



CSIRO
MARINE RESEARCH

**REPORT FROM A PILOT TAG SEEDING PROGRAM FOR ESTIMATING
TAG REPORTING RATES FROM THE AUSTRALIAN SURFACE FISHERY**

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CCSBT-ESC/0309/25

TABLE OF CONTENTS

Abstract..... 1
Introduction 1
Approaches for Estimating Tagging Reports From the Surface Fishery..... 1
Pilot Tag Seeding Programme..... 2
Literature Cited..... 4

Abstract

A key component for the success of the CCSBT conventional tagging program is the quantitative estimation of tag reporting rates for the various fishery components. While observer programs are intended to provide the basis for such estimates from longline fleets, the nature of the Australian surface fishery (i.e. farming) means that observer data during the capture process provides no information that can be used to estimate reporting rates. As an alternative, a program of tag seeding of fish within farms appears the most feasible approach for obtaining tag reporting rate estimates. A pilot tagging seeding programme was conducted this year to evaluate the viability of this approach – particularly with respect to gaining industries cooperation with the programme and ensuring that tag seeding did not induce increased mortality. A total of 80 fish were tagged from 6 tow cages and four different farm operators. While this is a bare minimum with which to monitor and estimate recovery rates, the pilot programme demonstrated that if tag seeding is carried out by skilled personnel, and if such personnel can be made available, there is no reason why in future years, with continuing industry support, that sufficient numbers of fish can be tagged for reliably estimating reporting rates.

Introduction

The CCSBT conventional tagging program is one of the four key components of the overall CCSBT Scientific Research Program, which was initiated to improve the information available for the SBT stock assessment. The primary objective of the conventional tagging program is to “provide important additional information on fishing and mortality rates to improve the ability to estimate changes in stock sizes” (Anon. 2001). A key component of any tagging program, particularly if it is to provide quantitative estimates of mortality rates is the ability to estimate the tag reporting rates for the various fishery components. In the case of the CCSBT conventional tagging program, comparison of reporting rates from vessels with and without observers was anticipated as providing the primary, and in many cases the only feasible, mechanism for estimating reporting rates, particularly for the longline fisheries. However, the Scientific Committee has recognized that “the nature of the Australian surface fishery meant that observer data during the capture process provides no information that can be used to estimate reporting rates. As such, alternative approaches are required if reporting rates are to be estimated from this large component of the SBT fishery.

Approaches for Estimating Tagging Reports From the Surface Fishery

Two possible approaches have been identified – the first involves tag seeding of fish in the farms prior to their being harvested and the second involves placement of observers in Port Lincoln to monitor tag recoveries during the harvesting of fish from the farms. After careful consideration, the observer option for monitoring returns appears unlikely to feasibly provide a reliable reporting rate estimation approach. The problem is that it would be extremely difficult to design an observer program for a monitoring program that would provide a representative sample that could be used for estimating a reporting rate. Some of the difficulties are that (1) partial harvesting for the fresh market from individual farms can occur over an extended period and size selectivity in the fish harvest for the fresh market occurs; (2) substantial differences in size can occur among the fish in different farms and the expected number of tagged fish per farm will depend upon the size distribution of fish in that farm and (3)

observing/sampling during the peak harvesting for the frozen market would be logistically difficult because of the larger quantity of fish and farms being simultaneously processed. Because of these problems, it was decided to initially concentrate on the tag seeding approach as the estimation and implementation are more straightforward.

Nevertheless, the tag seeding approach also has potential difficulties. The primary ones are (1) gaining the cooperation and permission from individual farm operators to allow tagging of farm fish prior to harvesting to occur and (2) higher rates of tag-shedding in farms for newly tagged fish compared to fish tagged in the wild..

With respect to obtaining cooperation, farm operators have been reluctant to allow tagging of fish within their farms. Farm operators minimize the handling of farm fish because of concerns that increased handling can result in increased mortality rates and a decrease in growth rates. In the past, there have been incidents of higher mortality rates in the farms for fish tagged by inexperienced taggers, which has understandably created reluctance to allow tagging to proceed. Farm operators have shown some reluctance to allow tagging of farm fish by non-company individuals because potentially the tagging could be used to provide information on growth rates of individuals. Since the details of farming practices (e.g. feeding practices) differ among individual farms, achieved growth rates are commercially sensitive and considered proprietary information.

Pilot Tag Seeding Programme

A pilot tagging seed programme was conducted this year to determine whether the above difficulties could be overcome. In this pilot programme, a protocol was developed in consultation with industry that resulted in a general agreement among most farm operators to allow tagging to proceed. The protocol included that the fish to be tagged would be from the sample of fish that are measured and weighed at the time when fish are transferred from towing cages to farm cages. This meant that there was only a slight increase in the amount of extra handling (e.g. the time required to insert the tag). In addition, all tagging was to be done by experienced taggers. The protocol also specified that at least 10 fish would be tagged from as many towing cages as possible (if a farm operator was willing more fish would be tagged - up to the full sample of fish measured at the time of transfer). Thus, if tagging from all towing cages had taken place, this would have provided a sample of at least ~400 tag seeded fish. In addition, it was agreed that data on the size of tagged fish would remain confidential (but made available to the individual farm owner whose fish had been tagged) and not be released to other parties without the permission of the farm operator to ensure that any commercially in-confidence data were not released. All fish were double tagged to ensure that the differential in tag shedding rates between wild and farm tagged fish could be accounted for in estimating reporting rates.

These protocols and financial arrangements for the pilot programme were not finalized until after the start of fishing season. With the resulting time available it was only possible to seed tags into 6 cages from a total of 4 companies (Table 1). This represents 16% of all tow cages bringing in SBT this year. A total of 80 fish were tagged and released directly into the farms. This is a bare minimum number of tagged fish with which to monitor and estimate recovery rates. However, it was sufficient to evaluate whether the protocols were adequate in terms of concerns about tagging related mortality and logistic feasibility. In this regard the programme was successful,

in that there were no reports of increased mortality rates for fish that were tagged. This pilot programme demonstrated that if tag seeding is carried out by such skilled personnel, and if such personnel can be made available, there is no reason why in future years, with continuing industry support, that sufficient numbers of tagged fish for estimating reporting rates can not be seeded into the cages. As such, it is proposed to attempt to continue and expand the tag seeding next year as the most viable and feasible approach for obtaining reporting rate estimates from this sector of the SBT fishery. It is critical that there are comparable efforts to obtain reliable reporting rate from the other major sectors of the SBT fishery for the overall success of the CCSBT tagging program and for maintaining continued cooperation from the farm sector.

In terms of tag returns from this pilot programme, harvesting of the cages has been delayed this year. By the end of June, only one cage with seeded tags had been substantially harvested. Table 1 provides results on the number of seeded tags that were returned by the end of June. However, these are clearly only partial results and should not be used as an indication of the overall returns or reporting rates. Completed results and more detail analyses will not be possible until the end of the harvesting season.

Literature Cited

Anon. 2001. Report of the fifth meeting of the Scientific Committee. CCSBT. 19-24 March. Tokyo, Japan.

Anon. 2002. Report of the seventh meeting of the Scientific Committee. CCSBT. 9-11 September, 2002. Canberra, Australia.

Table 1. Tagged fish seeding details

| Company | Cage | Number of fish tagged | Recoveries to 30/06/03 | % |
|--------------------|--------|-----------------------|------------------------|------|
| 1. | Cage 1 | 20 | 15 | 75 |
| | Cage 2 | 20 | 1 | 5 |
| 2. | Cage 1 | 10 | 1 | 10 |
| | Cage 2 | 10 | 2 | 20 |
| 3. | Cage 1 | 10 | 0 | 0 |
| 4. | Cage 1 | 10 | 0 | 0 |
| | | | | |
| Totals for 6 cages | | 80 | 19 | 23.8 |