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|  <p data-bbox="215 548 454 593">Agreement on the Conservation of Albatrosses and Petrels</p> | <p data-bbox="497 235 1406 280">Fifth Meeting of the Seabird Bycatch Working Group</p> <p data-bbox="853 295 1406 336"><i>La Rochelle, France, 1-3 May 2013</i></p> <p data-bbox="486 409 1406 504">Bycatch of great albatrosses in pelagic longline fishing of the southwest Atlantic</p> <p data-bbox="555 593 1337 678"><i>Sebastián Jiménez, Richard Phillips, Alejandro Brazeiro, Omar Defeo and Andrés Domingo</i></p> |
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SUMMARY

The aim of this study was to determine the spatial and temporal variation in species capture, and the environmental and operational variables affecting the bycatch of great albatrosses (*Diomedea* spp.) in pelagic longline fisheries in the southwest Atlantic. We used data of the national observer program of Uruguay (about 5 900 000 hooks observed) collected on board the Uruguayan pelagic longline fleet (2004-2011) and on Japanese pelagic longline vessels operating in Uruguay (2009-2011) under an experimental fishing license. Despite the differences between fleets in the fishing effort distribution, some spatial and temporal patterns were found in the bycatch of these species. High bycatch levels of northern (*D. sanfordi*) and southern royal (*D. epomophora*) albatrosses were recorded for the first time in this region, particularly over the shelf break. Wandering (*D. exulans*) and Tristan albatrosses (*D. dabbenena*) are mainly captured in more pelagic areas, where numerous fleets operate. Bycatch of great albatrosses was stronger during April to November. Royal albatrosses have a bycatch peak during June-July; while the strongest impact for wandering and Tristan albatrosses seemed to be from September to November. A range of fishing operative and habitat variables were found to be important in explaining the bycatch occurrence for these species, some of them (i.e. time of the set, moon phases) allowing relevant information for management.

RECOMMENDATIONS

1. Bycatch of the two royal albatross species could be reduced by the strict use of mitigation measures during May-August in the shelf break area. Bycatch of wandering and Tristan albatrosses are spatially less restricted. Mitigation measures for these species should be focused during August to December.
2. Setting the longline during the night is an unambiguous mitigation measure to reduce the bycatch of great albatrosses in pelagic longline fisheries. However, the catch rates observed during the most luminous moon phases require higher attention.

3. The combined use of night setting and toriline could be not enough to reduce the bycatch of great albatrosses during the full moon. At least during this period of the lunar cycle, a precautionary approach for these highly threatened species would be the combined used of these two measure plus appropriated weighting in the branch-lines.
4. Because great albatrosses access to pelagic longline baits mainly as secondary species, they would greatly benefit from mitigation measures focused on prevent the access to longline bait of medium size petrels and, in lesser extent, of *Thalassarche* albatrosses.

Captura secundaria de albatros *Diomedea* en la pesca con palangre pelágico en el sudoeste del Océano Atlántico

El objetivo de este estudio fue determinar la variación espacial y temporal en la captura de la especie, y las variables ambientales y operacionales que afectan la captura secundaria del albatros diomedea (*Diomedea* spp.) en las pesquerías con palangre pelágico en el sudoeste del Océano Atlántico. Usamos datos del programa nacional de observadores de Uruguay (se observaron alrededor de 5.900.000 anzuelos) recolectados a bordo de la flota uruguaya de pesca con palangre pelágico (2004-2011) y en buques palangreros pelágicos japoneses que operan en Uruguay (2009-2011) con una licencia para pesca experimental. A pesar de las diferencias entre las flotas en la distribución del esfuerzo pesquero, se observaron algunos patrones espaciales y temporales en la captura secundaria de estas especies. Se registraron por primera vez los niveles altos de captura secundaria del albatros real del norte (*D. sanfordi*) y del albatros real (*D. epomophora*) en esta región, en particular sobre el borde de la plataforma. El albatros viajero (*D. exulans*) y el albatros de Tristán (*D. dabbenena*) son capturados principalmente en áreas más pelágicas, donde operan varias flotas. La captura secundaria del albatros diomedea fue mayor durante los meses de abril a noviembre. Los albatros reales tienen un pico de captura secundaria durante los meses de junio a julio; aunque el efecto mayor para el albatros viajero y el albatros de Tristán parecen ser desde septiembre a noviembre. Se observó que una serie de variables de pesca operativa y hábitat eran importantes para explicar la captura secundaria de estas especies, algunas de ellas (por ejemplo, la hora del lance, las fases de la luna) proporcionaron información relevante para la gestión.

RECOMENDACIONES

1. La captura secundaria de las dos especies de albatros reales podría reducirse mediante el uso estricto de las medidas de mitigación durante los meses de mayo a agosto en la zona del borde de la plataforma. La captura secundaria del albatros viajero y el albatros de Tristán es menos restringida desde el punto de vista espacial. Las medidas de mitigación para estas especies debe centrarse durante los meses de agosto a diciembre.
2. El lanzamiento del palangre durante la noche es una medida de mitigación indiscutible para reducir la captura secundaria del albatros real en las pesquerías de palangre pelágico. Sin embargo, las tasas de captura observadas durante las fases de luna más luminosas requieren mayor atención.

3. El uso combinado del lance nocturno y la línea espantapájaros podría no ser suficiente para reducir la captura secundaria de albatros diomedea durante la fase de luna llena. Al menos, durante este período del ciclo lunar, un enfoque de precaución para estas especies fuertemente amenazadas sería el uso combinado de estas dos medidas además del uso adecuado de pesas en los reinales.
4. Dado que los albatros diomedea acceden a las carnadas del palangre pelágico principalmente como especie secundaria, se beneficiarían enormemente con las medidas de mitigación centradas en evitar el acceso a la carnada del palangre de los petreles medianos, y en menor medida, de los albatros *Thalassarche*.

Capture accessoire des albatros de l'espèce *Diomedea* dans les pêcheries à la palangre des eaux de l'Atlantique du Sud-ouest

Cette étude avait pour objectif de déterminer la variabilité spatiale et temporelle dans la capture d'une espèce, ainsi que d'autres variables d'ordre environnemental et opérationnel qui peuvent entrer en jeu dans la capture accessoire des albatros de l'espèce *Diomedea* dans les pêcheries à la palangre des eaux de l'Atlantique du Sud-ouest. Nous avons utilisé les données provenant du programme d'observateurs national de l'Uruguay (environ 5 900 000 hameçons observés) et recueillies à bord des palangriers uruguayens (période 2009-2011), en plus des palangriers japonais pêchant dans les eaux pélagiques de l'Uruguay en vertu d'un permis de pêche expérimental. Malgré les différences notables d'entre les deux flottilles, en termes de la distribution de l'effort de pêche, nous avons distingué certaines tendances spatiales et temporelles quant à la capture accessoire de cette espèce. Des taux élevés de capture accessoire de l'albatros royal du Nord (*D. Sanfordi*) et de l'albatros royal du Sud (*D. epomophora*) ont été établis pour cette région et ce pour la première fois, surtout aux environs des rebords continentaux. Par contre l'albatros hurleur (*D. exulans*) and et l'albatros de Tristan (*D. dabbenena*) sont capturés dans des zones plus pélagiques où l'on trouve en général un grand nombre de palangriers. Les captures accessoires des albatros de l'espèce *Diomedea* sont plus élevées pendant la période avril - novembre, alors que le pic des captures accessoires de l'albatros du Nord et de l'albatros du Sud survient autour de juin - juillet et que l'impact maximal sur l'albatros hurleur et l'albatros de Tristan se situe entre septembre et novembre. Cette variabilité dans la susceptibilité de chaque membre de l'espèce à être capturé en des périodes différentes souligne l'importance d'une gamme de facteurs portant sur l'habitat et l'opération de pêche, tels l'heure de la pose, les phases de la lune etc., ce qui a permis aux gestionnaires d'obtenir des informations utiles et pertinentes.

RECOMMANDATIONS

1. La capture accessoire des deux espèces d'albatros royal pourrait se réduire avec l'application de mesures strictes d'atténuation pendant la période mai - août autour des rebords continentaux. La capture accessoire des albatros hurleur et Tristan est moins limitée spatialement, et les mesures d'atténuation devraient être appliquées de décembre à août.

2. La pose de nuit de la palangre s'avère être une mesure incontestée de réduction de la capture des albatros des pêcheries à la palangre des eaux pélagiques. Cependant les taux de capture observés pendant la phase la plus lumineuse de la lune requièrent une attention toute particulière.
3. Recommandation 3. L'utilisation combinée de la pose de nuit et d'une ligne de banderoles pourrait ne pas être suffisante pour réduire la capture accessoire des albatros de l'espèce *Diomedea* pendant la période de la pleine lune. Pendant cette période du cycle lunaire il est recommandé que, pour cette espèce en danger d'extinction, une approche de précaution soit adoptée qui consisterait à combiner l'utilisation de ces deux mesures en plus d'une pondération appropriée des branches de la palangre.
4. Comme les albatros de l'espèce *Diomedea* n'accèdent aux appâts des palangres pélagiques qu'en tant qu'espèce secondaire, ils pourraient tirer grand profit de ces mesures d'atténuation qui visent à entraver l'accès aux appâts des palangres pélagiques des pétrels de dimension moyenne ainsi que, dans une plus faible mesure, les albatros de l'espèce *Thalassarche*.

1. INTRODUCTION

The pelagic longline fishery in the southwest Atlantic is a major conservation issue for several threatened albatrosses, including four species of great albatross: wandering albatross (*Diomedea exulans*), Tristan albatross (*D. dabbenena*), southern royal albatross (*D. epomophora*) and northern royal albatross (*D. sanfordi*). The aim of this study was to determine the spatial and temporal variation in species capture, and the environmental and operational variables affecting the bycatch of great albatrosses in pelagic longline fisheries in the southwest Atlantic.

2. MATERIALS AND METHODS

We used data of the national observer program ("Programa Nacional de Observadores a bordo de la flota atunera uruguaya" (PNOFA) of the "Dirección Nacional de Recursos Acuáticos" (DINARA)) of Uruguay (about 5 900 000 hooks observed) collected on board the Uruguayan pelagic longline fleet (2004-2011) and on Japanese pelagic longline vessels operating in Uruguay (2009-2011) under an experimental fishing license. The fishing area of the Uruguayan fleet encompasses the waters of the southwest Atlantic between 19°S and 47°S, and between 20°W and 60°W. The fishing area of Japanese vessels was between 34°S and 37°S, and between 49°W and 54°W, and the vessels concentrate their fishing effort within Uruguayan waters near the shelf break. Carcasses of great albatrosses were collected for further examination and identification at the laboratory.

3. RESULTS AND DISCUSSION

Despite the differences between fleets in the fishing effort distribution, some spatial and temporal patterns were found in the bycatch of these species. High bycatch levels of northern and southern royal albatrosses were recorded for the first time in this region,

particularly over the shelf break. Wandering and Tristan albatrosses are mainly captured in more pelagic areas, where numerous fleets operate. Bycatch of great albatrosses was stronger during April to November. Royal albatrosses have a bycatch peak during June-July; while the strongest impact for wandering and Tristan albatrosses seemed to be from September to November.

A range of fishing operative and habitat variables (SST, wind speed, bathymetry, ocean domains, time of the set, moon phases) were found to be important in explaining the bycatch occurrence for these species, some of them (i.e. time of the set, moon phases) allowing relevant information for management.

4. IMPLICATIONS FOR MANAGEMENT

Great albatrosses are among the most affected species in the pelagic longline fishing in the southwest Atlantic (Jiménez et al., 2012a), therefore any measure that could prevent/reduce the interaction between these species and longline fisheries operating in this region should be considered a high priority. The present paper finds key factors affecting the bycatch likelihood (and the catch rate) of great albatrosses which are extremely useful for the conservation of these highly threatened species.

Firstly, considering the peak bycatch seasons (with conservative temporal bounds of \pm a month), bycatch of both royal albatross species could be reduced by the strict use of mitigation measures during May-August in the shelf break area. Bycatch of wandering and Tristan albatrosses are spatially less restricted, and the bycatch region relays more in pelagic areas from the shelf break toward high seas (including international waters), mainly over the confluence Brazil-Malvinas. Mitigation measures for these species should be focused during August to December.

Secondly, setting the longline during the night is an unambiguous mitigation measure to reduce the bycatch of great albatrosses in pelagic longline fisheries. However, the catch rates observed during the most luminous moon phases require higher attention.

Current recommended mitigation measures for pelagic longline fisheries include the combined use of night setting, toriline and appropriated weighting in the branch-lines (Løkkeborg, 2011). The recommendation 11-09 (<http://www.iccat.int/en/RecsRegs.asp>) of the International Commission for the Conservation of Atlantic Tunas (ICCAT) indicated that in the area south of 25° S, CPCs (i.e. Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities) shall ensure that all longline vessels use at least two of these mitigation measures. Strict night setting is useful to reduce bycatch of great albatrosses (this study) and toriline has a demonstrated effect in reduce bycatch of seabirds in pelagic longline. Our results suggest that the combined use of night setting and toriline could be not enough to reduce the bycatch of great albatrosses during the full moon. At least during this period of the lunar cycle, a precautionary approach for these highly threatened species would be the combined used of the three aforementioned measures. The mitigation effect of the current proposed modifications on branch-line weighting (e.g. weight amount, distance of the point of attachment of the weight to the hook; see Robertson et al., 2010) need to be urgently tested for the seabird assemblage attending pelagic longline fisheries in the southern hemisphere.

Because great albatrosses access to pelagic longline baits mainly as secondary species (Jiménez et al. 2012b), they would greatly benefit from mitigation measures focused on

prevent the access to longline bait of medium size petrels (*Procellaria* and *Puffinus* spp.) and, in lesser extent, of *Thalassarche albatrosses*.

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