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Pelagic Freezer-trawler Association self-sampling programme in the SPRFMO Area
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The PFA self-sampling programme for pelagic freezer-trawlers in the SPRFMO area: results of the 2015 sampling.

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1 Introduction

In 2015, a self-sampling protocol has been initiated for the two Pelagic Freezer-Trawler Association (PFA) vessels fishing in the SPRFMO area (KW174 Annelies Ilena and KL855 Margiris). The self-sampling protocol aims to collect the information required by SPRFMO for all trips carried out in the area. The focus of the self-sampling is on data for Jack mackerel.

2 Fishery

The members of the PFA operate pelagic freezer-trawlers with aim to catch fish for human consumption in any part of the world where legitimate and sustainable quota management is in place. The basic principle of the fishery is that the catch is sorted and fully frozen as soon as possible after catching. This guarantees a high quality product. The vessels of PFA members range in length between 60 and 140 metres. The vessels fishing in the Pacific are generally the larger vessels of PFA members because they need to be able to stay at sea for long periods. About 80% of the capacity of a freezer-trawler is used for sorting, processing, freezing and cold-storage on-board. The maximum catching capacity is limited by the freezing capacity per 24 hours and fluctuates between less than 100 t/day, for the smaller vessels, and up to over 250 t/day, for the bigger vessels.

An extensive monitoring takes place on-board of the PFA vessels. Most vessels have a Quality Manager (QM) on-board who is responsible for the quality control and documentation of the catch. This monitoring is currently primarily aimed at the sales process. To this end, catches are combined into batches of the same species and size class. Batches often consist of catches from multiple hauls. Each of the batches is sampled by the QM on-board. The sampling process consists of a counting and weighing of all individual fish contained in one frozen carton of around 23 kg of fish and the determination of additional features like stomach content, fat content and the amount of damaged fish. There is an enormous amount of knowledge and information embedded in this quality control process that was until now not available for research or fisheries management.

3 Self-sampling protocol

The PFA self-sampling protocol was designed to deliver data on catch compositions of commercial fish species in the SPRFMO area and on length compositions of Jack mackerel, to be collected for all hauls and all trips carried out by the vessels of PFA members.

The self-sampling protocol follows as closely as possible the monitoring that already takes place on board of the vessels. However, traditionally the measurement of fish is focussed on the composition of batches which cannot be linked to individual hauls.

Two main changes to the standard way of measuring the catch were introduced:

1. Establishing a coupling between haul and batch
2. Measuring one sample of fish every day.

Establishing a coupling between haul and batch

The vessels were equipped with a coupled Excel workbook that contained four key Worksheets:

1. Haul – specification of duration, position, depth and other properties of the different hauls
2. Batch – specification of the biological properties of the different batches (length range, mean weight, number of fish per 10 kg, etc.)
3. Haul and batch – specification of the number of cartons produced of each batch and for every haul.
4. Length – tallying of one sample of fish (~20 kg) per day. During the first two trips (April and May, the length measurements were taken as random samples from the unsorted catch). After

comparison with the first trip with a scientific observer, this system was changed to one 20 kg sample of a particular batch on every day.

Measuring one sample of fish every day

During normal operations, the vessel will measure fish on the so-called 'commercial length', at the onset of the tail. These measurements are not kept, except for the minimum and maximum length for each of the batches. During the self-sampling project, the vessel were requested to measure one sample of fish (~20 kg) using fork-length, and to tally the individual measurements.

4 Results obtained during 2015

In 2015, two vessels of the PFA fleets participated in the Jack Mackerel fishery: KW174 Annelies Ilena (NL) and KL855 Margiris (LT). Each vessel participated in the fishery for 4 trips, starting on April 15 2015, and ending in August/September 2015.

Self-sampling has been carried out during all of the trips. In addition, scientific observers were present during 3 of the 8 trips, which allows us to compare the results of the self-sampling with the observer trips.

The text table below shows the number of length samples taken, the number of sampled fish and the number of fishing days up until 18 August 2015. A total of 91 samples have been taken consisting of 5264 fish measurements. The overall sampling rate (measured as the number of days with jack mackerel catches and the number of days sampled) was 63%.

Row Labels	Sampled hauls/batches	Sampled fish	Fishing days	%days sampled
KL855	47	2510	67	70%
KW174	44	2754	77	57%
	91	5264	144	63%

The length compositions of the self-sampling by trip are shown in figure 1 which also has the length compositions as measured by the scientific observers during 3 of the trips. There is very good correspondence between results of the the self-sampling and scientific observers on vessel 1. However, on vessel 2 (trip 4) there are substantial differences between the self-sampling and the scientific observer. It is hypothesized that the differences are mostly caused by the sampling method used by the scientific observer on vessel 2, as de self sampling on vessel 2 and both the self-sampling and scientific observer on vessel 1 all show very comparable length compositions.

The cumulative length compositions of the self-sampling trips, separated by month, are shown in figure 2. Overall, there is a close correspondence between vessels V1 and V2, which is as expected, as they were mostly fishing relatively close together.

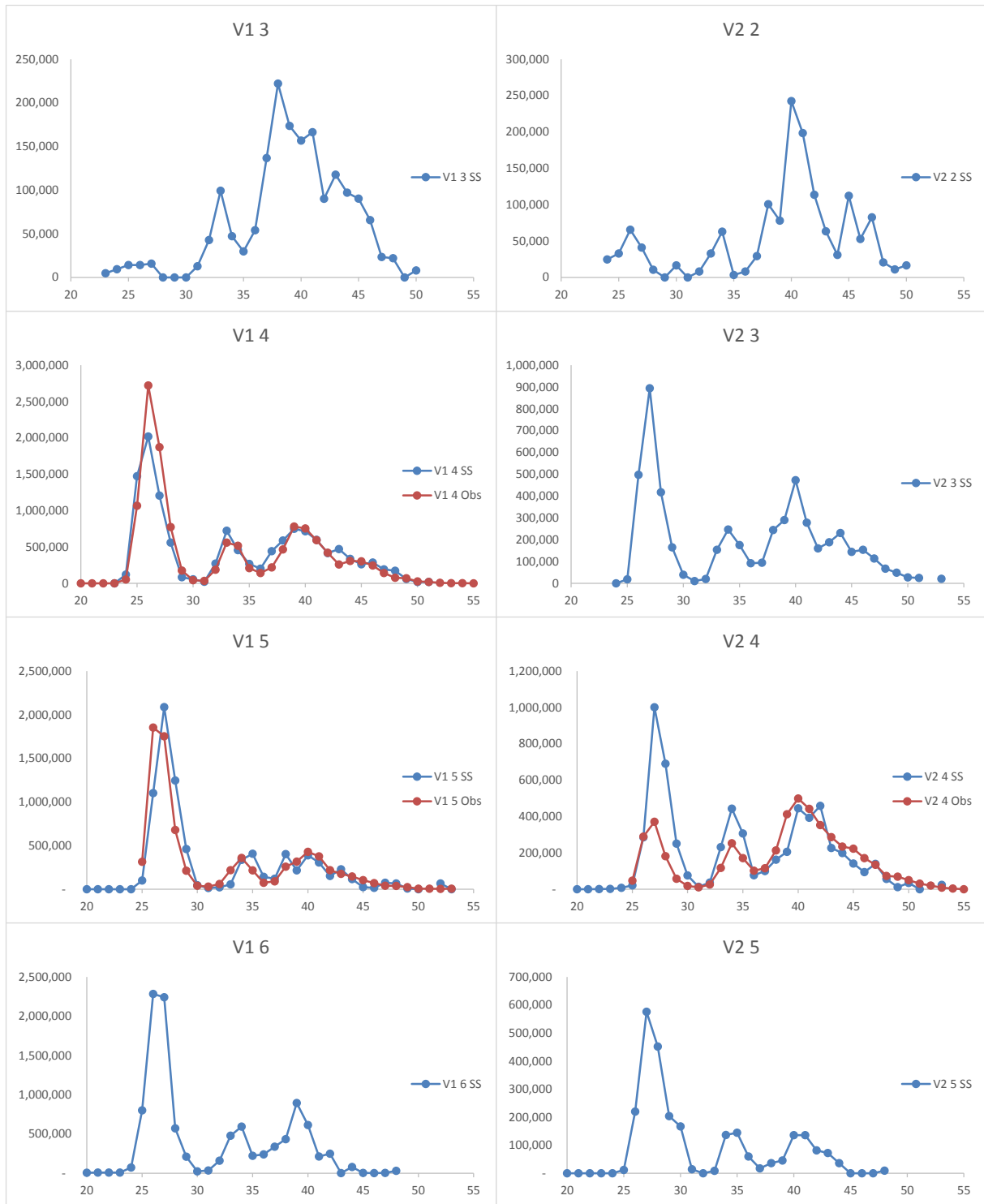


Figure 1 Jack Mackerel length composition of self-sampling of vessels V1 and V2 during 4 subsequent trips in 2015. During trips 4 and 5 of V1 and trip 4 of V2, the length compositions of the scientific observer on board is also shown. Data for the last trip is not complete yet, as the trip has not been finalized yet.

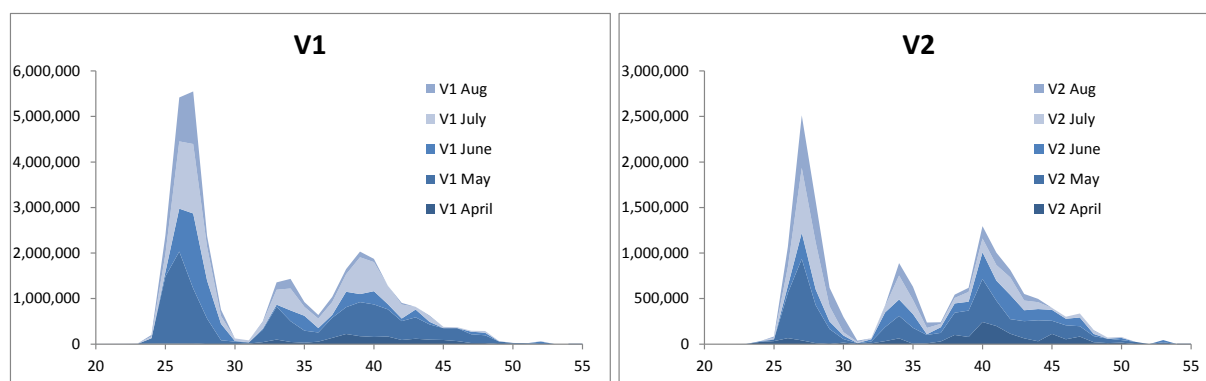


Figure 2 Jack Mackerel cumulative length composition of self-sampling of vessels V1 and V2 the months April, May, June, July and August 2015. Data for the month August is not complete yet, as the trip has not been finalized yet.

5 Discussion

The self-sampling programme initiated by PFA in 2015 has shown that reliable and robust length-compositions of Jack mackerel can be derived from the industry data. The self-sampling programme is to a large extent based on the sampling that is already going on on pelagic freezer-trawlers, where catches are separated into certain batches defined by size and quality. The additional steps taken during the self-sampling were to connect the haul information to the processing of the batches and to take a single daily length sample from a haul or from a batch.

The difference between taking a daily length sample from the haul or from a batch could not be demonstrated conclusively.

An interesting additional benefit from the self-sampling programme was that it provides an independent check on the length sampling carried out by scientific observers on board of pelagic freezer-trawlers. Scientific observers on these vessels have a challenging task because they need to keep track of many things at the same time while being on a large vessel. Because the processing of the catch is normally not organized by haul, but by fish-tank, the observers need to keep track of the haul that is being processed. Another major challenge for the scientific observers is to take a random sample of a haul that can be measured for length and species composition. Because the fish are already sorted in the very beginning of the processing steps, it is difficult to obtain an unbiased sample from the whole catch. If fish are picked by hand in order to create a random sample, this could in fact lead to a bias in picking larger fish (because there are fewer of them). This may have happened with the observer on board of vessel 2 (see figure 1) who has likely overestimated the abundance of large fish and underestimated the abundance of small fish.

Given the demonstration of the feasibility of a self-sampling programme to generate reliable and robust length compositions of Jack mackerel, the fact that this information is now available for all trips and not just for the trips sampled by scientific observers, gives substantial additional information into the development of the fishery and the seasonal and spatial changes in catches. This is expected to improve our understanding of the distribution of Jack mackerel.

6 Outlook

The PFA will present the self-sampling approach at the upcoming SPRFMO science meeting in Vanuatu. The PFA is committed to continuing the self-sampling programme in the coming years and taking into

account additional requirements from SPRFMO if they can be fitted into the work schedule on board of the vessels.