ON THE DIALOGUE BETWEEN KNOWLEDGE BACKGROUNDS INVOLVED IN TAGGING PROGRAMS

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SUMMARY

This document, based on our observations done during the ICCAT/GBYP and the ICCAT/AOTTP tagging programs, aims at analyzing the different knowledge backgrounds involved in tagging programs. After describing these different knowledge backgrounds and their implications, we analyze the interactions – both in terms of conflicts or synergies – that can exist between captains and scientists during tagging programs, and finally provide recommendations regarding agreements with vessels, trade-offs regarding tagging strategies and dialogue with the captains.

RÉSUMÉ

Ce document, reposant sur nos observations faites lors des programmes de marquage ICCAT-GBYP et ICCAT-AOTTP, vise à analyser les différents contextes des connaissances en lien avec les programmes de marquage. Après avoir décrit ces différents contextes épistémiques et leurs implications, nous analysons les interactions - à la fois en termes de conflits ou de synergies - qui peuvent exister entre les patrons pêcheurs et les scientifiques lors des programmes de marquage, et enfin fournir des recommandations concernant les accords avec les navires, les compromis concernant les stratégies de marquage et le dialogue avec les capitaines.

RESUMEN

Este documento, basado en nuestras observaciones realizadas durante los programas de marcado ICCAT/GBYP e ICCAT/AOTTP, tiene como objetivo analizar los diferentes contextos epistémicos de los programas de marcado. Después de describir estos diferentes antecedentes de conocimiento y sus implicaciones, analizamos las interacciones – tanto en términos de conflictos como de sinergias – que pueden existir entre patrones de pesca y científicos durante los programas de marcado, y finalmente proporcionar recomendaciones sobre acuerdos con buques, negociaciones en cuanto a estrategias de marcado y diálogo con los patrones.

KEYWORDS

Tagging, strategy, fishers knowledge, dialogue, synergy, trade-off, baitboat, tuna

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1. Introduction

Large-scale tuna tagging programs, from their initial design to practical tagging operations, imply the participation of people with very different knowledge backgrounds in terms of understanding a tuna resource and how to organize a scientific work around this resource. In order to achieve successful tagging programs, a dialogue and basic mutual understanding between these different backgrounds is paramount, both prior to planning tagging activities as well as during these activities. This document intends to describe the main features of two backgrounds involved (fishermen and scientists), and to propose some guidelines to improve the dialogue between these backgrounds, focusing on the organization and achievement of scientific surveys. The analysis proposed here derives from observations done during the ICCAT/GBYP Phases 2, 3 and 4 tagging programs in the Bay of Biscay, Gibraltar Strait and Central Mediterranean, and during the ICCAT/AOTTP Phase 1 tagging programs in Northwest Africa, Gulf of Guinea Ecosystem, Canary and Azores Islands.

2. Knowledge backgrounds

2.1. Fishing vessel captains

2.1.1. Concern about resource availability

Epipelagic F/V captains are used to work in unstable and unpredictable environments, in which the resource availability can be moving quickly and with a high magnitude, especially for highly mobile species such as tunas. Although this unpredictability is smoothed in tropical areas using FADs, considering the resource as highly variable in the short term is still deeply rooted in fishermen's way of thinking, and plays a big role in their decision-making. Consequently, if captains are given a definite TAC (or a definite goal in terms of tagging), they will display a strong risk-aversion behavior (Bernoulli, 1738) and tend to prefer reaching an important part of the objective in the short-term, and letting a small part for the rest of the fishing (or tagging) period, that can more easily be spread in space, time and species distribution without putting at risk the fulfillment of the quantitative goal.

2.1.2. Value given to empirical vs science-based knowledge

Fishermen are interested in any type of scientific knowledge they cannot directly obtain from empirical experience. For example, tuna feeding behavior, growth, or migrations outside the fishing periods, are matters of interest and frequent questions to the scientists. On the other hand, regarding knowledge they can directly obtain from empirical experience, fishermen will always tend to favor their own knowledge *vs* any scientific knowledge that tagging scientists can provide. The main reason of this preference is that from fishermen's point of view, the value of knowledge is directly proportional to the time spent building it, i.e. the more years of experience the more valuable the knowledge will be considered. For this reason, the knowledge of a scientist with a small number of months at sea during her/his career will be considered of little relevance from the point of view of a captain with 30 or more years of experience, regarding knowledge the captain directly obtains from empirical experience.

2.1.3. Emulation

Emulation is an important driver of fishing captains' strategies and tactics, most probably rooted in a basic competition between captains regarding the access to a highly mobile resource (i.e. tunas), and the efficiency of their predation upon this resource. Being this competing predation the base of their profession, the eagerness about quantitative achievements is an important part of captains' *face* (Goffman, 1955). When hired for tagging surveys, captains understand that the reason of their selection among others is directly related to their quantitative performances, and display the same usual attitude when it comes to achieving tagging objectives.

2.1.4. Resulting attitude in tagging surveys

This combination of concern about resource availability, value given to their own empirical knowledge, and emulation-derived attitude, most often leads to a strong eagerness to be in control of the situation. This can have both constructive and detrimental sides according to how it is driven by the scientists in charge of tagging.

2.2. Tagging scientists

Following the tagging design, scientists involved into tagging programs are usually concerned about two elements: (1) reaching the quantitative objective (i.e. the amount of tagging required to get a relevant number of long-term recoveries), and (2) spreading out the tagging effort as best as possible, in terms of time, space and species distribution, to get the best possible representativeness of migration and growth estimates for each species targeted. These two elements can turn to be the opportunity for both possible conflicts or possible synergies with the (1) eagerness to control the strategy and (2) willingness to perform well, that can be present on the captains' side.

3. Interactions between captains and scientists during tagging programs

3.1. Possible conflicts

The captains' concern about resource availability can generate difficulties in terms of understanding the need to spread out as best as possible the tagging effort over time or space, in several possible situations:

- The cruise leaders impose a quota of fish to be tagged by day, in an effort to spread out the tagging effort in time. This can arouse the captains' concerns, as from their point of view this could put at risk the achievement of the quantitative goal, in addition to using more bait, time and fuel per tagged fish.

- The captains have empirical evidence that the distribution of the targeted tunas is narrow and concentrated into a given area for a given period. In such a situation, they would difficultly accept exploring other areas, as from their point of view this could put at risk the achievement of the quantitative goal.

- The partial objective for a given species or size category was met, whereas the local abundance of another one is low. In such a situation, they would difficultly accept voluntarily skipping the species or size category of which the target was met, as this would be considered a loss of opportunity that can also threaten the achievement of the quantitative objective, in addition to using more bait, time and fuel per tagged fish.

- The captains must sail to an area in which tagging is required but for which they have no real-time good indication regarding tuna availability, whereas they have good indications for another area that was not accepted by the cruise leader or project coordinator (e.g. because it was already intensively tagged). Such a situation can lead to severe conflicts between the captains and the cruise leaders, as from the captain's point of view this would mean ignoring his empirical knowledge, and force him to use bait, time and energy for a very low output in terms of quantitative tagging. This could heavily damage the good will of the captain for the rest of the tagging survey, and put at risk the fulfillment of the quantitative objectives and future collaborations, especially if existing penalties in the contract due to no achievement of the quantitative tagging objective.

3.2. Possible synergies

- Simultaneous use of two vessels to enhance positive emulation (as was done during e.g. GBYP Phase 4 in the Gibraltar Strait; or during IOTTP in the Indian Ocean). Using more than one boat simultaneously enhanced collaboration and competition among captains, crews and tagging teams, creating an optimal working environment on board. On the other hand, referred to safety, having another vessel to support each other if any problem, especially in non-habitual or remote fishing grounds, is very reassuring and beneficial for the development of tagging cruises usually full of uncertainty.

- Following the captain's advice regarding a zone where no or little tagging was done historically (e.g. AOTTP Phase 1 in the Sierra Leone Rise). The Zone B of the AOTTP Phase 1 had a very large area to cover and high uncertainty. The captain suggested tagging operations in the Sierra Leone Rise, considered to be a hub area where we could find the required species and sizes. The result was satisfactory in terms of species distribution and very successful in terms of number of tagged fish.

- Encouraging the captain to show his capacity to find a given species or size-category, if the presence of this species or size category is backed both by scientific and empirical knowledge (e.g. GBYP Phase 2 in the Bay of Biscay). We can know more than we can say (Polanyi, 1966). Captains with extensive experience have a tacit knowledge that could lead to audacious yet successful decision making, when the tuna distribution is not the usual. Due to the absence of tunas> 90cm during GBYP phase 2 in the Bay of Biscay in the usual fishing grounds, encouraging the captain was very successful when he decided to try a remote and little frequented area.

3.3. General recommendations

3.3.1. Agreements with vessels

The type of agreements with vessels should be adapted to each situation, according to the variability of tuna presence, and to the use of a local or non-local vessel. For example, in a region where local fleets are present and have developed an important knowledge, and where tunas are present either year-round or seasonally with limited inter-annual variability, a payment by fish can be established. This type of tagging can allow, in parallel to the tagging activity, a commercial fishing activity for the fishermen (thus increases the interest of the skippers and can reduce the overall price of tagging) as well as a broader temporal distribution of the tagging effort, i.e. fewer fish tagged by day during more days.

On the opposite, in a region where tuna presence is seasonal with an important inter-annual variability, and/or where the vessel used as no local experience, a more classical approach (payment in function of the time of activity, eventually with an incentive scheme) should be used, so as not to generate any financial penalty that would be detrimental in terms of collaboration with fishermen.

3.3.2. Trade-offs and negotiations

When the captains' proposals do not fully support the tagging strategy that would ideally allow meeting the objectives, either due to disagreeing real-time information regarding the abundance or distribution of a given species or size-category, or to a general concern about resource availability, we recommend developing a tactic that looks for the best trade-off between the initially defined tagging strategy and the captains' point of view. We give a few examples of these trade-offs:

- Imposing tagging quotas *vs* following the captains' concern regarding tuna availability: the cruise leaders should acknowledge the high mobility of tunas and the possibility of shifting local abundance in the short term, particularly in a region where tuna presence is seasonal with an important inter-annual variability. In this sense, they should partly allow an important quantitative tagging at the beginning of the surveys, e.g. setting large quotas for the first surveys then adjusting them for the next ones.

- Voluntarily spreading the tagging effort *vs* following a current narrow distribution of the tunas: if there is reliable real-time information about an eventual narrow spatial distribution of the resource, the cruise leaders should not force the captain to sail towards other areas, as in case of failure to spot tunas this would enhance a negative opinion of captain towards scientists' knowledge, and would put at risk the captain's good will and cooperation for the rest of the survey. The best trade off would be to locally spread the tagging effort within the area recommended by the skipper. Similarly, in case a region comprised in the initial workplan displays current evidence of tuna scarcity or absence, information should be first carefully checked before deciding to displace the vessel to that region, and eventually the cruise leaders together with the program coordinators should adopt a different tactic and orient the tagging to another zone.

- Voluntarily skipping a species or size-category whereas another one is missing: the best option would be to set a minimal duration in which the captain should look for the missing species or size-category, and if after reasonable effort looking for it, it is not encountered in significant amounts, the cruise leader should allow tagging another species or size-category in replacement of the missing one.

3.3.3. Permanent dialogue

Dialogue between tagging scientists and captains is a key component of the success of a tagging survey. A particular importance should be given to the captains' experience-based knowledge, and the tagging scientists should propose to complete this knowledge with scientific knowledge that fishermen cannot directly obtain from empirical experience. They should also always be receptive to captains' concerns about the volatility of tuna local availability, and adapt the tactics through reasonable trade-offs between securing the tagged amounts and spreading a minimum part of the tagging effort over time. The best combination for a successful tagging survey is one where the cruise leaders can rely on the captain's knowledge, on a positive emulation and on a willingness of the captain to show his ability to achieve important objectives.

In general, we should never expect a captain to fully comply with a tagging strategy that he did not contribute to define, but we should rather use the knowledge and behavior traits of captains to orientate them towards our goals.

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