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Otolith Sampling Protocol for Alfonsino

Relates to agenda item:7.1 Alfonsino Working paper ☐ Info paper ☒

Delegation of SIODFA

Abstract

A protocol of sampling of alfonsino otoliths is presented.

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Otolith Sampling Protocol for Alfonsino

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1. INTRODUCTION

This protocol is written with alfonsino in mind but the principles are general and may be applied to any species for which otolith samples are required. This Protocol is based on the following assumptions.

i. Length frequency measurements are collected from fish sampled from the catch and are used to infer an age distribution of the catch.
ii. The objective is selecting the fish for removing their otoliths is to obtain a relationship with minimum whose lengths are measured error.
iii. To best achieve this the number of samples for each class interval should reflect the variability of of ages for the respective class intervals (often called bins).
iv. As yet there is no information to inform on this variability and thus a sample size of three males and three females for each one-centimeter class is used on two SIODFA vessels.
v. It is expected that otoliths from larger fish will show more variability and that in the future the sample size will be increased for larger fish.

This protocol is designed to collect otoliths in a manner that enables the preparation of an age-length key. A well-founded age-length key will allow the ages of fish measured by the standard 100-fish measuring programme to be inferred from the length measurements. In this way a minimum error age-length key should be obtained.

As alfonsino length is usually in the range 20 – 50 cm, this means that 3 x 2 x 30 fish are sampled and two otoliths are removed from each fish, for a total of 180 fish samples and 360 otoliths retained.

2. WHEN TO COLLECT THE OTOLITHS SAMPLE

Ideally a complete sample of otoliths from an area would be collected during the same trip but this is not essential and sampling could continue during the next trip if it is in the same area. Each main area should be sampled once each year. This could mean one complete sample from (a) Walters Shoal, (b) South-west Indian Ridge and (c), 90°East each year. For the three areas, this means in total 540 fish sampled each year. If possible, the samples should come from the same sea floor feature.

As there are three factory trawlers in the SIO alfonsino fishery, each vessel should undertake to sample one main area each year. This would cover the three main areas.

3. PROTOCOL FOR SELECTING THE FISH FOR OTOLITH EXTRACTION

The long-established sample of 100 alfonsino measurements of length, weight, sex and gonad condition should continue as before. These fish are selected at random, i.e. *there is **no** attempt to measure some big fish, some small fish and some in between* - purposeful sampling. Rather the fish to be measured are just pulled off the conveyor haphazardly, the common term used is at ‘random’.

The fish from the 100-fish sample *can be (and should be) used* for the otolith sample. But, once the required 3 fish for each sex in each centimeter class have had their otoliths removed, there is no need to continue taking further otolith samples for that particular length class. However, after the 100-measurement lengths sample has been taken there will be some, possibly many, length classes (or bins) for which 3 fish were not encountered. Thus, otoliths from fish in these length classes should continue to be taken from the catch. The length measurements and sex observations from these fish *should not be included in, or added to, the measurements from the standard 100-fish sample.* The additional fish sampled for otoliths can come from a subsequent tow but the tow should be from the same area and ideally from the same feature.

Attention: Be extremely careful not to damage the margins of the otoliths.

Note that data collected from the 100-fish 'random' sample can be used when their otolith are removed to determine the age-length key. However, the reverse *is not true* – fish purposively selected to get an evenly balanced otolith sample across the size range *must not be used to make inferences about the age distribution of the particular catch from which they were collected.* If this were done the results would be meaningless.

An additional column should be used on the Excel spread sheet recording the data for the 100-observations sample to indicate if the otoliths were saved, e.g.

Sample no.	Length	Weight	Sex	Gonad condition	Gonad weight	Otoliths collected	Comment
						N/Y/	

"N" = no otoliths taken. Note, the sample number is automatic on the Excel spread sheet.

4. WHAT EQUIPMENT IS NEEDED?

- Knives – there should be no shortage of these on board, but think about safety gloves.
- Forceps/tweezers to pick the otoliths out of the skull pockets
- Coin envelopes to store the otoliths, one envelop per fish. Coin envelopes (they are about 4 * 7 cm in size) *may not be available in Port Louis.* Thus, safer to source from a home supplier (Nelson/Cape Town stationary shop).
- Paper towels to dry the otoliths before putting in the envelopes
- Pen ideally with non-smudge or water proof ink or appropriate pencil.

5. LABELING AND STORING THE OTOLITH SAMPLES

Otoliths can be stored in various ways but the easiest way appears to be the best way. When preparing for sea ensure that you have adequate "coin envelopes". These are small, about 4 * 7 cm and most stationary shops sell them in boxes of 1000: they should be inexpensive ($15/box?). Buy those made from good quality paper, acid free if possible.– it may be that the otoliths will sit on a shelf for > 10 years before being examined. It is surprising the number of envelopes that are encountered years later for which incomplete information has been recorded and which then can't be used!

Envelopes can be labeled (See figure below) in your cabin before going to the factory deck to speed the process. Otolith removal and data entry is best done using two people. The vessel officers have been asked to help by making a factory-deck crew member available to assist as required. Try to use the same person if possible. One person should remove the otoliths – he will have continually messy hands, the other person

should record the related information, put the otoliths in the envelopes and seal them. Figure 1 shows an example of good recording practice.

Figure
Example of data to be recorded on the otolith envelope,

Date / /202 Trip No.: WW103_ Initials

Species: BYS Tow No.xxx

Sample Number – from 100-sample spread sheet (as available)

Length Sex: M/F

6. NOTING MAXIMUM FISH SIZE

An important parameter in fish stock assessment is the maximum size that is obtained by the fish, referred to as the asymptotic length (L_∞) or weight (W_∞). Take some measurements and otoliths from these individuals when they are encountered, but take care not to aggregate their data with those from the 100-fish 'random' sample! It will bias their results.

Use the following sheet to manage your otolith collection efforts – *keep the sheet when it is completed though.*

Otolith Sample Schedule. **Trip No.** **Tow(s) No.** **Feature:** **Name:**

	Males			**Females**		
Length	1	2	3	1	2	3
16						
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