NORTHERN COMMITTEE
Third Regular Session
11-13 September 2007
Tokyo, Japan

SEABIRDS AVOIDANCE EFFECT OF TORI-LINES IN THE JAPANESE LONGLINE FISHERY: COMPARISON OF TORI-LINE STREAMERS

WCPFC/NC3/11

11th September, 2007

Paper submitted by Japan[1]

Abstract

The effects of tori-line streamer types on seabirds avoidance were examined with the data from Japanese observer program in southern bluefin tuna fishery. Nominal catch rates (catch/1000 hooks) and per-capita catch rates (catch/1000 hooks/albatross abundance) were compared between “WCPFC type” streamers and “Light type” (polypropylene band) streamers. There was no significant difference in these catch rates between the two streamer types ($P > 0.05$). These results indicate that “Light type” streamers have seabird avoidance effects equivalent to that of “WCPFC type” streamers.

Introduction

Yokota et al. (2007) examined effective factors of tori-poles in reducing incidental catch of albatross in a model analysis using the data collected by Japanese scientific observers in southern bluefin tuna fishery. The model analysis revealed that length of the tori-line and number of seabirds observed during line setting had significant effects on seabird catch rates and the effects of material and structure of streamers was not significant.

In the WCPFC-SC3, specification of seabird bycatch mitigation measure was discussed, and scientific information on “1b) Tori line (light streamer [e.g., polypropylene band])” was requested (WCPFC 2007). As a follow-up of Yokota et al. (2007), we made direct comparison of seabird catch rates between two types of tori-line streamers: “1a) Tori lines” (described as “WCPFC type” hereafter in this present paper), and “1b) Tori line” (light streamer) (described as “Light

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type”)[2], to provide additional information for the consideration of mitigation measures in WCPFC-TCC3.

Materials and Methods

The same data used in Yokota et al. (2007) were re-analyzed. Before comparing the catch rates between streamer types, we had to eliminate the effects of tori-line length and albatross abundance (number of albatross observed during line setting) because these two factors had significant effects on catch rates. First, we separated data by tori-line length categories, and used the data in 100 m and 150 m line categories, which had sufficient number of observed sets. We next divided the data into albatross abundance categories (“0”, “1-5”, “6-10”, “11-15”, “16-20”, “21-30” and “30<”; Fig. 1), and made two kinds of analyses which cancel the effects of albatross abundance on catch rates: 1) comparison of nominal catch rates (catch/1000 hooks) for a limited subset of data in a particular albatross abundance category (6-10) for each tori-line length (100 m and 150m); 2) comparison of approximate per-capita catch rates (catch/1000 hooks/albatross abundance) using a broader subset of data in albatross abundance categories from “1-5” to “21-30” for each tori-line length (100 m and 150 m). In the calculation of per-capita catch rate, medians of the albatross abundance category ranges were used as denominators. We performed Mann-Whitney’s *U* tests in catch rate comparisons.

Results and Discussion

Mean nominal catch rates of albatross for the two streamer types are shown in Fig. 2. There was no significant difference in catch rates between “WCPFC type” and “Light type” in both tori-line lengths (P = 0.39 for 100 m line length; P = 0.39 for 150 m line length).

Mean per-capita catch rates of the two streamer types are shown in Fig. 3. The catch rates did not differ significantly between the two streamer types in both tori-line length (P = 0.97 for 100 m line length; P = 0.27 for 150 m line length). Additionally, we calculated mean per-capita catch rates for each vessel and compared the vessel averages between the two streamer types. Again, there was no significant differences between streamer types (P = 0.50 for 100 m line length, N = 12; P = 0.92 for 150 m line length, N = 10).

These results indicate that “Light type” streamers have seabird avoidance effects equivalent to that of “WCPFC type” streamers. Considering the practicality and the performance of the “Light type” streamers under difficult weather and oceanic conditions (Minami et al. 2007), “Light type” streamer should be a good option of mitigation measures for reducing seabird bycatch in tuna longline vessels operating in the higher latitude.

References

[2] In Yokota et al. (2007), “WCPFC type” and “Light type” were described as “Type A” and “Type B”, respectively.

Minami, H., Yokota, K., Kiyota, M., 2007. Examination of tori-pole configuration in middle-sized longline vessels. WCPFC-SC-3-2007/EB-IP-14. pp.7.

WCPFC, 2007. SC3 outcomes on seabird bycatch mitigation. WCPFC-TCC3-2007/22. pp.4.

Yokota, K., Minami, H., Kiyota, M., 2007. Effective factors of tori-poles in reducing incidental catch of seabirds in the Japanese longline fishery. WCPFC-SC-3-2007/EB-WP-13. pp.11.

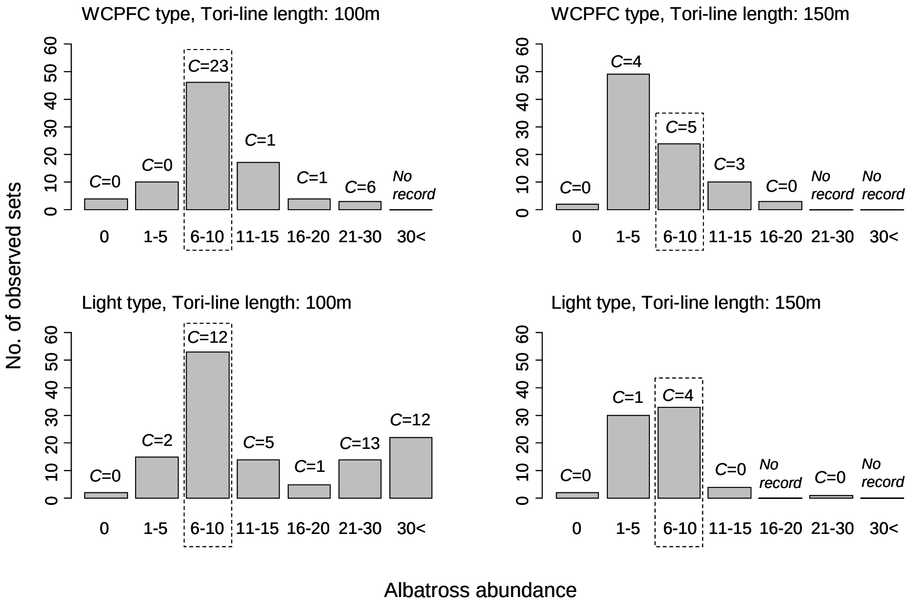

Fig. 1. Number of observed sets by albatross abundance categories (no. of albatross observed during line setting) for different types and lengths of tori-lines used during the line setting. *C* indicates total catch of albatross for each category. Data in the albatross abundance category 6-10 (shown by dotted line boxes) were used for nominal catch rate analysis.

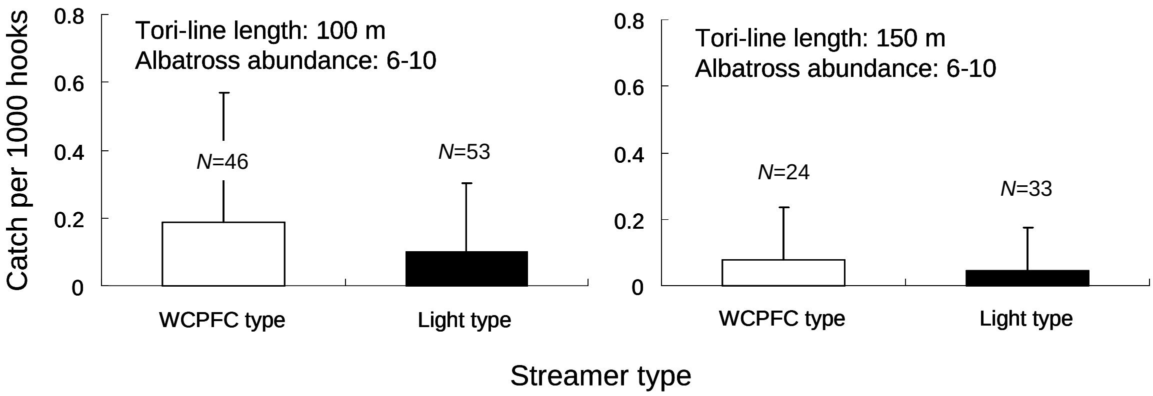

Fig. 2. Comparison of nominal albatross catch rates (catch / 1000 hooks) between two different types ("WCPFC type" and "Light type") of tori-line streamers. Only data with 6-10 albatross abundance category were used. Tori-line length 100 m (left), and 150 m (right) were treated separately. Vertical bars indicate standard deviations. *N* denotes number of sets.

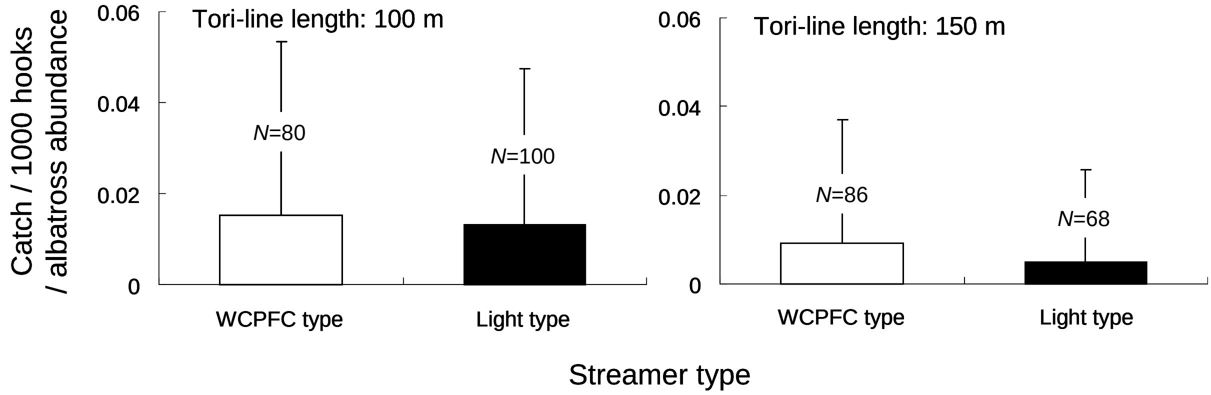

Fig. 3. Comparison of per-capita catch rates of albatross (catch / 1000 hooks / albatross abundance) between the two types of toil-line streamers. Data within the albatross abundance categories 1-5, 6-10, 11-15, 16-20, 21-30 were used. Vertical bars indicate standard deviations. *N* denotes number of sets.