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Recommendations concerning ACAP's advice for reducing the impact of pelagic longlines on seabirds

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SUMMARY

This document recommends that SBWG supports adopting short leaders as best practice line weighting for pelagic longline fishing. Current knowledge is presented that summarises the benefits to seabird conservation of using branch lines with short leaders and provides new information concerning the sink rate of differing branch line weighting configurations. These findings are provided to inform SBWG's decision-making process on best practice branch line weighting.

RECOMMENDATIONS

1. That ACAP's best practice advice on line weighting for pelagic longline fisheries be amended, replacing the existing advice with the following:

   Current recommended minimum standard for branch line weighting configurations are:

   Lead weights of 40 g or greater attached at the hook;

   Lead weights of 60 g or greater attached within 1 m of the hook or;

   Lead weights of 80 g or greater attached within 2 m of the hook.

   Positioning weight farther from the hook is not recommended.

   The weighting regimes pertain to the use of dead bait only (not live bait or a mix of dead and live bait)

   The use of sliding lead weights such as those reported in Robertson et al., (2013), not lead weights crimped into branch lines, is also encouraged.

2. That ACAP's best practice advice on line weighting for pelagic longline fisheries be amended, to include the following:

   Sliding leads, instead of leads crimped into the fishing gear, are recommended for crew safety reasons.

3. That the advice presented in section 5 below is taken into consideration in the determination of best practice branch line weighting.

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Indicaciones sobre las recomendaciones del ACAP para reducir el impacto que tiene la pesca con palangre pelágico sobre las aves marinas

Este documento recomienda que el GdTCS respalde la adopción de líneas cortas como buena práctica de lastrado de brazoladas para la pesca con palangre pelágico. Se presenta el estado actual de conocimientos, se sintetizan los beneficios que aporta para la conservación de aves marinas el empleo de brazoladas con líneas cortas, y se brinda nueva información sobre la velocidad de hundimiento de las distintas configuraciones del lastrado de brazoladas. Se proporcionan dichas conclusiones para documentar el proceso de la toma de decisiones del GdTCS sobre las mejores prácticas de lastrado de brazoladas.

RECOMENDACIONES

1. Que se modifiquen las recomendaciones de mejores prácticas del ACAP sobre lastrado de brazoladas para pesquerías de palangre pelágico; y que, para ello, se reemplacen las actuales recomendaciones por las siguientes:

   Las pautas mínimas actualmente recomendadas para las configuraciones del lastrado de brazoladas son:

   las pesas de plomo de 40 g o más deben colocarse en el anzuelo;

   las pesas de plomo de 60 g o más deben colocarse a 1 m de distancia del anzuelo; o

   las pesas de plomo de 80 g o más deben colocarse a 2 m de distancia del anzuelo.

   No se recomienda colocar las pesas a una mayor distancia del anzuelo que las indicadas más arriba.

   Los regímenes de lastrado se aplican solamente al uso de carnada muerta (y no al de carnada viva ni a la combinación de carnada viva y muerta).

   También se fomenta el empleo de pesas de plomo deslizantes, tales como las informadas en Robertson et al. (2013), y no de las pesas de plomo integradas a las brazoladas.

2. Que se modifiquen las recomendaciones de mejores prácticas del ACAP sobre lastrado de brazoladas para pesquerías de palangre pelágico para incluir la siguiente:

   Se recomienda utilizar plomos deslizantes y no integrados al arte de pesca para seguridad de la tripulación.

3. Que se consideran las recomendaciones presentadas más abajo en la sección 5 a la hora de determinar las mejores prácticas de lastrado de brazoladas.

Recommandations relatives aux avis del'ACAP sur la réduction des retombées de la pêche palangrière pélagique sur les oiseaux marins

Le présent document appelle le GTCA à soutenir l'adoption de bas de lignes courts comme recommandation de bonnes pratiques en matière de lestage de la palangre dans les pêcheries palangrières pélagiques. Il expose également les connaissances actuelles afin de résumer les avantages que présente l'utilisation de lignes secondaires dotées de bas de lignes courts en matière de préservation des oiseaux marins et de communiquer les dernières informations sur la vitesse d'immersion des différentes configurations de lestage des lignes secondaires. Le présent document présente les résultats dans le but d'informer les responsables du processus de prise de décisions du GTCA sur le lestage des lignes secondaires

RECOMMANDATIONS

1. Il est recommandé de modifier les bonnes pratiques de l'ACAP en matière de lestage de la palangre dans les pêcheries palangrières pélagiques, en remplaçant les bonnes pratiques existantes par les suivantes :

   Les normes minimales actuelles recommandées en matière de configurations de lestage des lignes secondaires sont :

   Plombs de 40 g ou plus attachés à l'hameçon ;

   Plombs de 60 g ou plus attachés à moins de 1 m de l'hameçon ou ;

   Plombs de 80 g ou plus attachés à moins de 2 m de l'hameçon.

   Il n'est pas recommandé de placer les lests à plus de 2 m de l'hameçon.

   Les régimes de lestage concernent uniquement l'utilisation d'appâts morts (appâts non vivants ou un mélange d'appâts morts et vivants)

   L'utilisation de torpilles en plomb telles que celles figurant dans Robertson et coll. (2013) et non de plombs sertis dans les lignes secondaires, est également encouragée.

2. Il est recommandé de modifier les bonnes pratiques de l'ACAP en matière de lestage de la palangre dans les pêcheries palangrières pélagiques, afin d'inclure le point suivant :

   Les torpilles en plomb sont à privilégier par rapport aux plombs sertis dans les engins de pêche, pour des raisons de sécurité de l'équipage.

3. Il est conseillé que la recommandation de bonne pratique présentée au chapitre 5 ci-dessous soit prise en compte lors de la définition des bonnes pratiques en matière de lestage des lignes secondaires.

1. INTRODUCTION

At SBWG5 (La Rochelle, 6-10 May 2013) changes were recommended concerning to ACAP's best practice advice on line weighting for pelagic longline fisheries to accommodate short leaders (weights close to hooks) (SBWG5 Doc 31). It was recommended that line weighting should be given priority over night setting and using bird scaring lines, as part of the best practice advice. This would safeguard against any non-compliance by fishing operators with night setting and bird scaring line measures, and would address problems associated with current low levels of onboard observers and lack of uptake of electronic monitoring systems. Giving priority to line weighting assists with compliance, as line weighting is integral to the fishing gear, and is more likely to be consistently implemented, even for fishing fleets where limited to no independent monitoring of fishing operations occurs.

SBWG5 Doc 31 recommended that line weighting should be assessed as if it is a single measure within ACAP's best practice advice, and that branch lines with short leaders should be preferred — because of the far superior sink rates this gear configuration achieves. Under the recommended approach best practice line weighting for pelagic longline fishing would:

i. effectively deter seabirds in the absence of other mitigation

ii. have minimal, if any, detectible effects on fish catch rates (for target and non-target species)

iii. be safe for crews

iv. facilitate assessment of compliance by at-sea and in-port inspections of gear storage bins.

These recommendations are based on Robertson et al., 2013 (SBWG5 Doc 51). That paper highlighted that longline fishing gear with weights placed at or near the hook satisfied points (i)-(iv) above. Data were not available concerning the effectiveness of the proposed gear configurations in deterring seabirds, because the research was conducted in an area of the Australian pelagic longline fishery where there is a low abundance of seabirds. Current knowledge of the deterrent effectiveness concerning seabirds, and effects on fish catch, of longline fishing gear with short leaders is presented below

2. BENEFITS OF SHORT LEADERS

Table 1 summarises the results of research to date on the influence of leader length on catch rates of seabirds and fish. Although the masses of the lead weights used in these studies varied, the variations were minor (≤15 g in most cases) compared to the changes in leader length. Leader length has a far greater influence on sink rate, especially in the upper reaches of the water column (Robertson et al., 2010). In the five studies presented in Table 1 there were no detectible effects on fish catches associated with the placement of weights closer to hooks. Studies in Brazil and Uruguay provided results on seabirds. In the Brazilian study a reduction in leader length from 5.5 m to 2 m yielded a four-fold reduction in seabird attacks. In the Uruguayan study a reduction in leader length from 4.5 m to 1 m reduced seabird attacks and seabird mortality by ~59% and ~50%, respectively. These trials were conducted substantially in daylight and at dusk and without scaring lines, against seabird species that are among the most difficult to deter.

Table 1: Summary of information available to ACAP on the effects of reduced leader lengths on seabird attack rate, seabird mortality and fish catch. See source material for methodological details for each trial. WCP = white-chinned petrel; BBA = black-browed albatross; RA = royal albatross. n.a. = not applicable.

Country	Weighting compared	Seabirds: Involved?	Spp.	Setting time	Bird scaring line?	Effect of shorter leader: Seabirds	Fish catch	Sample size	Source
Brazil	60 g/75 g at 2 m versus 60 g/75 g at 5.5 m	Yes	WCP; BBA; Sp	Day and night	No (Table 7, source document)	Four-fold reduction in attacks (Table 7, source document)	None detected	Medium/ large (see source document)	SBWG4 Doc 09
Brazil	60 g/75 g at 2 m versus 60 g/75 g at 5.5 m	No	n.a.	Day and night	n.a.	n.a.	None detected	Large (see source document)	SBWG5 Doc 33
Uruguay	75 g at 4.5 m versus 65 g at1 m	Yes	BBAs; RAs;	Day-time and at dusk	No	59% reduction in attacks; 50 % reduction in mortality	None detected	Small (preliminary study)	SBWG5 Doc 49
Australia	60 g at 3.5 m versus 120 g at 2 m	No	n.a.	Day and night	n.a.	n.a.	None detected	Large	Robertson et al., 2013
Australia	60 g at 3.5 m versus 40 g at 0 m	No	n.a.	Day and night	n.a.	n.a.	None detected	Large	Robertson et al., 2013 and SBWG5 Doc 51

For a given amount of weight the difference between long and short leaders is most pronounced in the upper levels of the water column e.g., 0-2 m or thereabouts; (Robertson et al., 2010, Robertson et al., 2013), so the reduced number of attacks and mortality in Table 1 likely reflect the faster initial sink rates of gear with shorter leaders. For example, in the preliminary study in Uruguay baited hooks on 1 m leaders reached 2 m depth at almost twice the rate (o.27 m/s) as hooks on 4.5 m leaders (0.15 m/s) (SBWG5 Doc 49). The differences to this depth in the Brazilian study are less pronounced but still substantial: 0.32 m/s (2 m leader) c.f. 0.24 m/s (5.5 m leader; the former > 30% faster) for one vessel and 0.25 m/s c.f. 0.18 m/s for another (the former nearly 40% faster, SBWG4 Doc 09). Presumably the faster sinking baits reduced the visual ques and therefore the number of seabird attacks, which in the Uruguayan study translated into a major reduction in the number of seabirds killed.

The 50% reduction in seabird mortality recorded in the Uruguayan trial was based on small sample sizes. Although additional data would be desirable to refine the accuracy of the estimate further data are unlikely to reverse this finding. More likely, more data will either corroborate the 50% (or thereabouts) reduction in mortality or yield estimates more, or less, than that figure. Either way, the Uruguayan study has critically important implications for seabird conservation: branch lines with short leaders, once implemented, *can save the lives of seabirds irrespective of whether or not other measures are used*.

The other important consideration is compliance. Line weighting is integral to the fishing gear, meaning that on the short trips typical of vessels in coastal State longline fisheries it is not practical for the weights to be removed from the gear. Of the three measures that constitute ACAPs best practice, line weighting is the only measure where compliance can be assured without the presence of onboard observers or electronic monitoring.

3. LINE WEIGHTING OPTIONS

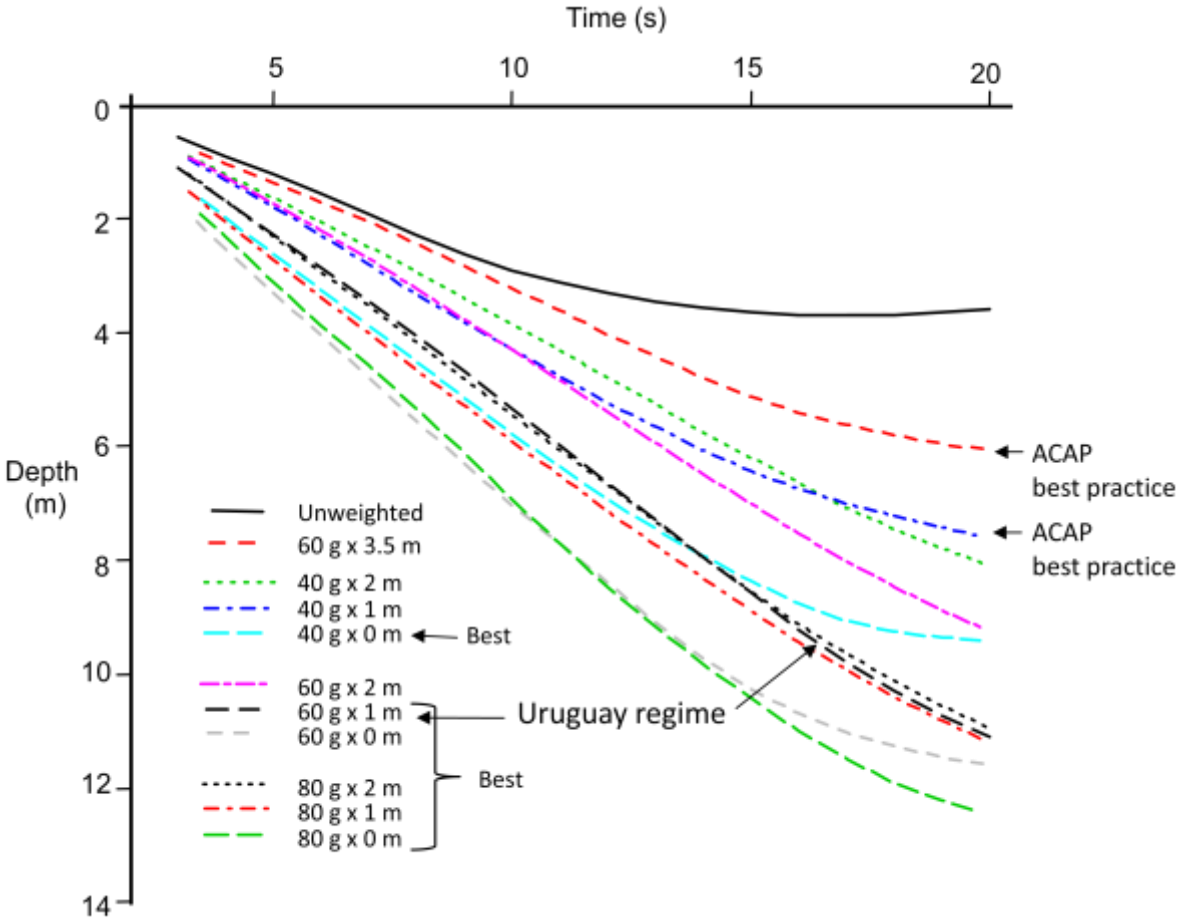
New information is provided on the sink rates of a range of line weighting regimes that approximate the sink rate of the Uruguayan regime in Table 1 (65 g at 1 m; ~50% reduction in mortality). This information is critical to the choice of line weighting options. Gear sinking at rates similar to the Uruguayan regime should yield the same (or similar) seabird deterrent outcome while providing operators some degree of flexibility regarding choice of line weighting regimes.

Sink rate information was gathered on a chartered vessel (the F/V *Samurai*) in the Australian pelagic longline fishery in November 2013. The number of weighting regimes trialled was limited to 11, determined by the number of time-depth recorders available for the study, the necessity to deploy all weight regimes on all sets of the mainline (to minimise confounding effects) and funds available for vessel charter.

The regimes tested were: unweighted, 60 g at 3.5 m and a 3 x 3 combination of leaders of 0 m (weight at the hook), 1 m and 2 m, each with 40 g, 60 g and 80 g lead weights (see Fig 1 and Table 2). These three masses span the range of weights currently used in pelagic longline fisheries operating in coastal States in the Southern Hemisphere. The regime of 60 g at 3.5 m is the industry standard in Australia and one of the options recommended by ACAP as best practice line weighting. The 40 g at 1 m regime approximates the 45 g at 1 m regime recommended by ACAP. Weights were sliding leads crimped into the branch lines to safeguard against slippage. The fishing vessel, metrics of all the fishing gear, vessel setting speed, vessel operational procedures and data analytical methods were identical to Robertson et al., (2013) except that the branch lines were three meters longer (15 m) to allow baited hooks to sink a little deeper before becoming taut on the mainline. The branch lines were purpose built from new materials and each regime was deployed 15 times.

The sink profiles of the 11 weighting regimes are shown in Figure 1. Unweighted gear sank the slowest followed by the 60 g at 3.5 m regime, the latter sinking at the same rate as unweighted gear until about 10 seconds after deployment. As expected from previous studies (cited above), within ‘weight’ the order of the profiles followed leader lengths in descending order: the shorter the leader the faster the sink rate. Of the weighted gear the 60 g at 3.5 m regime was by far the slowest and the 60 g at the hook and 80 g at the hook regimes the fastest. Of the regimes with 1 m leaders, 60 g and 80 g performed similarly and both were far superior to the 40 g regime.

Figure 1. Comparison of sink profiles of various branch line weighting regimes trialled in the Australian pelagic longline fishery. The weighting regimes are listed at bottom left. Note that the sink rates for several of the regimes (e.g., 40 g at 0 m; 60 g at 0 m) slowed after 15 seconds or so, suggesting branch line length became limiting. Sink rates in the 0-5 m range, where the profiles are linear, should be considered indicative of terminal velocity. Profiles for ACAPs current best practice regimes and the regime in the Uruguayan study are indicted. Regimes that equal or exceed the Uruguay regime are also indicated. N = 15 for each regime.



The sink rates of the regimes are shown in Table 1. Importantly, all the weighted regimes tested in Figure 1 sank faster than the 65 g at 1 m regime in the Uruguayan study reported in SBWG5 Doc 49. Even the industry standard regime (60 g at 3.5 m), which sank initially at about the same rate as gear without added weight, matched the sink rate of the Uruguayan regime (0.29 m/s versus 0.27 m/s to 2 m). The sink rate (0.43 m/s) of the 60 g at 1 m regime, which is virtually identical to the Uruguayan regime (65 g at 1 m), greatly exceeded the sink rate for the latter regime. The reasons for the different sink rates of the same weighting regimes between the Australian and Uruguayan studies are unclear and may reflect different sea states, different vessel propeller thrust characteristics (e.g., Robertson and Candy 2014), different analytical methods, unaccounted zero offsets in the time depth recorders or other effects.

Table 2. Mean sink rates and standard errors of the line weighting regimes shown in Figure 1 in the 0-2 m, 0-5 m and 0-10 m depth ranges. The 0-2 m range is a measure of the initial sink rate when baits are near the surface and most visible to seabirds. Note that the sink rates for several of the regimes (e.g., 40 g at 0 m; 60 g at 0 m, see Fig 1) slowed after 15 seconds or so, suggesting branch line length was limiting. Sink rates in the 0-5 m range, where the profiles are linear, should be considered indicative of terminal velocity. UW = unweighted (no leader). DNR = depth not reached (after 20 sec

*elapsed time). NA = not applicable. *not terminal velocity – see caption to Figure 1. N = 15 for each regime.*

Weight (g)	Leader (m)	Depth (m)	Sink rate (m/s)	Depth (m)	Sink rate (m/s)	Depth (m)	Sink rate (m/s)
UW	NA	2	0.27 ± 0.17	5	DNR	10	DNR
60	3.5	2	0.29 ± 0.02	5	0.34 ± 0.06	10	DNR
40	2	2	0.34 ± 0.02	5	0.40 ± 0.07	10	DNR
40	1	2	0.37 ± 0.02	5	0.43 ± 0.07	10	DNR
40	0	2	0.49 ± 0.03	5	0.57 ± 0.1	10	0.48 ± 0.17*
60	2	2	0.35 ± 0.02	5	0.44 ± 0.1	10	DNR
60	1	2	0.43 ± 0.03	5	0.53 ± 0.1	10	0.57 ± 0.21
60	0	2	0.59 ± 0.04	5	0.68 ± 0.1	10	0.68 ± 0.22*
80	2	2	0.44 ± 0.03	5	0.53 ± 0.1	10	0.56 ± 0.21
80	1	2	0.51 ± 0.03	5	0.58 ± 0.1	10	0.58 ± 0.21
80	0	2	0.55 ± 0.04	5	0.66 ± 0.1	10	0.70 ± 0.25

The lack of conformity between the two identical weighting regimes in the two studies suggests weighting regime is not always a reliable indicator of sink rate *between* studies. The most practical option, therefore, is for branch line weighting regime to be the diagnostic metric for comparison (recognising, of course, that seabirds presumably respond to the sink rate of the gear, not its physical characteristics).

The weighting regimes of 60 g at 1 m (Australian study) and 65 g at 1 m (Uruguayan study) are considered equal. The sink rates of the weighting regimes in Table 2 that approximate or exceed that of the 60 g at 1 m regime are:

(i) 60 g at the hook;

(ii) 80 g at 2 m;

(iii) 80 g at 1 m;

(iv) 80 g at the hook; and

(v) 40 g at the hook.

These five regimes are additional to the 60 g at 1 m regime, making six regimes in total.

4. RECOMMENDATIONS

The six regimes can be simplified to:

(i) Lead weights of 40 g or greater attached at the hook or;
(ii) Lead weights of 60 g or greater attached within 1 m of the hook or;
(iii) Lead weights of 80 g or greater attached within 2 m of the hook.

It is recommended that these three regimes constitute ACAP's best practice advice for branch line weighting.

The weighting regimes pertain to the use of dead bait only (not live bait or a mix of dead and live bait).

Sliding leads, instead of leads crimped into the fishing gear, are recommended for crew safety reasons.

5. ADVICE

Of the three branch line weighting options, a regime with lead weights of 60 g or greater within 0.5 m from the hook has the greater utility and its adoption is encouraged. This configuration facilitates assessments of compliance by in-port inspection of gear storage bins (lead weights 1-2 m from hooks will lie beneath the coils of branch line and cannot be readily observed in storage bins) and satisfies the other important standards for branch line weighting mentioned in the Introduction. In addition, the regime has the advantage of minimising lead loss from bite-offs by sharks (see SBWG6 Doc 12).

Concern about the leads sliding up the branch line (as sometimes occurs when a large fish is hauled) and not positioned correctly by crews can be addressed by placement of a small (<10 g) swivel at an appropriate distance from the hook (e.g., 1 m for the regime with leads of 60 g or greater). This swivel would act as a "stopper" to prevent leads from sliding beyond a prescribed distance up the branch line and could be maintained until such time that compliance to the correct position in branch lines was assured (see SBWG6 Doc 12).

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