINIMUM STANDARDS FOR BRANCH LINE WEIGHTING

### 2.1. Recommended branch line weighting regimes

Currently, ACAP recommends three branch line weighting regimes that are considered within ACAP's Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds:

- (d) 40 g or greater attached within 0.5 m of the hook; or
- (e) 60 g or greater attached within 1 m of the hook; or
- (f) 80 g or greater attached within 2 m of the hook.

However, these minimum standards recommended by ACAP do not consider the materials of the weights used, nor the sink rates on which they were categorized within the best practices.

### 2.2. Categorisation of branch line weighting by sink rates

This categorisation is the result of a detailed study on the sink rates of baited hooks in branch lines with several weighting configurations (Barrington et al. 2016). This study provided evidence that there is demonstrable practical significance, as well as statistical significance, that using short leaders is better to increase sink rates of baited hooks. Based on 11 branch line weighting configurations, the mentioned study reveals seven distinct sink profile categories, from which three performed better:

1. 60 g and 80 g at 0 m
2. 40 g at 0 m and 80 g at 1 m
3. 60 g at 1 m and 80 g at 2 m

The sink rates of these branch line weighting regimes were on average equal to or above 0.5 m.sec<sup>-1</sup> (Barrington et al. 2016).

The branch line weighting regimes currently recommended by ACAP were selected from these three sink profile categories at the SBWG7 and endorsed at the AC9. The Working Group discussed the practicality of using a 40 g weight at the hook, and noted that in many cases it would be operationally more feasible to place the weight a small distance from the hook. Consequently, the Working Group agreed that the weighting configurations recommended in Barrington et al. 2016 should be modified by replacing the configuration of 40 g or greater at the hook with 40 g or greater within 0.5 m of the hook.

### **2.3. Sink rates in branch line weighting studies**

The sink rates profiles on which the minimum standards recommended by ACAP are based (Barrington et al. 2016), were obtained from dedicated at-sea experimental trials under controlled conditions (Robertson et al., 2010a; Robertson et al., 2010b; Robertson et al., 2013; Robertson & Candy, 2014). Barrington et al. (2016) mentioned the benefits of conduct such experiments under controlled conditions: “Dedicated at-sea experimental trials under controlled conditions reduce the likelihood of (i) sampling bias, (ii) confounding of average effects of experimental configurations with nuisance variables, (iii) insufficient statistical power to detect differences due to uncontrolled variability.”

From the perspective of compliance with the minimum standards, the sink rates of baited hooks on the recommended branch line regimes obtained under real fishing conditions should be considered. There is variation in the depth ranges used to evaluate sink rates across different studies that have addressed some of the weight regimes recommended by ACAP. In the studies that have demonstrated a reduction in seabird bait attacks and/or bycatch, the regime of 60 g or greater attached within 1 m of the hook has generated average values of 0.31 m.sec<sup>-1</sup> or greater within the first 4m depth (Jiménez et al. 2019; Santos et al. 2019). This value is lower than the average reported under controlled conditions equal to or above 0.5 m.sec<sup>-1</sup> (Barrington et al. 2016).

### **2.4. Material and type of branch line weights**

The minimum standards recommended by ACAP do not specify the type and the materials of the branch line weights. Studies on sink rates and the effectiveness of this measure have used lead swivels, safe leads and lumo leads (Gianuca et al. 2011; Jiménez et al. 2013; 2017; 2019; Robertson et al. 2010; 2013; Barrington et al. 2016). Other weighting methods included the double-weight system (Ochi et al. 2013, Melvin et al. 2014), weighted hooks or heavy hooks (Gilman et al. 2023, Brothers 2023). Recently it has become apparent that the use of underwater LED lights (as an alternative to traditional light-sticks) have the potential to be considered a branch line weight, based on their mass. Such devices are typically composed of plastic and other materials, and whilst they may weigh 60g or 80g, due to their greater displacement of water compared to solid metal weights, they sink much slower than equivalent metal weights. There are also other devices such as shark deterrents, which attach to the branch line and have the potential to act as a branch line weight.

A study in southern Brazil concluded that the addition of an electric fishing light with an approximate total weight of 160g out of the water (including two AA batteries and the snap) and located approximately 2 m from the hook, had a null or very low effect on the sink rates of baited hooks (Gianuca et al. 2016).

### **3. DISCUSSION**

It is vital that branch line weighting options specified by ACAP Best Practice Advice are effective at rapidly sinking hooks beyond the reach of seabirds. As the specifications stand currently, mass is the only parameter of the branch line weight considered, based on an historic assumed use of metal weights. To safeguard against the use of “weights” that may not be effective, it is apparent that further specification is necessary.

Including the sink rate of baited hooks in the minimum standards for branch line weighting could provide greater flexibility for the development of weighting regimes in pelagic longline configurations where current weight specifications might pose operational challenges for implementation. Within the research priorities, the working group has indicated that the use of a single weight (e.g. Melvin et al. 2013), or an improved version of the existing double weight system (i.e. Ochi et al. 2013, Melvin et al. 2014), could be the operationally preferred weighting option for experimentation to improve branch line weighting in high seas fisheries. In the latter case, the weight is distributed along a section of the branch line (Ochi et al. 2013, Melvin et al. 2014), not located at a specific distance from the hook, exemplifying a case where the flexibilization of current specifications could yield the desired results if similar sink rates are achieved. If branch line weighting specifications were changed to define weighting options by the sink rate they achieve, instead of by their mass, this would ensure that only effective weights could be used. However, such specification would be very challenging to measure compliance with, not only due to the requirement to take measurements of sink rates, but also the variability of measured rates under different circumstances (e.g. controlled experimental situations compared to real world fishing).

Branch line weighting specifications could be changed to define the materials required to be used by such weights, to ensure only those that are known to sink rapidly are used. However, this approach would be challenging for weights of composite material, such as sliding weights, and could also act to limit options available to operators.

A compromise between the above two options could be to require the use of either a solid metal weight of a given mass, or the use of a “weight” which has been demonstrated to achieve a certain sink rate, although a process would be required to assess how robustly this was demonstrated.

There is great potential to help drive the uptake of branch line weights as a seabird bycatch mitigation option if this can be achieved through use of devices which achieve multiple purposes, such as also being an underwater light or shark deterrent. Finding ways to specify branch line weighting options accordingly should therefore be considered by SBWG.

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