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SC11 – JM04
Comparison of EU self-sampling and observer data with the objective to supplement observer data for non-observed quarters

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Comparison of EU self-sampling and observer data with the objective to supplement observer data for non-observed quarters

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Abstract

This working document provides a comparison of the EU observer trips in the Jack mackerel fishery with the EU self-sampling data to assess the quality and reliability of the self-sampling data in trips where both observer data and self-sampling data are available. Provided that the quality and reliability of the self-sampling data is satisfactory, then those data could be used to supplement the observer data for quarters where no observer trips have been realized.

The EU pelagic freezer-trawler fleet has been carrying out a self-sampling program on the freezer-trawler fleet since 2015.Within the fishery for jack mackerel in the South Pacific, the self-sampling program has been carried out on all trips.

The EU scientific observer program for that fishery is targeted to cover at least 10% of the effort. Over the years 2015-2022 the analysis has shown that around 34% of the catch has been covered by scientific observers. Over these years, 22 trips were covered by both self-sampling and scientific observers. In total, the fishery took place during 19 quarters of which 15 had at least some observer coverage and 4 quarters had no observer coverage (but did have self-sampling coverage). The overall number of length measurements between the observer trips (87,323) and the self-sampling trips (100,589) up to and including 2022 is comparable. The self-sampling program samples fewer fish per

trip (1734 compared to 3969 in observer trips) but samples more trips than in the observer program (58 vs. 22).

In addition, self-sampling data is available for the 2 quarters in the current year (2023) for which no observer data is yet available.

A comparison of the overall length compositions by year derived from all self-sampled trips or derived from the raised observer trips, demonstrates that the self-sampling covers a wider part of the fishery (season, area) which explains some of the differences between the two data sources. Thus self-sampling provides a substantial improvement in the coverage of the fishery and thereby a more realistic length composition to be used in the assessment of jack mackerel. The combination of self-sampling and observer trips allows for quality control of both programs while being able to assure a wide coverage of the fishing season.

During the Jack mackerel Benchmark Working Group (SCW14) it was decided to develop a protocol for inclusion of self-sampling data for the EU fleet for those quarters where no observer trips were carried out. This document describes that protocol and the selection of quarters for which the self-sampling data will be used. For SC11, it is proposed to used 2022_Q4, 2023_Q2 and 2023_Q3 from the self-sampling data.

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1 Introduction

1.1 EU pelagic freezer-trawler fisheries

The EU pelagic freezer trawler fishery targets small pelagic species. In the Northeast Atlantic, the most important species are: herring (*Clupea harengus*), Blue whiting (*Micromesistius poutassou*), Horse mackerel (*Trachurus trachurus*), mackerel (*Scomber scombrus*), Greater argentine (*Argentina silus*) and sardine or pilchard (*Sardina pilchardus*). There is also a fishery for sardine (*Sardina pilchardus*) and sardinella (*Sardinella aurita*) in the waters west of Africa and for Jack mackerel (*Trachurus murphyi*) in the South Pacific.

1.2 Scientific observer program for the South Pacific

In the European Union, the collection and management of fisheries data is regulated through the Data Collection Framework (DCF) of the European Union (EU).

The observer program in the South Pacific was initially carried out by Corten Marine Research (CMR). In 2015 this observer program became embedded into the European Data Collection Framework even though the coordination was still carried out by CMR. From 2017 onwards the coordination has been taken over by the National Marine Fisheries Research Institute in Poland. A minimum of 10% of the trips in the South Pacific is to be covered by scientific observers. The scientific observer program aims to cover the catch compositions of the vessels and also any potential bycatch of birds and sea-mammals or other protected species.

1.3 PFA self-sampling program for the South Pacific

The Pelagic Freezer-trawler Association (PFA) is an association that has nine member companies that together operate 18 (in 2022) freezer trawlers in six European countries (www.pelagicfish.eu). A self-sampling program has been initiated in 2015 that extended and harmonized the already ongoing sampling activities on the vessels for commercial reasons. The extension in the self-sampling program consists of recording of haul information, recording the species compositions per haul and regularly taking random length-samples from the catch. The self-sampling is carried out by the vessel quality managers on board of the vessels, who have a long experience in assessing the quality of fish, and by the skippers/officers with respect to the haul information. The scientific coordination of the self-sampling program is carried out by Niels Hintzen (PFA chief science officer) with support of Lina de Nijs and Floor Quirijns (consultant). A self-sampling manual is used to provide instructions to the crews (Pastoors 2020). Results of the self-sampling program are published in annual reports (Pastoors & Quirijns 2017, 2018, 2019, 2020, 2021a, 2022) and in dedicated reports for specific expert groups (e.g. Pastoors 2021a, 2021b, 2021c, Quirijns 2021, Pastoors & Quirijns 2021b). Within the PFA fisheries in the South Pacific, the self-sampling program is carried out on all trips and by all vessels.

1.4 Aim of this paper

This paper aims to present a comparison of the results of the EU observer program and the PFA self-sampling program. Direct comparisons are made of trips and hauls were self-sampling was carried out while an scientific observer was also carrying the observer sampling. Secondly, an assessment will be made of the years and quarters where no observer data is present but where there is information from self-sampling activities. Thirdly, a protocol will be outlined on how to use the self-sampled length distributions, for quarters that are not covered in the observer program, in the context of the EU data-submission for the stock assessment of Jack mackerel(*Trachurus murphyi*).

2 Material and methods

Data from the PFA self-sampling program has been made available from the PFA database system. Data from the observer programs has been made available by the National Marine Fisheries Research Institute in Poland under a strict confidentiality agreement. Earlier version of this analysis were presented in Pastoors et al 2018 and Pastoors & Wójcik 2020. The aim of the current analysis was to present a haul-by-haul comparison of observer data and self-sampling data and to develop a protocol for the inclusion of self-sampling data into the assessment of Jack mackerel. The comparisons have been carried out for the years 2015-2022.

Note, that in 2016 one of the European vessels fishing in the South Pacific did not belong to the PFA membership and was not covered by the self-sampling program. However, the catches of this vessel were very low.

3 Results

The European fishery in the South Pacific is targeting a Jack mackerel (*Trachurus murphyi*) and has been carried out by up to three vessels per years. All trips of vessels by PFA members are covered by self-sampling and at least 10% of the effort is covered by observer trips.

An overview of the key-characteristics of the self-sampling and scientific observer trips between 2015-2023 is shown in Table 3.1. Of the just over 90 000 tonnes of catch during those years, around 38 000 tonnes were covered by the scientific observer program (~ 42%). The number of length measurements in the self-sampling and the observer program are more or less similar. This means that the self-sampling covers a larger part of the fishery at a more extensive rate, while the observer program targets fewer trips but with higher sampling rate.

year	observer						self-sampling					
	nvessels	ntrips	ndays	nhauls	catch	nlength	nvessels	ntrips	ndays	nhauls	catch	nlength
2015	2	3	81	176	13,935	18,457	2	9	178	379	28,933	7,299
2016	1	2	28	50	2,694	5,594	1	4	95	169	10,284	6,845
2017	1	3	91	183	7,429	14,575	2	10	277	615	29,652	20,829
2018	1	2	59	117	6,012	9,417	1	5	130	236	10,234	4,692
2019	1	2	46	90	8,463	5,435	1	3	85	162	12,114	6,615
2021	2	4	39	71	9,488	8,397	3	10	207	483	49,341	21,366
2022	2	5	87	220	20,162	25,334	2	17	267	656	65,359	32,943
2023							1	1	14	35	2,539	1,143
all	**11**	**23**	**432**	**907**	**68,314**	**87,323**	**13**	**59**	**1,253**	**2,735**	**208,456**	**101,732**

Table 3.1: Summary of self-sampling and scientific observer trips in the South Pacific: number of vessel, trips, hauls, catch (tonnes) and number of fish measured

Catch by species

A comparison of the proportion of the total cumulative catch by trip and species for the hauls in common between the self-sampling and the observer program is shown in figure 3.1. This shows good correspondence in the estimated proportions for the main species.

Figure 3.1: Comparison of catch per species for hauls in common in observer trips ("obs") and self-sampling trips ("ss")

Length distributions

The length distributions of Jack mackerel (in proportion at length calculated from raised catch numbers) by trip for the hauls that are in common between the self-sampling and observer program are shown in figure 3.2. There is generally a close correspondence between the length distributions from the self-sampling and the observer program.

Discrepancies in trips 201604_V3, 201903_V4, 201904_V4 and 202208_V2 are due to too low sample sizes during the self-sampling process. This has subsequently been addressed in the self-sampling instructions to the vessels. The discrepancy 202103_V3 is simply due to almost no Jack mackerel being caught during that trip and hence only very few fish being measured.

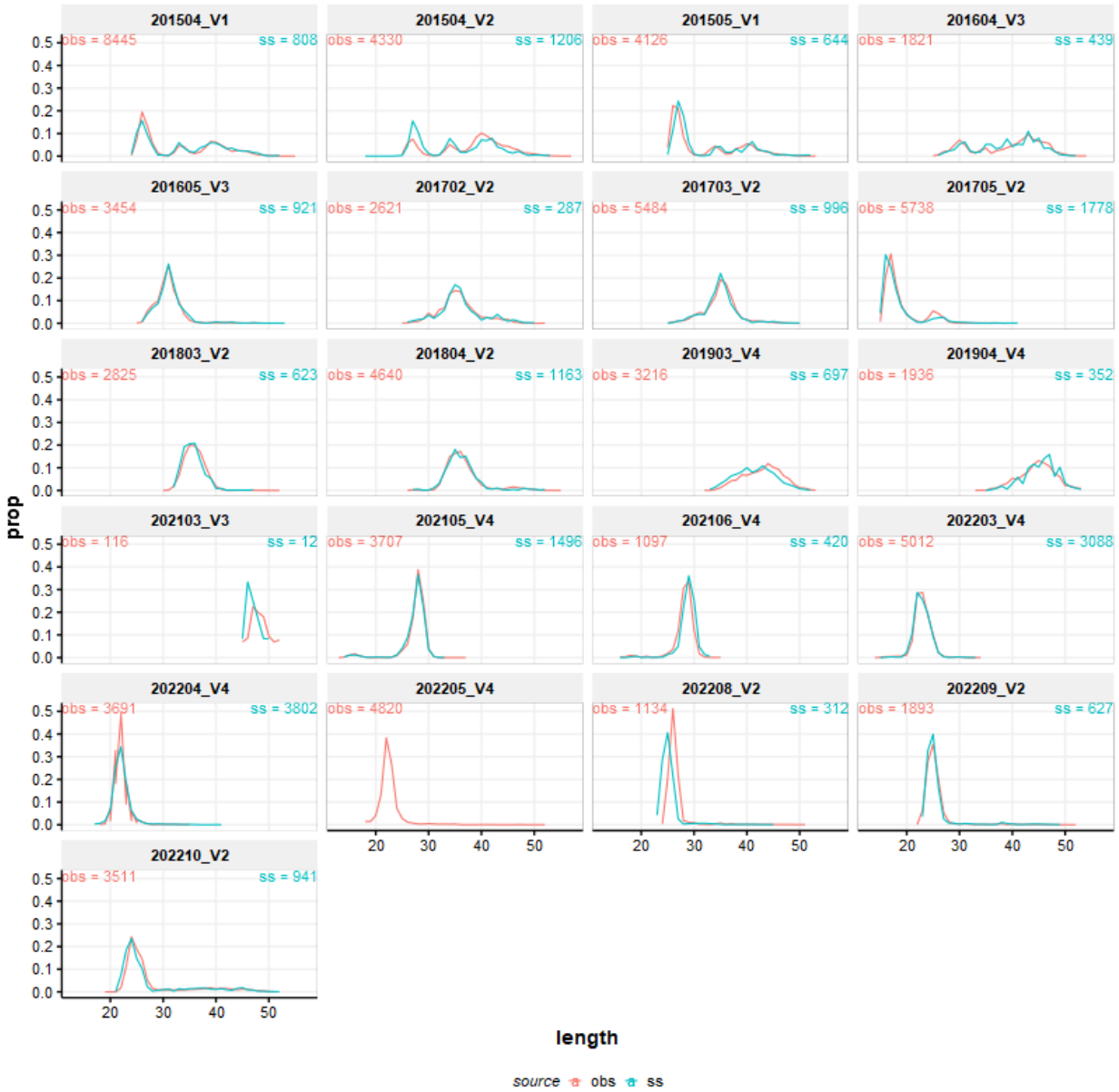

Figure 3.2 Jack mackerel length distributions by trip only for hauls that are in common between self-sampling and observer trips

Comparison of the spatial distribution of self-sampled hauls and observer trip hauls

The scientific observer program aims to cover at least 10% of the fishing effort in the area. In practice, over the years 2015-2022 around 34% of the catch has been covered by scientific observers (see also table 3.1). However, that still means that a substantial part of the catch has not been covered by the scientific observers. Figure 3.3 shows the spatial distribution of self-sampled hauls (blue-green) and observer trip hauls (red) by year and quarter.

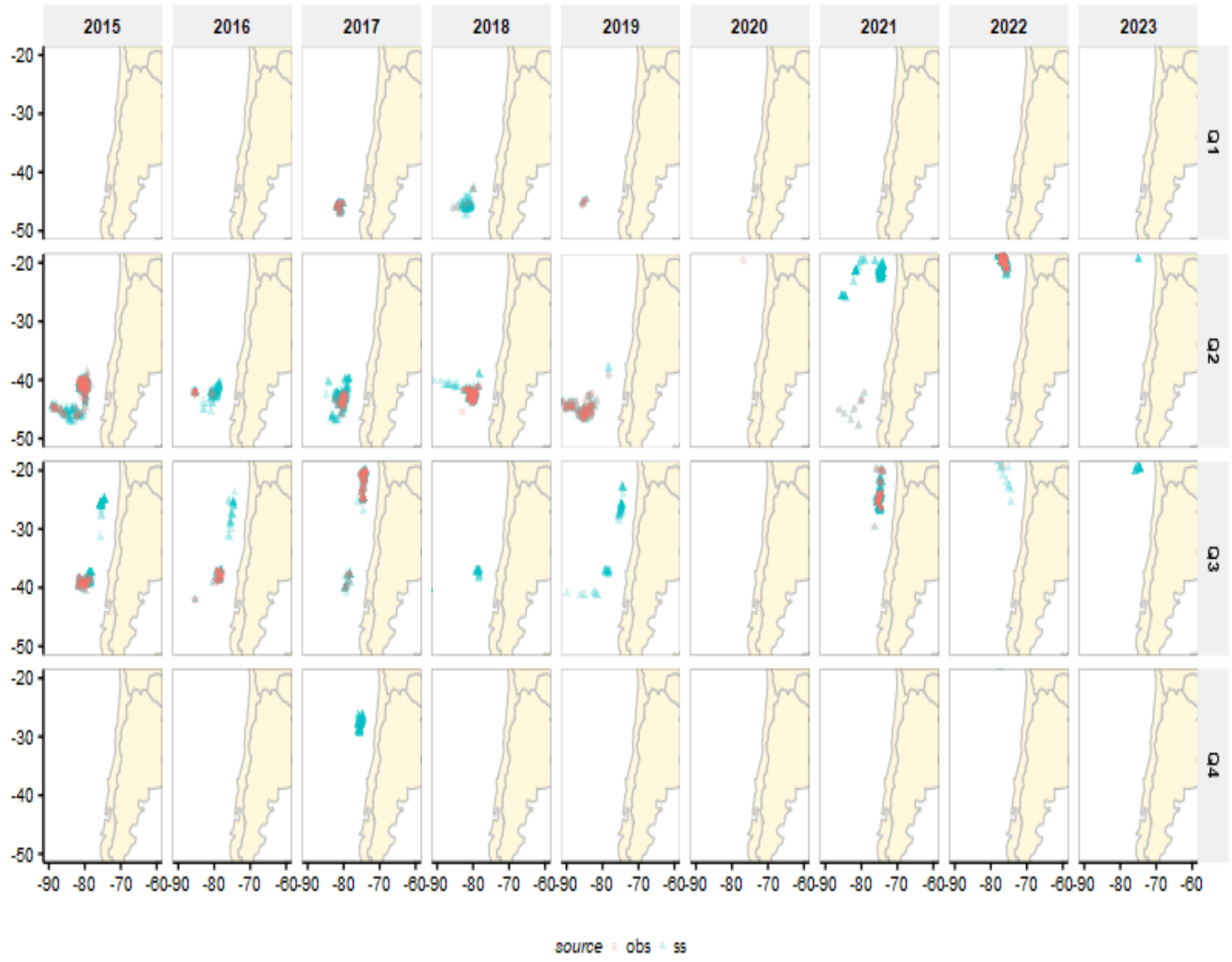

Figure 3.3 mapping of self-sampling hauls (blue-green) and observer hauls (red) by year and quarter.

Comparison of the total Jack mackerel catch from self-sampled trips and observer trips

A direct comparison of the Jack mackerel catch by quarter and year is shown in figure 3.4. The quarters 2017_Q4, 2018_Q3, 2019_Q3, 2022_Q4 have not been covered by the observer program. .

During 2021_Q2 there was one observer trip but it covered a trip where almost no catch was taken (in the southern area) whereas another vessel had substantial catches in the northern area. Therefore the length distribution for this quarter would better be taken from the self-sampling data. In addition, the self-sampling data for the catches in 2023 is already available while the observer data is not yet available. As a preliminary estimate of the 2023 length distributions, it is proposed to use the self-sampling data.

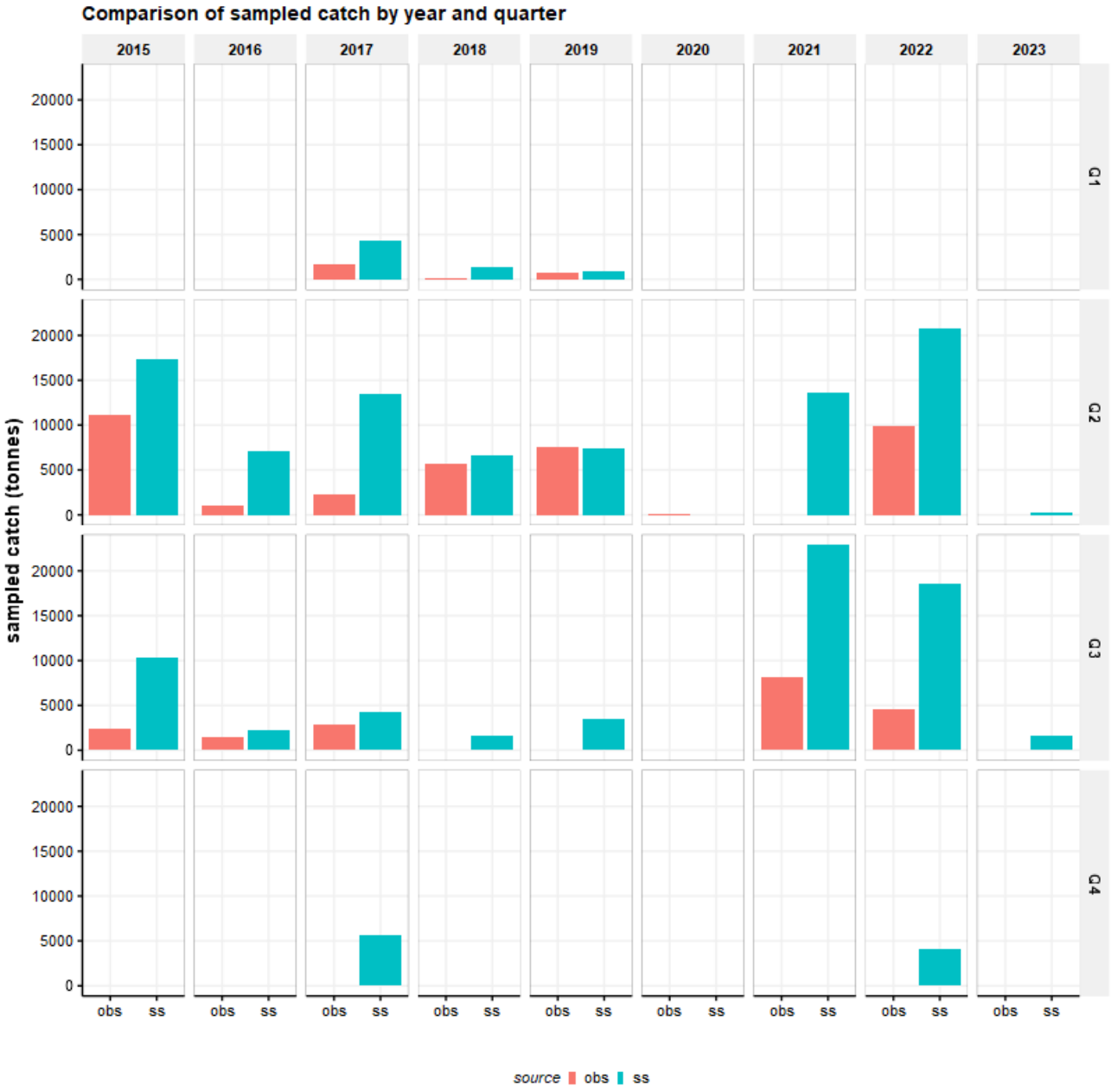

Figure 3.4 Comparison of sampled catch in self-sampling trips (blue-green) and observer trips (red) by year and quarter.

Comparison of raised catch number at length (in proportions) and selection of quarters from which self-sampling will be used

Given that the direct comparison of the observer-trips with the self-sampling data from the same trip yielded very close correspondence, in this section we are exploring the impacts of comparing raised estimates from all self-sampling trips with raised estimated from observed trips only. The raised numbers at length by year are expressed as proportions to make them comparable between years and quarters.

The facets with blue-ish backgrounds refer to the quarters in the past where no observer trips were carried out. The facets with reddish backgrounds refer to the quarters where the length distributions will be taken from the self-sampling program. These will be added to the EU data submission for 2021 (final data) and 2022 (preliminary data).

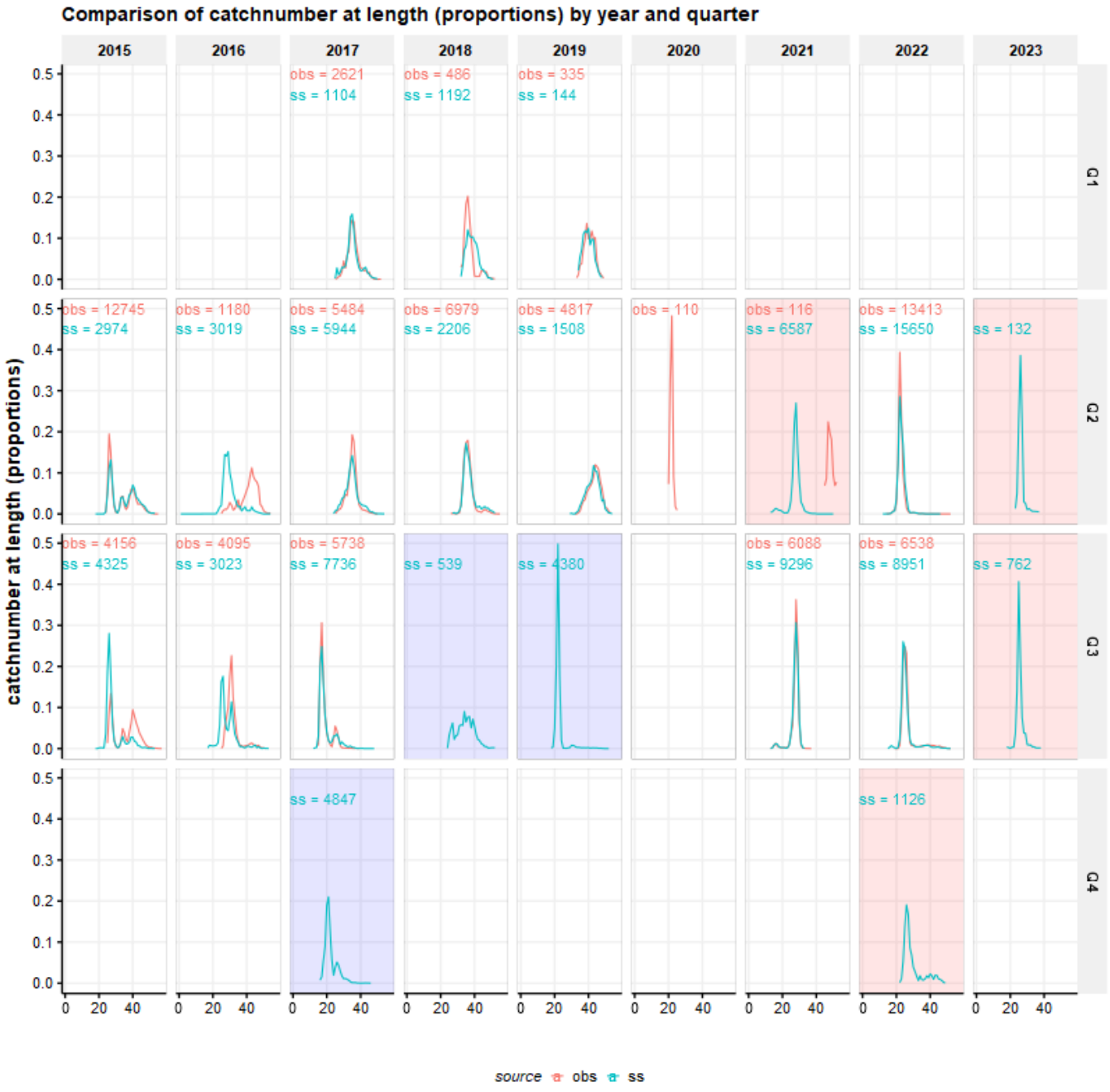

Figure 3.6 Jack mackerel overall relative length distributions from all trips where self-sampling (blue-green) and observer trips (red) where available.

4 Discussion

This working document provides a comparison of the EU observer trips in the Jack mackerel fishery with the EU self-sampling data to assess the quality and reliability of the self-sampling data in trips where both observer data and self-sampling data are available. Provided that the quality and reliability of the self-sampling data is satisfactory, then those data could be used to supplement the observer data for quarters where no observer trips have been realized.

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5 Acknowledgements

We would like to acknowledge the crews of the PFA vessels and the scientific observers who have been on board of the vessels. We would like to thank the coordinators of the scientific observer program for allowing access to the observer data for this analysis.

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