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Discard self-sampling of Dutch bottom-trawl and seine fisheries in 2014-2016

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Summary

In the European Union the collection and management of fisheries data is regulated through the Data Collection Framework (DCF) of the European Commission (EC). Within this context, Wageningen Marine Research (WMR) coordinates a discards monitoring programme in collaboration with the Dutch demersal fishing industry. A 'reference fleet' of vessels of which the owners are willing to participate in a self-sampling programme, was recruited. Fishermen within the reference fleet are requested to collect discard samples according to a definite annual sampling plan. After the discard samples are brought to shore, WMR collects and analyses these samples. This report summarizes data that has been collected within this monitoring programme in 2014-2016.

In 2014-2016 the reference fleet consisted of 20-22 vessels. In total, 160, 172 and 157 trips were sampled in 2014, 2015 and 2016 respectively. All sampled trips were assigned to their respective metiers, based on gear type, mesh size and species composition of the catch. Within a trip, the crew retained a sample during two separate hauls, thus constructing two independent samples. Sampling was conducted on board vessels from eleven different metiers: beamtrawlers with 70-99 (Eurocutters (i.e. engine power ≤ 300 hp) and large vessels (i.e. engine power >300 hp)), 100-119, and ≥120 mm meshes, Scottish seiners with 70-99, 100-119 mm, and ≥120 mm meshes, and otter trawlers with 70-99 mm meshes, 100-119 and ≥120 mm meshes.

Discard patterns are quite similar between all metiers; dab and undersized plaice are the most frequently discarded species. In addition, the flyshoot trips frequently discarded grey gurnard, whiting and horse mackerel. The majority of the benthos discards within the beamtrawl and otter trawl metiers consisted of echinoderms and crustaceans. In comparison, flyshooters discarded almost no benthos.

An important element in the reform of the Common Fishery Policy (CFP) is the obligation to land all catches, i.e. a discard ban. Under this landing obligation all discards of quota regulated species have to be landed. For the demersal fisheries the landing obligation will be phased in over a number of years. The landing obligation will have a particular strong impact on the Dutch demersal fishing industry as this is a mixed fishery where catches can contain many different quota species.

Samenvatting

In de Europese Unie wordt het verzamelen en beheren van visserijgegevens gereguleerd doormiddel van de Data Collectie Verordening (DCF) van de Europese Commissie (EC). Binnen deze regulatie, coördinatie Wageningen Marine Research (WMR) een discards monitoring programma in samenwerking met de Nederlandse demersale visserij. In dit project wordt gebruik gemaakt van een 'referentie vloot', bestaande uit een groep Nederlandse commerciële vissers die zich willen inzetten voor het onderzoek. Deze vissers wordt gevraagd om voor specifieke visreizen, die aan het begin van het jaar zijn vastgesteld, een deel van de discards aan boord te houden, waarna dit wordt opgehaald en geanalyseerd door WMR. Voorliggend rapport presenteert de resultaten van het zelfbemonsteringproject van de Nederlandse demersale vloot opererend inde Noordzee (ICES deelgebied IV) in 2014-2016.

In 2014-2016 bestond de referentievloot uit 20-22 schepen. In totaal zijn 160, 172 en 157 visreizen bemonsterd in respectievelijk 2014, 2015 en 2016. Voor de zelfbemonstering neemt de referentievloot volgens een door WMR opgezet bemonsteringsschema gedurende een vis reis op gezette tijden van twee vistrekken steekproeven van de vangst die anders overboord zou zijn gegaan (d.w.z. discards) De monsters met bijbehorende gegevens over de totale vangst per trek, visserij-inspanning en vispositie worden aangeland en aan WMR overgedragen. WMR zorgt voor de verdere verwerking van de monsters. Op basis van vistuig, maaswijdte en soorten samenstelling van de vangst zijn alle bemonsterde visreizen aan een metier groep toegekend. In 2014-2017 zijn 11 verschillende metiers bemonsterd: boomkorschepen vissend met 70-99 (waarbij onderscheid gemaakt wordt tussen Eurokotters (d.w.z. vissend met een motorvermogen ≤ 300 pk) en grote kotters (d.w.z. vissend met een motorvermogen > 300 pk)), 100-119, en ≥120 mm maaswijdte, flyshooters vissend met 70-99, 100-119 mm, en ≥120 mm maaswijdte, en otter trawlers vissend met 70-99 (waarbij onderscheid gemaakt wordt tussen schepen die voornamelijk Noorse kreeft vangen en schepen die voornamelijk demersale vis vangen), 100-119, en ≥120 mm maaswijdte.

De waargenomen discards patronen blijken vergelijkbaar tussen de verschillende metiers; schar en ondermaatste schol zijn de meest voorkomende soorten in de visdiscards. Daarbij werden grauwe poon, wijting en horsmakreel frequent gediscard binnen de flyshoot reizen. De meerderheid van de benthos discards binnen de boomkor en otter trawlers bestonden uit stekelhuiden (verschillende zeestersoorten) en kreeftachtigen (zoals zwemkrabben en Noorse kreeft).

Een belangrijk element in de herziening van het Gemeenschappelijk Visserij Beleid (GVB) is de verplichting om alle vangsten aan land te brengen. Onder de aanlandplicht moeten alle discards van commerciële soorten die gereguleerd worden door quota aangeland worden. Binnen de demersale visserij wordt de aanlandplicht tussen 1 januari 2016 en 1 januari 2019 ingevoerd. De aanlandplicht zal met name voor de Nederlandse demersale visserij een effect hebben aangezien dit een gemengde visserij is waar de vangsten uit tal van verschillende soorten bestaan.

1 Introduction

Discarding unwanted organisms in European fisheries is an inevitable consequence in mixed fisheries (Feekings et al., 2012). Reasons for discarding may be for economic reasons (if there is no commercial value for the species caught) or because of regulatory measures (such as minimum landing size or catch limits (quota)). Keeping record of quantities being discarded may improve scientific stock assessments and advice on quota, enabling more accurate estimates of total fishing mortality.

Box 1: Data Collection Framework (DCF)
In the European Union (EU) the collection and management of fisheries data is enforced through the Data Collection Framework (DCF) of the European Commission (EC) (EC 1543/2000 and EC 199/2008, from 2017 onwards: EU 2016/1701, EU 2016/1251 and EU 2017/1004). The DCF states which information should be collected, managed and made available by the Member States (MS) for scientific advice regarding the Common Fisheries Policy (CFP). For this purpose all MS are obliged to submit a work plan for data collection in the fisheries and aquaculture sectors on a multiannual basis.

The collection of discard data is enforced through the EC DCF (Box 1). The DCF requires the implementation of at-sea monitoring programmes, which deliver discard estimates with an acceptable level of precision. In the Netherlands, a "self-sampling programme" is implemented for demersal fisheries in the North Sea. Within this programme discard data are collected for Dutch bottom-trawl and seine fisheries for a number of metiers which are defined based on gear type, target species assemblage, and mesh characteristics in the DCF. To verify the accuracy and objectivity of self-sampling 10 observer trips are carried out annually on board fishing vessels that participate in the programme. Hauls sampled during the self-sampling trips are verified using the observer data from the same haul from observer trips (Verkempynck et al., in prep). In addition, the observer trips have proven to be of importance for training crew members in sampling of discards. Also, the observer trips are appreciated by the skipper and the members of the reference fleet, it bridges the gap between scientists and crew. The data from these observer trips are excluded from this report.

The aim of this report is to present an overview of the data that has been collected within the Dutch self-sampling programme of bottom-trawl and seine fisheries in 2014-2016. The data is used for further analyses within different projects, including stock assessment working groups (ICES, 2017a).

2 Methods

2.1 Discard self-sampling programme

2.1.1 Reference fleet

A 'reference fleet', consisting of 20-22 vessels in 2014-2016, with protocol-instructed fishers collected discard samples according to a predefined schedule during their regular commercial operations. Prior to sampling, fishers were provided with all necessary equipment (labels, plastic sampling bags, sealing cable ties, markers, and sampling sheets) and written instructions. Additionally, WMR staff visited the crew in port regularly to evaluate and, when necessary, to reinstruct the sampling protocol.

2.1.2 Sampling and data collection procedures

Operational- and catch data are collected each time the fishing gear is deployed (each 'haul') during a particular fishing trip. With each haul the following information was registered: vessel position (at start and end); haul duration; depth; weather conditions; and the volumes of catches and landings. The total volume of discards of each haul was calculated by subtracting the total landings, which was recorded in a logbook, from the total catch volume which was estimated by the skipper/crew.

Within a trip, the crew was instructed to retain a sample of two boxes of discards (one box equals approx. 40 kg) during two separate hauls, thus constructing two independent samples, and collecting a total of approx. 160 kg of discards per trip. These boxes were filled by scooping discards randomly at regular intervals from the end of the processing conveyer belt. Crew members sample the discards while other crew members sort and select the commercial catch. The samples were then collected in large plastic bags which were sealed off using a cable tie, labelled and cool-stored until the vessel returns to the port. Back at port, the discard samples were collected by WMR staff and are returned to the laboratory for analysis.

From each sample all species were identified. Numbers at length were recorded for all fish species, Norway lobster *(Nephrops norvegicus,* hereafter termed *Nephrops*) and edible crab (*Cancer pagurus)*. Numbers without length measurements were recorded for all remaining (benthos) species. Standard Data management software was used to enter and subsequently audit all data before the data were stored in the centralised WMR database.

2.1.3 Metier classification

All sampled trips were assigned to their respective metiers based on the level 6 for the metier classification defined by the European Union (EU) definitions (2008/969/EC Appendix IV) after the trip was executed (Table 1).

Sampling was conducted on board vessels from eleven different metiers. Within the Dutch beamtrawl metier (TBB_DEF 70-99 mm), distinction is made based on the vessel's engine power. Due to regulations allowing only vessels with an engine power of ≤300 hp (so called "Eurocutters",) to fish in a marine protected area ("plaice box") and the Dutch 12-mile Exclusive Economic Zone. To reflect this spatial difference of the fleet -which also has implications on their discarding pattern- in the following analysis, summaries of the discard data are presented separately for Eurocutters (termed TBB_DEF_70-99mm_S300hp) and the remaining part of the beamtrawl fleet fishing (termed TBB_DEF_70-99mm_G300hp; Table 1). The other metiers are beamtrawlers with 100-119, and ≥120 mm meshes, Scottish seiners with 70-99, 100-119 mm, and ≥120 mm meshes, and otter trawlers with 70-99 mm meshes (MCD and DEF), 100-119 and ≥120 mm meshes. The total number of samples per metier is based on fleet composition of the reference fleet.

2.2 Raising procedures

See figure 1 for a flow-chart of the raising procedure. Numbers (at length) were registered for all (fish) species for each sample. Whenever a species was very abundant within the sample, a sub-sample of this species was counted. Then, the numbers (at length) were multiplied with the sub-sample fraction to estimate total numbers (at length) within the sample. The numbers (at length) in the samples were multiplied with the volume ratio between discard sample and total discards to estimate total numbers (at length) within that haul.

Next, length/weight-relationships[1] were applied to convert numbers at length to weight at length for all fish species. Both numbers (fish and benthos) and weights (fish) for the two samples were summed up. These numbers and weights were then standardized into discards per unit effort (expressed in number/hour and kg/hour) rates by dividing them by the deployment duration (i.e. fishing time). Total numbers and weights per fishing trip were calculated by multiplying the standardize rates with the duration of all hauls. Doing this we assume that the sampled hauls per trip are representative in species composition and variance for all the other hauls per trip.

2.3 Fleet effort

A measure of fleet effort was calculated using the WMR VISSTAT database containing the official Dutch logbook information. In this database, the date and time of port departure and arrival, and other vessel characteristics (such as gear type, engine power, mesh size) are registered for all Dutch fishing vessels over 12 metres. Time between departure and arrival is multiplied by the engine power of each vessel, resulting in a measure of fishing effort expressed as kWdays. The ratio between fleet effort and sampling effort is used to estimate total discards by species for the Dutch demersal fleet by metier. This information is sent to the ICES assessment Working Groups for several stocks for which enough information is available. Since 2011, discard data from the reference fleet have been used in several ICES Working Groups for the assessment for stocks in the North Sea, such as plaice, cod, sole, whiting, turbot, brill, *Nephrops* (ICES, 2017a). Furthermore, the data is also sent to the STECF Expert working Group on Fisheries Dependent Information.

[1] The L/W relationships for plaice (*Pleuronectus platessa)*, sole (*Solea solea*), turbot (*Scophthalmus maxima*), brill (*Scophthalmus rhombus*) and thickbacksole (*Microchirus variegatus*) are based on WMR data. For all other species these relations are based on literature.

3 Results

In total, 161, 172 and 162 trips were sampled in 2014, 2015 and 2016 respectively. Trips that were not sampled according to the sampling protocol and/or trips for which essential information was missing were considered invalid and excluded from the analysis. This resulted in 160, 172 and 157 valid trips in 2014, 2015 and 2016 respectively. All sampled trips (Table 2b) were assigned to their respective metiers, based on gear type, mesh size. For the otter trawls fishing with small mesh sizes further definition of metiers are made based on the species composition of the catch. It should be noted that for some metiers the results are based on a small number of trips. These results should therefore be interpreted with caution.

3.1 TBB_DEF_70-99_G300hp

Within the beamtrawl metier, different types of innovative gears are deployed. Since 2009, fishermen have been switching from traditional beam trawling to pulse trawling in the Dutch demersal fleet. The pulse fishery uses electric stimulation instead of tickler chains to stun fish out of the ground and move them into the net. Pulse gear shows increased sole catches and decreased fuel use in comparison with the traditional beam trawl gear (van Marlen 2014). Another popular innovate gear within the beamtawl metier is the sumwing. This device is designed to "fly" over the bottom, whereas traditional beamtrawls have "shoes", steel beam heads that keep space between the beam and the sea floor(van Marlen, 2009).

The large (>300hp, often >35m LOA) beamtrawlers compromise the majority of the Dutch demersal fisheries, with a fleet effort of 23089366, 22645181, 23748144 kWdays in 2014, 2015 and 2016 respectively (Table 2a). 84, 69 and 81 trips were self-sampled for this metier in 2014, 2015, and 2016 respectively, which coincides with a sampling coverage of ~3% (Tables 2b,3). Sampling was highest in quarters 1 and 4 (Table 2b). This peak can to some extent also be observed in the fleet effort (Table 2a). Figure 3 shows the distribution of total fleet effort by year and corresponding positions of sampled trawls.

Plaice and sole are the most frequently landed species within this metier, with plaice being landed ~2 times more than sole (Table 4). Dab, turbot, brill, whiting and various other species, for example cod, make up the rest of the landings.

Plaice and dab are the most frequently discarded species within this fleet (Tables 4,5,8). Plaice is discarded because it is undersized and therefore not allowed to be landed (Figure 4). Dab is discarded because of its low commercial value. Most other fish species that are discarded include smaller flatfishes (e.g. scaldfish (*Arnoglossus laterna*), solenette (*Buglossidium luteum*), sole (*Solea solea*)) or benthic oriented species (e.g. common dragonet (*Callionymus lyra*), grey gurnard (*Eutrigla gurnardus*)). Commercial value for these species is low or zero. In addition, some (semi-)pelagic oriented species (e.g. whiting (*Merlangius merlangus*), herring (*Clupea harengus*)) for which no individual quota is available for the demersal fleet, are encountered in the discards (Table 8). The majority of the benthos discards consisted of echinoderms (sand sea star (*Astropecten irregularis*), common starfish (*Asterias rubens*), serpent star (*Ophiura ophiura*)) and crustaceans (swimming crab (*Liocarcinus* sp.), hermit crab (*Pagurus bernhardus*)) species (Table 9).

3.2 TBB_DEF_70-99_S300hp

Eurocutters (<300hp) are the only vessels allowed to fish in the Dutch 12-mile Exclusive Economic Zone and the plaice box (Pastoors et al., 2000). This is reflected in the distribution of the fleet effort and the sampling locations (Figure 3). During fall and winter the Eurocutters move a little more offshore than in spring and summer (van der Reijden et al., 2014). This

might be a reaction of fishermen on seasonal variation in sole and plaice distribution (Poos & Rijnsdorp, 2007).

22, 23 and 25 trips were self-sampled for this metier in 2014, 2015, and 2016 respectively, which coincides with a sampling coverage of ~3% (Tables 2b,3).

Plaice and sole are the most frequently landed species within this metier (Table 4). Dab, *Nephrops*, turbot and various other species make up the rest of the landings. Dab and undersized plaice are the most frequently discarded species within this fleet (Tables 4,5,8, Figure 4). Most other fish species that are discarded include undersized sole, undersized whiting and solenette. The three most discarded benthic species include serpent star, common starfish and swimming crab (Table 9).

3.3 TBB_DEF_100-119

This fishery targets plaice at the Doggersbank (Figure 3) by large beam trawlers only (>300hp). Effort of the beam trawlers with of 100-119mm has increased substantially in comparison with 2011 (van der Reijden et al., 2014; Table 2); fleet effort has increased 2-3 times (Table 2a).
The large mesh sized beamtrawler metier is a seasonal fishery, with a peak in effort in quarter 2, and quarter 3 and low effort in quarters 1 and 4 (Table 2a). This can partly be explained by a market driven switch in fleet effort of the TBB_DEF_70-99 in quarters 1 and 4. During winter, sole is caught more easily and of better quality, which has a positive effect on the price. Therefore, several fishermen switch from 100mm to 80mm during winter, to target sole (van der Reijden et al., 2014).
8, 4 and 7 trips were self-sampled for this metier in 2014, 2015, and 2016 respectively, which coincides with a sampling coverage of ~1%-5% (Tables 2b,3).

Plaice is the most frequently landed species within this metier (Table 4). Dab and undersized plaice are the most frequently discard fish species (Tables 4,5,8 and Figure 4). However, the observed discard estimate for plaice is substantially lower than the small mesh sized beamtrawlers (TBB_DEF_90-99); 8%-20% in TBB_DEF_100-119 *vs*. 56%-59% in TBB_DEF_70-99_G300hp (Table 4). Benthos discards are dominated by the sand seastar (Table 9).

3.4 TBB_DEF_>=120

Effort of the large beam trawlers (>300hp) with fishing with a of 120mm has increased substantially in comparison with 2011 (van der Reijden et al., 2014; Table 2); fleet effort has increased more than four times (Table 2a). As the TBB_DEF_100-119, the TBB_DEF_>=120 is a seasonal fishery, with peaking effort in spring and summer (quarter 2 and 3). The majority of the effort is concentrated at the Doggersbank and northeast of the Doggersbank (Figure 3). In winter, effort is reduced substantially (Table 2a). This probably reflects a (seasonal) shift towards the deployment of small meshed nets (TBB_DEF_70-99), which target sole (van der Reijden et al., 2014). Sampling coverage of this metier was low; 0 trips in 2014, 2 trips in 2015 and 1 trip in 2016 (Table 2b). Therefore, the presented information of discards in this metier can only be used as an indication for discard patterns, and not as exact discard rates.

A limited number of fish species were observed in the sampled trips; 11 and 6 species in 2015 and 2016 respectively. Undersized plaice and dab were the most frequently discarded fish species (Tables 4,5,8, Figure 4). In addition, starry ray (*Amblyraja radiata*) and grey gurnard were discarded frequently in 2015 (Table 8b), while in 2016 these species were discarded in significantly lower numbers per hour (>20 times lower) (Table 8c). Starry ray was mostly discarded within this metier. This is most likely due to the natural distribution of this species overlapping with this fishery (ICES, 2017b). Benthos discards were dominated by the common starfish in 2015 (Table 9b). This species was not found in such abundant numbers in 2016;

almost no benthos was caught in 2016 (Table 9c). However, it should be noted that the 2016 numbers are based on only 1 trip.

3.5 SSC_DEF_70-99

Flyshooters apply a deviating fishing technique in comparison with the other demersal fisheries. This fishing technique is developed to catch both pelagic and demersal fish, while the time the fish are in the net is as short as possible. Long lines are attached to the net doors. The net is set in a circle or square by the fisherman. Then, when hauling the lines, the circle/square closes and the lines herd the fish towards the middle of the circle/square where they are caught in the net (van der Reijden et al., 2014). The flyshoot fishery is a seasonal fishery targeting mullet, tub gurnard, squid, mackerel, plaice, dab, whiting and cod. Flyshoot vessels fish in the North Sea in spring and summer. In the autumn and winter the vessels move towards warmer waters in the Channel.

Only the flyshooter trips fishing in the North Sea and Skagerrak are taken into account in this monitoring programme. Sampling of this metier commenced in 2015, no trips were sampled prior to this (van der Reijden et al., 2014; Uhlmann et al., 2013). 10 trips were self-sampled in 2015 and 1 trip was sampled in 2016. This coincides with a sampling coverage of ~4% and ~1% respectively. Trips were sampled in quarters 2-4 (Table 2b,3).

The sampled trips mainly landed mackerel (*Scomber scombrus*), mullet (*Mullus surmuletus*) and tub gurnard (*Chelidonichthys lucerna*). The most frequently observed discarded fish species differed between years. In 2015, whiting and horse mackerel (*Trachurus trachurus*) were most frequently discarded, followed by dab, grey gurnard and bib (*Trisopterus luscus*) (Table 8b). In 2016, dab, grey gurnard and whiting were the most frequently discarded fish species (Table 8c). However, it should be noted that the latter is based on only 1 trip. This observed difference between the years should therefore be interpreted with caution. Almost no benthos was caught in this metier in comparison with the metiers using other gear types. This is reflected in the observed low discard rates for benthos presented in Table 9.

3.6 SSC_DEF_100-119

See section 3.5 for general description of the flyshooter fishery. 3, 4 and 2 trips were sampled for this metier in 2014, 2015 and 2016 respectively, which coincides with a sampling coverage of ~2%-4%. Trips were sampled in quarters 2-4 (Tables 2b,3).

The sampled trips mainly landed plaice, tub gurnard, dab and cod. The most frequently discarded fish species over the sampled years included dab, grey gurnard and undersized plaice (Tables 4,5,8, Figure 4). In addition, horse mackerel and tub gurnard were discarded in considerable amounts in 2015 and 2015-2016 respectively (Table 8). Almost no benthos was caught in this metier, due to the fishing method, in comparison with the metiers using other gear types. This is reflected in the observed low discard rates for benthic species presented in Table 9.

3.7 SSC_DEF_>=120

See section 3.5 for general description of the flyshooter fishery. 3, 4 and 3 trips were sampling for this metier in 2014, 2015 and 2016 respectively, resulting in a sampling coverage varying between ~3% and ~8%. Trips were sampled in quarters 2-4 (Tables 2b,3). The sampled trips mainly landed cod, plaice and dab.

The most frequently discarded fish species were dab, undersized plaice and grey gurnard (Tables 4,5,8, Figure 4). Almost no benthos is caught in comparison with the metiers using other gear types. This is reflected in the observed low discard rates presented in Table 9.

3.8 OTB_MCD_70-99

Even though otter trawlers fishing with small mesh size (OTB_70-99) operate with similar gear, the target species may differ; some target mainly plaice, while others target *Nephrops* with plaice as by-catch. To discriminate between both fisheries, the metiers are classified based on landing data per trip. If *Nephrops* from otter-trawl gears (OTB/OTT) composes more than 30% landings in a trip, this trips is classified as a mixed crustacean and demersal (OTB_MCD) targeting metier. If *Nephrops* composes less than 30% of landings, the trip is classified as OTB_DEF. It should be noted that this results in a knowledge deficiency of the initial purpose of the fishing trip (which is probably linked to fishing location), as an unsuccessful trip for *Nephrops* will be classified as OTB_DEF and vice versa. The OTB_MCD_70-99 fishery is a seasonal fishery. This is reflected in the fleet effort; effort is highest in quarter 3 (Table 2a).

19, 17 and 6 trips were self-sampled for this metier in 2014, 2015 and 2016 respectively, resulting in a sampling coverage varying between ~5% and ~7% (Tables 2b,3). The seasonal character of this fishery is reflected in the number of trips that are sampled by quarter (Table 2b). Quarter 1 was not sampled for this metier in 2015 and quarters 1 and 3 were not sampled for this metier in 2016 (Table 2b). *Nephrops* occur at specific habitats, which to some extent is visualised in the distribution of the total effort of this metier (Figure 3).

As expected, this metier lands most *Nephrops* of the sampled demersal metiers (Table 4). Plaice also comprises a large part of the landings (Table 4). The most frequently discarded fish species within this metier were dab and undersized plaice (Tables 4,5,8). This was followed in all years by grey gurnard and in 2015 and 2016 by whiting (Table 8). Overall, *Nephrops* was the most abundant benthos species that was discarded (Table 9). Figure 4 shows that the majority of the discarded *Nephrops* was of marketable size (i.e. above minimum landing size). The common starfish and harbour crab (*Liocarcinus depurator*) were also frequently discarded benthos species within this metier (Table 9). Furthermore, the sand sea star belonged to one of the most frequently discarded benthos species in 2015 (Table 9b), while this benthic echinoderm species was discarded in significant lower numbers per hour (>10 times lower) in 2014 and 2016 (Tables 9a,c).

3.9 OTB_DEF_70-99

7, 22 and 22 trips were self-sampling for this metier in 2014, 2015 and 2016 respectively, resulting in a sampling coverage varying between ~1% and ~9% (Tables 2b,3). Quarters 3 and 4 were not sampled for this metier in 2014 (Table 2b).

The sampled trips mainly landed plaice and *Nephrops* (Table 4). The most frequently discarded fish species were similar to OTB_MCD_70-99; dab and undersized plaice, followed by grey gurnard and whiting (2015, 2016) (Tables 4,5,8 and Figure 4). Over the years the composition of the discarded benthos species differed slightly. In 2014 the harbour crab and common starfish were the most frequently discarded benthos species within this metier (Table 9a), while in 2015 and 2016, common starfish and *Nephrops* were the most frequently discarded benthos species. Furthermore, the sea potato (*Echinocardium cordatum*) (2015), harbour crab (2015,2016) and serpent star (2015) belonged to one of the most frequently discarded benthos species in 2015-2016 (Table 9b,c).

3.10 OTB_DEF_100-119

This metier regards a seasonal fishery, with a peak in fleet effort in quarters 2 and 3 (Table 2a). This peak is to some extend also represented in the self-sampling programme (Table 2b).
13, 13 and 7 trips were sampled for this metier in 2014, 2015, and 2016 respectively, which coincides with a sampling coverage of ~6%-8% (Tables 2b,3).

This metier is targeting plaice, at the Doggersbank (Table 4, Figure 3). Dab and undersized plaice are the most frequently discarded fish species (Tables 4,5,8 and Figure 4). Benthos discards are dominated by common starfish, common brittle star (*Ophiothrix fragilis*) (2014, 2015), and Nephrops (2015, 2016) (Table 9).

3.11 OTB_DEF_>=120

The overall number of sampled trips of this metier was lower in comparison most other sampled metiers; 1 trip in 2014, 4 trips in 2015 and 2 trips in 2016 (Table 2b). However, this was not reflected in the sampling coverage; varying between ~4% and ~14%.

This metier mainly landed plaice (Table 4). Dab and undersized plaice are the most frequently discarded fish species (Tables 4,5,8 and Figure 4). In addition, starry ray was discarded frequently in 2014 (Table 8a). Almost no benthos was caught in 2014 (Table 9a). However, it should be noted that these numbers are based on one trip only. In 2015-2016 benthos discards were dominated by common starfish and sand sea star (2016) (Table 9b,c).

4 Discussion

In total, 161, 172 and 162 trips were sampled in 2014, 2015 and 2016 respectively. Trips that were not sampled according to the sampling protocol and/or trips for which essential information

4.1 Discard patterns

The reform of the DCF in 2009 required member states to increase sampling intensity. In order to meet his requirement a reference fleet was recruited that were willing to participate in a self-sampling programme. This has resulted in an increased spatial and temporal coverage of the many metiers in the diverse Dutch demersal fishery. The self-sampling programme is found to be beneficial for stock assessment purposes of commercially important species such as sole and plaice as it has an increased spatial and temporal coverage in comparison with an observer programme. Simultaneously an overall indication of the distribution patterns of the demersal fleets and discards in the whole North Sea is obtained. Any observer programme with insufficient sampling coverage will provide patchy information and consequently result in increased uncertainty in estimated discards. Although, observer trips can provide very accurate information on trip level, it is not suitable to raise to fleet level when sampling coverage is too low.

Discard patterns are quite similar between all metiers; dab and undersized plaice are the most frequently discarded species. In addition, the flyshoot trips frequently discarded grey gurnard, whiting and horse mackerel. The majority of the benthos discards within the beamtrawl and otter trawl metiers consisted of echinoderms and crustaceans. For the flyshooters almost no benthos was caught in comparison with the other metiers.

Overall, the Dutch demersal fisheries are widely distributed over the North sea (Figure 3). However, spatial diversity is distinguishable within the demersal fleet. Spatial patterns can be observed for the different metiers: Eurocutters (TBB_DEF_70-99_S300hp) fish close to the Dutch shore whereas fisheries with large mesh sizes (>=100mm) are because of regulations mainly located offshore, in the central and northern North Sea. The *Nephrops* fisheries are located in specific regions and functional units. This is caused by the very specific habitat requirements of the target species *Nephrops*, as *Nephrops* prefers muddy substrates for digging its burrows. The metiers targeting plaice and sole (TBB_DEF_70-99mm_G300hp) are more uniformly spread over the North sea, though some 'hotspots' such Doggerbank can be identified as well.

Seasonal trends are also present in the Dutch demersal fisheries. The flyshooter vessels are hardly present in the North sea during wintertime (quarter 1 and 4), and move into the English channel (VIId) during this period. The large mesh sized beam trawlers have a strongly reduced effort in wintertime. As they shift from target species plaice to sole and other high valued species (e.g. turbot), these vessels deploy their gears with 70-99mm mesh sizes.

Sampled trips were assigned to their respective metiers after the trip was executed. For example, for the OTB metier fishing with 70-99mm the target assemblage (i.e. level 5 in the metier classification defined by the EU) is defined based on the landings composition of the trip; trips where more than 30% of the landings consisted of *Nephrops* are grouped into OTB_MCD-metiers. Post stratification of metier is not necessarily in line with the trip selection of the reference fleet vessels. This results that for some metiers only one metier is available (e.g. OTB_DEF_>=120 in 2014). In essence this is the result that the vessels are selected from a fixed pool of beamtrawl, ottertrawl and flyshoot vessels that according to the EU metier definition shifts between metiers.

4.2 Reform of the Common Fishery Policy

An important element in the reform of the CFP is the obligation to land all catches, i.e. a discard ban. Under this landing obligation all discards of commercial species that are regulated by quota have to be landed and is categorised as Below Minimum Size (BMS). The landing obligation is introduced gradually, starting in 2015 with pelagic fisheries, extending to demersal fisheries in 2016, and being fully implemented by 2019. For the demersal fisheries the landing obligation will be phased in over a number of years. From 1st of January 2016 it is effective for all target species (depending on the fishery). For the non-target quota species the landing obligation will ultimately come into force on 1st January 2019 at the latest. The landing obligation will have a particular strong impact on the Dutch demersal fishing industry as this is a mixed fishery where catches can contain many different species.

The gradual implementation of the landing obligation in the demersal fishery commenced in 2016. In 2016 the beamtrawl fleet targeting sole (TBB_DEF_70-99) was obliged to land all undersized sole, and the otter trawl fleet targeting Nephrops (OTB_MCD_70-99) was obliged to land all undersized *Nephrops*. Details of the implementation of the landing obligation are defined in the multiannual plans for demersal fisheries in the North Sea and in Union waters of ICES Division IIa (EU 2015/2440; EU 2016/2250). In these plans the fisheries subjected to the landing obligation (described by fishing gear, mesh size and species concerned) are described. Furthermore, they include information on exemptions (for species that show 'high' survivability, or a specific *de minimus* discard allowance under certain conditions has been assigned), specific technical measures and minimum conservation reference sizes. The beamtrawl fleet targeting sole was granted an exemption when measures were taken to modify nets and add a 3-metres panel (so-called "Belgian panel") with 120mm mesh size that permits fishermen to discard remaining undersized sole from their catches. Most vessels in the reference fleet adopted this modification in their nets and were exempted of landing BMS sole in 2016. BMS sole was therefore observed only sporadically in the 2016 self-sampling beamtrawl trips targeting sole. The producer organisations dismissed the PO measures for *Nephrops* (i.e. minimum number of individuals per kg and PO minimum landing size) in order to reduce discarding of marketable *Nephrops*. BMS *Nephrops* was not observed in the 2016 self-sampling ottertrawl trips targeting *Nephrops*.

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5 Tables

Table 1: List of Dutch bottom-trawl and seine metiers sampled in 2014-2016. Note that not all metiers are sampled for discards each year. These have been classified according to European Union (EU) definitions (2008/949/EC Appendix IV) requiring information about gear type (i.e. demersal beam – TBB; otter trawl - OTB/OTT; and Scottish seine – SSC; level 4), target species assemblage (i.e. demersal fish - DEF, mixed crustaceans and demersal fish – MCD; level 5), mesh size ranges (in mm; level 6), further specifications, and regulated gear groups as outlined in Annex 1 of the cod management plan 1342/2008.

Level 4	**Level 5**	**Level 6**	
Gear type	**Target assemblage**	**Mesh size**	**Regulated gear group**
TBB (> 300 hp)*	DEF	70-99 **	BT2
TBB (≤ 300 hp)*	DEF	70-99 **	BT2
TBB	DEF	100-119	BT2
TBB	DEF	≥120	BT1
SSC	DEF	70-99	TR2
SSC	DEF	100-119	TR1
SSC	DEF	≥120	TR1
OTB***	MCD	70-99	TR2
OTB***	DEF	70-99	TR2
OTB***	DEF	100-119	TR1
OTB***	DEF	≥120	TR1

* Note that the TBB metier is further subdivided on a national level in the Netherlands based on engine size (horse power, hp): vessels with ≤ 300hp engine power are so called "Eurocutters".

** Note, that due to regulation vessels within this metier do not fish with a mesh size < 80 mm.

*** In this report, all OTB should be read as OTB/OTT/QUA, as in logbook in the Netherlands data otter (OTB), pair trawl (OTT), and quadrig gear can be used interchangeably.

Table 2a. Summary of the total effort (in kWdays) for the fleet in **2014-2016**, for each quarter and year.

	2014					**2015**					**2016**				
Metier	Q1	Q2	Q3	Q4	**Total**	Q1	Q2	Q3	Q4	**Total**	Q1	Q2	Q3	Q4	**Total**
OTB_DEF_>=120	27775	28369	36843	8169	**101156**	23367	52293	43228	16207	**135095**	44708	43080	12997	730	**101515**
OTB_DEF_100-119	123338	304926	223449	131793	**783506**	64742	296159	220525	111730	**693156**	43470	272640	270995	114869	**701974**
OTB_DEF_70-99	104598	252280	196347	87415	**640640**	112192	127703	61446	104806	**406147**	128539	75240	13197	114541	**331517**
OTB_MCD_>=120		30696			**30696**							3499	2602		**6101**
OTB_MCD_100-119		2905	11620		**14525**	7147	22951	2186		**32284**		5567	1993	7593	**15153**
OTB_MCD_70-99	103711	215863	287502	72746	**679822**	25583	123277	260724	9320	**418904**	52249	158849	264440	63533	**539071**
SSC_DEF_>=120		70657	97237	3188	**171082**		6646	125592	23700	**155938**		31008	137728	41759	**210495**
SSC_DEF_100-119		98910	142986	76025	**317921**	876	100690	135667	36130	**273363**	1962	94637	189055	31620	**317274**
SSC_DEF_70-99	21771	254322	160540	67350	**503983**	9826	259994	191787	53829	**515436**	71049	219209	232821	119105	**642184**
TBB_DEF_>=120	43037	773434	303826	67160	**1187457**	52047	367201	165759	57672	**642679**	12583	467389	691647	203506	**1375125**
TBB_DEF_100-119	133291	574292	222986	168224	**1098793**	120161	1658789	1037757	338864	**3155571**	108173	1222996	623076	377280	**2331525**
TBB_DEF_70-99_G300hp	7031267	4690760	5456719	5910620	**23089366**	6661287	4564435	5241875	6177584	**22645181**	7044937	4923247	5280868	6499092	**23748144**
TBB_DEF_70-99_S300hp	200507	215929	114534	129436	**660406**	207819	262594	156465	167987	**794865**	236236	274956	136966	134192	**782350**
TBB_MCD_100-119								1857		**1857**					
TBB_MCD_70-99							17813	44100	2587	**64500**		11960	24993		**36953**
Total	7789295	7513343	7254589	6722126	**29279353**	7285047	7860545	7688968	7100416	**29934976**	7743906	7804277	7883378	7707820	**31139381**

Table 2b. Summary of the total number of valid self-sampled trips per metier for **2014-2016**, for each quarter and year.

	2014					**2015**					**2016**				
Metier	Q1	Q2	Q3	Q4	**Total**	Q1	Q2	Q3	Q4	**Total**	Q1	Q2	Q3	Q4	**Total**
OTB_DEF_>=120			1		**1**		1	2	1	**4**		1	1		**2**
OTB_DEF_100-119	2	7	3	1	**13**	2	6	3	2	**13**		3	3	1	**7**
OTB_DEF_70-99	4	3			**7**	4	8	1	9	**22**	7	4	8	3	**22**
OTB_MCD_70-99	2	8	8	1	**19**		6	9	2	**17**		1		5	**6**
SSC_DEF_>=120		2		1	**3**			3	1	**4**			2	1	**3**
SSC_DEF_100-119			3		**3**		3	1		**4**		1	1		**2**
SSC_DEF_70-99							3	5	2	**10**		1			**1**
TBB_DEF_>=120						1	1			**2**		1			**1**
TBB_DEF_100-119		4	1	3	**8**	1	2	1		**4**		5	2		**7**
TBB_DEF_70-99_G300hp	23	14	17	30	**84**	18	12	12	27	**69**	24	13	17	27	**81**
TBB_DEF_70-99_S300hp	8	4	4	6	**22**	5	7	2	9	**23**	8	8	4	5	**25**
Total	39	42	37	42	**160**	31	49	39	53	**172**	39	38	38	42	**157**

Table 3. Sampling and fleet effort (in kWdays) of sampled metiers, and sampling coverage (% of kWdays) per self-sampled metier for **2014-2016**.

Year	Metier	Sampling effort (kWdays)	Fleet effort (kWdays)	Sampling coverage kWdays (%)
2014	OTB_DEF_>=120	13498	101156	13.3%
	OTB_DEF_100-119	60685	783506	7.7%
	OTB_DEF_70-99	4538	640640	0.7%
	OTB_MCD_70-99	33156	679822	4.9%
	SSC_DEF_>=120	9686	171082	5.7%
	SSC_DEF_100-119	6260	317921	2.0%
	SSC_DEF_70-99		503983	0%
	TBB_DEF_>=120		1187457	0%
	TBB_DEF_100-119	52993	1098793	4.8%
	TBB_DEF_70-99_G300hp	754016	23089366	3.3%
	TBB_DEF_70-99_S300hp	18007	660406	2.7%
2015	OTB_DEF_>=120	4743	135095	3.5%
	OTB_DEF_100-119	46868	693156	6.8%
	OTB_DEF_70-99	36466	406147	9.0%
	OTB_MCD_70-99	23245	418904	5.5%
	SSC_DEF_>=120	12573	155938	8.1%
	SSC_DEF_100-119	9514	273363	3.5%
	SSC_DEF_70-99	21711	515436	4.2%
	TBB_DEF_>=120	19489	642679	3.0%
	TBB_DEF_100-119	34171	3155571	1.1%
	TBB_DEF_70-99_G300hp	607711	22645181	2.7%
	TBB_DEF_70-99_S300hp	22494	794865	2.8%
2016	OTB_DEF_>=120	11999	101515	11.8%
	OTB_DEF_100-119	40105	701974	5.7%
	OTB_DEF_70-99	39461	331517	11.9%
	OTB_MCD_70-99	11814	539071	2.2%
	SSC_DEF_>=120	6709	210495	3.2%
	SSC_DEF_100-119	5443	317274	1.7%
	SSC_DEF_70-99	3635	642184	0.6%
	TBB_DEF_>=120	16800	1375125	1.2%
	TBB_DEF_100-119	66953	2331525	2.9%
	TBB_DEF_70-99_G300hp	746577	23748144	3.1%
	TBB_DEF_70-99_S300hp	16800	782350	2.1%

Table 4. Average weights (in kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier for **2014-2016**. N= number of sampled trips; Na= not available (No length-weight key was used on 2014 *Nephrops* data). *) Metier not sampled.

	Metier	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
2014	OTB_DEF_>=120	1	0	1.10	0	15.53	9.89	16.94	0	2.51	26.32	432.75	0	8.16	0	1.65	0	3.14
	OTB_DEF_100-119	13	0	0.35	0.50	1.30	14.62	3.78	Na	1.26	33.95	201.34	0	0.06	0	3.60	0.03	0
	OTB_DEF_70-99	7	0	0.55	0.46	1.71	36.21	3.19	Na	20.42	68.79	81.18	0.02	0.32	0	4.34	0.81	0.19
	OTB_MCD_70-99	19	0.12	0.40	0.31	0.64	61.75	0.44	Na	27.96	55.50	20.43	0.06	0.68	0	2.76	3.30	0.17
	SSC_DEF_>=120	3	0	0	0.81	223.27	23.21	67.75	Na	0	24.59	60.84	0	0	0	0	0	0
	SSC_DEF_100-119	3	0	2.41	0.13	64.58	21.43	114.96	0	8.44	9.11	225.51	0	0	0	0	0.16	9.19
	SSC_DEF_70-99*)	0																
	TBB_DEF_>=120*)	0																
	TBB_DEF_100-119	8	0	2.99	0.02	0.12	26.80	3.07	Na	0.10	71.70	293.32	0	1.35	0	5.19	0.14	2.08
	TBB_DEF_70-99_G300hp	84	0.17	2.88	0.21	0.32	79.48	4.99	Na	0.10	104.07	80.96	5.25	33.08	0.15	5.94	4.21	0.57
	TBB_DEF_70-99_S300hp	22	0.92	0.66	0.55	0.21	50.53	4.79	Na	1.62	32.56	11.25	5.86	21.87	0.73	0.77	2.08	0.31
2015	OTB_DEF_>=120	4	0.21	4.11	0.10	0.08	79.25	4.31	0.13	0	166.47	93.27	0	0	0.44	7.48	0.79	0
	OTB_DEF_100-119	13	0.02	0.41	0.13	0.41	6.87	1.90	1.42	2.98	22.10	204.74	0	0.09	0.01	3.52	0.04	0.69
	OTB_DEF_70-99	22	0.08	2.06	0.07	1.73	59.50	1.62	14.86	17.88	61.10	38.80	0.56	2.78	0.14	4.99	6.49	0.76
	OTB_MCD_70-99	17	0.14	1.36	0.05	1.26	47.90	0.14	51.42	31.74	42.85	20.42	0	0.68	0.04	3.01	8.60	0.12
	SSC_DEF_>=120	4	0	0	22.09	201.84	15.34	42.23	0	0	39.82	249.26	0	0	0	0	1.38	0
	SSC_DEF_100-119	4	0.12	0	0.14	14.80	53.48	17.40	0.03	0	16.57	23.15	0	0	0.05	0	4.44	0
	SSC_DEF_70-99	10	0	0	14.47	13.82	57.23	15.81	0	0	4.59	2.99	0	0	0	0	251.41	29.77
	TBB_DEF_>=120	2	0	0	0	0	35.38	3.02	0	0	79.14	198.30	0	0	0	0.63	0.87	0
	TBB_DEF_100-119	4	0	0.74	0	0	28.20	0	0	0	41.68	484.88	0	0.03	0	1.18	0	5.64
	TBB_DEF_70-99_G300hp	69	0.22	2.89	0.16	0.75	58.60	3.74	0.10	0.13	95.28	65.37	4.27	35.88	0.13	6.64	4.06	0.21
	TBB_DEF_70-99_S300hp	23	0.21	0.89	0.05	0.33	48.65	3.75	0.09	1.05	27.58	10.13	6.62	19.40	0.67	1.52	4.96	0.51

Table 4. Continued.

	Metier	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
2016	OTB_DEF_>=120	2	0	1.11	0	0	63.49	4.40	0.35	0.16	169.15	256.27	0	0.58	7.20	5.73	0.17	0
	OTB_DEF_100-119	7	0	0.55	0.01	0.65	10.81	1.22	1.06	17.12	17.53	196.95	0	0.13	0.34	3.65	0.54	0
	OTB_DEF_70-99	22	0	1.45	0.08	0.73	71.93	0.48	21.07	35.92	47.05	26.86	0.06	0.76	0.16	3.42	7.48	0.24
	OTB_MCD_70-99	6	0	1.79	0.03	0.31	68.51	0	35.02	36.38	51.49	26.25	0	0.75	0	3.99	7.11	0.06
	SSC_DEF_>=120	3	0	0	0.26	406.09	1.94	13.75	0.04	0	0	29.35	0	0	0	0	7.86	1.08
	SSC_DEF_100-119	2	0.05	0	0	5.22	136.72	2.32	0	0	8.83	14.84	0	0	0	0	0.81	0
	SSC_DEF_70-99	1	0	0	0	0	47.07	0.81	0	0	7.60	25.06	0	0	0	0	25.51	1.62
	TBB_DEF_>=120	1	0	0	0	0	9.54	0	0	0	45.17	266.77	0	0	0	0	0	0
	TBB_DEF_100-119	7	0	0	0	0	27.29	2.06	0	0	48.23	252.18	0	0.01	0	2.49	0.07	0.92
	TBB_DEF_70-99_G300hp	81	0.46	2.48	0.05	0.69	73.23	6.51	0.21	0.20	99.36	74.03	3.09	33.82	1.78	6.81	3.56	0.38
	TBB_DEF_70-99_S300hp	25	0.09	0.58	0	0.60	41.55	5.17	1.74	1.76	40.09	17.87	3.11	20.37	0.76	1.83	1.56	0.05

Table 5. Average numbers per hour of discarded (commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier for **2014-2016**. N= number of sampled trips. *) Metier not sampled.

	Metier	N	BLL	COD	DAB	NEP	PLE	SOL	TUR	WHG
2014	OTB_DEF_>=120	1	0	0	78.90	0	157.14	0	0	0
	OTB_DEF_100-119	13	0	2.54	171.86	12.37	227.43	0	0	0.23
	OTB_DEF_70-99	7	0	4.34	469.03	80.41	507.35	0.22	0.09	9.00
	OTB_MCD_70-99	19	0.53	2.48	956.01	1226.94	456.91	0.56	0	45.52
	SSC_DEF_>=120	3	0	4.05	146.74	0.94	139.11	0	0	0
	SSC_DEF_100-119	3	0	0.85	162.04	0	52.13	0	0	1.42
	SSC_DEF_70-99*)	0								
	TBB_DEF_>=120*)	0								
	TBB_DEF_100-119	8	0	0.12	353.31	0.08	476.20	0	0	1.55
	TBB_DEF_70-99_G300hp	84	1.22	1.95	1507.77	41.61	1190.73	64.27	0.53	78.63
	TBB_DEF_70-99_S300hp	22	9.23	6.65	814.04	5.78	570.08	100.71	3.71	37.21
2015	OTB_DEF_>=120	4	0.86	0.76	1220.12	6.99	1283.73	0	2.74	16.93
	OTB_DEF_100-119	13	0.10	0.22	94.40	69.15	139.29	0.02	0.10	0.60
	OTB_DEF_70-99	22	0.57	0.73	996.12	770.89	610.47	6.85	0.69	96.77
	OTB_MCD_70-99	17	0.63	0.22	900.31	2648.30	369.60	0	0.17	112.92
	SSC_DEF_>=120	4	0	103.84	140.98	0	281.91	0	0	14.72
	SSC_DEF_100-119	4	1.10	0.52	663.70	1.48	158.95	0	0.25	49.41
	SSC_DEF_70-99	10	0	52.54	786.65	0	37.96	0	0	2806.60
	TBB_DEF_>=120	2	0	0	371.90	0	507.74	0	0	9.97
	TBB_DEF_100-119	4	0	0	404.36	0	332.31	0	0	0
	TBB_DEF_70-99_G300hp	69	1.22	0.59	1211.83	4.87	1056.87	51.15	0.60	72.50
	TBB_DEF_70-99_S300hp	23	1.41	0.27	773.49	5.49	409.11	116.88	3.93	71.89

Table 5. Continued.

	Metier	N	BLL	COD	DAB	NEP	PLE	SOL	TUR	WHG
2016	OTB_DEF_>=120	2	0	0	1260.10	2.47	1358.28	0	18.47	2.05
	OTB_DEF_100-119	7	0	0.03	163.39	44.46	125.59	0	0.81	10.67
	OTB_DEF_70-99	22	0	0.63	1338.54	964.39	368.46	0.43	0.59	116.41
	OTB_MCD_70-99	6	0	0.19	1204.87	1881.06	391.83	0	0	139.82
	SSC_DEF_>=120	3	0	1.59	17.43	0.44	0	0	0	66.80
	SSC_DEF_100-119	2	0.29	0	1630.36	0	85.65	0	0	17.22
	SSC_DEF_70-99	1	0	0	818.92	0	67.00	0	0	254.89
	TBB_DEF_>=120	1	0	0	140.24	0	300.91	0	0	0
	TBB_DEF_100-119	7	0	0	376.62	0	322.60	0	0	0.98
	TBB_DEF_70-99_G300hp	81	1.52	0.34	1480.85	10.14	1060.58	37.04	4.91	61.07
	TBB_DEF_70-99_S300hp	25	1.04	0	696.78	63.01	484.11	44.75	2.98	31.77

Table 6a. Average weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2014**. Na= not available (No length-weight key was used on 2014 *Nephrops* data).

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_100-119	1	2	0	0.06	0	4.38	9.76	7.01	Na	0.19	47.04	175.51	0	0	0	1.49	0	0
OTB_DEF_70-99	1	4	0	0.36	0.47	2.83	25.84	2.49	Na	12.22	79.68	89.47	0.03	0.43	0	0.58	0.94	0.29
OTB_MCD_70-99	1	2	0	0	0.43	2.19	33.79	0	Na	19.61	34.08	22.03	0	0.88	0	0.63	11.68	1.02
TBB_DEF_70-99_G300hp	1	23	0.16	3.08	0.37	0.69	86.68	10.50	Na	0.16	112.10	120.73	3.15	31.39	0.03	5.42	1.80	0.42
TBB_DEF_70-99_S300hp	1	8	0.16	0.75	1.50	0.51	48.22	4.31	Na	3.04	33.16	11.73	7.99	24.67	0.15	0.15	2.72	0.80
OTB_DEF_100-119	2	7	0	0.07	0.11	0.73	18.44	4.21	Na	2.14	34.53	206.08	0	0	0	4.22	0.05	0
OTB_DEF_70-99	2	3	0	0.81	0.44	0.20	50.04	4.11	Na	31.34	54.27	70.13	0	0.17	0.01	9.35	0.64	0.06
OTB_MCD_70-99	2	8	0	0.25	0.61	0.63	46.62	0.39	Na	25.14	57.03	22.37	0	0.14	0	3.78	2.48	0.13
SSC_DEF_>=120	2	2	0	0	1.13	323.96	25.70	14.98	Na	0	32.48	58.06	0	0	0	0	0	0
TBB_DEF_100-119	2	4	0	2.23	0.05	0.24	40.31	0.20	Na	0	102.02	278.35	0	0	0	6.00	0.21	0.20
TBB_DEF_70-99_G300hp	2	14	0.50	2.99	0.12	0.03	55.36	5.96	0	0.09	78.98	70.79	3.33	28.09	0.25	5.49	0.69	0.03
TBB_DEF_70-99_S300hp	2	4	3.39	1.60	0	0.06	86.62	5.01	Na	2.41	52.00	19.84	9.15	19.32	1.97	1.42	0.38	0.04
OTB_DEF_>=120	3	1	0	1.10	0	15.53	9.89	16.94	0	2.51	26.32	432.75	0	8.16	0	1.65	0	3.14
OTB_DEF_100-119	3	3	0	0.11	1.89	0	13.19	0.80	0	0	25.14	228.73	0	0.07	0	3.55	0	0
OTB_MCD_70-99	3	8	0.28	0.58	0.02	0.29	87.88	0.66	Na	33.46	60.91	16.85	0.09	1.13	0	2.34	1.91	0.01
SSC_DEF_100-119	3	3	0	2.41	0.13	64.58	21.43	114.96	0	8.44	9.11	225.51	0	0	0	0	0.16	9.19
TBB_DEF_100-119	3	1	0	9.16	0	0	15.13	0	0	0	80.64	594.69	0	9.34	0	0	0	2.66
TBB_DEF_70-99_G300hp	3	17	0.12	2.85	0.14	0.14	121.12	3.15	Na	0.06	130.23	57.81	5.12	41.41	0.31	6.39	1.95	0
TBB_DEF_70-99_S300hp	3	4	0.26	0.18	0.02	0	10.53	2.67	0	0	13.83	7.22	1.73	21.85	0.14	0.33	0	0

Table 6a. Continued.

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_100-119	4	1	0	3.92	0	0	1.95	0	Na	2.15	30.21	163.53	0	0.58	0	5.76	0	0
OTB_MCD_70-99	4	1	0	0.98	0	0.52	29.68	0	Na	23.18	42.71	30.33	0.36	0.94	0	2.27	4.26	0.03
SSC_DEF_>=120	4	1	0	0	0.18	21.88	18.24	173.29	0	0	8.82	66.39	0	0	0	0	0	0
TBB_DEF_100-119	4	3	0	1.95	0	0	12.68	7.90	0	0.28	28.29	212.82	0	0.50	0	5.84	0.08	4.40
TBB_DEF_70-99_G300hp	4	30	0.07	2.74	0.16	0.27	61.61	2.03	Na	0.08	94.81	70.73	7.82	32.20	0.10	6.23	8.97	1.13
TBB_DEF_70-99_S300hp	4	6	0.71	0.14	0.02	0.03	56.22	7.08	0	0	31.28	6.82	3.58	19.46	1.06	1.58	3.74	0

Table 6b. Average weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2015**.

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_100-119	1	2	0	0.05	0.83	0	10.97	2.99	0	0.59	24.46	149.15	0	0	0	0.47	0.18	0.69
OTB_DEF_70-99	1	4	0	2.04	0.20	3.65	65.89	2.81	0.15	3.49	72.32	51.00	2.03	6.50	0	4.60	3.90	1.93
TBB_DEF_>=120	1	1	0	0	0	0	18.32	6.04	0	0	136.87	389.55	0	0	0	0	0	0
TBB_DEF_100-119	1	1	0	1.90	0	0	31.19	0	0	0	51.80	805.44	0	0	0	1.90	0	6.39
TBB_DEF_70-99_G300hp	1	18	0.38	3.33	0.48	1.07	43.66	6.63	0.23	0.22	73.50	70.32	4.52	29.67	0.04	5.11	4.11	0.30
TBB_DEF_70-99_S300hp	1	5	0.33	1.17	0.18	0.30	25.00	2.52	0	0	19.74	8.49	2.52	19.43	0.32	0.40	0.94	0
OTB_DEF_>=120	2	1	0.07	1.12	0	0	28.82	0	0	0	50.47	70.28	0	0	0.33	8.76	1.81	0
OTB_DEF_100-119	2	6	0	0.34	0.01	0.85	3.02	2.85	0.01	3.12	19.24	264.52	0	0.14	0	5.40	0	1.26
OTB_DEF_70-99	2	8	0.22	0.96	0.10	1.62	54.69	2.20	1.91	12.55	57.86	30.88	0.44	2.68	0.12	4.02	3.40	0.91
OTB_MCD_70-99	2	6	0	0.66	0.04	1.55	37.60	0.19	13.92	27.15	40.22	20.32	0	0.50	0.03	2.97	4.21	0.30
SSC_DEF_100-119	2	3	0.16	0	0	0	69.33	12.36	0.04	0	21.93	29.71	0	0	0.06	0	2.61	0
SSC_DEF_70-99	2	3	0	0	43.78	19.90	98.72	1.28	0	0	10.85	7.43	0	0	0	0	739.83	51.61
TBB_DEF_>=120	2	1	0	0	0	0	52.43	0	0	0	21.42	7.05	0	0	0	1.26	1.73	0
TBB_DEF_100-119	2	2	0	0.53	0	0	28.92	0	0	0	44.85	419.28	0	0	0	0.53	0	5.18
TBB_DEF_70-99_G300hp	2	12	0.47	2.36	0.17	0.37	73.06	3.56	0	0	96.49	44.21	3.82	29.08	0.46	5.54	2.75	0
TBB_DEF_70-99_S300hp	2	7	0.42	0.72	0	0.04	56.50	6.10	0.08	3.42	24.62	12.24	5.30	19.21	0.37	0.91	0.53	0.04

Table 6b. Continued.

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_>=120	3	2	0.38	7.67	0.21	0.16	125.65	8.62	0.27	0	287.48	102.93	0	0	0.64	4.42	0.58	0
OTB_DEF_100-119	3	3	0.10	0.55	0	0.05	13.41	0.54	6.14	6.27	32.05	160.08	0.01	0.11	0.04	2.30	0.06	0
OTB_DEF_70-99	3	2	0	3.37	0	0.16	188.43	2.08	10.65	87.95	39.59	45.04	0.34	1.42	0	8.42	2.51	0.14
OTB_MCD_70-99	3	9	0.26	1.63	0.07	0.91	63.83	0.14	81.87	37.07	49.14	20.52	0	0.66	0.06	2.79	7.14	0.03
SSC_DEF_>=120	3	3	0	0	29.45	164.01	17.92	38.36	0	0	52.05	271.85	0	0	0	0	1.36	0
SSC_DEF_100-119	3	1	0	0	0.56	59.20	5.90	32.53	0	0	0.49	3.47	0	0	0	0	9.93	0
SSC_DEF_70-99	3	5	0	0	2.07	11.99	46.75	18.32	0	0	2.64	1.41	0	0	0	0	30.52	10.83
TBB_DEF_100-119	3	1	0	0	0	0	23.79	0	0	0	25.23	295.52	0	0.11	0	1.75	0	5.79
TBB_DEF_70-99_G300hp	3	12	0.24	2.71	0	1.11	58.06	3.96	0.04	0.02	113.40	84.61	2.95	41.74	0.07	4.50	1.42	0.15
TBB_DEF_70-99_S300hp	3	2	0.07	0.15	0	0	9.47	2.87	0	0	37.87	10.15	2.05	16.67	0.92	0.15	0.03	0
OTB_DEF_>=120	4	1	0	0	0	0	36.88	0	0	0	40.43	96.96	0	0	0.16	12.32	0.20	0
OTB_DEF_100-119	4	2	0	0.75	0	0	4.52	0	0	0	13.36	147.97	0	0	0	2.76	0	0
OTB_DEF_70-99	4	9	0	2.77	0	1.34	46.61	0.48	33.37	13.44	61.38	39.05	0.03	1.51	0.23	5.27	10.83	0.25
OTB_MCD_70-99	4	2	0	2.27	0	2.01	7.13	0	26.90	21.58	22.41	20.26	0	1.28	0	4.13	28.30	0
SSC_DEF_>=120	4	1	0	0	0	315.33	7.60	53.85	0	0	3.13	181.48	0	0	0	0	1.46	0
SSC_DEF_70-99	4	2	0	0	1.49	9.29	21.20	31.33	0	0	0.07	0.31	0	0	0	0	71.04	44.36
TBB_DEF_70-99_G300hp	4	27	0	2.92	0.01	0.53	62.37	1.79	0.08	1.17	101.20	62.91	4.89	40.44	0.07	9.10	5.79	0.26
TBB_DEF_70-99_S300hp	4	9	0.01	1.04	0.03	0.66	64.39	2.80	0.18	0.03	31.95	9.41	10.93	20.14	1.04	2.93	11.73	1.27

Table 6c. Average weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2016**.

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_70-99	1	7	0	1.43	0.05	1.21	26.82	0.87	11.71	21.15	21.78	35.28	0	0.63	0	2.15	11.19	0.70
TBB_DEF_70_99_G300hp	1	24	0.04	3.11	0.06	1.77	82.96	15.14	0.03	0.01	73.79	59.54	4.07	36.65	0.63	5.76	4.77	0.54
TBB_DEF_70_99_S300hp	1	8	0.07	0.83	0	1.70	36.46	4.33	0.01	0.09	28.64	10.04	2.73	16.93	0.35	1.54	1.47	0.11
OTB_DEF_>=120	2	1	0	2.21	0	0	117.55	0.74	0.70	0.33	306.82	145.38	0	0	14.39	9.50	0.33	0
OTB_DEF_100-119	2	3	0	0.11	0	1.52	3.80	0.26	0	0	20.34	259.57	0	0	0	3.99	0	0
OTB_DEF_70-99	2	4	0	1.47	0	1.43	129.21	0.19	7.16	34.33	72.79	26.43	0	0.13	0.15	2.37	11.08	0.01
OTB_MCD_70-99	2	1	0	0.73	0	0	42.22	0	8.83	51.36	71.04	13.20	0	0.24	0	2.87	0.47	0
SSC_DEF_100-119	2	1	0	0	0	10.43	188.14	4.64	0	0	0	10.44	0	0	0	0	1.61	0
SSC_DEF_70-99	2	1	0	0	0	0	47.07	0.81	0	0	7.60	25.06	0	0	0	0	25.51	1.62
TBB_DEF_>=120	2	1	0	0	0	0	9.54	0	0	0	45.17	266.77	0	0	0	0	0	0
TBB_DEF_100-119	2	6	0	0	0	0	25.69	2.74	0	0	55.48	222.50	0	0.01	0	2.75	0.04	1.22
TBB_DEF_70_99_G300hp	2	13	0.43	2.83	0	0.09	57.21	4.91	0	0	110.31	89.40	3.25	23.36	3.01	5.18	1.19	0
TBB_DEF_70_99_S300hp	2	8	0.19	0.31	0	0.02	63.71	10.06	0	0	35.70	10.99	5.14	27.63	1.19	0.79	0.52	0.01
OTB_DEF_>=120	3	1	0	0	0	0	9.43	8.07	0	0	31.48	367.15	0	1.17	0	1.97	0	0
OTB_DEF_100-119	3	3	0	0.68	0	0	20.81	2.60	2.46	34.36	14.48	171.25	0	0.14	0.70	2.95	1.25	0
OTB_DEF_70-99	3	8	0	1.42	0.12	0.09	100.56	0.46	37.56	50.50	60.16	15.65	0.16	1.08	0.36	4.77	1.64	0.02
SSC_DEF_>=120	3	2	0	0	0.38	540.17	2.46	14.83	0	0	0	25.35	0	0	0	0	3.12	1.62
SSC_DEF_100-119	3	1	0.10	0	0	0	85.30	0	0	0	17.65	19.24	0	0	0	0	0	0
TBB_DEF_100-119	3	2	0	0	0	0	31.29	0	0	0	30.11	341.19	0	0.03	0	1.72	0.13	0
TBB_DEF_70_99_G300hp	3	17	0.45	1.89	0.11	0.64	124.65	4.76	0.02	0.17	128.23	48.26	2.72	36.91	1.78	6.03	1.11	0.88
TBB_DEF_70_99_S300hp	3	4	0	0.17	0	0.15	26.22	2.91	10.69	10.78	16.38	12.54	1.38	16.19	0.17	2.10	2.25	0.01

Table 6c. Continued.

Metier	Q	N	Dis BLL	Lan BLL	Dis COD	Lan COD	Dis DAB	Lan DAB	Dis NEP	Lan NEP	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis TUR	Lan TUR	Dis WHG	Lan WHG
OTB_DEF_100-119	4	1	0	1.43	0.06	0	1.80	0	0	16.78	18.22	86.18	0	0.48	0.30	4.78	0	0
OTB_DEF_70-99	4	3	0	1.58	0.14	0.38	24.44	0	17.51	33.66	36.71	37.65	0	1.09	0	4.22	9.57	0.04
OTB_MCD_70-99	4	5	0	2.00	0.03	0.37	73.77	0	40.26	33.39	47.58	28.86	0	0.85	0	4.22	8.43	0.08
SSC_DEF_>=120	4	1	0	0	0.02	137.92	0.91	11.61	0.11	0	0	37.35	0	0	0	0	17.35	0
TBB_DEF_70_99_G300hp	4	27	0.84	2.11	0.02	0.05	39.93	0.71	0.58	0.50	98.64	95.72	2.38	34.39	2.22	9.02	5.18	0.09
TBB_DEF_70_99_S300hp	4	5	0.02	0.92	0	0.13	26.48	0.50	0.15	0.03	84.40	45.68	1.84	17.64	1.17	3.77	3.82	0.06

Table 7a. Average numbers per hour of discarded commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2014**.

Metier	Q	N	BLL	COD	DAB	NEP	PLE	SOL	TUR	WHG
OTB_DEF_100-119	1	2	0	0	114.35	0.40	328.33	0	0	0
OTB_DEF_70-99	1	4	0	5.02	309.65	95.22	594.07	0.39	0	10.94
OTB_MCD_70-99	1	2	0	3.98	435.65	1667.65	218.03	0	0	113.94
TBB_DEF_70-99_G300hp	1	23	1.35	5.38	1496.60	17.19	1395.69	39.90	0.10	26.06
TBB_DEF_70-99_S300hp	1	8	1.99	17.99	831.81	14.55	577.13	143.44	1.24	55.55
OTB_DEF_100-119	2	7	0	1.33	219.45	22.75	236.16	0	0	0.43
OTB_DEF_70-99	2	3	0	3.43	681.53	60.67	391.72	0	0.21	6.42
OTB_MCD_70-99	2	8	0	4.68	767.20	487.98	427.28	0.07	0	33.28
SSC_DEF_>=120	2	2	0	5.81	156.60	1.42	182.42	0	0	0
TBB_DEF_100-119	2	4	0	0.24	553.32	0.16	688.24	0	0	2.48
TBB_DEF_70-99_G300hp	2	14	3.29	1.11	961.05	0	1135.13	37.50	1.04	11.87
TBB_DEF_70-99_S300hp	2	4	36.12	0	1242.92	2.70	760.12	139.57	8.96	7.17
OTB_DEF_>=120	3	1	0	0	78.90	0	157.14	0	0	0
OTB_DEF_100-119	3	3	0	7.90	147.39	0	156.83	0	0	0
OTB_MCD_70-99	3	8	1.25	0.21	1330.54	1978.93	562.69	1.07	0	35.55
SSC_DEF_100-119	3	3	0	0.85	162.04	0	52.13	0	0	1.42
TBB_DEF_100-119	3	1	0	0	163.02	0	486.61	0	0	0
TBB_DEF_70-99_G300hp	3	17	0.54	0.65	2507.84	12.16	1309.72	60.49	1.04	34.64
TBB_DEF_70-99_S300hp	3	4	2.29	0.38	162.39	0	234.97	27.29	0.91	0.12
OTB_DEF_100-119	4	1	0	0	27.23	0.86	176.47	0	0	0
OTB_MCD_70-99	4	1	0	0	510.93	241.28	325.58	1.62	0	86.22
SSC_DEF_>120	4	1	0	0.53	127.03	0	52.49	0	0	0
TBB_DEF_100-119	4	3	0	0	150.06	0	190.00	0	0	0.82
TBB_DEF_70-99_G300hp	4	30	0.54	0.45	1204.77	96.44	992.13	97.58	0.34	175.02
TBB_DEF_70-99_S300hp	4	6	5.61	0.15	938.86	0	657.37	66.77	5.36	57.50

Table 7b. Average numbers per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2015**.

Metier	Q	N	BLL	COD	DAB	NEP	PLE	SOL	TUR	WHG
OTB_DEF_100-119	1	2	0	1.31	126.71	0	156.69	0	0	1.83
OTB_DEF_70-99	1	4	0	2.51	886.90	5.70	735.74	25.23	0	41.26
TBB_DEF_>=120	1	1	0	0	141.09	0	804.51	0	0	0
TBB_DEF_100-119	1	1	0	0	321.78	0	359.57	0	0	0
TBB_DEF_70-99_G300hp	1	18	1.99	1.55	844.34	12.83	902.97	53.26	0.27	54.18
TBB_DEF_70-99_S300hp	1	5	2.16	0.78	443.08	0	305.81	40.03	1.37	13.52
OTB_DEF_>=120	2	1	0.37	0	371.03	1.34	406.28	0	1.93	20.39
OTB_DEF_100-119	2	6	0	0.03	36.62	0.08	120.71	0	0	0.07
OTB_DEF_70-99	2	8	1.57	0.77	832.87	100.58	697.72	5.77	0.65	37.40
OTB_MCD_70-99	2	6	0	0.23	654.74	702.56	360.87	0	0.14	52.12
SSC_DEF_100-119	2	3	1.47	0	863.64	1.97	210.54	0	0.33	33.94
SSC_DEF_70-99	2	3	0	164.59	1469.36	0	93.46	0	0	8464.97
TBB_DEF_>=120	2	1	0	0	602.71	0	210.97	0	0	19.94
TBB_DEF_100-119	2	2	0	0	434.67	0	369.57	0	0	0
TBB_DEF_70-99_G300hp	2	12	3.11	0.70	1342.53	0	1248.76	45.08	2.23	35.26
TBB_DEF_70-99_S300hp	2	7	2.88	0	1015.04	3.98	385.66	88.48	2.81	7.44
OTB_DEF_>=120	3	2	1.52	1.52	1905.80	13.31	2195.57	0	4.10	21.40
OTB_DEF_100-119	3	3	0.44	0	220.55	299.48	202.22	0.10	0.44	1.22
OTB_DEF_70-99	3	2	0	0	3892.36	442.55	302.36	2.00	0	37.09
OTB_MCD_70-99	3	9	1.20	0.26	1234.85	4190.86	421.56	0	0.23	107.07
SSC_DEF_>=120	3	3	0	138.45	169.14	0	370.41	0	0	15.75
SSC_DEF_100-119	3	1	0	2.08	63.89	0	4.17	0	0	95.83
SSC_DEF_70-99	3	5	0	5.35	619.88	0	19.60	0	0	275.80
TBB_DEF_100-119	3	1	0	0	426.30	0	230.55	0	0	0
TBB_DEF_70-99_G300hp	3	12	0.94	0	1167.13	0.95	1111.33	33.33	0.24	31.25
TBB_DEF_70-99_S300hp	3	2	0.40	0	184.78	0	690.60	28.99	8.83	0.40
OTB_DEF_>=120	4	1	0	0	697.84	0	337.49	0	0.84	4.52
OTB_DEF_100-119	4	2	0	0	46.17	0	83.20	0	0	0
OTB_DEF_70-99	4	9	0	0	867.98	1743.29	511.49	0.17	1.12	180.85
OTB_MCD_70-99	4	2	0	0	131.61	1543.95	161.97	0	0	321.67
SSC_DEF_>=120	4	1	0	0	56.49	0	16.41	0	0	11.63
SSC_DEF_70-99	4	2	0	2.43	179.49	0	0.61	0	0	646.02
TBB_DEF_70-99_G300hp	4	27	0	0.17	1418.61	3.48	1049.99	60.35	0.25	119.61
TBB_DEF_70-99_S300hp	4	9	0.08	0.26	899.99	10.94	422.17	201.21	5.12	170.34

Table 7c. Average numbers per hour of discarded (Dis) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod (COD), whiting (WHG) and *Nephrops* (NEP) by metier and quarter (Q) in **2016**.

Metier	Q	N	BLL	COD	DAB	NEP	PLE	SOL	TUR	WHG
OTB_DEF_70-99	1	7	0	0.50	412.49	641.22	160.15	0	0	143.23
TBB_DEF_70_99_G300hp	1	24	0.27	0.58	1498.52	1.06	876.43	50.34	2.95	70.10
TBB_DEF_70_99_S300hp	1	8	0.47	0	572.62	0.49	332.62	42.90	1.95	28.37
OTB_DEF_>=120	2	1	0	0	2388.54	4.93	2499.12	0	36.94	4.09
OTB_DEF_100-119	2	3	0	0	64.23	0	138.65	0	0	0.08
OTB_DEF_70-99	2	4	0	0	2833.39	347.34	552.60	0	0.67	163.16
OTB_MCD_70-99	2	1	0	0	681.10	308.32	580.68	0	0	5.24
SSC_DEF_100-119	2	1	0	0	2008.89	0	0	0	0	34.44
SSC_DEF_70-99	2	1	0	0	818.92	0	67.00	0	0	254.89
TBB_DEF_>=120	2	1	0	0	140.24	0	300.91	0	0	0
TBB_DEF_100-119	2	6	0	0	326.06	0	364.22	0	0	0.64
TBB_DEF_70_99_G300hp	2	13	1.67	0	1108.02	0	1251.22	38.16	9.01	16.25
TBB_DEF_70_99_S300hp	2	8	2.69	0	1024.74	0	485.81	72.05	5.50	9.66
OTB_DEF_>=120	3	1	0	0	131.66	0	217.43	0	0	0
OTB_DEF_100-119	3	3	0	0	313.39	103.75	118.15	0	1.69	24.83
OTB_DEF_70-99	3	8	0	0.39	1762.29	1605.89	488.65	1.18	1.28	42.25
SSC_DEF_>=120	3	2	0	1.56	21.73	0	0	0	0	26.18
SSC_DEF_100-119	3	1	0.57	0	1251.82	0	171.31	0	0	0
TBB_DEF_100-119	3	2	0	0	503.03	0	218.54	0	0	1.84
TBB_DEF_70_99_G300hp	3	17	2.11	0.50	2627.75	0.39	1413.70	29.80	5.37	30.64
TBB_DEF_70_99_S300hp	3	4	0	0	398.28	383.69	226.31	23.65	0.46	45.96
OTB_DEF_100-119	4	1	0	0.23	10.91	0	108.75	0	0.62	0
OTB_DEF_70-99	4	3	0	2.37	376.18	830.53	288.49	0	0	189.22
OTB_MCD_70-99	4	5	0	0.22	1309.62	2195.61	354.06	0	0	166.73
SSC_DEF_>=120	4	1	0	1.64	8.84	1.31	0	0	0	148.03
TBB_DEF_70_99_G300hp	4	27	2.17	0.21	922.52	29.24	910.14	29.25	4.39	93.77
TBB_DEF_70_99_S300hp	4	5	0.14	0	609.49	7.32	930.01	20.91	2.60	61.23

Table 8a. Average numbers per hour of discarded fish species in Dutch demersal fisheries by metier in **2014**. *) Metier not sampled.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99 *)	TBB_DEF_>=120 *)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Agonus cataphractus	0.78	0.12	0.58	3.86	0	0			0.76	26.68	39.39
Alosa fallax	0	0	0	0	0	0			0	0.09	0
Amblyraja radiata	55.91	8.99	1.35	2.23	17.25	0			10.18	2.76	0.05
Ammodytes sp.	0	0	0	0	0	0			6.33	6.06	15.50
Argentina	0	0	0	0	6.60	0			0	0	0
Argentina silus	0	0	0	0	0.71	0			0	0	0
Arnoglossus laterna	0	0.41	6.78	23.03	0	0			21.52	144.29	64.49
Belone belone	0	0	0	0	0	0			0	0.02	0
Buglossidium luteum	0	0.25	0.18	8.26	0	0			42.44	121.85	109.45
Callionymus lyra	0	0.95	5.00	19.20	0.65	1.10			5.50	90.68	71.81
Callionymus maculatus	0	0	0	0	0	0			0	0.02	0
Callionymus reticulatus	0	0	0	0	0	0			0	1.56	3.93
Chelidonichthys cuculus	0	0	0	0	0	0			0	2.55	0
Chelidonichthys lucerna	0	0.32	0.19	4.37	0	0.44			0.38	17.36	20.85
Ciliata mustela	0	0	0	0	0	0			0	0.04	0
Clupea harengus	0	0	1.52	0.31	18.63	3.54			0	4.09	0.04
Cyclopterus lumpus	0	0.02	0	0	6.60	0			0	0.03	0
Echiichthys vipera	0	0	0	0.19	0	0			0.90	27.37	2.68
Enchelyopus cimbrius	0	0.33	3.82	12.67	0.47	0			0	5.64	0
0Eutrigla gurnardus	20.45	45.29	103.52	108.11	141.33	106.28			25.67	58.74	5.72
Gadus morhua	0	2.54	4.34	2.48	4.05	0.85			0.12	1.95	6.65
Glyptocephalus cynoglossus	0	0.33	1.07	4.15	15.63				0.05	0.27	0
Gobius niger	0	0	0	0	0	0			0	0.01	0
Hippoglossoides platessoides	7.53	6.59	11.61	21.14	65.09	0.51			1.46	3.14	0.22
Hyperoplus lanceolatus	0	0	0	0	0	0.44			0	5.91	8.08
Leucoraja naevus	0	0	0	0.29	0				0.03	0	0
Limanda limanda	78.90	171.86	469.03	956.01	146.74	162.04			353.31	1507.77	814.04
Liparis liparis liparis	0	0	0	0	0	0			0	0.37	5.84
Lophius piscatorius	0	0	0	0	0	0.44			0	0.04	0
Melanogrammus aeglefinus	0	0	0	0	12.97	0			0	0.03	0
Merlangius merlangus	0	0.23	9.00	45.52	0	1.42			1.55	78.63	37.21

Table 8a. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99*)	TBB_DEF_>=120*)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Merluccius merluccius	0	0	0	0	14.69	0			0	0	0
Michrochirus variegatus	0	0	0	0	0	0			0	0.06	0
Micromesistius poutassou	0	0	0	0	26.42	0			0	0	0
Microstomus kitt	1.56	8.40	4.44	9.61	6.60	5.00			32.17	26.15	25.93
Molva molva	0	0	0	0.77	0	0			0	0.12	0
Mullus surmuletus	0	0.03	0	1.05	0	0			0	16.65	1.61
Mustelus sp.	0	0.07	0	0	0	0			0	0.11	0
Myoxocephalus scorpius	0	1.07	8.97	3.36	0	0.65			0.08	8.50	42.26
Osmerus eperlanus	0	0	0	0	0	0			0	0.11	0
Pagellus erythrinus	0	0	0	0	0	0			0	0.01	0
Pegusa lascaris	0	0	0	0	0	0			0	0.10	0
Platichthys flesus	0	0	0.10	0.65	0	0			0	1.63	3.87
Pleuronectes platessa	157.14	227.43	507.35	456.91	139.11	52.13			476.20	1190.73	570.08
Pomatoschistus minutus	0	0	0	0	0	0			0	0.31	0.21
Pomatoschistus sp.	0	0	0	0.90	0	0			0.65	3.23	8.87
Raja brachyura	0	0	0	0.20	0	0			0.09	0.09	0
Raja clavata	0	0.03	0.48	0.37	0	0			0	3.17	0.52
Raja montagui	0	0.58	2.61	1.11	0	0			0.22	2.77	0.17
Scomber scombrus	0	0	0	0.04	0	0			0	0.02	0
Scophthalmus maximus	0	0	0.09	0	0	0			0	0.53	3.71
Scophthalmus rhombus	0	0	0	0.53	0	0			0	1.22	9.23
Scyliorhinus canicula	0	0.08	0.40	0.72	0	0			0	3.96	0.25
Solea solea	0	0	0.22	0.56	0	0			0	64.27	100.71
Sprattus sprattus	0	0	0.39	0.03	0	0			0	0.13	0.39
Squalus acanthias	0	0.02	0	0	0	0			0	0	0.05
Syngnathus acus	0	0	0	0	0	0			0	0.03	0.45
Syngnathus rostellatus	0	0	0	0	0	0			0	0	0.24
Trachinus draco	0	0	0	0	0	0			0	0.01	0
Trachurus trachurus	0	0	0	0	0.97	0			0	0.09	0
Trisopterus esmarkii	0	0	0	0	50.24	0			0	0.20	0
Trisopterus luscus	0	0	0.10	0.47	0	0			0	14.60	6.29

Table 8a. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99*)	TBB_DEF_>=120*)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Trisopterus minutus	0	0	0	0	0	0			0	5.33	0.01
Zeugopterus norvegicus	0	0	0.86	0.73	0	0			0	0.45	0.17
Zeus faber	0	0.08	0	0	0	0			0	0.04	0.01

Table 8b. Average numbers per hour of discarded fish species in Dutch demersal fisheries by metier in **2015**.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Agonus cataphractus	3.17	0.30	8.84	2.15	0	1.99	0.25	2.85	0.68	19.94	39.99
Alosa fallax	0	0	0.37	0	0	0	3.05	0	0	0.26	0
Amblyraja radiata	0	10.29	0.64	0.35	0.61	0	0	129.20	6.70	0.58	0
Ammodytes sp.	0	0	0	0	0	0	0	0	13.20	3.80	11.92
Ammodytus tobianus	0	0	0	0	0	0	9.28	0	1.63	4.26	2.56
Argentina	0	0	0	0	0.20	0	0	0	0	0	0
Arnoglossus laterna	9.03	1.88	46.89	24.27	0	0	0	5.23	14.25	103.71	43.87
Buglossidium luteum	1.08	0.40	25.55	9.49	0	0	0	0	27.39	90.05	56.94
Callionymus lyra	49.71	0.95	48.09	68.58	0	3.98	28.79	3.99	2.28	93.99	26.06
Callionymus maculatus	0	0	0	0	0	0	0	0	0	0.10	0.15
Callionymus reticulatus	0	0	0	0	0	0	0	0	0	0.80	0.40
Chaenophryne draco	0	0	0.90	0	0	0	0	0	0	1.30	0.27
Chelidonichthys cuculus	0	0	0	0	0	0	10.22	0	0	1.76	0
Chelidonichthys lucerna	46.84	1.97	6.22	9.70	7.08	291.12	9.01	0	0	20.28	9.40
Ciliata mustela	0	0	0	0	0	0	0	0	0	0.03	0.03
Clupea harengus	1.52	0	1.09	0	7.84	0	3.56	0	0	4.00	1.29
Cyclopterus lumpus	0	0	0.11	0	0	0	0	0	0	0.03	0
Dicentrarchus labrax	0	0	0	0	0	0.52	2.78	0	0	0	0
Echiichthys vipera	0	0	1.22	0.09	0	0	0.65	0	0	40.61	2.65
Enchelyopus cimbrius	0	0	1.44	3.82	0	0	0	0	0	1.76	0.38
Eutrigla gurnardus	122.58	14.15	100.90	93.49	43.21	456.85	404.22	336.61	29.79	59.43	4.72
Gadus morhua	0.76	0.22	0.73	0.22	103.84	0.52	52.54	0	0	0.59	0.27
Gaidropsarus guttatus	0	0	0	0	0	0	0	0	0	0.28	0.07
Glyptocephalus cynoglossus	0	0.09	2.48	3.80	0	0	0	0	0	0.07	0.04
Hippoglossoides platessoides	0	0.28	8.48	9.02	10.09	0	0	8.13	2.73	0.80	0.10
Hyperoplus lanceolatus	0	0	0	0	0	0	2.37	10.18		3.01	1.07
Limanda limanda	1220.12	94.40	996.12	900.31	140.98	663.70	786.65	371.90	404.36	1211.83	773.49
Liparis liparis liparis	0	0	0	0	0	0	0	0	0	0.20	0.48
Lophius piscatorius	0	0.04	0	0	0	0	0	0	0	0	0
Melanogrammus aeglefinus	0	0	0.46	0.23	15.04	0	0.79	0	0	0	0
Merlangius merlangus	16.93	0.60	96.77	112.92	14.72	49.41	2806.60	9.97	0	72.50	71.89

Table 8b. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Merluccius merluccius	0	0	0	0	4.04	0	0	0	0	0	0
Michrochirus variegatus	0	0	0	0	0	0	0	0	0	0.03	0
Microstomus kitt	0	4.48	11.65	16.74	2.22	0.86	40.67	7.74	34.26	13.98	2.54
Molva molva	0	0	0	0	0	0	1.97	0	0	0	0
Mugilidae	0	0.23	0.06	0	0	0	0	0	0	0	0
Mullus surmuletus	0	0	0	0.88	0	5.55	6.77	0	0	1.70	0
Mustelus asterias	0	0	0	0	0	0	1.67	0	0	0	0
Mustelus mustelus	0	0	0	0	0	0.74	3.95	0	0	0	0
Mustelus sp.	0	0	0.05	0.29	0	0	0	0	0	0.09	0
Myoxocephalus scorpius	2.03	0.14	1.63	4.23	0	4.74	21.32	0	0	5.24	15.27
Neogobius melanostomus	0	0	0	0	0	0	0	0	0	0	0.09
Pagellus erythrinus	0	0	0	0	0	0	4.82	0	0	0	0
Pegusa lascaris	0	0	0	0	0	0	0	0	0	0.03	0.02
Platichthys flesus	0	0	0.04	0	0	0.99	0	0	0	1.22	5.40
Pleuronectes platessa	1283.73	139.29	610.47	369.60	281.91	158.95	37.96	507.74	332.31	1056.87	409.11
Pomatoschistus minutus	0	0	0	0	0	0	0	0	0	0	0.15
Pomatoschistus sp.	0	0	0.61	0	0	0	0	0	0	0.87	3.44
Raja brachyura	0	0	0	0	0	0	0	0	0	0.71	0
Raja clavata	1.30	0.13	0.29	0	0.60	0.23	1.22	0	0	1.90	0.37
Raja montagui	0.58	0.96	2.89	0.74	0	0.11	0.12	0	0	1.72	0.15
Sardinella sp.	0	0	0	0	0	0	0.07	0	0	0	0
Scomber scombrus	9.56	0	0	0.24	0	3.24	158.89	0	0	0.04	0
Scophthalmus maximus	2.74	0.10	0.69	0.17	0	0.25	0	0	0	0.60	3.93
Scophthalmus rhombus	0.86	0.10	0.57	0.63	0	1.10	0	0	0	1.22	1.41
Scyliorhinus canicula	7.49	0.04	1.24	2.71	0	1.18	2.66	0	0	5.08	0.22
Solea solea	0	0.02	6.85	0	0	0	0	0	0	51.15	116.88
Spinachia spinachia	0	0	0	0	0	0	0	0	0	0.15	0
Sprattus sprattus	0	0	0	0	7.40	0.23	148.56	0	0	0.67	0.59
Squalus acanthias	0	0	0	0	0.20	0	0	0	0	0	0
Syngnathus rostellatus	0	0	0	0	0	0	0	0	0	0	0.35
Thorogobius ephippiatus	0	0	0	0	0	0	0	0	0	0.49	9.17
Trachinus draco	0	0	0	0	0	0	0	0	0	0.45	0

Table 8b. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Trachurus trachurus	0	0	0	0	0.25	425.47	1804.61	0	0	0.42	0
Trisopterus esmarkii	0	0	0.29	0.37	15.79	0.35	0	0	0	0	0
Trisopterus luscus	0	0	0.42	0.69	0	0	390.24	0	0	5.84	4.63
Trisopterus minutus	0	0	0.09	0	0	0	186.57	0	0	1.72	0.05
Zeugopterus norvegicus	0	0	0.63	0.04	0	0	0	0	0	0.40	0
Zeus faber	0	0	0	0	0	0	0.39	0	0	0.06	0.06

Table 8c. Average numbers per hour of discarded fish species in Dutch demersal fisheries by metier in **2016**.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Agonus cataphractus	0	0.12	0.58	1.20	0	0	0	0	0.27	10.99	12.07
Alosa fallax	0	0	0.05	0	0	0	0	0	0	0	0
Amblyraja radiata	0	0.91	5.54	0	11.79	0	0	6.49	13.22	1.99	0.05
Ammodytes sp.	0.29	0.12	0	0	0	0.69	0	0	13.66	1.32	1.13
Ammodytus tobianus	0	0	0	0	0	0	0	0	0.55	1.44	0.53
Arnoglossus laterna	9.72	1.32	9.78	15.19	0	0	0	0	4.86	80.31	35.57
Buglossidium luteum	1.58	0.35	17.50	2.85	0	0.69	0	0	12.45	103.39	40.56
Callionymus lyra	50.78	3.79	20.34	8.38	1.49	2.37	85.06	0	3.11	52.81	31.56
Callionymus reticulatus	0	0	0	0	0	0	0	0	0	0.20	0.07
Chelidonichthys cuculus	0	0	0	0	0	0	0	0	0	1.06	
Chelidonichthys lucerna	7.79	0.41	4.91	1.24	0	363.91	0	0	0	5.89	7.28
Clupea harengus	0	0	2.58	0.55	7.54	0	2.51	0	0	1.01	0.23
Dicentrarchus labrax	0	0	0	0	0	0	0	0	0	0.02	
Echiichthys vipera	0	0.10	0	0	0	0	0	0	0	39.64	0.90
Enchelyopus cimbrius	0	0.12	1.62	0.27	0	0	0	0	0	2.20	0.61
Eutrigla gurnardus	177.54	9.54	102.85	91.05	55.63	722.63	462.83	18.29	26.15	61.77	13.35
Gadus morhua	0	0.03	0.63	0.19	1.59	0	0	0	0	0.34	
Glyptocephalus cynoglossus	0	0	1.82	12.06		0	0	0	0	0.05	0.10
Hippoglossoides platessoides	0	0.07	7.37	15.97	65.66	0	0	1.14	2.32	0.44	1.08
Hyperoplus lanceolatus	0	0	0	0	0	0	0	0	1.15	1.58	0.57
Leucoraja naevus	0	0.02	0.04	0	0	0	0	0	0	0	0
Limanda limanda	1260.10	163.39	1338.54	1204.87	17.43	1630.36	818.92	140.24	376.62	1480.85	696.78
Liparis liparis liparis	0	0	0	0	0	0	0	0	0	0.12	0.12
Lophius piscatorius	0	0	0.12	0	0	0	0	0	0	0.09	0
Melanogrammus aeglefinus	0	0	0.12	0	5.35	0	0	0	0	0	0
Merlangius merlangus	2.05	10.67	116.41	139.82	66.80	17.22	254.89		0.98	61.07	31.77
Merluccius merluccius	0	0.03	0	0	0	0	0	0	0	0	0
Michrochirus variegatus	0	0	0	0	0	0	0	0	0	0.06	0
Microstomus kitt	7.49	3.50	4.99	20.01	2.25	0.29	95.97	6.39	35.47	16.09	3.11
Mullus surmuletus	0	0.25	0.14	0.09	0	0	0	0	0	1.91	0.49
Mustelus asterias	0	0	0.08	0	0	0	0	0	0	0	0

Table 8c. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Mustelus mustelus	0	0	0	0	0	0	0	0	0	0.04	0
Mustelus sp.	0	0	0	0	0	0	0	0	0	0.05	0
Myoxocephalus scorpius	1.23	0.13	0.05	0	0	4.72	2.51	0	0.27	2.72	7.51
Pegusa lascaris	0	0	0	0	0	0	0	0	0	0.12	0
Phrynorhombus norvegicus	0	0	0.36	0.27	0	0	0	0	0	0	0
Platichthys flesus	0	0	0	0.09	0	0	0	0	0	1.42	3.69
Pleuronectes platessa	1358.28	125.59	368.46	391.83	0	85.65	67.00	300.91	322.60	1060.58	484.11
Pollachius virens	0	0	0	0	1.49	0	0	0	0	0	0
Pomatoschistus sp.	0	0	0.83	0.19	0	0	0	0	0	3.83	1.46
Raja brachyura	0	0	0	0	0	0	0	0	0	0.24	0
Raja clavata	0	0.14	0.14	0.63	0	0.57	0	0	0	0.98	0.11
Raja montagui	0	0.40	1.19	1.66	0	0.69	0	0	0	3.39	0.46
Scomber scombrus	0	0	0	0	0	0	0	0	0	0.03	0.03
Scophthalmus maximus	18.47	0.81	0.59	0	0	0	0	0	0	4.91	2.98
Scophthalmus rhombus	0	0	0	0	0	0.29	0	0	0	1.52	1.04
Scyliorhinus canicula	1.58	0.08	0.73	1.53	0	0.98	0	0	0	3.61	0.19
Solea solea	0	0	0.43	0	0	0	0	0	0	37.04	44.75
Sprattus sprattus	0	0	0.17	0	0	0	0	0	0	1.77	0.06
Squalus acanthias	0	0.02	0	0	0.11	0	0	0	0	0	0
Syngnathus acus	0	0	0	0	0	0	0	0	0	0.04	0
Thorogobius ephippiatus	0	0	0.01	0	0	0	0	0	0	0.10	0.64
Trachinus draco	0	0	0	0	0	0	0	0	0	0.15	0
Trachurus trachurus	0	0	0	0	0.11	0	15.41	0	0	0.29	0.07
Trisopterus esmarkii	0	0	0	0	12.47	0	0	0	0	0	0
Trisopterus luscus	0	0	0.39	0.79	0	0	13.78	0	0	4.41	0.15
Trisopterus minutus	0	0	0.16	0.29	0	0	7.52	0	0	1.01	0
Zeus faber	0	0	0	0	0	0	0	0	0	0.02	0

Table 9a. Average numbers per hour of discarded benthos species in Dutch demersal fisheries by metier in **2014**. *) Metier not sampled.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99 *)	TBB_DEF_>=120 *)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Abra alba	0	0	0	0	0	0			0	0	0.75
Abra prismatica	0	0	0	0	0	0			0	46.16	0
Acanthocardia echinata	0	0.03	0	0.29	0	0			27.89	22.79	0
Aequipecten opercularis	0	0	2.37	0.76	0	0.22			0.64	1.37	0.46
Alcyonidium diaphanum	0.78	1.17	0.26	0.49	0	0			3.66	0.38	0.15
Alcyonium digitatum	0	2.19	9.21	2.19	0.79	1.54			1.83	3.36	85.51
Allotheuthis subulata	0	0.33	0.56	2.05	0	0			0.28	0.87	0.11
Anthozoa	0	0.17	1.93	1.42	0.71	0			0	0.94	1.94
Aphrodita aculeata	0	5.32	12.71	36.28	0	0			96.00	65.30	1.69
Arctica islandica	0	0.05	0.04	0.04	0	0.32			9.76	4.23	0
Ascidiacea	0	0.01	0	0	0	0			0	0.09	0
Ascidiella scabra	0	0.06	0.26	0	0	0			0	11.08	0
Asterias rubens	6.10	52.97	284.36	539.62	7.40	0.74			213.25	1581.01	2203.36
Astropecten irregularis	0.39	5.12	17.22	114.24	0.47				2190.95	5309.08	3.22
Atelecyclus rotundatus	0	0	0	0	0	0			0	0.06	0
Buccinum undatum	0.39	1.88	0.47	0.62	2.12	1.14			14.56	9.20	18.47
Callinectes sapidus	0	0	0	0	0	0			0	0.29	0
Cancer pagurus	0.39	2.73	18.26	8.41	6.16	10.54			5.28	9.55	0.25
Carcinus maenas	0	0	0	0	0	0			0	0	0.25
Cerastomderma edule	0	0.06	0	0	0	0			0	0.31	0
Chamelea gallina	0	0	0	0	0	0			0.32	1.08	1.04
Ciona intestinalis	0	0	0	0.02	0	0			0	0.06	0
Colus gracilis	0	0	0	0.11	0	0			0	0	0
Corbula gibba	0	0	0	0	0	0			0	0	2.53
Corystes cassivelaunus	0	0.61	0.41	3.99	0.24	0			183.97	424.32	4.85
Crangon crangon	0	0	0.45	1.50	0	0			0	19.90	6.43
Crepidula fornicata	0.45	0	0	0	0	0			0	0.07	4.05
Crossaster papposus	0	0	0	0	0.24	0			0	0	0
Demospongiae	0	0	0	0	0	0			0	0	0.08
Diogenes pugilator	0	0	0	0	0	0			0	0	15.78
Dosinia exoleta	0	0	0	0.08	0	0			1.96	1.17	0.11

Table 9a. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99*)	TBB_DEF_>=120*)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Ebalia cranchii	0	0	0	0	0	0			0	0.20	0
Echinocardium cordatum	0.84	5.37	10.33	21.72	0	0			2.81	853.50	9.32
Echinocardium sp.	0	0	0	0	0	0			0	0	0.17
Echiurus echiurus	0	0	0	0	0	0			0	0.08	0
Ectopleura larynx	0	0	0.10	0	0	0			0	0.28	0.21
Ensis sp.	0	0	0	0	0	0			0	0.14	3.82
Ectopleura pulchella	0	0.42	0	0	0	0			15.27	2.01	4.81
Flustra foliacea	0	2.47	0.14	0.53	0	0.25			2.70	2.00	0.05
Gari sp.	0	0	0	0	0	0			2.76	0	0
Geryon trispinosus	0	0	0	0	3.30	0			0	0	0
Glycymeris glycymerus	0	0	0	0	0	0			0	0.02	0
Goneplax rhomboides	0	0	0.83	8.67	0	0			0.03	5.22	0.03
Grote rode zeekomkommer	0	0	0	0	0.47	0			0	0	0
Halecium halecinum	0	0.18	0	0.11	0	0			0	0.30	0
Halichondria panicea	0.39	5.59	12.00	4.45	0	0			15.49	52.23	0
Homarus gammarus	0	0	0	0	0	0			0.65	0	0
Hyas araneus	0	0	0	0.02	0.47	0			0	0.04	0
Hyas coarctatus	0	0	0	0.11	0.47	0			0	0	0
Hyas sp.	0	0	0	0	0	0			0	0.45	0.08
Hydrozoa	0	0	0	0	0	0			0	0.14	0.77
Laevicardium crassum	0	0	0	0	0	0			5.11	0.11	0
Liocarcinus depurator	0	13.06	309.57	296.32	0.09	0.41			0.39	191.38	221.69
Liocarcinus holsatus	0.84	8.75	81.46	157.92	1.48	2.65			115.12	1654.89	1447.42
Liocarcinus marmoreus	0	0	0	0	0	0			0	9.25	0.98
Liocarcinus navigator	0	0	0	0	0	0			0	0.36	0.18
Lithodes maja	5.26	0	0	0	0	0			0	0	0
Loligo forbesii	1.36	0.12	0	0	0.32	0			0	0.55	0.30
Loligo sp.	0	0	0	0	0	0			0	0.62	0
Loligo vulgaris	0	0.02	0	0	0	0			0	0.23	0.04
Luidia sarsii	0	0.02	0	0	0	0			0	0.06	0
Lunatia catena	0	0	0	0	0	0			0	0	1.40
Lutraria lutraria	0	0	0	0	0	0			0	0	0.21

Table 9a. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99*)	TBB_DEF_>=120*)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Macoma balthica	0	0	0	0	0	0			1.35	0.24	0
Macropodia rostrata	0	0	0	0	0	0			0	9.28	2.02
Macropodia tenuirostris	0	0	0.20	0	0	0			0	1.12	0
Mactra corallina	0	0.01	0	0	0	0			17.42	11.54	0.17
Marthasterias glacialis	0	0	0	0	0.97	0			0	0	0
Metridium senile	0	0	0	0	0	0			0	0.04	0
Modiolus modiolus	0	0	0	0	0	0			0	0.05	0
Mya truncata	0	0	0	0.07	0	0			0	0	0
Mytilus edulis	0	0.03	0	0	0	0			0	2.04	11.15
Mytilus sp.	0	0	0	0	0	0			0	0	0.02
Nassarius incrassatus	0	0	0	0	0	0			0	0	1.15
Nassarius reticulatus	0	0	0	0	0	0			0	0.06	36.16
Necora puber	0	0	0.05	0.05	0	0			0.04	11.25	2.28
Nemertesia sp.	0	0.14	0.14	0.20	0	0			0	0.16	0
Nephrops norvegicus	0	12.37	80.41	1226.94	0.94	0			0.08	41.61	5.78
Neptunea antiqua	2.66	5.86	1.22	1.59	0.94	0.22			0.04	0.95	0.06
Nereis sp.	0	0	0	0	0	0			0	0.05	0
Nucula nucleus	0	0	0	0	0	0			0	0	0.11
Ophiothrix fragilis	0	72.51	12.41	15.93	0	0			429.81	190.64	0
Ophiura albida	0	0	0.46	13.78	0	0			0.09	9.83	242.79
Ophiura ophiura	0	2.35	0.69	0.50	0	0			46.74	1007.64	7420.15
Pagurus bernhardus	1.17	6.36	41.02	77.92	6.36	1.14			158.34	184.07	452.31
Pagurus prideaux	0	0	0	0	0	0			0	0	0
Pagurus pubescens	0	0	0	0	0	0			0	0.21	0
Palaemon sp.	0	0	0	0.15	0	0			0	0.08	0
Pilumnus hirtellus	0	0	0	0	0	0			0	0.06	0
Pisidia longicornis	0	0.06	0	0.41	0	0			8.53	0.01	0
Psammechinus miliaris	0	0.75	0.12	0.15	4.25	0			2.84	77.02	1142.13
Scalibregma inflatum	0	0	1.58	0.28	0	0			3.33	0.42	0.06
Scaphander lignarius	0	0	0	0	0	0			0.32	0.02	0
Sepia officinalis	0	0	0	0	0	0			0	1.01	0.38

Table 9a. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99*)	TBB_DEF_>=120*)	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Sepia sp.	0	0	0	0	0	0			0	0.02	0.02
Sepiola atlantica	0	0	0	0	0	0			0	0.08	0
Sepiola sp.	0	0	0	0.16	0	0			0	0.49	0.73
Solen marginatus	0	0	0	0	0	0			0	0.23	0
Spatangus purpureus	0	0	0	0	0	0.22			0	0.65	2.25
Spisula elliptica	0	0	0	0	0	0			0	0.80	0.96
Spisula solida	0	0	0	0	0	0			0	2.15	7.14
Spisula sp.	0	0	0	0.18	0	0			0.32	0.67	3.98
Spisula subtruncata	0	0	0	0	0	0			0	0.05	201.75
Thyone sp.	0	0	0	0	0	0			0	0.02	0
Tubularia indivisa	0	0	0	0	0	0			0	0.23	0
Turritella communis	0	0	0	0	0	0			0.03	0.09	0

Table 9b. Average numbers per hour of discarded benthos species in Dutch demersal fisheries by metier in **2015**.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Abra alba	0	0	0	0	0	0	0	0	0	0.04	491.45
Abra prismatica	0	0	0	0	0	0	0	0	0	1.62	0
Acanthocardia echinata	0	0.15	0.21	0	0.70	0	0	1.45	34.93	8.05	0.04
Aequipecten opercularis	0	0.04	0.07	1.99	0.48	0	11.83	4.74	1.89	2.99	0.18
Alcyonidium diaphanum	0	3.85	0.27	0.14	0	0	0	265.39	175.75	2.18	0
Alcyonium digitatum	10.87	9.26	1.47	35.67	15.54	0	15.74	6.67	2.18	2.91	0.45
Allotheuthis subulata	0.10	0.03	0.18	0.27	0	0.74	0.64	0	0	0.27	0.52
Anthomedusae	0	0.04	0	0	0.32	0	0	0	0	0	0
Anthozoa	1.20	0.05	2.30	0.74	0.50	1.02	0	0	2.18	1.37	34.71
Aphrodita aculeata	27.90	7.31	52.09	101.04	1.24	0.63	0	79.15	234.59	61.14	5.78
Aporrhais perspelecani	0	0	0	0	0	0	0	0	0	0.09	0
Arctica islandica	0	0.22	0.01	0.18	0	0	0	17.38	2.85	5.55	0
Ascidiacea	0.81	0	0	0	0	0	0	0	0	0	0
Ascidiella scabra	0	0	0.45	18.25	0	0	0	0	0	0.95	0
Asterias rubens	446.26	104.44	1398.32	2452.68	16.01	12.99	5.48	2255.66	208.26	2061.89	1953.09
Astropecten irregularis	726.36	17.96	434.30	1087.40	14.91	1.25	0	402.34	3148.57	5855.76	102.36
Atelecyclus rotundatus	0	0	0	0	0	0	2.97	0	0	0.09	0
Botryllus schlosseri	0	0	0	0	0	0	0	0	0	0.07	0
Buccinum undatum	0	2.97	0.01	0.69	3.80	0	0.39	32.18	45.87	9.12	0.82
Cancer pagurus	0.97	1.47	8.95	8.25	2.17	1.24	0	7.33	0.65	11.09	0.95
Carcinus maenas	0	0	0	0	0	0	0	0	0	0.16	0.95
Carnosa	0	0	0	0.13	1.10	0	0	0	0	0	0
Cerastomderma edule	0	0	0.08	0	0	0	0	0	0	0	0
Chamelea gallina	0	0	0	0	0	0	0	0	0	0.19	0.38
Chrysaora hysoscella	0.29	0	0	0	0	0	0	0	0	0.14	0.75
Ciona intestinalis	0	0	0	0.86	0	0	0	0	0	0	0
Cirolana cranchi	0	0	0	0	0	0	0	0	0	0.08	0.97
Colus gracilis	0	0	0	0	0.25	0	0	0	0	0	0
Corystes cassivelaunus	95.04	1.31	33.38	18.86	0.48	0.51	0	82.01	235.58	65.66	10.91
Crangon crangon	0	0	2.25	0	0	0	0	0	0	2.64	31.83

Table 9b. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Crepidula fornicata	0	0.12	0	0	0	0	0	0	0	0.12	93.96
Crossaster papposus	0	0	0	0	0	0	0.33	0	0	0	0
Cyanea sp.	1.79	0	0	0	0	0	1.97	0	0	0	0
Demospongiae	0.09	0	0	0	0	0	0	0	0	0	0
Diogenes pugilator	0	0	0	0	0	0	0	0	0	0.01	8.85
Donax vittatus	0	0	0	0	0	0	0	0	0	0.14	1.45
Dosinia exoleta	0	0	0	0	0	0	0	0	0	0.51	0.05
Echinocardium cordatum	0.31	0.77	362.84	11.98	0	0	0	1.62	62.09	199.09	38.07
Ectopleura larynx	0	0	0.02	0	0	0	0	0	0	0	0.60
Eledone cirrhosa	0	0	0	0	0	0	0	0	0	0.03	0
Ensis sp.	0	0	0	0	0	0	0	0	1.09	0.02	22.25
Euspira nitida	0	0.05	2.12	0	0	0	0	0	2.43	0.63	2.03
Facelina bostoniensis	0	0.38	0.40	0	0	0	0	0	0	0	0
Flustra foliacea	0	1.78	0.34	0.29	0	0	0	2.85	1.28	1.81	0.31
Gari fervensis	0	0	0	0.12	0	0	0	0	0	0.11	0.03
Goneplax	0.43	10.74	10.60	37.36	0	0	0	0	0	0.86	1.31
Goneplax rhomboides	4.45	0	0.41	0	0	0	0	0	0	0.69	0.85
Halecium halecinum	0	0.05	0.66	2.46	0	0	0	0	0	1.59	0.66
Halichondria panicea	0	17.53	1.86	1.89	0.66	0	0	102.45	10.19	2.85	0.12
Hyas coarctatus	0	0	0	0.04	0	0	0	0	0	0.02	0
Hyas sp.	0	0	0.43	0	0	0	0	2.37	0	0.25	0.01
Hydrozoa	0	0	0	0	0	0	0	0	0	0.06	0.02
Inachus dorsettensis	0	0	0	0	0	0	0	0	0	0.05	0
Laevicardium crassum	0	0	0	0	0	0	0	0	0	0.16	0.06
Leander serratus	0	0	0	0	0	0	0	0	0	0	2.64
Liocarcinus depurator	63.19	8.18	305.92	487.98	1.23	1.68	14.57	0	0	155.98	99.47
Liocarcinus holsatus	10.88	3.33	164.48	85.07	1.34	5.86	0.89	351.72	168.68	543.15	1077.61
Liocarcinus marmoreus	0	0	0	0	0	0	0	0	0	7.22	19.74
Liocarcinus navigator	0	0	0	0	0	0	0	0	0	0	11.72
Liocarcinus pusillus	0	0	0	0	0	0	0	0	0	0	0.05
Lithodes maja	0	0.19	0	0	0	0	0	0	0	0	0
Loligo forbesii	0.42	0	0.15	0	2.29	0	0	0	0	0.83	0.13

Table 9b. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Loligo sp.	0	0	0.09	0	0	0	0	0	1.09	0.16	0.02
Loligo vulgaris	0	0.02	0	0	0	0	0	0	0	0.26	0.69
Luidia sarsii	0	0	0	0	0.25	0	0	0	0	0	0
Luidia sp.	0	0.01	0	0	0	0	0	0	0.11	0	0
Lunatia catena	0	0.06	0	0	0	0	0	0	0.62	1.73	0.37
Lutraria lutraria	0	0	0	0	0	0	0	0	0	0	0.68
Macoma balthica	0	0	0	0	0	0	0	0	0	6.20	0
Macropodia rostrata	0	0	0.09	0.09	0	0	0	0	0	3.47	2.56
Macropodia sp.	0	0	0	0	0	0	0	0	0	1.62	0.01
Macropodia tenuirostris	0	0	0.24	0	0	0	0	0	0	0.20	0
Mactra corallina	0	0	0.22	0.13	0	0	0	2.37	1.66	8.28	0.64
Marthasterias glacialis	0	0	0	0	2.04	0	0	0	0	0	0
Metridium dianthus	0	0	0	0	0	0	0	0	0	0.03	0
Mya truncata	0	0	0	0.05	0	0	0	0	0	0	1.86
Mytilus edulis	0	0.12	0	0	0	0	0.12	0	0	1.42	150.37
Nassarius incrassatus	0	0	0	0	0	0	0	0	0	0.35	1.07
Nassarius nitidus	0	0	0	0	0	0	0	0	0	0	3.78
Nassarius reticulatus	0	0	0	0	0	0	0	0	0	0	83.02
Necora puber	0.28	0	0.11	0.13	0	0	2.21	0	0	3.66	3.93
Nephrops norvegicus	6.99	69.15	770.89	2648.30	0	1.48	0	0	0	4.87	5.49
Neptunea antiqua	0	1.95	0.09	0.18	9.36	0	0	56.14	1.87	0	0
Ophiothrix fragilis	0	37.09	2.17	0.86	0	0	0	16.60	6.37	2.29	0
Ophiura albida	3.72	0.02	34.27	13.53	0	0	0	0	0	18.11	534.54
Ophiura ophiura	15.24	0.27	247.30	0.56	0	0	0	15.79	13.84	1581.00	13891.97
Pagurus bernhardus	23.22	6.87	69.87	76.72	3.97	3.94	4.35	241.22	374.44	139.03	377.09
Pagurus prideaux	0	0	4.80	0	0	0	0	0	0	1.19	0
Pagurus pubescens	0	0	0	0	0	0	0	0	0	0	0.04
Palaemon sp.	0	0	0	0	0	0	0	0	0	0.12	0.28
Pecten maximus	0	0.01	0.02	0	0	0	0	0	0	0	0
Petricolaria pholadiformis	0	0	0	0	0	0	0	0	0	0	0.13
Pilumnus hirtellus	0	0	0	0	0	0	0	0	0	0.06	0
Pisa armata	0	0	0.09	0	0	0	0	0	0	0	0

Table 9b. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Pisidia longicornis	0	0.07	0.49	0.44	0	0	0	0	0	0.22	0.11
Plathyhelminthes	0	0	0	0.03	0	0	0	0	0	0	0
Polymastia sp.	0	0	0	0	0	0	0.33	0	0	0	0
Priapulus caudatus	0	0	0.08	0	0	0	0	0	0	0	0
Psammechinus miliaris	1.97	0.58	0.43	1.40	0.57	0	5.30	27.95	6.84	91.09	117.23
Sabellaria	0	0	0	0	0	0	0	0	0	0.25	0
Sabellaria alveolata	0	0	0	0	0	0	0	0	0	0.19	0
Scalibregma inflatum	0	0.03	0.06	0.65	0	0	0	0	7.87	0.31	0.05
Scaphander lignarius	0	0	0	0	0	0	0	0	2.17	0.03	0
Sepia officinalis	0	0	0	0	0	0	0	0	0	1.17	17.39
Sepiola sp.	0	0	0.10	0.04	0	0	0	0	0	0.02	0
Solen marginatus	0	0	0	0	0	0	0	0	0	0.50	0.50
Spatangus purpureus	0	0	0	0	0	0	0	0	0	0.02	0.03
Spisula elliptica	0	0	0	0	0	0	0	0	0	0	1.79
Spisula solida	0	0	0	0	0	0	0	0	0	0.95	2.40
Spisula sp.	0.10	0	0.81	0.18	0	0	0	0	0	0.94	0.82
Spisula subtruncata	0	0	0	0	0	0	0	0	0	0	112.98
Thia scutellata	0	0	0	0	0	0	0	0	0	0.03	0.02
Tubularia indivisa	0	0	0	0	0	0	0	0	0	0.24	0.53
Tubularia sp.	0	0	0	0	0	0	0	0	0	0.78	0.05
Turritella communis	0	0	0.03	0.13	0	0	0	0	0	0.39	0
Venerupis corrugata	0	0	0	0	0	0	0.39	0	0	0	1.28

Table 9c. Average numbers per hour of discarded benthos species in Dutch demersal fisheries by metier in **2016**.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Abra alba	0	0	0	0	0	0	0	0	0	0.02	0.11
Abra prismatica	0	0	0.08	0	0	0	0	0	0	6.04	0.17
Abra sp.	0	0	0.05	0	0	0	0	0	0	0	0
Acanthocardia echinata	0	0.28	0.04	0	2.84	0	0	0.61	54.83	8.85	2.69
Adamsia carciniopados	0	0	0	0	0	0	0	0	0	0.02	0
Aequipecten opercularis	0	0	0.07	1.81	3.93	0	1.62	0	0.83	4.04	5.03
Alcyonidium diaphanum	0	2.99	0.20	0	0	0	0	0.57	2.62	0.42	0
Alcyonium digitatum	0	3.01	3.73	0.57	33.52	0	8.77	0.61	0.91	6.16	1.62
Allotheuthis subulata	0	0	1.22	1.50	0	6.25	0	0	0	0.74	0.37
Anthozoa	0	0.02	0.35	0	0	0	0	0	0	1.14	0.29
Aphrodita aculeata	60.62	15.26	137.67	20.47	0.87		1.62	42.82	139.67	64.61	18.65
Aporrhais perspelecani	0	0	0	0	0	0	0	0	0	0.05	0
Arctica islandica	0	0.23	0.28	0.27	0.55	0	0	0.57	3.72	1.90	0
Ascidiella scabra	0	0	0	0	0	0	0	0	0	1.26	0.31
Asterias rubens	339.60	43.46	515.15	387.55	8.36	16.92	1.25	38.49	553.15	1871.86	2185.37
Astropecten irregularis	66.92	14.22	125.13	36.32	0.44	0.29	0	1.14	3828.91	5076.41	266.91
Atelecyclus rotundatus	0	0	0	0.09	0	0	0	0	0	0.16	0
Buccinum undatum	0	0.70	0.71	0.99	44.98	0	0	2.35	18.12	15.19	3.71
Cancer pagurus	1.23	2.39	6.83	5.18	4.39	0	0	2.32	1.82	4.99	1.95
Carcinus maenas	0	0	0	0	0	0	0	0	0	0	2.48
Cerastomderma edule	0	0	0	0	0.11	0	0	0	0	0	0
Chamelea gallina	0	0	0	0.21	0	0	0	0	0.12	0.58	1.31
Chrysaora hysoscella	0	0	0	0	0	0	0	0	0	0.06	0
Ciona intestinalis	0	0	0	0	0	0	1.25	0	0	0	0
Corystes cassivelaunus	0	0.41	15.21	0.86	0	0	0	5.28	494.33	254.24	144.08
Crangon crangon	0	0	0.03	0	0	0	0	0		0.90	8.42
Crepidula fornicata	0	0	0	0	0	0	0	0	0.73	0.98	20.97
Demospongiae	0	0	0	0	0	0	0	0	0	0	0.02
Dendronotus frondosus	0	0	0	0	0	0	0	0	0	0.03	0
Diogenes pugilator	0	0	0	0	0	0	0	0	0	0	6.52

Table 9c. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Donax vittatus	0	0	0	0	0	0	0	0	0	0	1.11
Dosinia exoleta	0	0	0.01	0	0	0	0	0	0.36	0.72	0
Echinocardium cordatum	0	0.18	41.96	1.40	0	0	0	1.18	0.86	201.49	106.23
Echiurus echiurus	0	0	0	0	2.18	0	0	0	0	0	0
Ectopleura larynx	0	0	0	0	0	0	0	0	0	0	0.51
Eledone cirrhosa	0	0	0	0	0	0	0	0	0	0	0
Ensis siliqua	0	0	0	0	0	0	0	0	0.16	0	0
Ensis sp.	0	0	0	0	0	0	0	0	0	0.09	12.28
Epitonium clathrus	0	0	0	0	0	0	0	0	0	0	0.04
Flustra foliacea	0	2.65	1.26	0	0	0	0	0.57	0.11	0.63	1.54
Galathea intermedia	0	0	0	0.99	0	0	0	0	0	0	0
Gari fervensis	0	0	0	0	0	0	0	0	0.26	0.19	0
Geryon trispinosus	0	0	0.03	0	0	0	0	0	0	0	0
Glycymeris glycymeris	0	0	0	0	0	0	0	0	0	0.04	0
Goneplax	0	0	1.26	1.57	0	0	0	0	0	0.49	0.27
Goneplax rhomboides	0	1.40	81.10	10.76	0	0	0	0	0	22.79	15.40
Halecium halecinum	0	0	0.55	1.40	0	0	0	0	0	0.57	0
Halichondria panicea	0	2.69	2.27	5.62	0.55	0	0	79.73	10.00	1.11	0.58
Harmothoe sp.	0	0	0	0	0	0	0	0	0.31	0	0
Hemigrapsus penicillatus	0	0	0	0	0	0	0	0	0	0	0.08
Henricia sp.	0	0	0	0	0.44	0	0	0	0	0	0
Hyas araneus	0	0	0	0	0	0	0	0	0.23	0	0
Hyas coarctatus	0	0	0.14	0	1.31	0	0	0	0.13	0.03	0
Hyas sp.	0	0	0	0	0	0	0	0	0.11	0	0
Inachus dorsettensis	0	0	0	0	0	0	0	0	0	0.07	0
Laevicardium crassum	0	0	0	0	0	0	0	0	0	0.16	0.11
Lepas anatifera	0	0	0	0	0	0	0	0	0	2.22	0
Liocarcinus depurator	22.00	11.73	299.66	247.56	0	0	1.25	0	0.28	173.42	112.76
Liocarcinus holsatus	6.20	7.10	160.74	41.81	1.70	19.57	0	1.18	84.75	564.40	582.37
Liocarcinus marmoreus	0	0	0	0	0	0	0	0	0	3.66	0.05
Liocarcinus navigator	0	0	0	0	0	0	0	0	0	0	1.20
Liocarcinus pusillus	0	0	0	0	0.44	0	0	0	0	0	0

Table 9c. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Loligo forbesii	0	0	0.28	0.66	0	0	0	0	0	0.37	0
Loligo sp.	0	0.03	0	0	0	0	0	0	0	0.32	0.04
Loligo vulgaris	1.74	0.09	0.12	0.99	0	0	0	0	0	0.24	0
Luidia sarsii	0	0.11	0.22	0.30	0	0	0	0.57	0.44	0.23	0
Lunatia catena	0	0	0	0	0	0	0	0	6.18	2.91	11.33
Lutraria lutraria	0	0	0	0	0	0	0	0	0	0	1.97
Macropodia rostrata	0	0	0.10	0	0	0	0	0	0	1.54	0.21
Macropodia tenuirostris	0	0	0.12	0	0	0	0	0	0	0.04	0
Mactra corallina	0	0	0	0	0	0	0	0	1.72	7.42	5.76
Maja squinado	0	0	0	0	0	0	0	0	0	0.09	0
Marthasterias glacialis	0	0	0	0	2.18	0	0	0	0	0	0
Metridium dianthus	0	0	0	0	0	0	0	0	0	0.09	0
Mya truncata	0	0	0.12	0	0	0	0	0	0	0	0.23
Mytilus edulis	0	0.02	0.01	0	0.11	0	0	0	6.58	0.42	16.29
Nassarius incrassatus	0	0	0	0	0	0	0	0	0	0	1.67
Nassarius nitidus	0	0	0	0	0	0	0	0	0	0	0.04
Nassarius reticulatus	0	0	0	0	0	0	0	0	0	0	21.57
Necora puber	0	0	0.37	0	0	0	0	0	0	2.70	0.29
Nephrops norvegicus	2.47	44.46	964.39	1881.06	0.44	0	0	0	0	10.14	63.01
Neptunea antiqua	0	0.94	0.96		72.49	0	0	6.66	5.29	0.57	0
Octopus vulgaris	0	0.02	0	0	0	0	0	0	0	0	0
Ophiothrix fragilis	0	12.03	4.37	5.37	0.11	0	0	21.24	6.53	0.14	0
Ophiura albida	0	2.31	31.94	10.34	0	0	0	0	0.07	5.65	343.13
Ophiura ophiura	0	0.29	7.37	3.45	0	0.98	0	0	19.56	297.07	1422.30
Pachygrapsus	0	0	0	0	0	0	0	0	0	0	0.02
Pagurus bernhardus	2.05	10.27	40.68	39.56	20.81	0	0	5.24	174.91	97.34	258.29
Pagurus prideaux	0	0	0	0	0	0	0	0	0	0.36	0
Pagurus pubescens	0	0	0	0	0	0	0	0	0	0.14	0
Palaemon adspersus	0	0	0	0.30	0	0	0	0	0	0.01	0
Palaemon serratus	0	0	0	0	0	0	0	0	0	0	0.05
Palaemon sp.	0	0	0	0	0	0	0	0	0	0	0.02

Table 9c. Continued.

Metier / Species	OTB_DEF_>=120	OTB_DEF_100-119	OTB_DEF_70-99	OTB_MCD_70-99	SSC_DEF_>=120	SSC_DEF_100-119	SSC_DEF_70-99	TBB_DEF_>=120	TBB_DEF_100-119	TBB_DEF_70-99_G300hp	TBB_DEF_70-99_S300hp
Pisidia longicornis	0	0.02	0.23	1.30	0	0	0	0	0	0.07	1.02
Psammechinus millaris	0	0.13	1.97	0	0.44	0	0	0	2.95	60.55	518.31
hizostoma pulmo	0	0	0	0	0	0	0	0	0	0.03	0
Rossia macrosoma	0	0	0.09	0	0	0	0	0	0	0.16	0
Sabellaria	0	0	0	0	0	0	0	0	0	0.06	0
Sabellaria alveolata	0	0	0	0	0	0	0	0	0	0.25	9.93
Scalibregma inflatum	0	0	0.39	0.19	0	0	0	0	1.58	0.18	
Scyphozoa	0	0	0.02	0	0	0	0	0	0	0	0
Sepia officinalis	0	0	0	0	0	0	0	0	0	1.49	0.04
Sepia sp.	0	0	0	0	0	0	0	0	0	0.02	0
Sepiola atlantica	0	0	0	0	0	0	0	0	0	0.02	0.06
Sepiola sp.	0	0	0	0	0	0	0	0	0	0	0.07
Solen marginatus	0	0	0	0	0	0	0	0	0	0.07	0.04
Spatangus purpureus	0	0	0	0	0	0	0	0	0	0.23	0
Spisula elliptica	0	0	0	0	0	0	0	0	0	0.03	0
Spisula solida	0	0	0	0	0	0	0	0	0	0.03	1.24
Spisula sp.	0	0	0	0	0	0	0	0	0	0.71	13.08
Spisula subtruncata	0	0	0	0	0	0	0	0	0	0	32.68
Todaropsis eblanae	0	0	0	0	0	0	0	0	0	0.03	0
Tubularia indivisa	0	0	0	0	0	0	0	0	0	1.12	0
Tubularia sp.	0	0	0	0	0	0	0	0	0	0.04	0
Turritella communis	0	0	0.09	0	0	0	0	0	0	0	0.04
Urticina felina	0	0	0	0	0	0	0	0	0	0.03	0

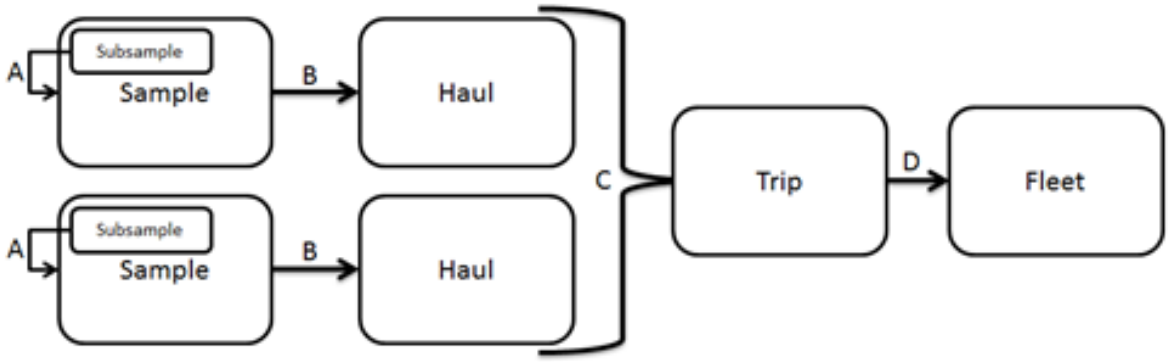
Table 10a. Average weights (kg) and numbers per hour of landed (L) and discarded (D) plaice (PLE) and sole (SOL) in the beamtrawl fisheries (TBB_DEF_70-99mm_>221kW) between 1976 and 2016. Nm, not measured; n/a, not available. (Before 2009, data is based on observer trips. 2009 and onwards is based on self-sampling trips.)

Year/		PLE						SOL					
		Numbers			Weight			Numbers			Weight		
Period	N trips	L	D	%D	L	D	%D	L	D	%D	L	D	%D
1976-1979	21	253	185	42%	108	28	20%	116	8	6%	32	1	4%
1980-1983	24	309	418	57%	99	51	34%	85	24	22%	19	3	15%
1989-1990	6	392	330	46%	104	46	30%	286	83	22%	48	12	20%
1999	3	145	181	55%	42	18	29%	112	16	13%	32	2	5%
2000	12	194	601	76%	50	47	48%	90	25	22%	22	2	10%
2001	4	364	1184	76%	84	89	51%	82	17	17%	17	1	6%
2002	6	263	868	77%	69	71	51%	126	38	23%	18	3	13%
2003	9	196	945	83%	52	70	57%	95	32	25%	20	3	14%
2004	8	158	792	83%	42	57	57%	175	69	28%	31	7	17%
2005	8	143	710	83%	47	51	52%	99	29	23%	20	2	11%
2006	9	166	997	86%	57	67	54%	64	26	29%	16	2	13%
2007	10	214	700	77%	67	57	46%	94	27	23%	22	2	10%
2008	10	169	902	84%	61	69	53%	95	16	16%	23	1	6%
2009	48	189	917	83%	61	76	55%	113	34	23%	25	3	11%
2010	74	201	872	81%	82	68	45%	132	42	24%	22	4	14%
2011	67	Nm	921	n/a	72	85	54%	Nm	50	n/a	23	5	18%
2012	61	Nm	934	n/a	90	87	49%	Nm	72	n/a	29	6	17%
2013	57	Nm	1189	n/a	81	106	57%	Nm	52	n/a	35	5	13%
2014	84	Nm	1191	n/a	81	104	56%	Nm	64	n/a	33	5	14%
2015	69	Nm	1057	n/a	65	95	59%	Nm	51	n/a	36	4	11%
2016	81	Nm	1061	n/a	74	99	57%	Nm	37	n/a	34	3	8%

Table 10b. Average weights (kg) and numbers per hour of landed (L) and discarded (D) dab (DAB) and whiting (WHG) in the beamtrawl fisheries (TBB_DEF_70-99mm_>221kW) between 1976 and 2016. Nm, not measured; n/a, not available. (Before 2009, data is based on observer trips. 2009 and onwards is based on self-sampling trips.)

		DAB						WHG					
Year/		Numbers			Weight			Numbers			Weight		
Period	N trips	L	D	%D	L	D	%D	L	D	%D	L	D	%D
1976-1979	21	12	917	99%	4	65	95%	10	34	78%	3	5	62%
1980-1983	24	31	796	96%	7	60	90%	21	89	81%	5	11	69%
1989-1990	6	15	2147	99%	2	123	98%	5	122	96%	1	17	95%
1999	3	112	1411	93%	13	106	89%	Nm	77	n/a	<1	10	93%
2000	12	28	951	97%	6	49	89%	Nm	117	n/a	2	9	85%
2001	4	125	2268	95%	12	97	89%	Nm	69	n/a	1	9	86%
2002	6	92	934	91%	11	57	84%	14	104	88%	1	7	85%
2003	9	60	1166	95%	8	64	89%	2	40	96%	<1	3	86%
2004	8	54	1037	95%	7	51	87%	0	46	100%	<1	2	92%
2005	8	25	492	95%	6	52	90%	3	18	85%	<1	2	85%
2006	9	46	2335	98%	9	79	90%	Nm	36	n/a	<1	3	74%
2007	10	81	1196	94%	12	62	83%	0	10	100%	<1	3	87%
2008	10	51	905	95%	8	49	87%	0	15	100%	<1	3	93%
2009	48	31	1221	98%	33	62	65%	Nm	58	n/a	<1	5	89%
2010	74	48	1178	96%	10	65	87%	Nm	70	n/a	1	5	82%
2011	67	Nm	1350	n/a	12	74	86%	Nm	54	n/a	3	4	57%
2012	61	Nm	1106	n/a	8	63	89%	Nm	73	n/a	2	6	75%
2013	57	Nm	1543	n/a	8	84	91%	Nm	42	n/a	1	3	75%
2014	84	Nm	1508	n/a	5	79	94%	Nm	79	n/a	1	4	88%
2015	69	Nm	1212	n/a	4	59	94%	Nm	73	n/a	<1	4	95%
2016	81	Nm	1481	n/a	7	73	92%	Nm	61	n/a	<1	4	90%

6 Figures



A: $number\ in\ subsample * subsample\ fraction$

B: $number\ in\ sample * \frac{Volume\ of\ (total\ catch\ of\ haul - total\ landings\ in\ haul)}{volume\ of\ discard\ sample}$

C: $sum\ of\ numbers\ in\ both\ samples * \frac{Total\ duration\ all\ hauls\ of\ the\ trip}{Duration\ both\ sampled\ hauls}$

D: $number\ per\ trip * \frac{effort\ (kWDays)\ national\ fleet\ (per\ métier)}{effort\ (kWDays)\ sampled\ trips\ (per\ métier)}$

Figure 1. Flowchart of the raising process

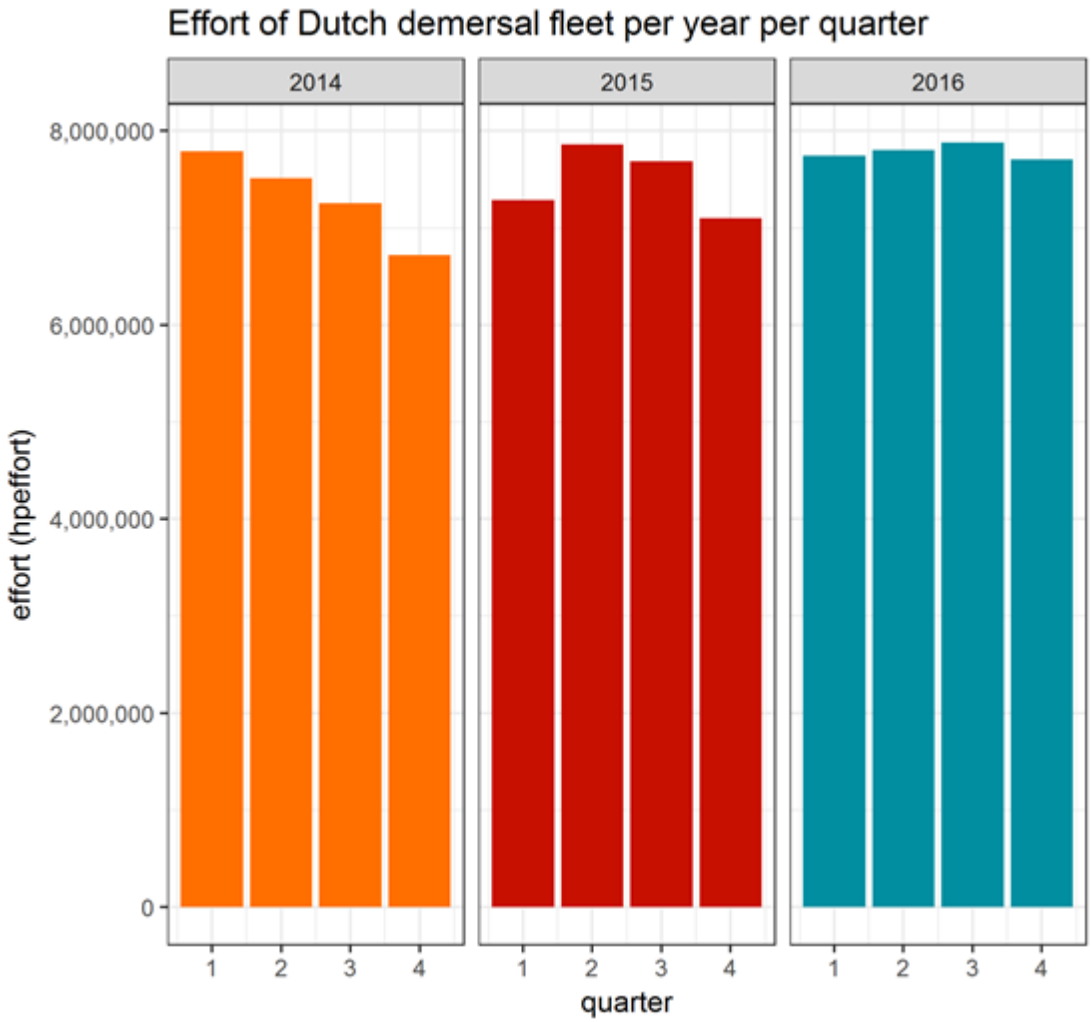


Figure 2. Effort of the Dutch demersal fleet (in kW*days) per year and quarter

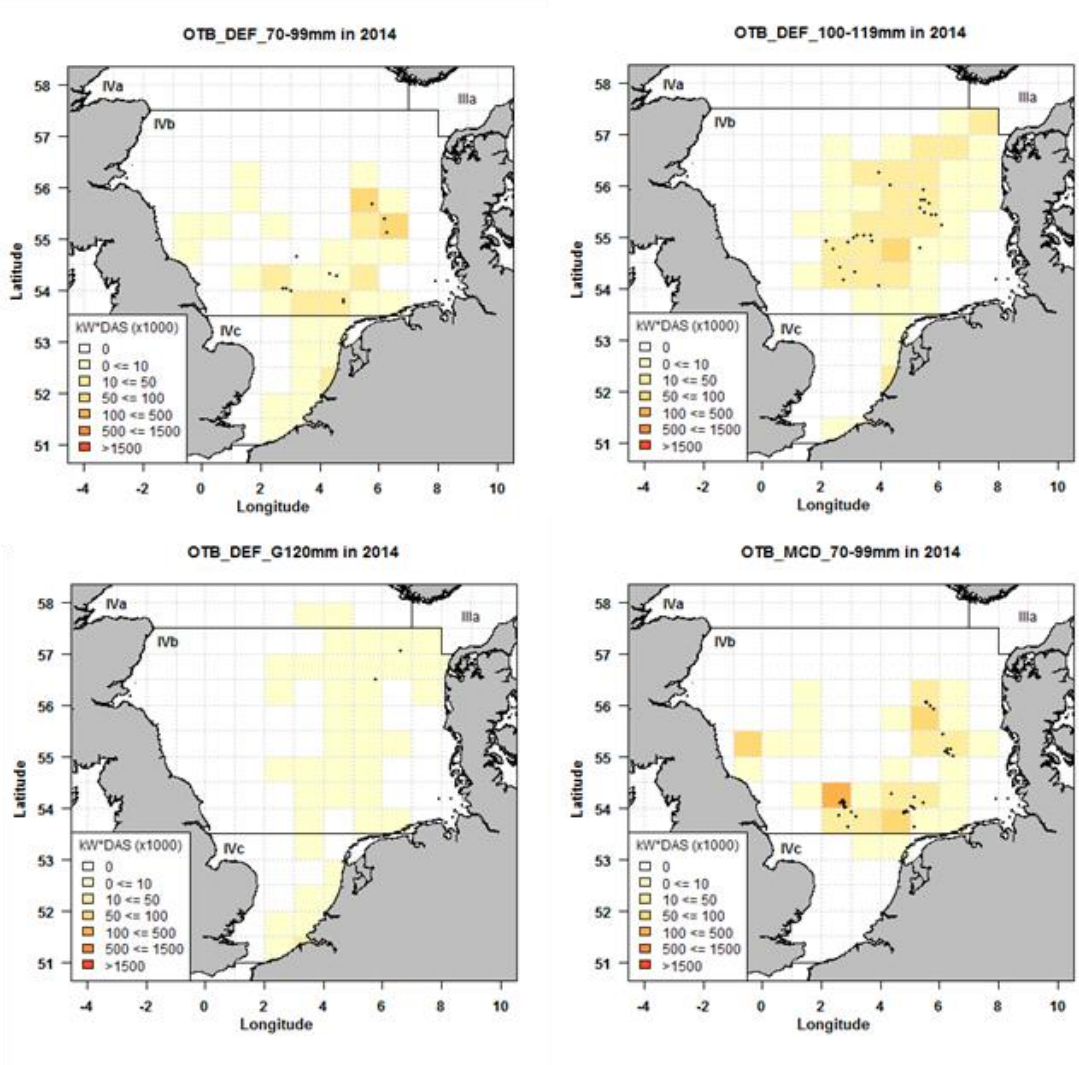


Figure 3a. Distribution of total effort (in kW*days (x1000) at sea, shaded colours per ICES 1/16 rectangle) and positions of sampled trawls (black dots) for the sampled demersal metiers in **2014**.

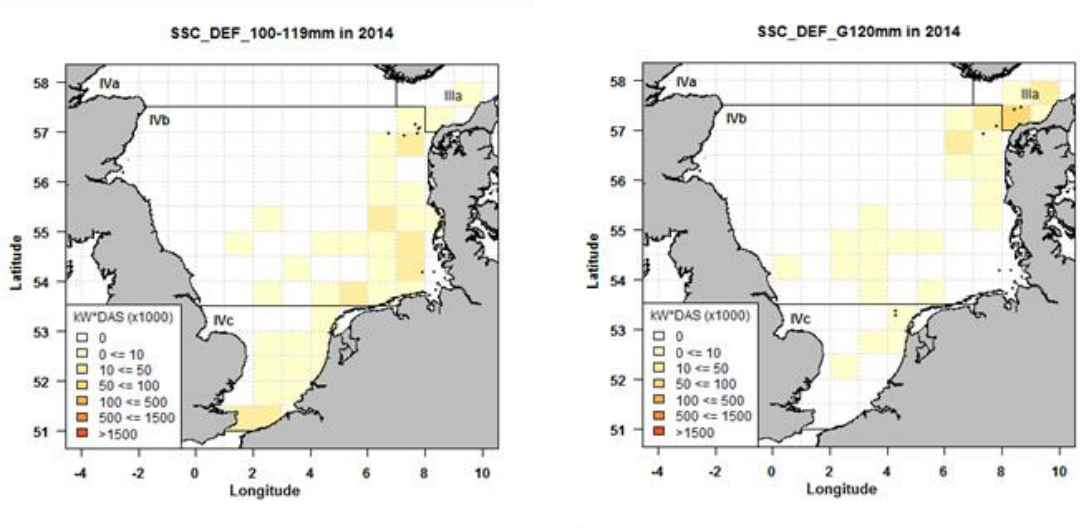


Figure 3a. Continued.

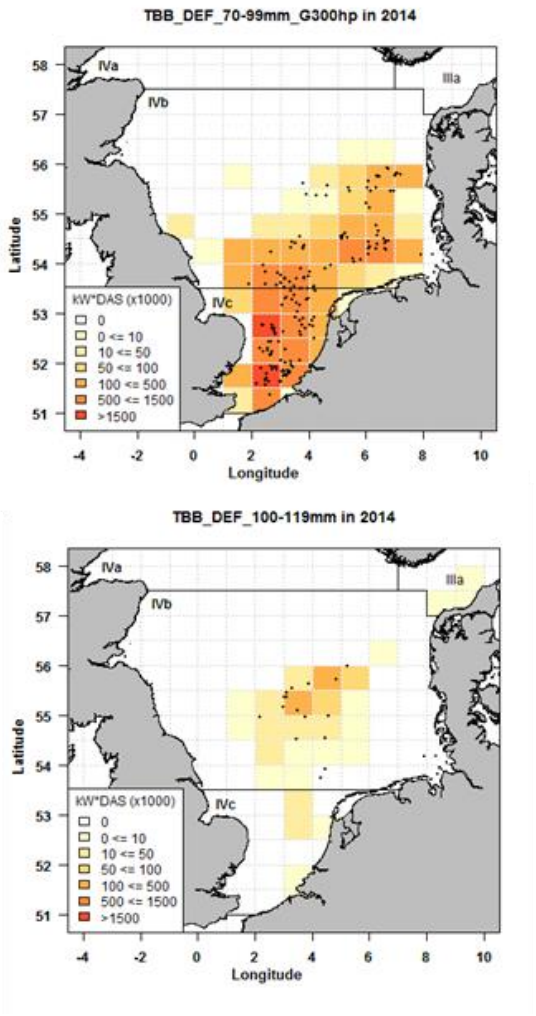


Figure 3a. Continued.

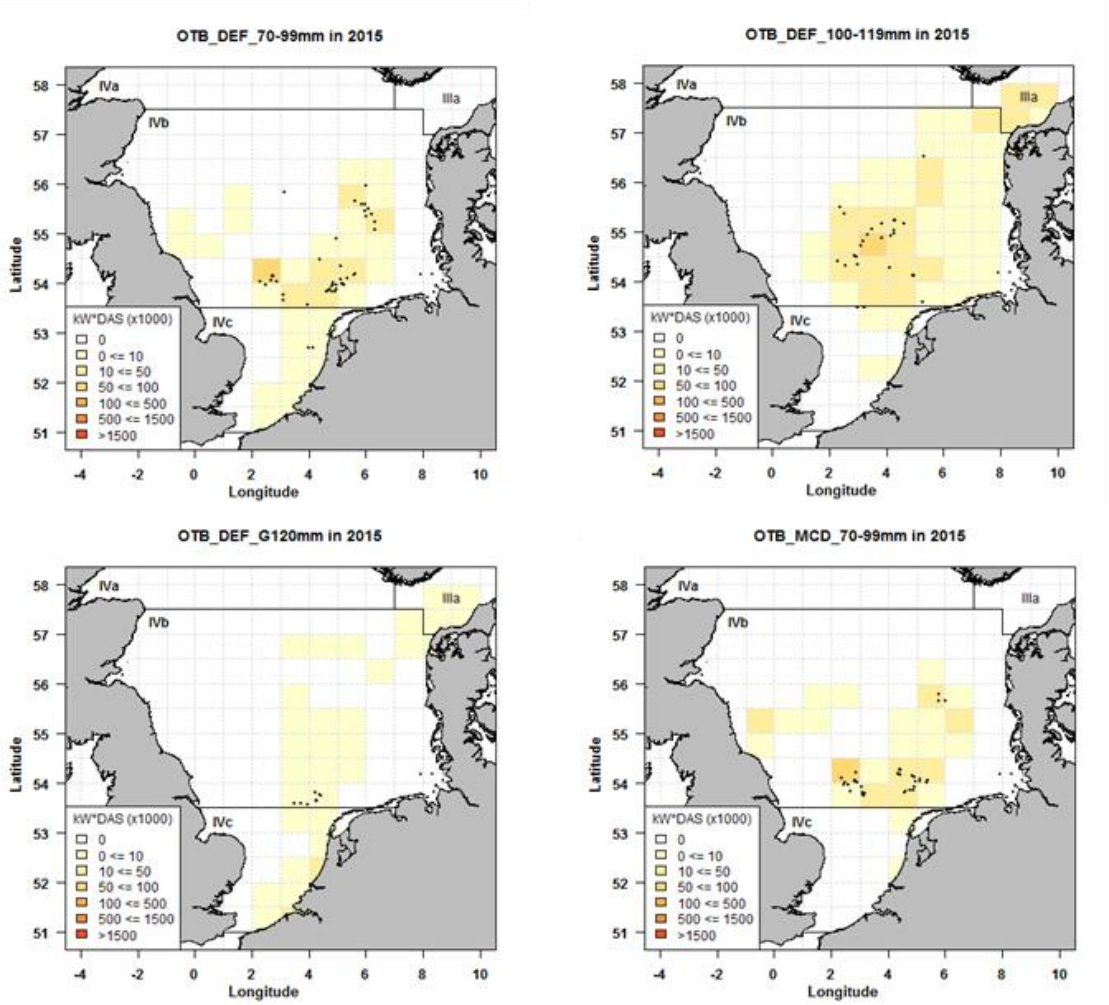


Figure 3b. Distribution of total effort (in kW*days (x1000) at sea, shaded colours per ICES 1/16 rectangle) and positions of sampled trawls (black dots) for the sampled demersal metiers in **2015**.

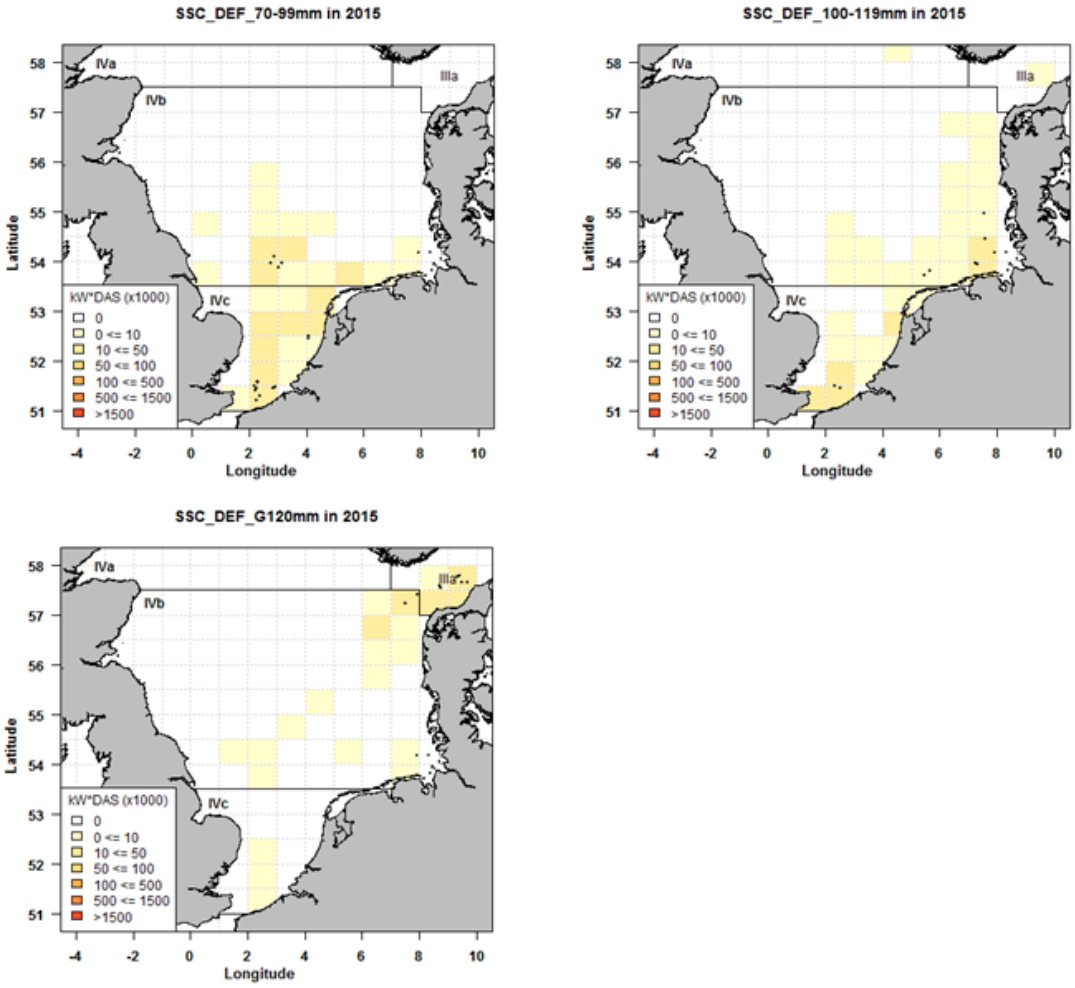


Figure 3b. Continued.

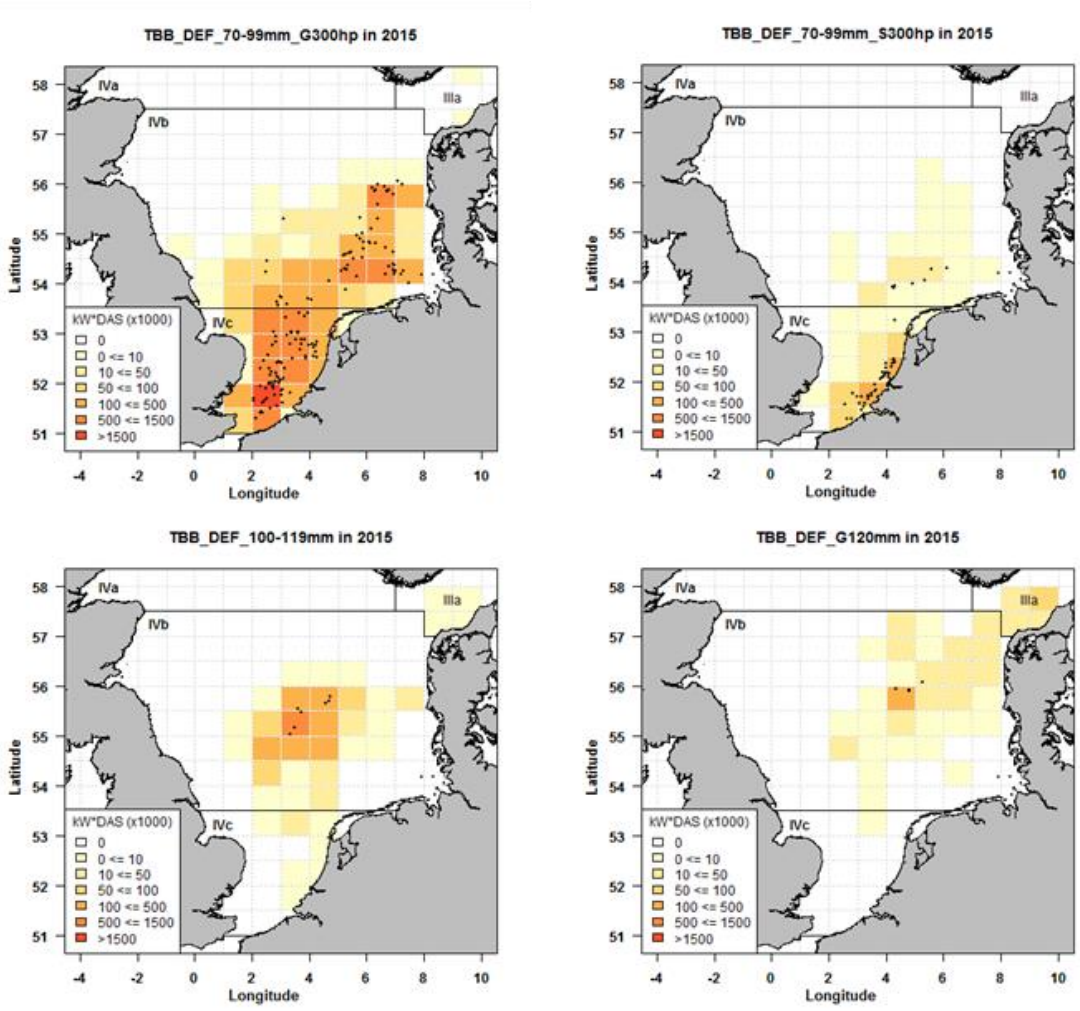


Figure 3b. Continued.

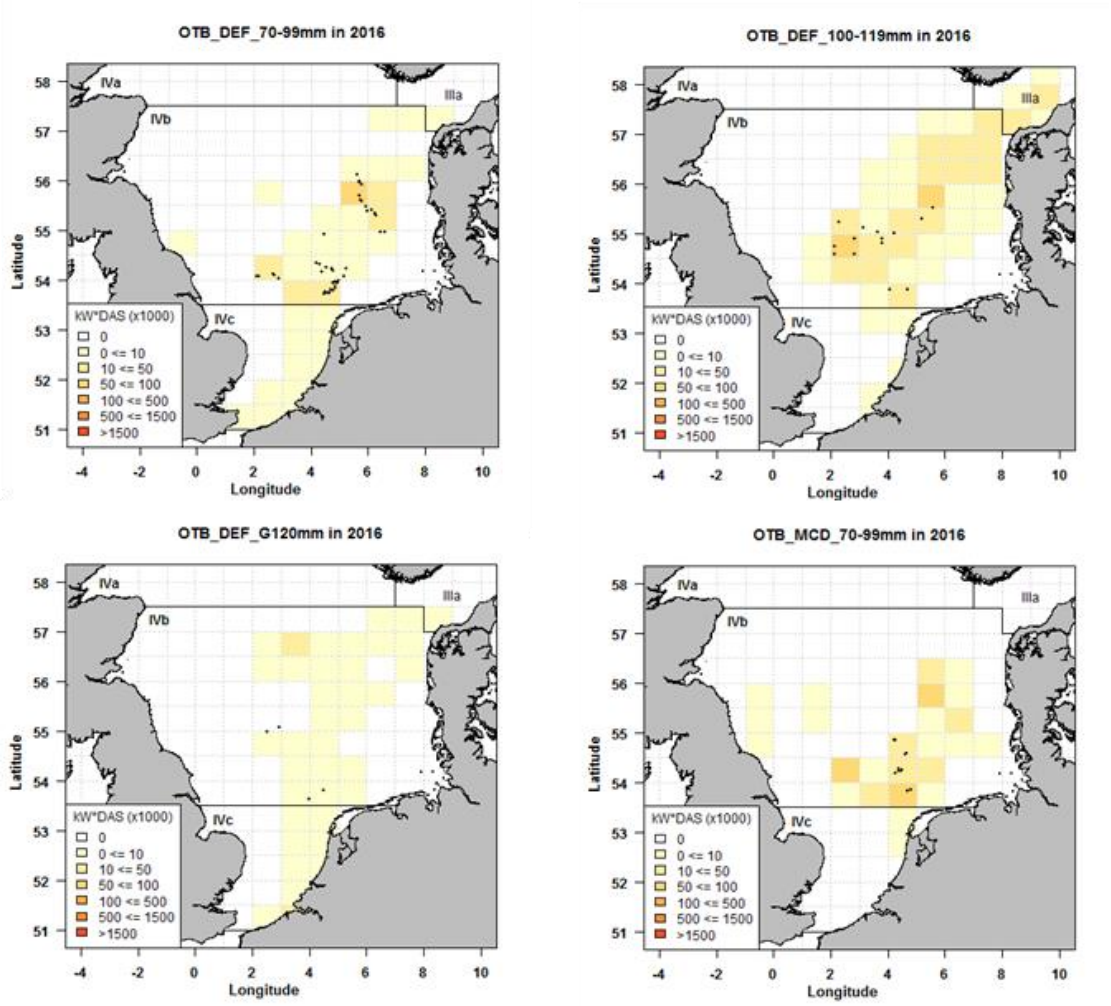
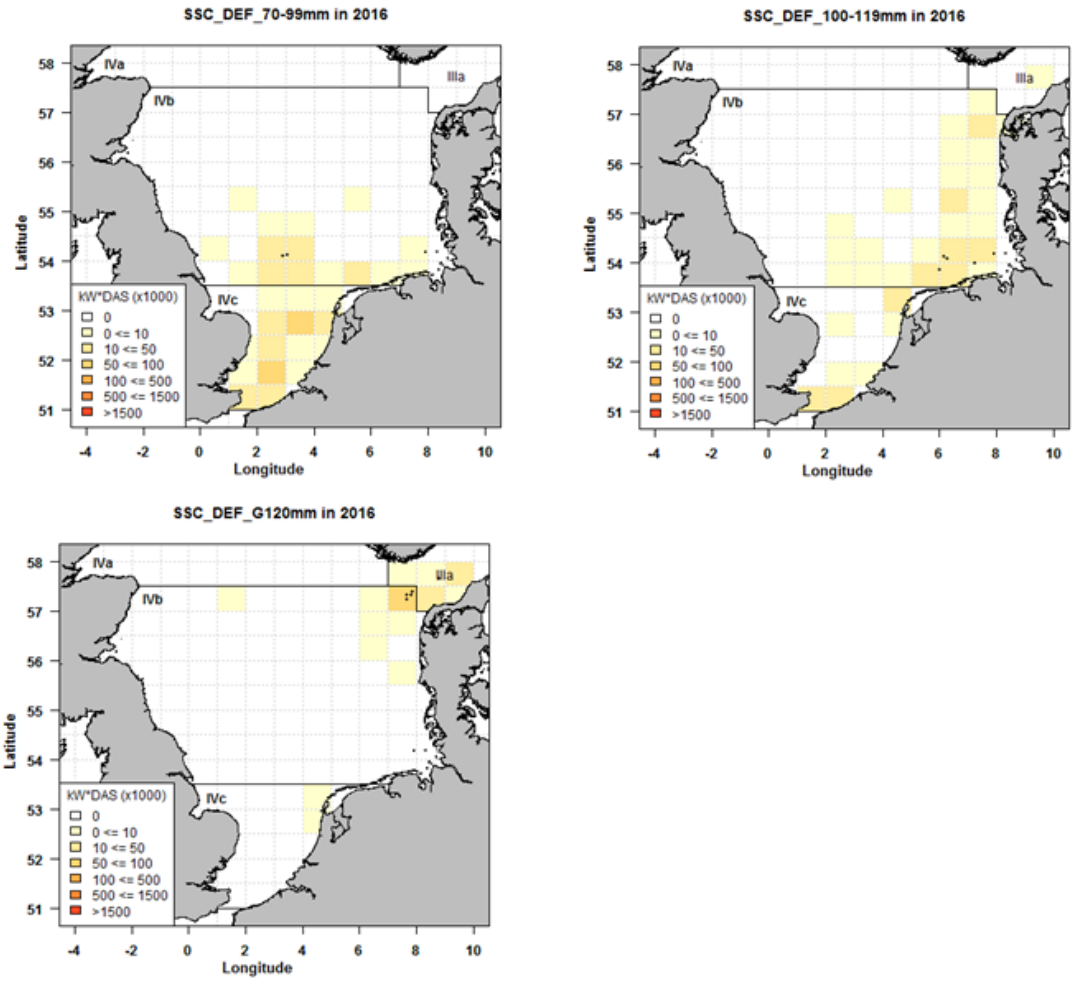


Figure 3c. Distribution of total effort (in kW*days (x1000) at sea, shaded colours per ICES 1/16 rectangle) and positions of sampled trawls (black dots) for the sampled demersal metiers in **2016**.



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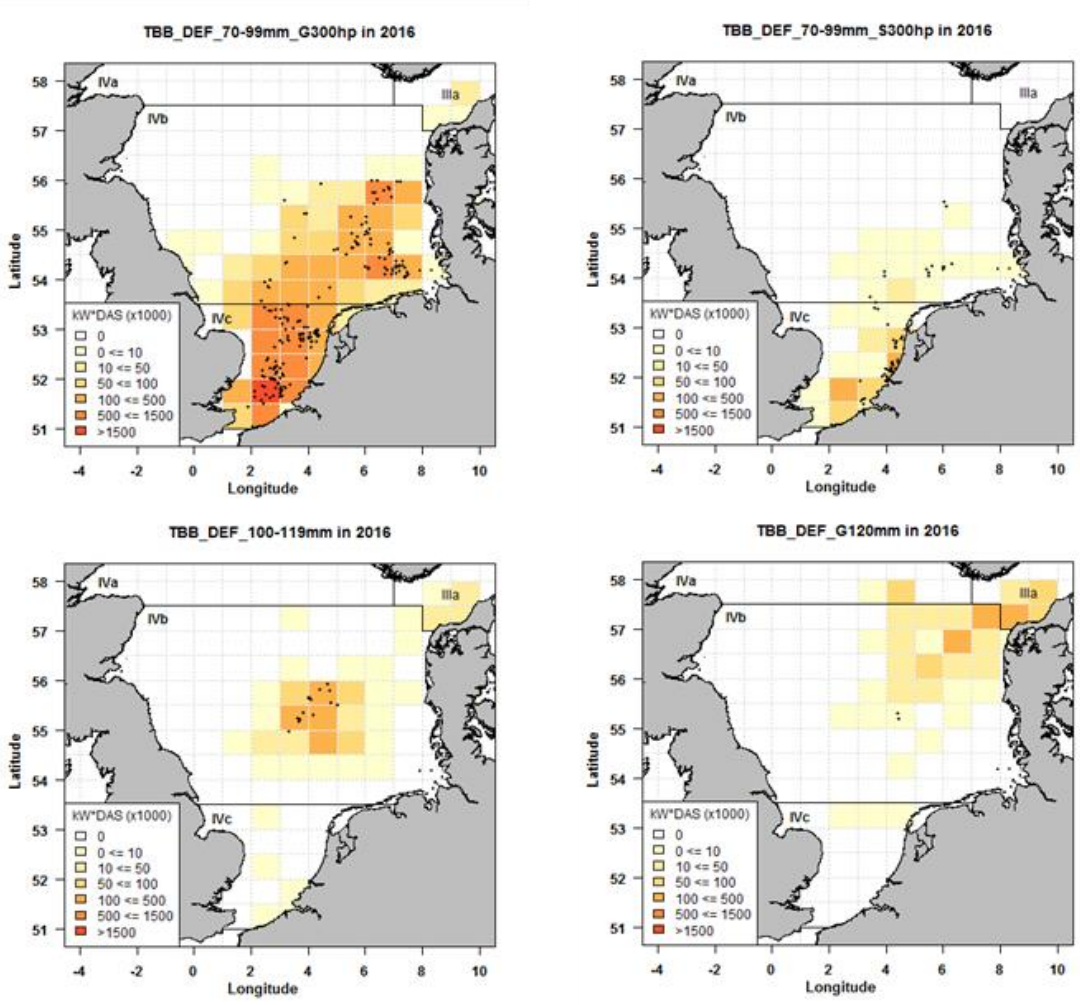

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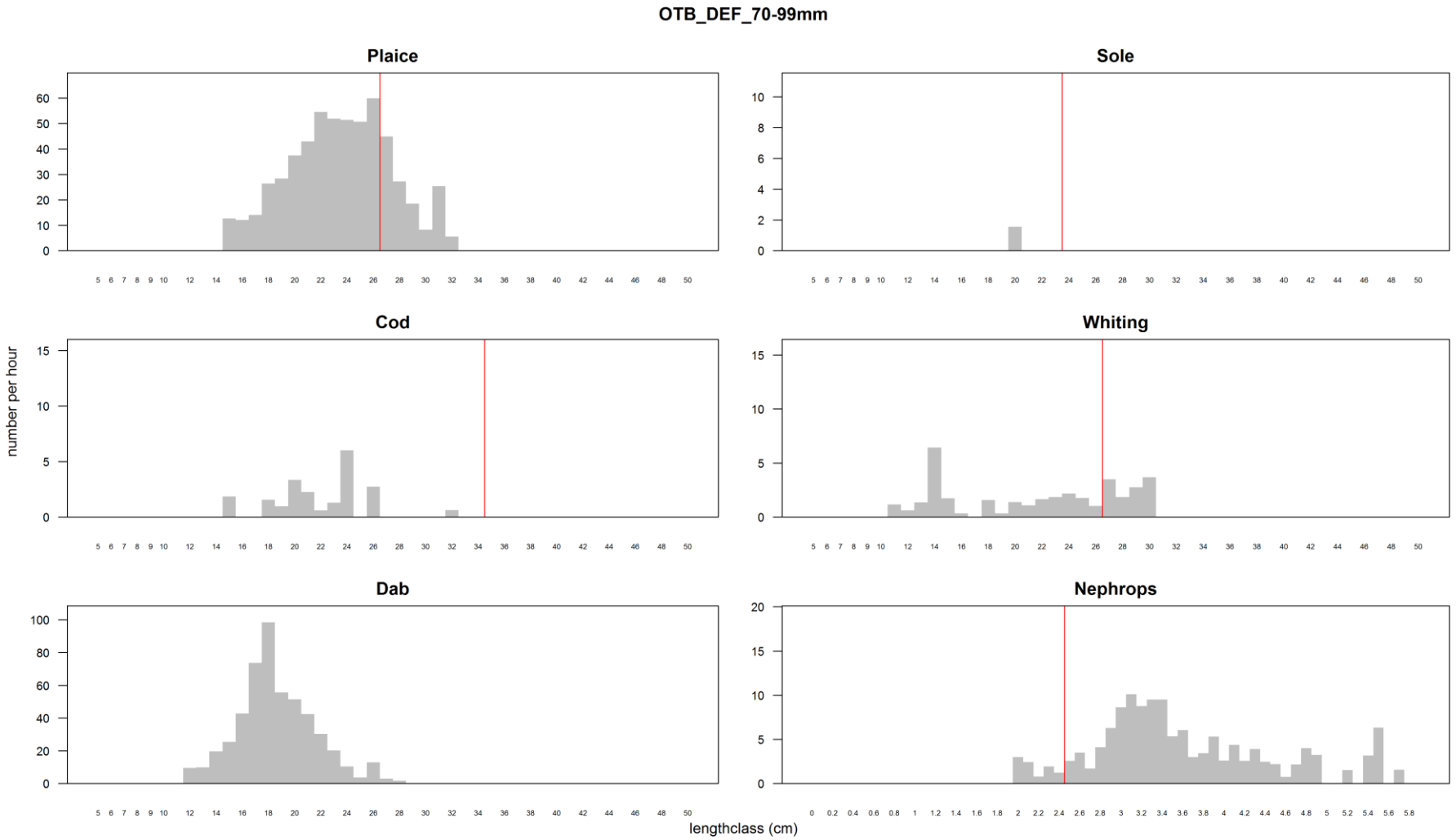


Figure 4a. Number per hour discarded per length class (cm) for several discarded species for the sampled demersal metiers in **2014** (red line = Minimum Landing

Size).

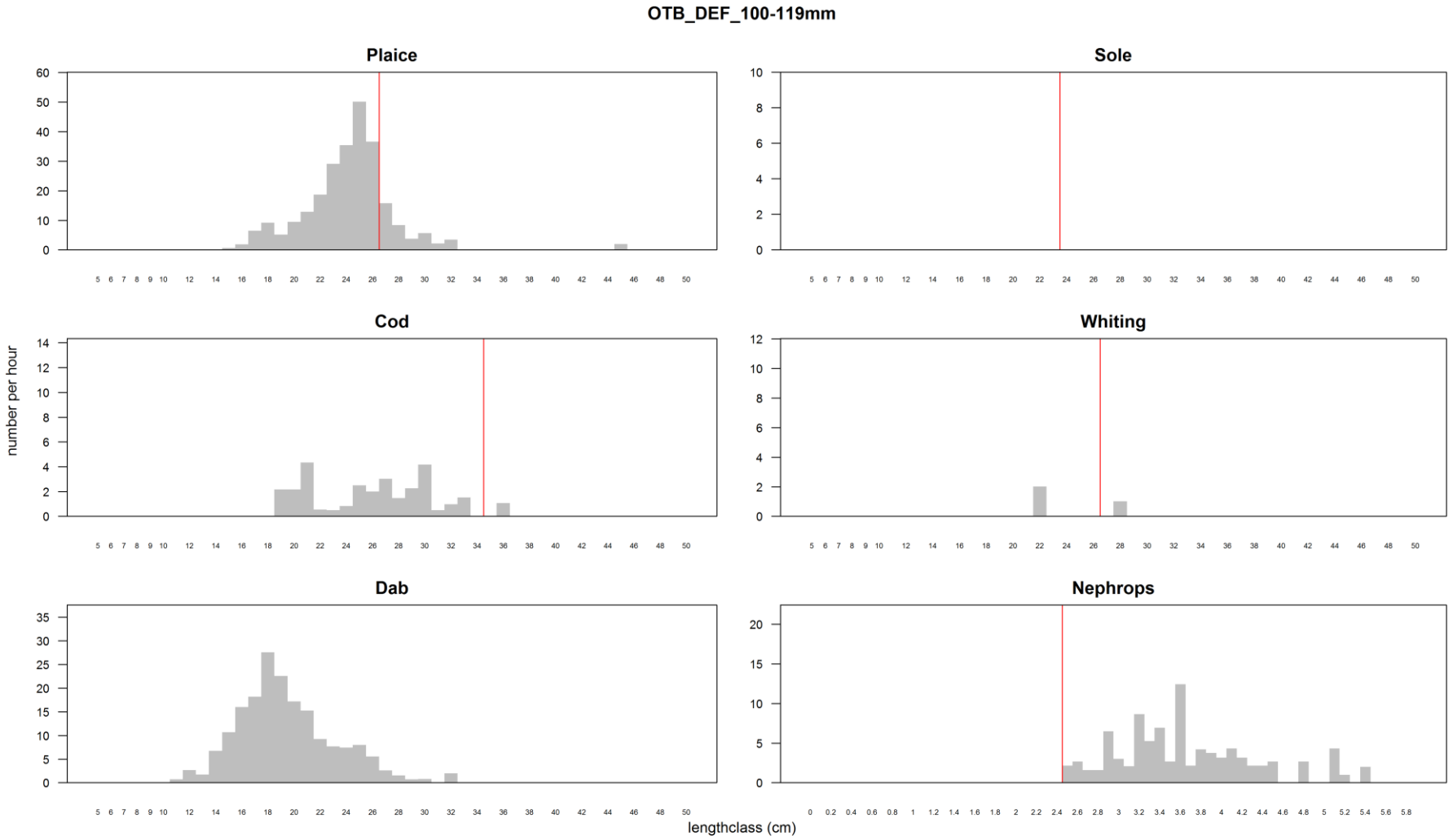


Figure 4a. Continued.

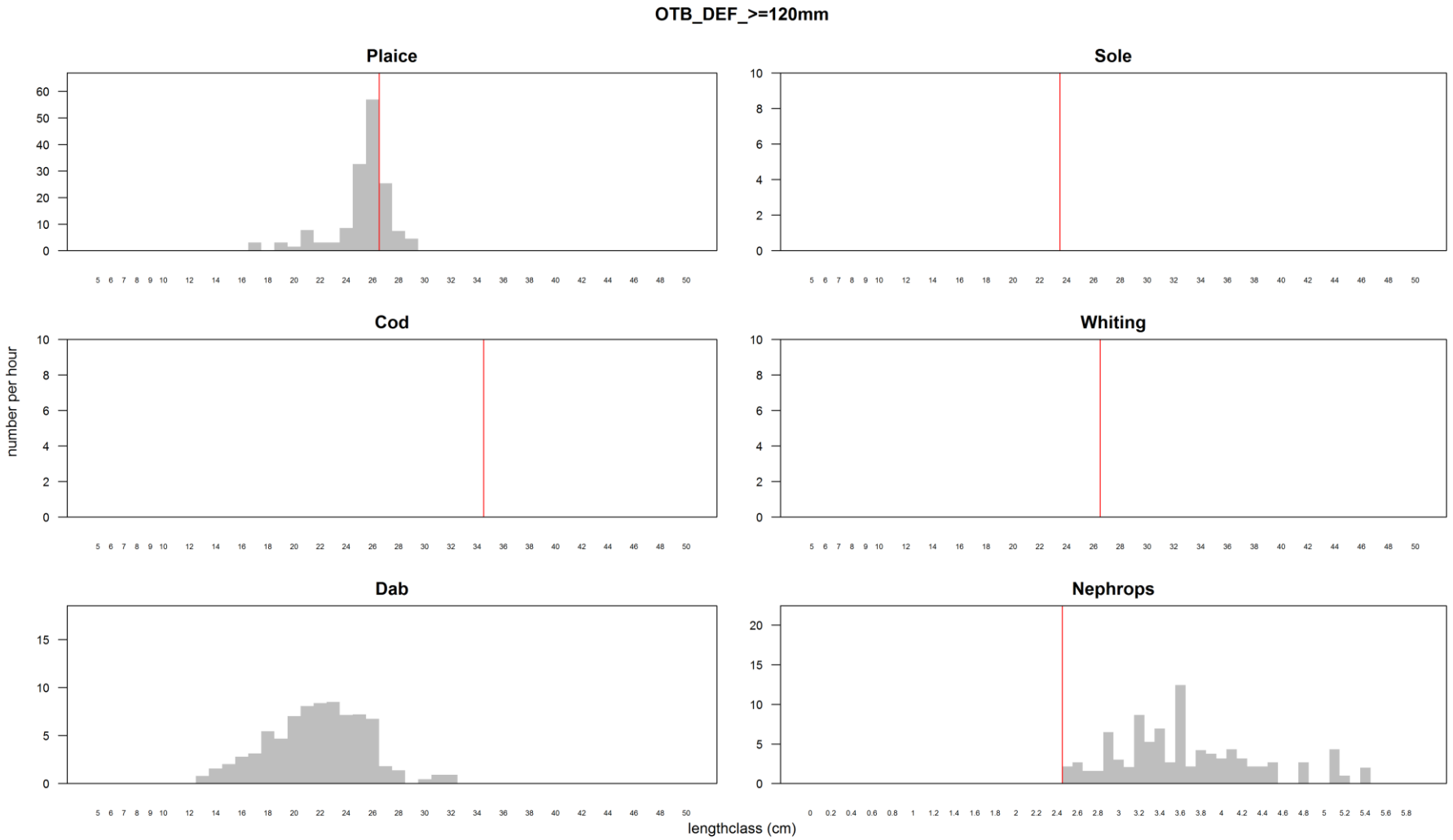


Figure 4a. Continued.

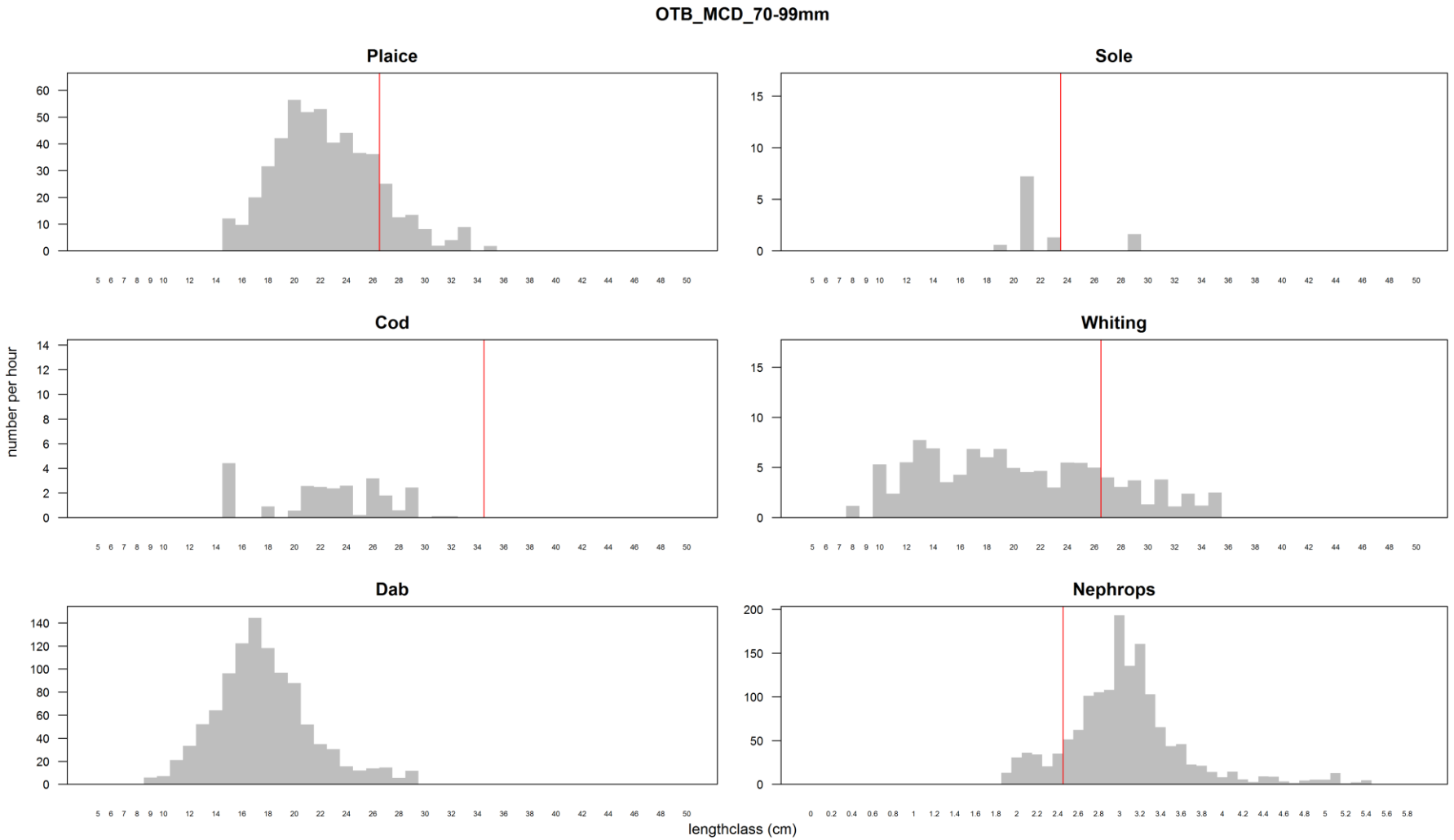


Figure 4a. Continued.

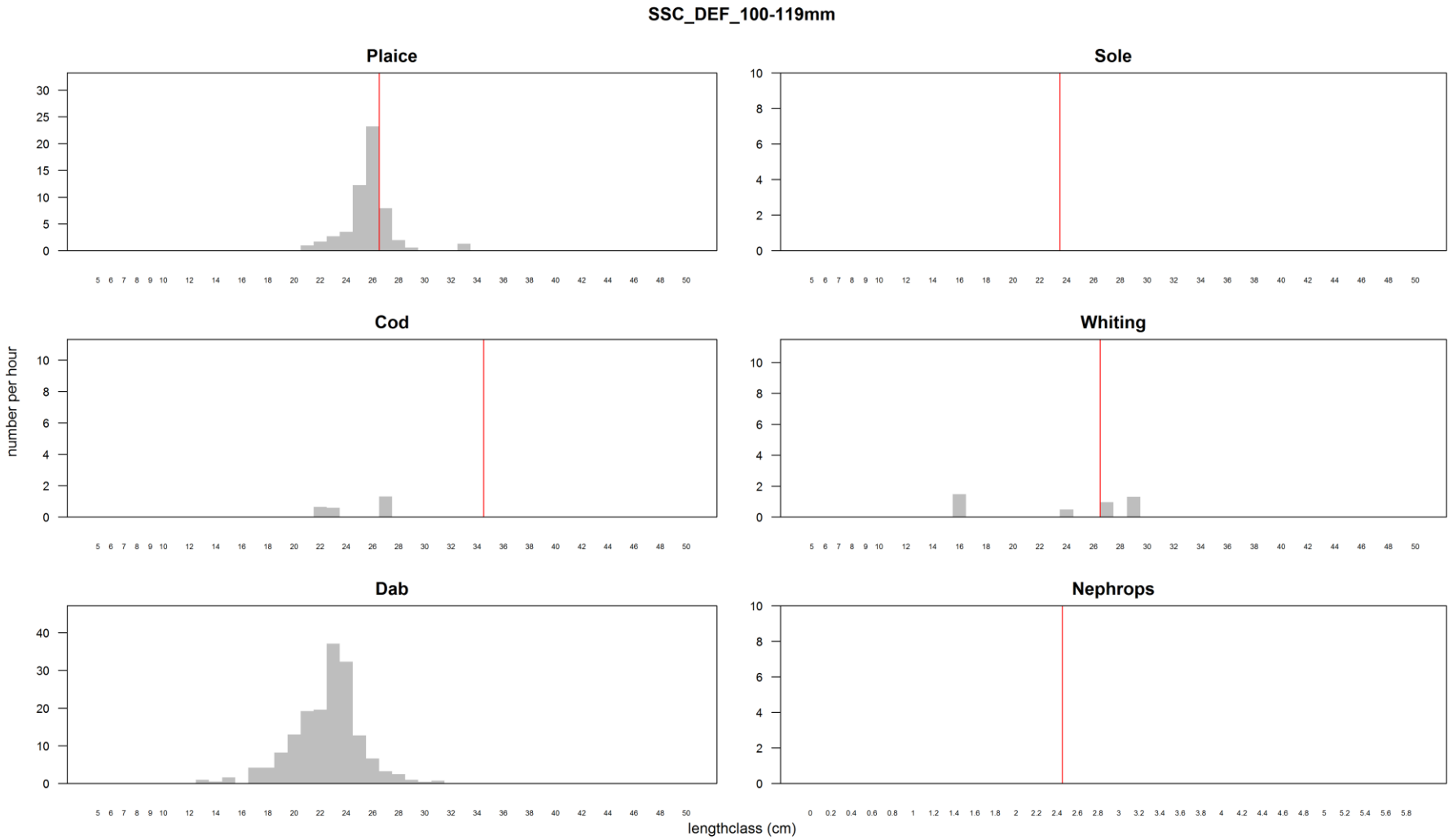


Figure 4a. Continued.

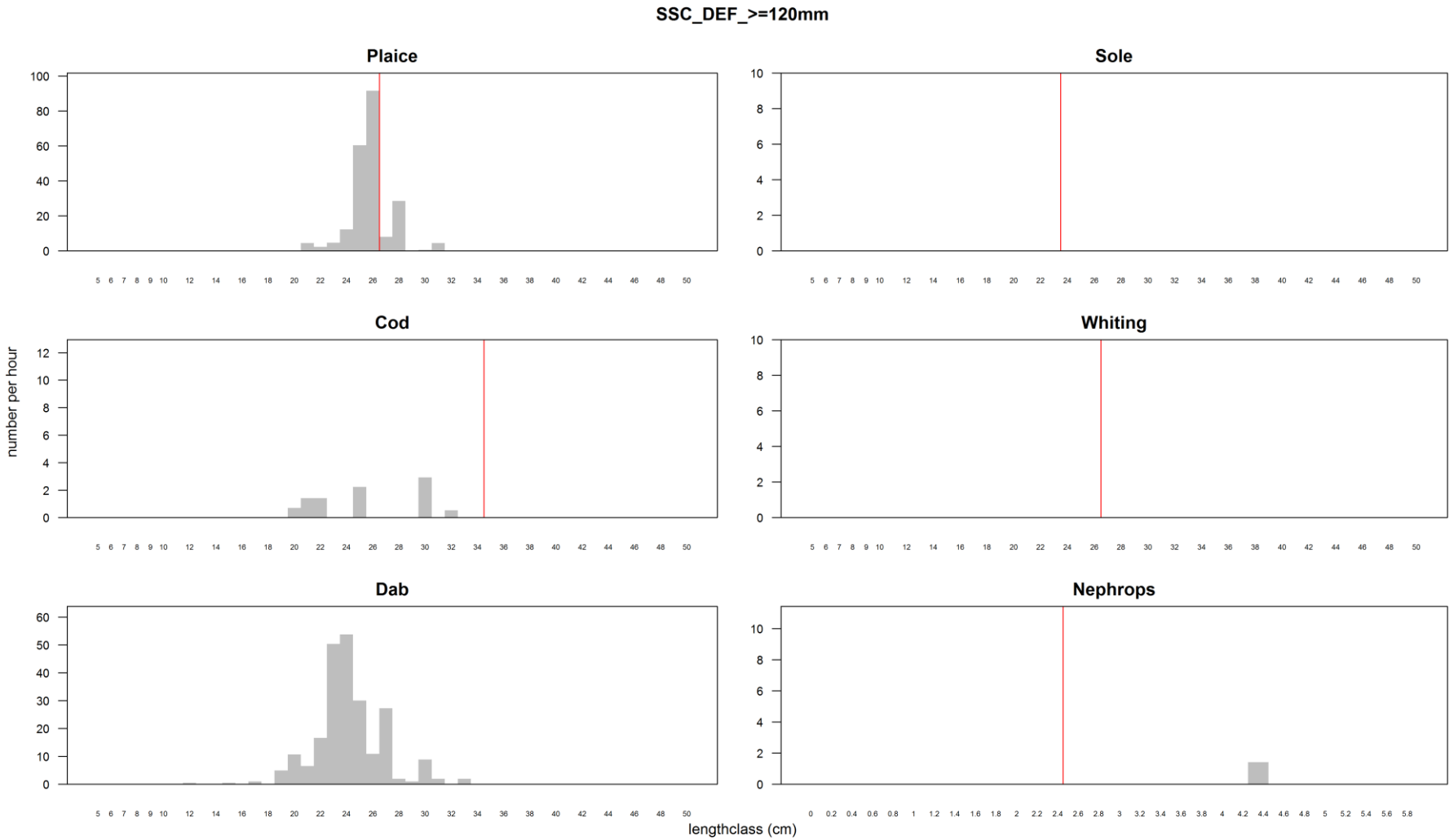


Figure 4a. Continued.

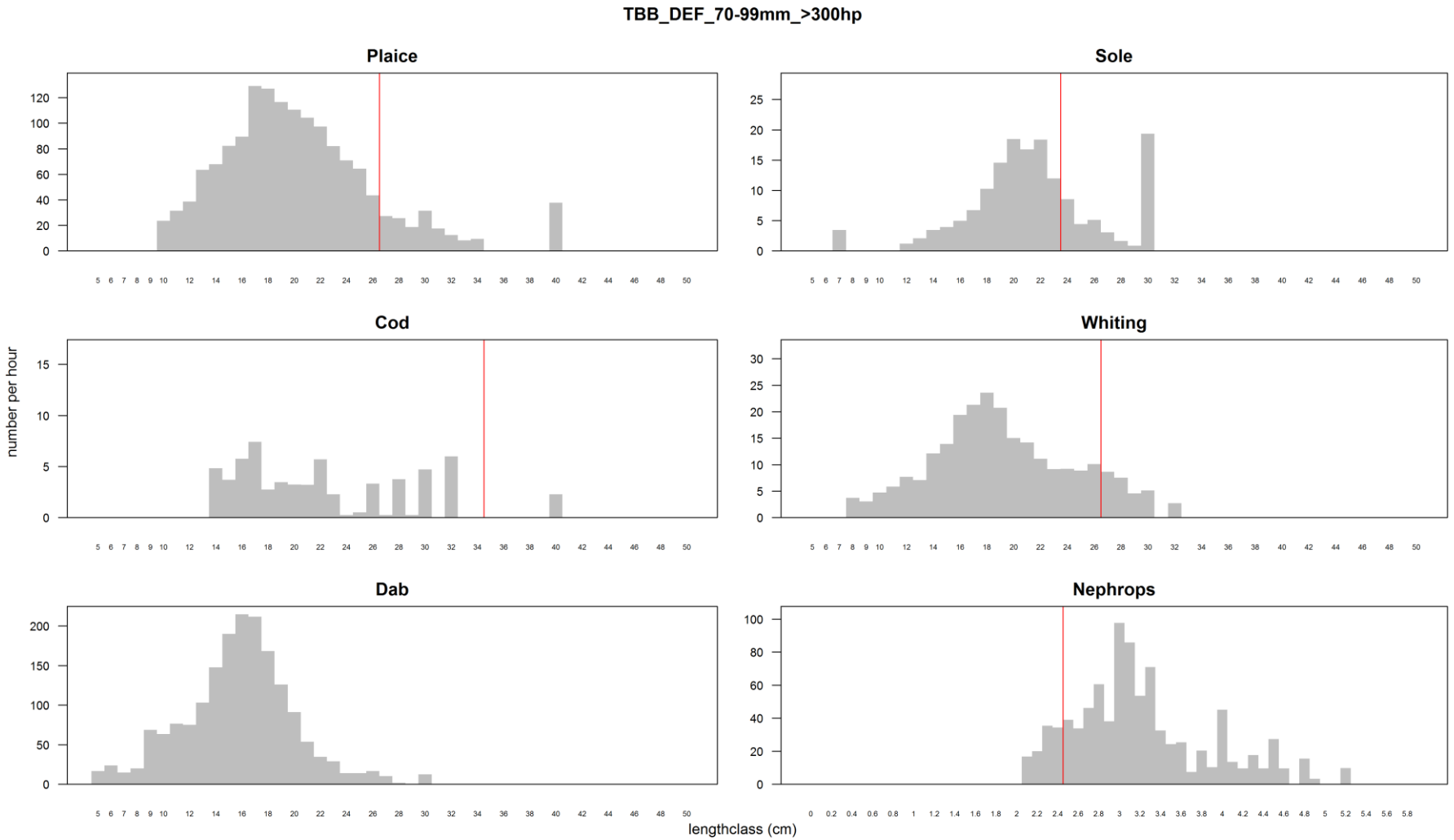


Figure 4a. Continued.

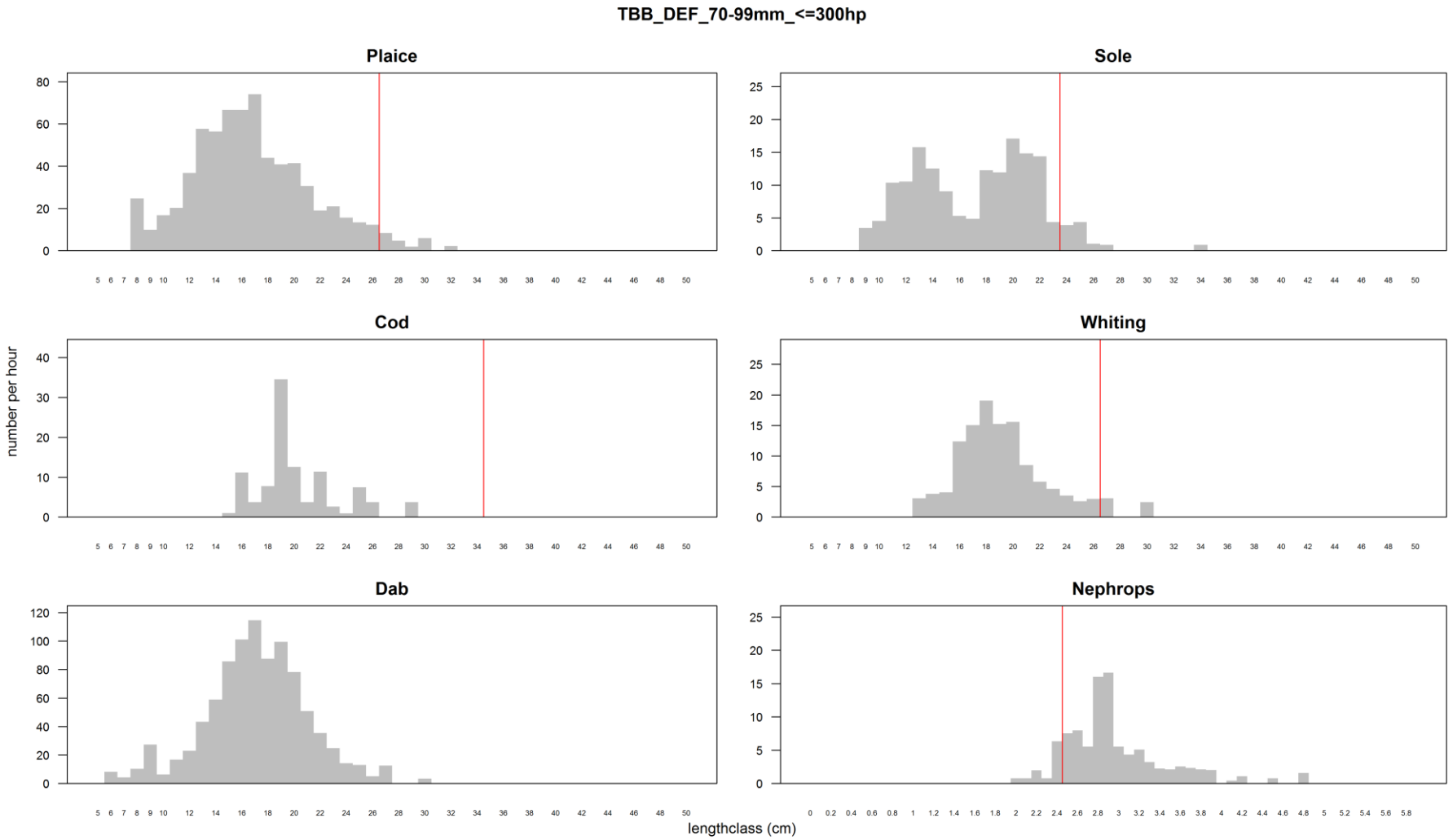


Figure 4a. Continued.

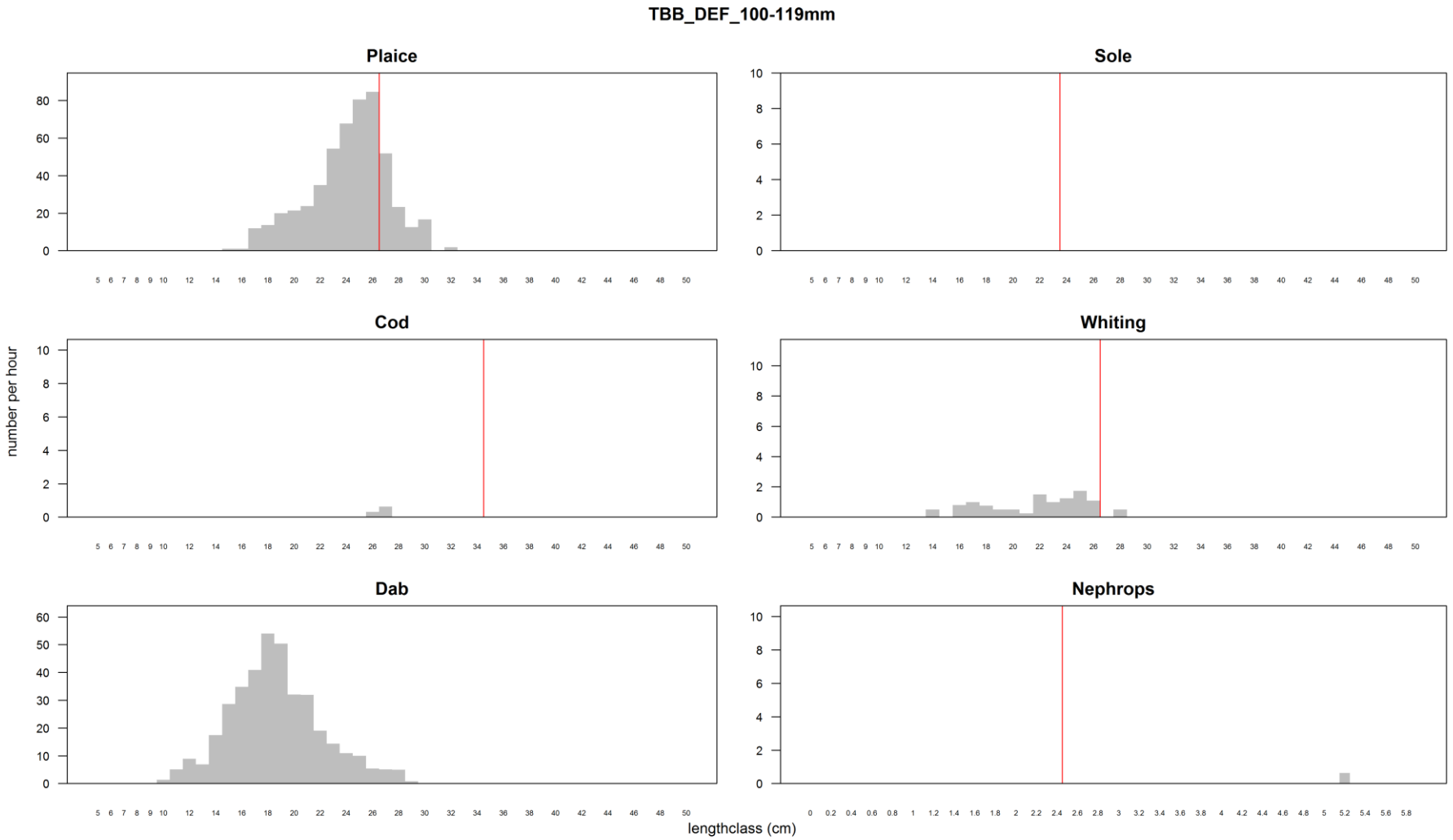


Figure 4a. Continued.

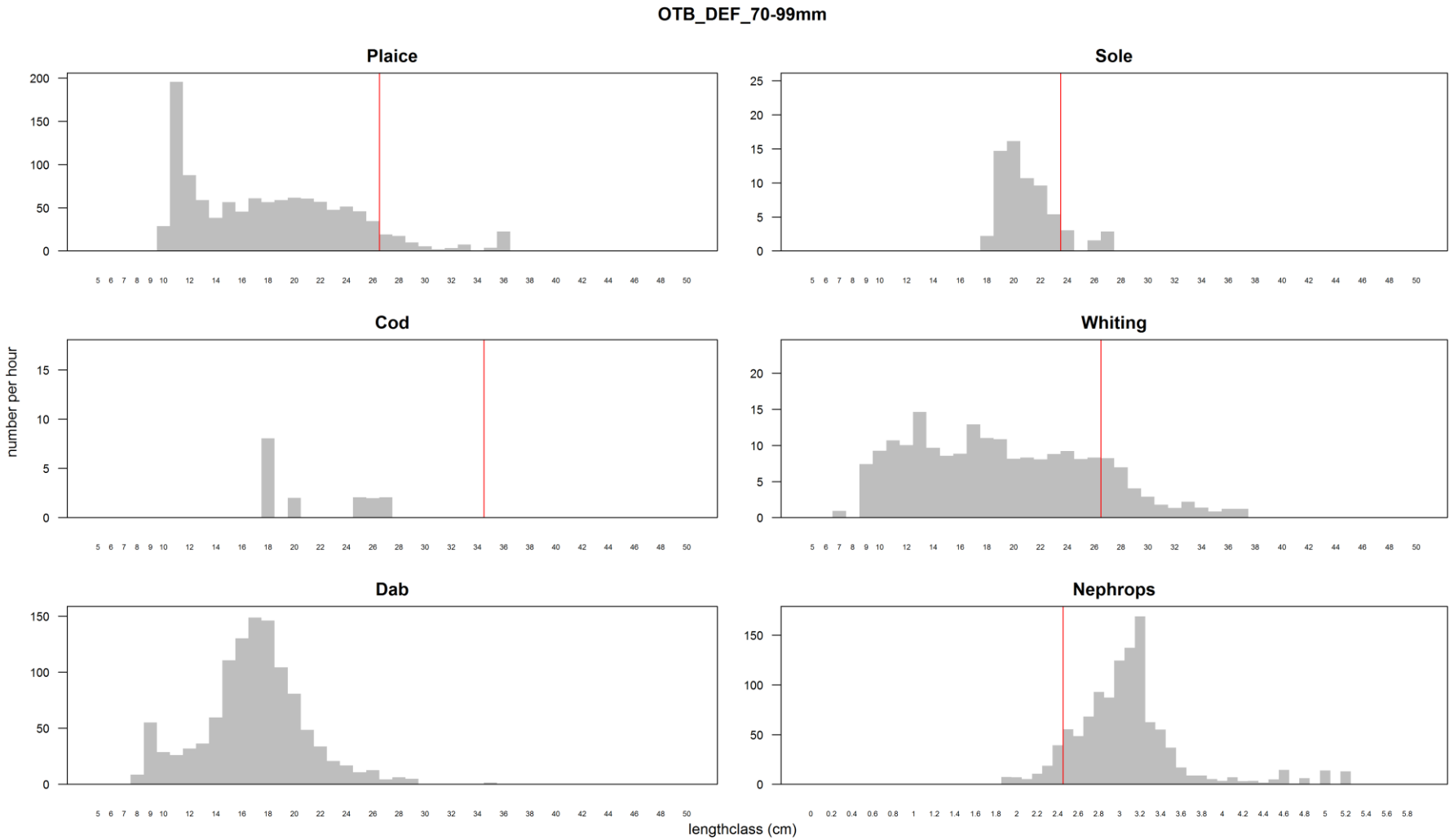


Figure 4b Number per hour discarded per length class (cm) for several discarded species for the sampled demersal metiers in **2015** (red line = Minimum Landing Size).

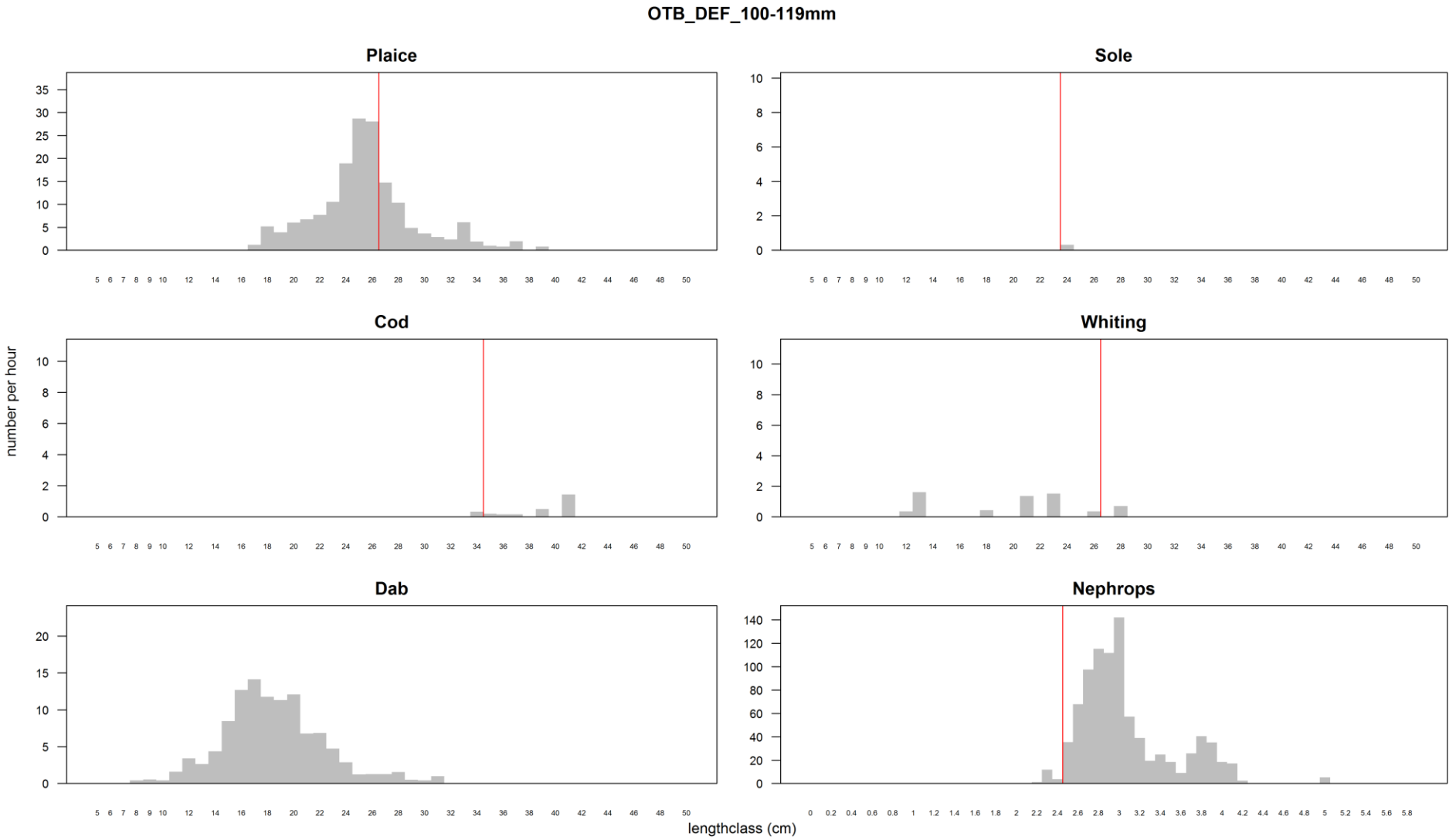
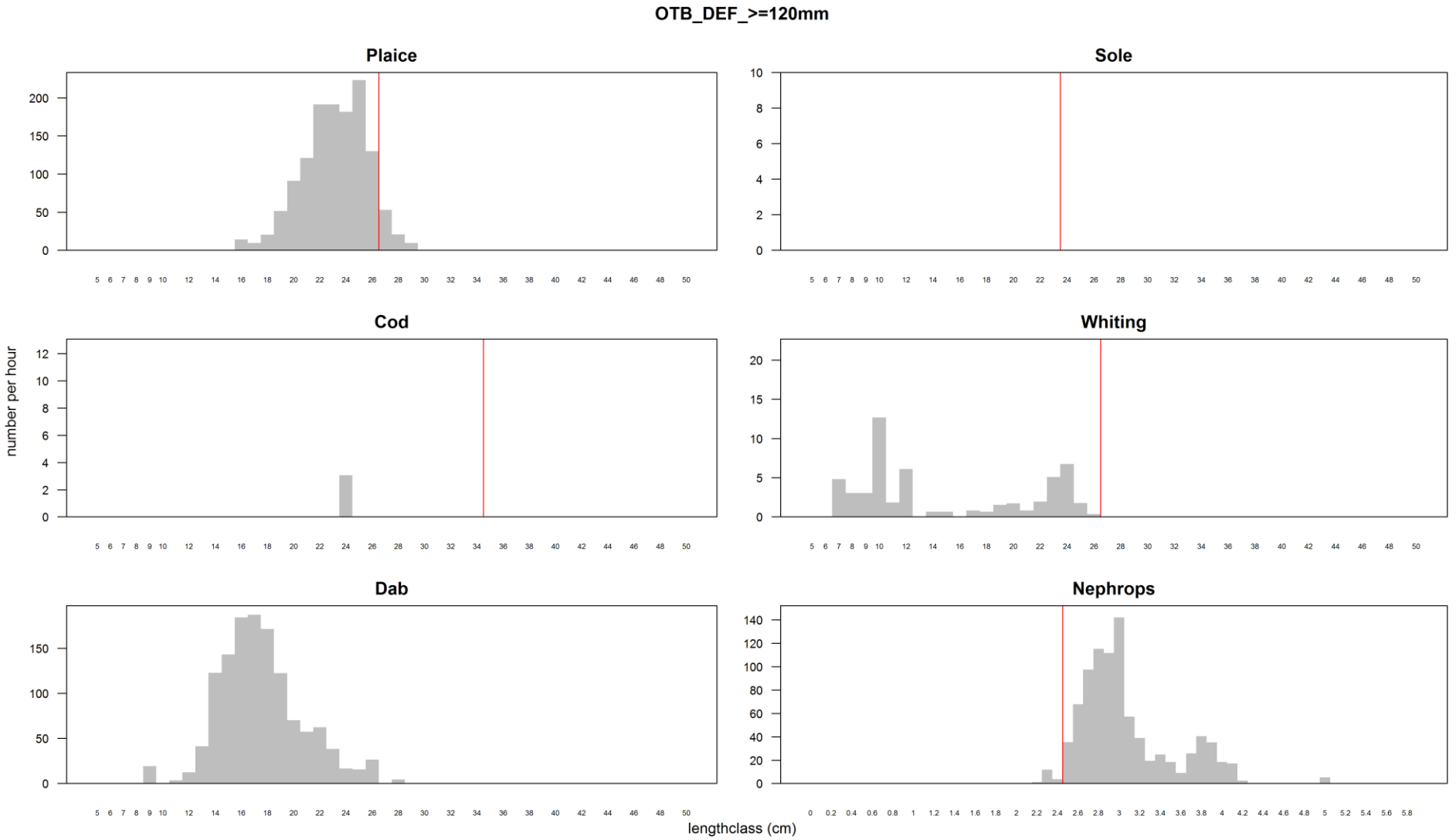


Figure 4b. Continued.



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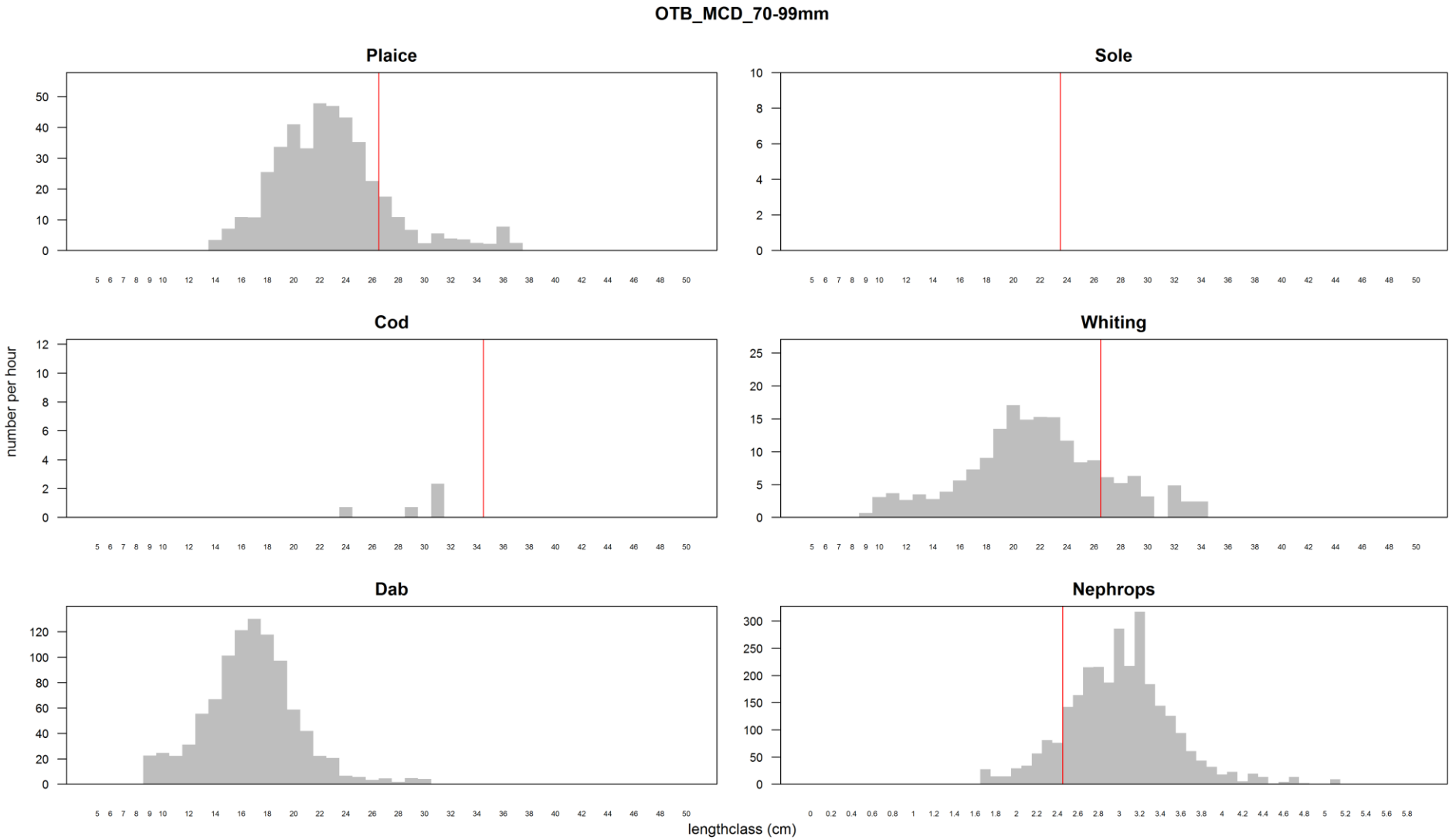

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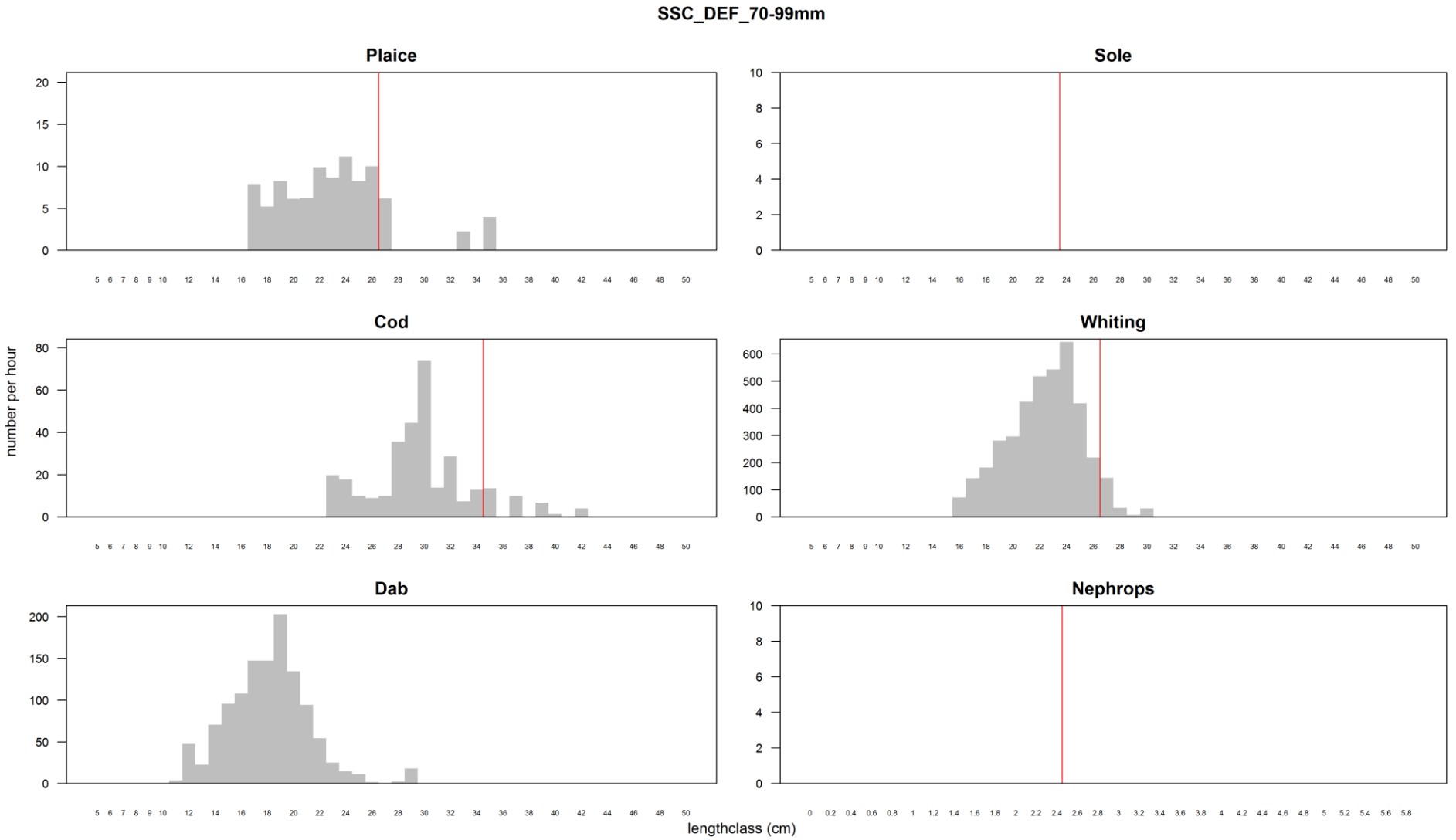
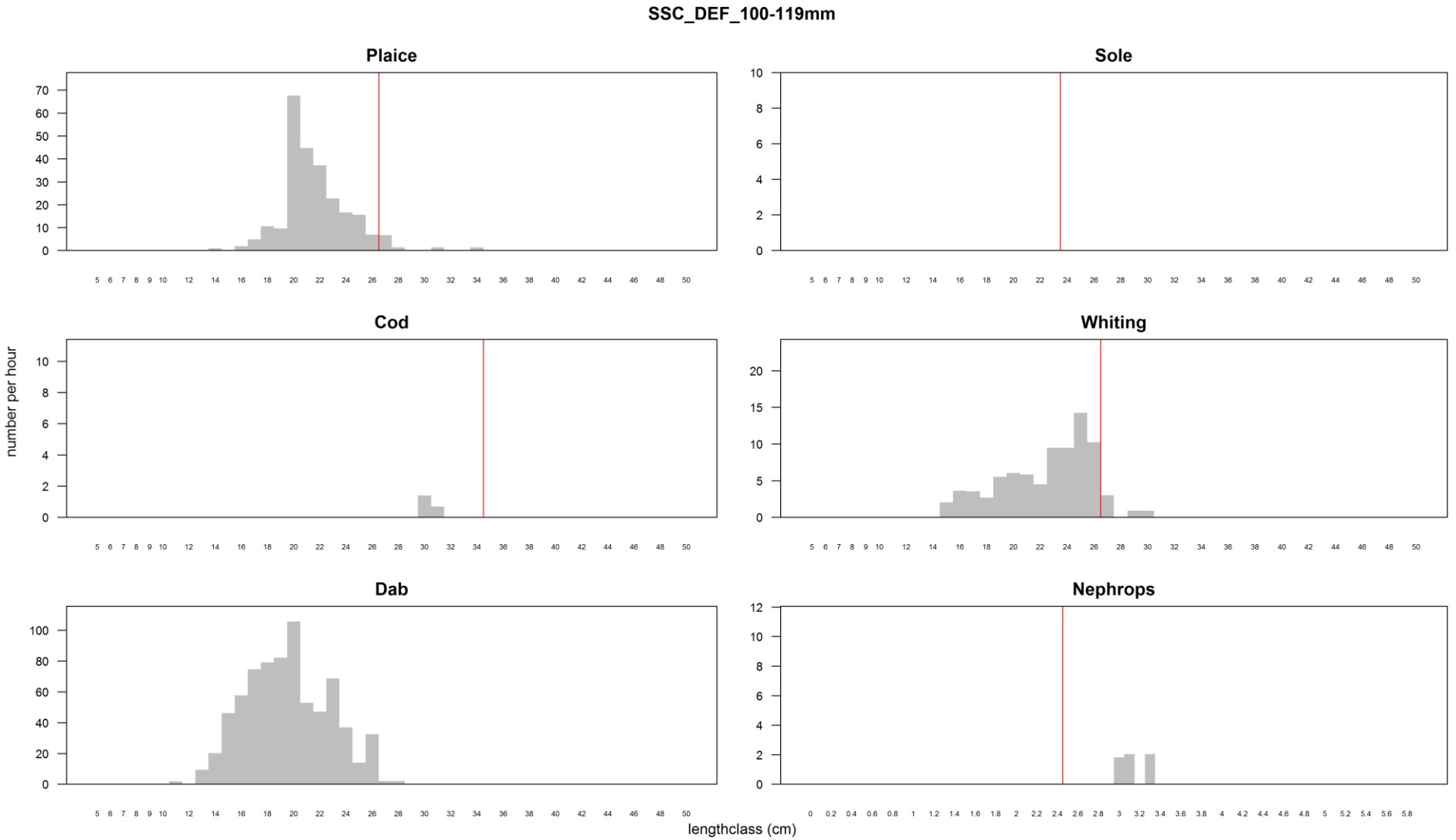


Figure 4b. Continued.



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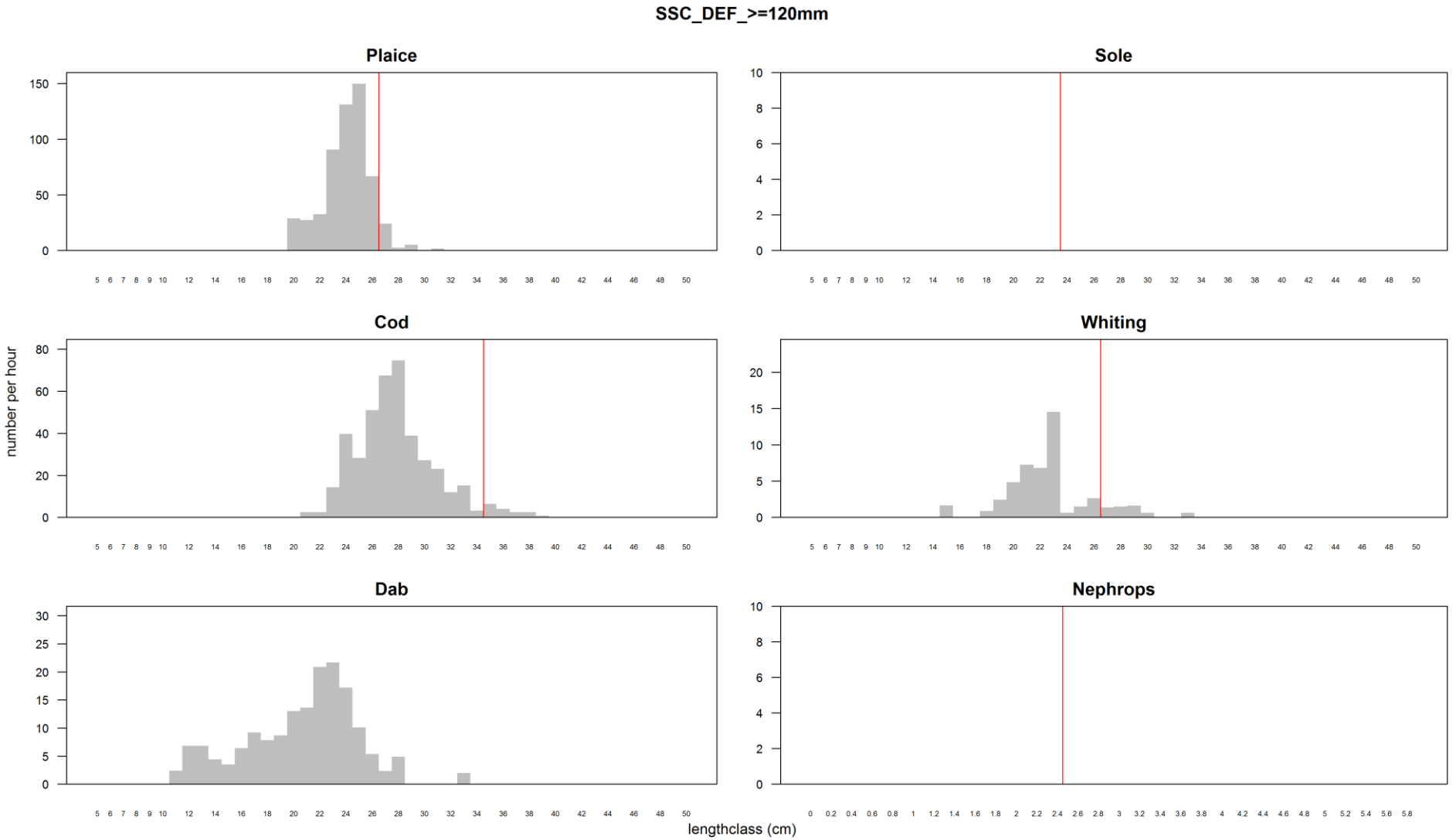

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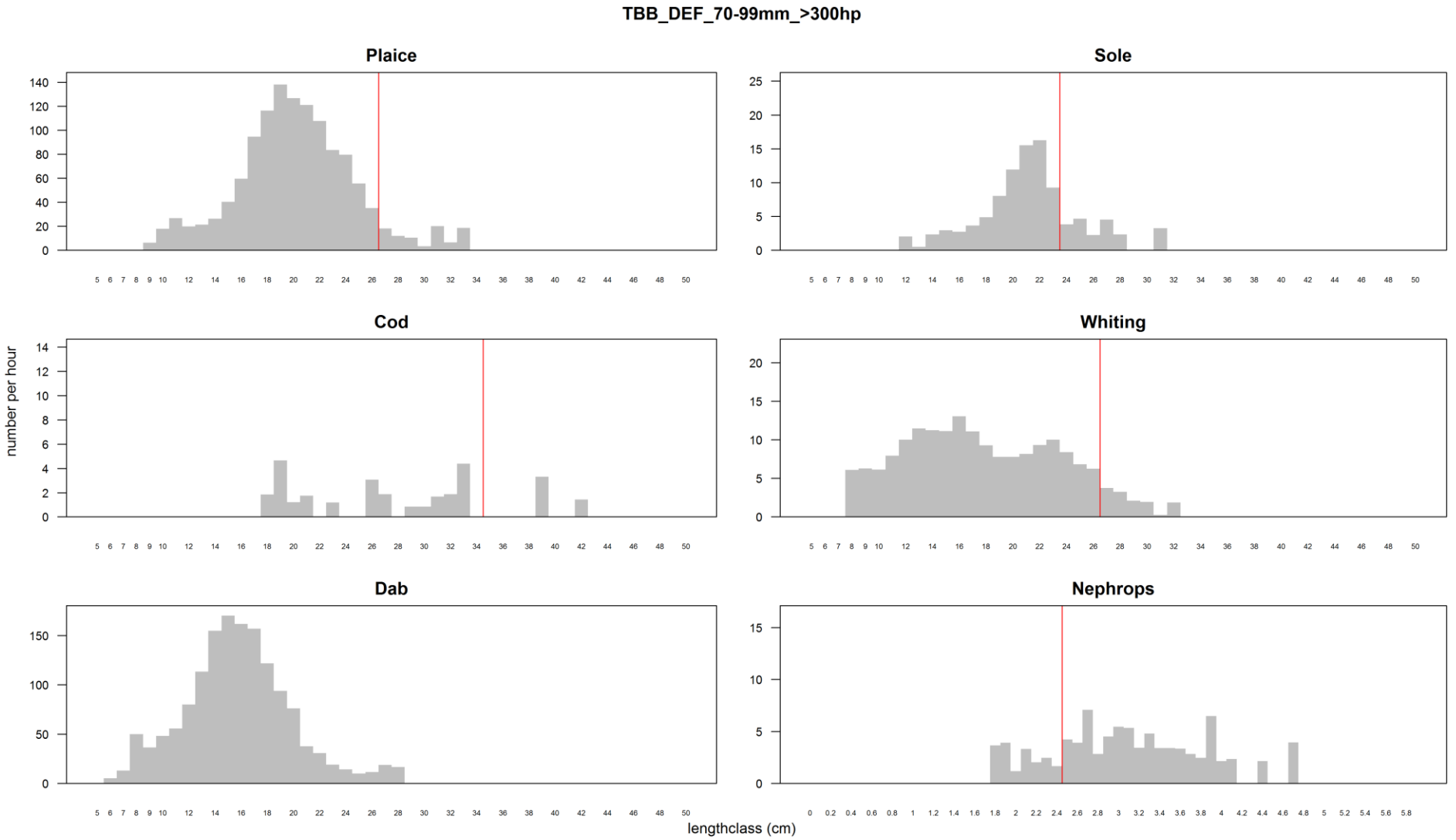


Figure 4b. Continued.

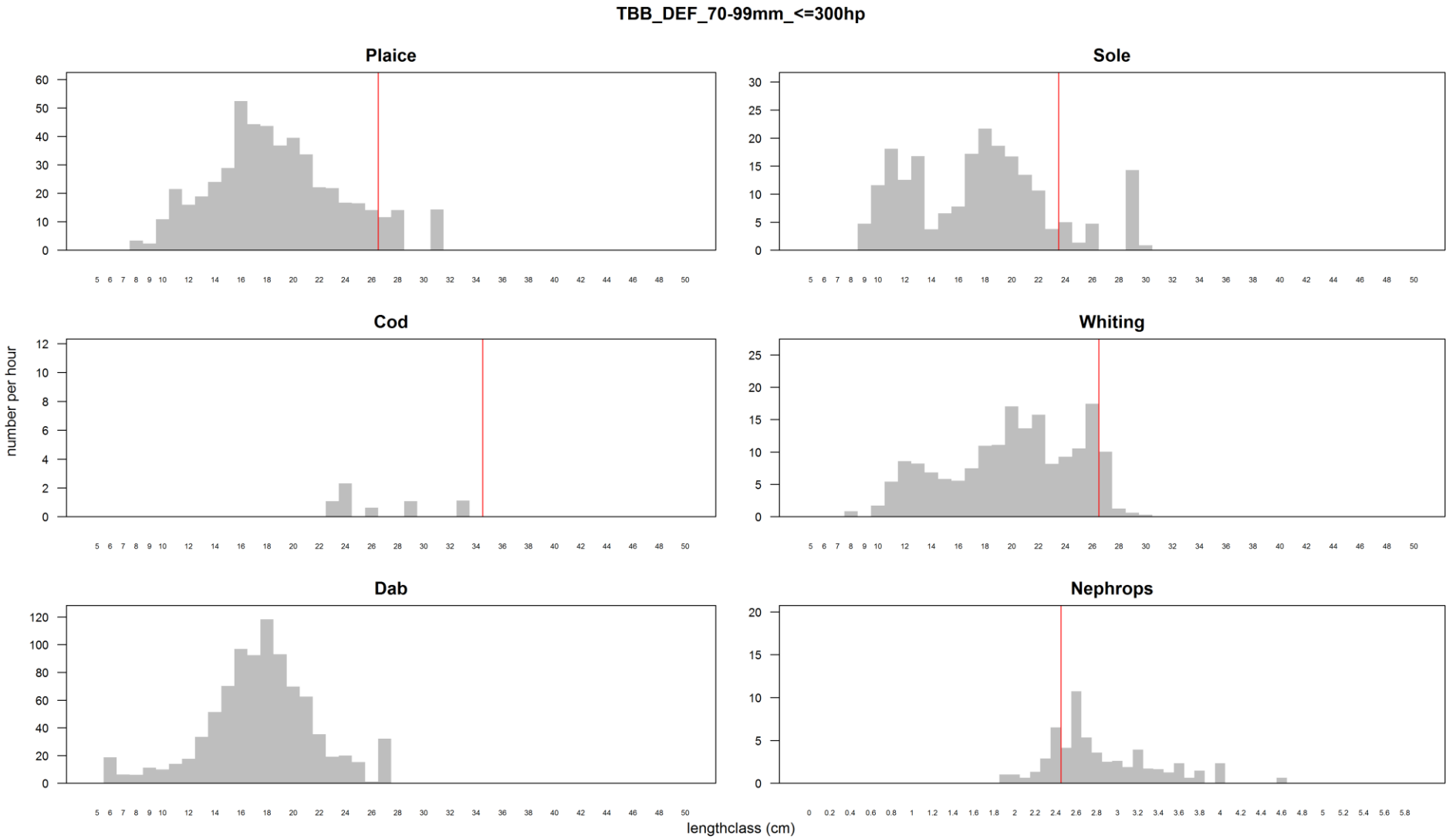
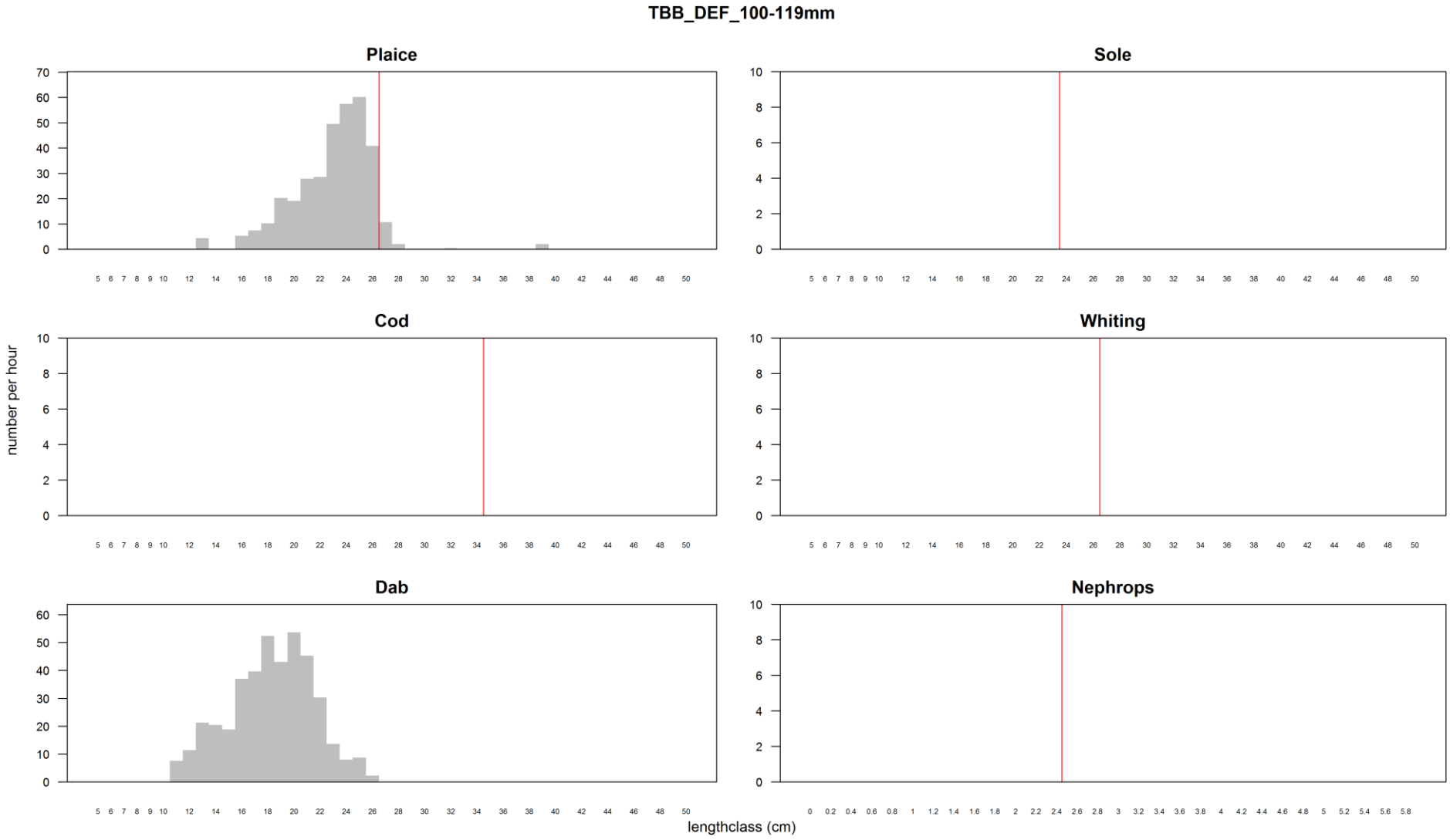


Figure 4b. Continued.



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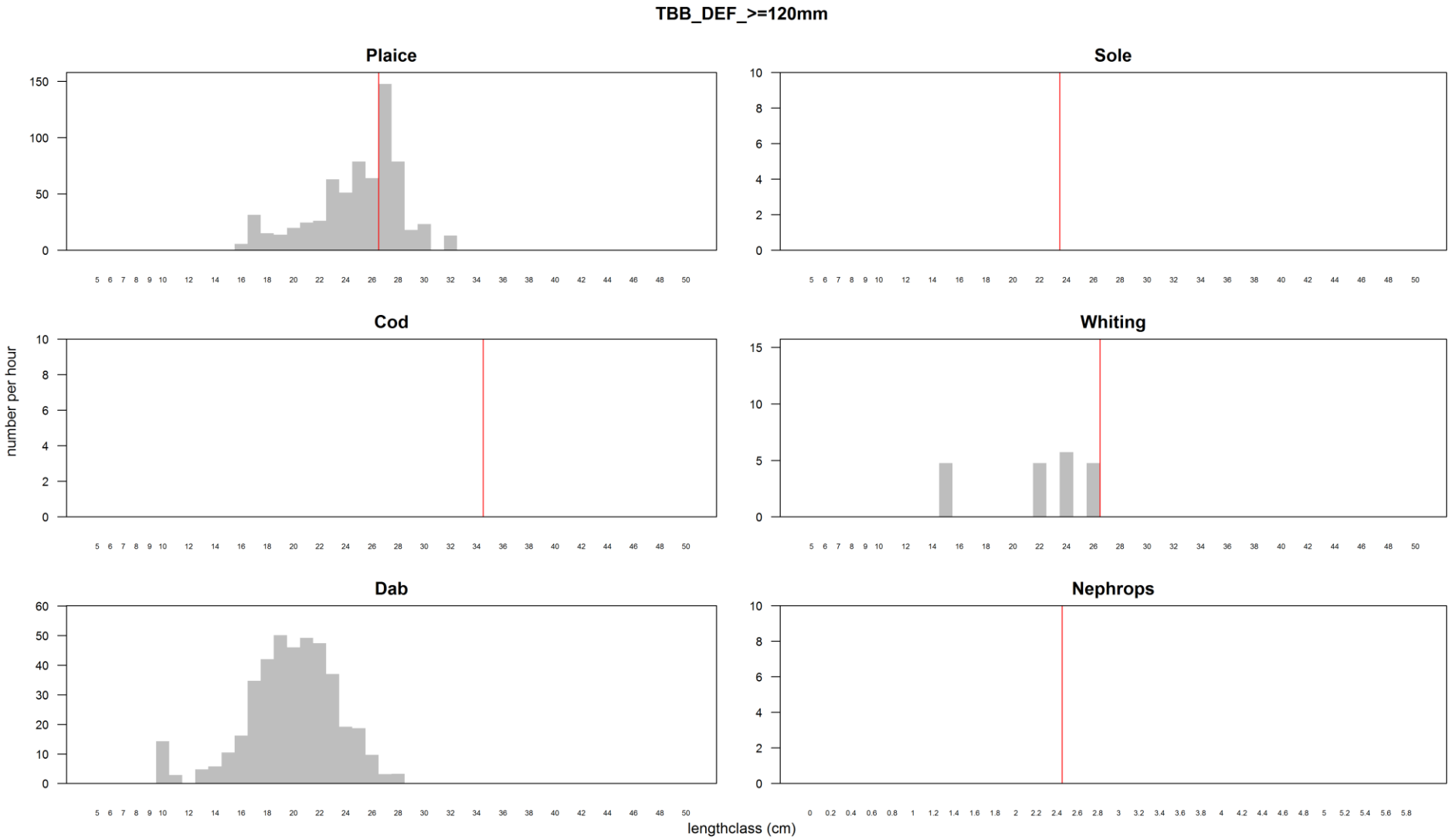

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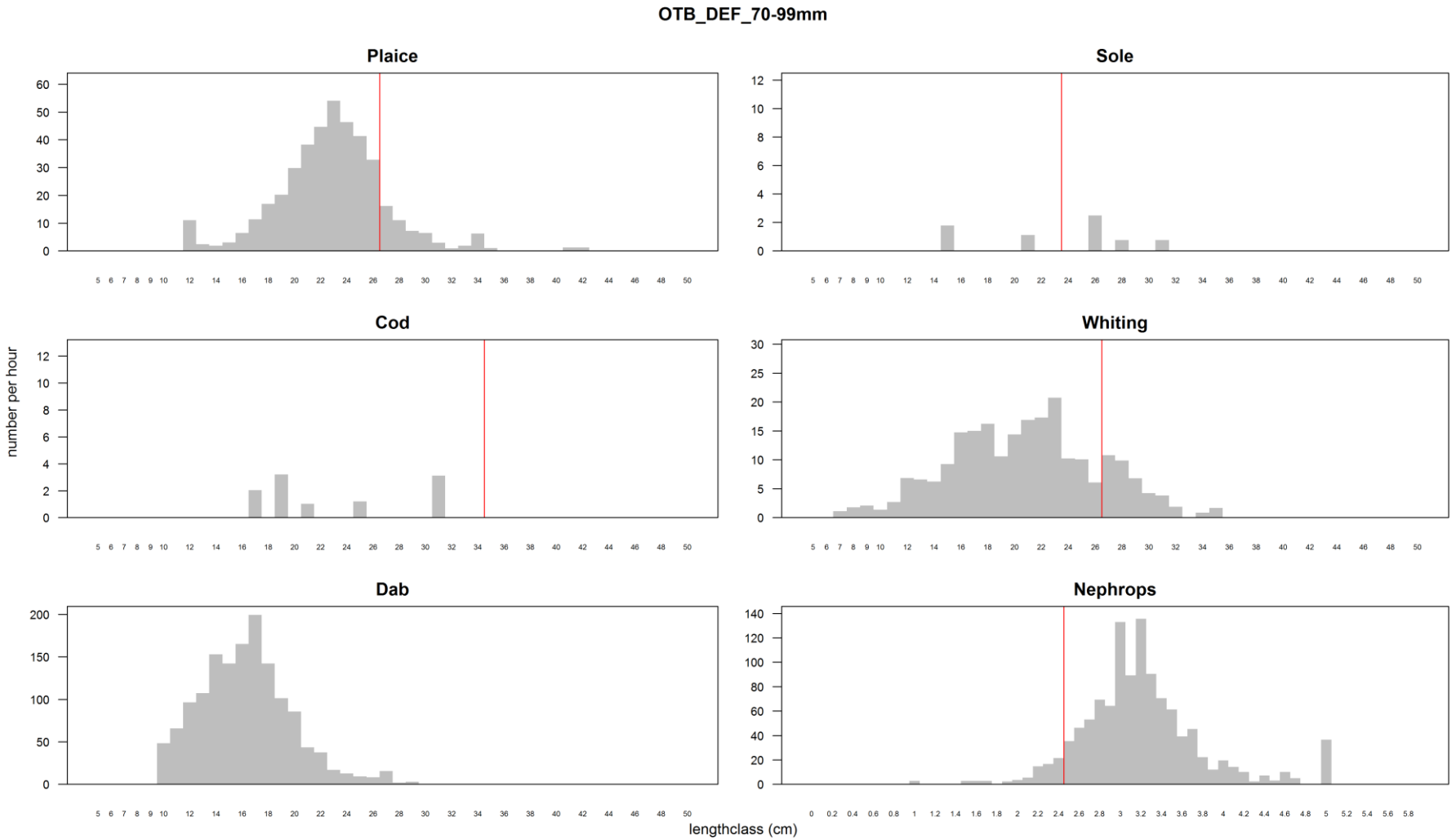
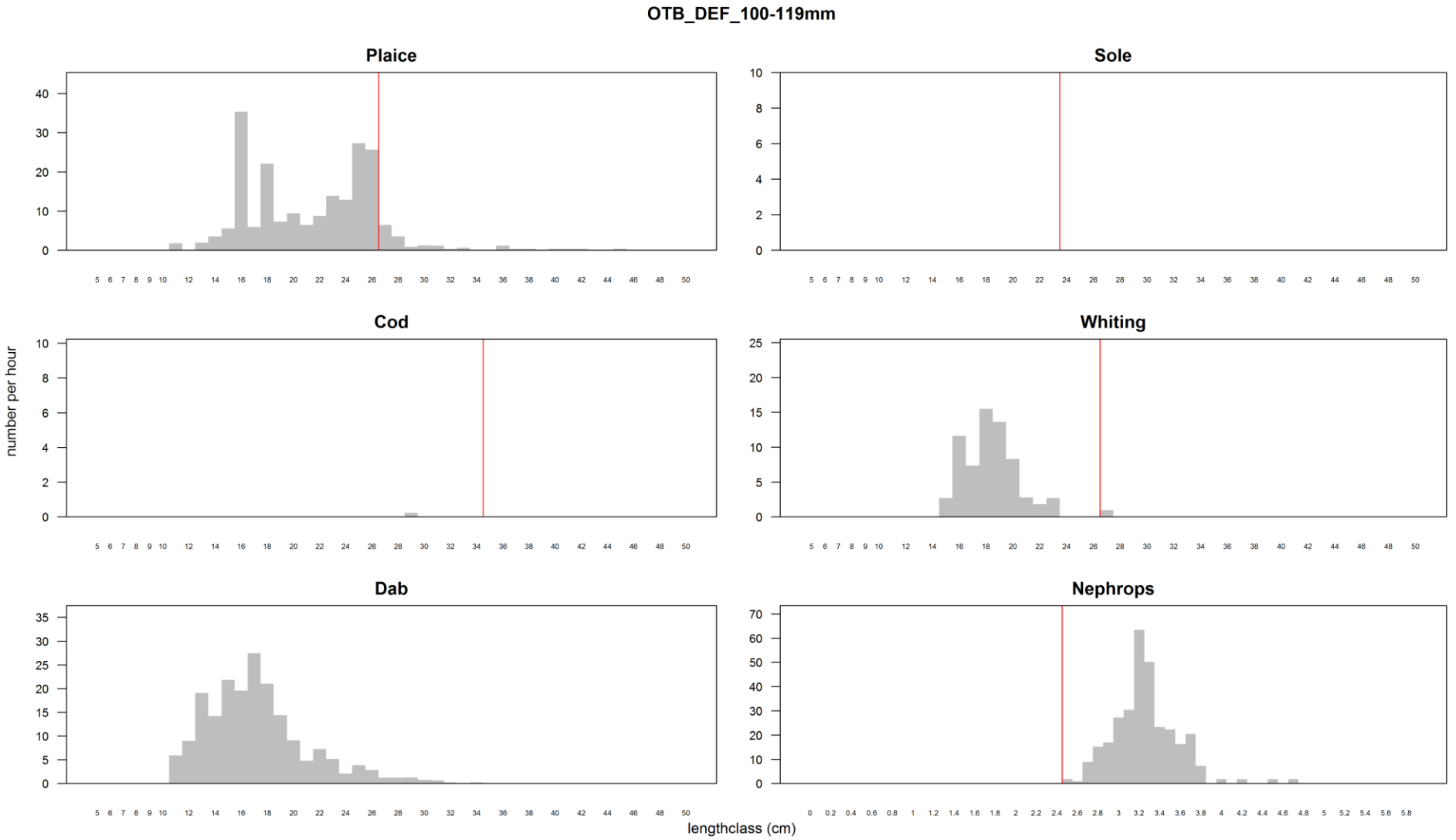


Figure 4c. Number per hour discarded per length class (cm) for several discarded species for the sampled demersal metiers in **2014** (red line = Minimum Landing Size).



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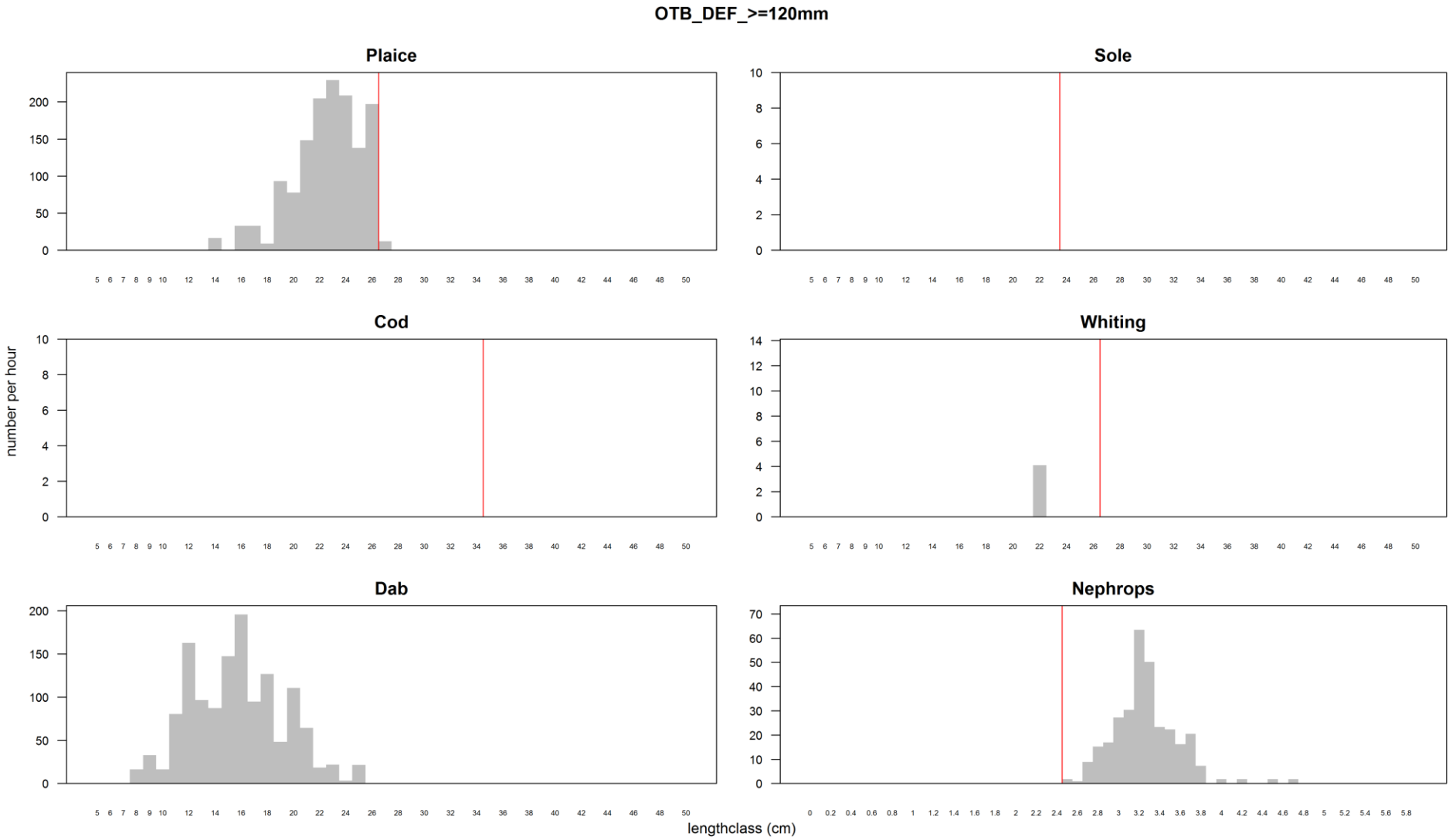


Figure 4c. Continued.

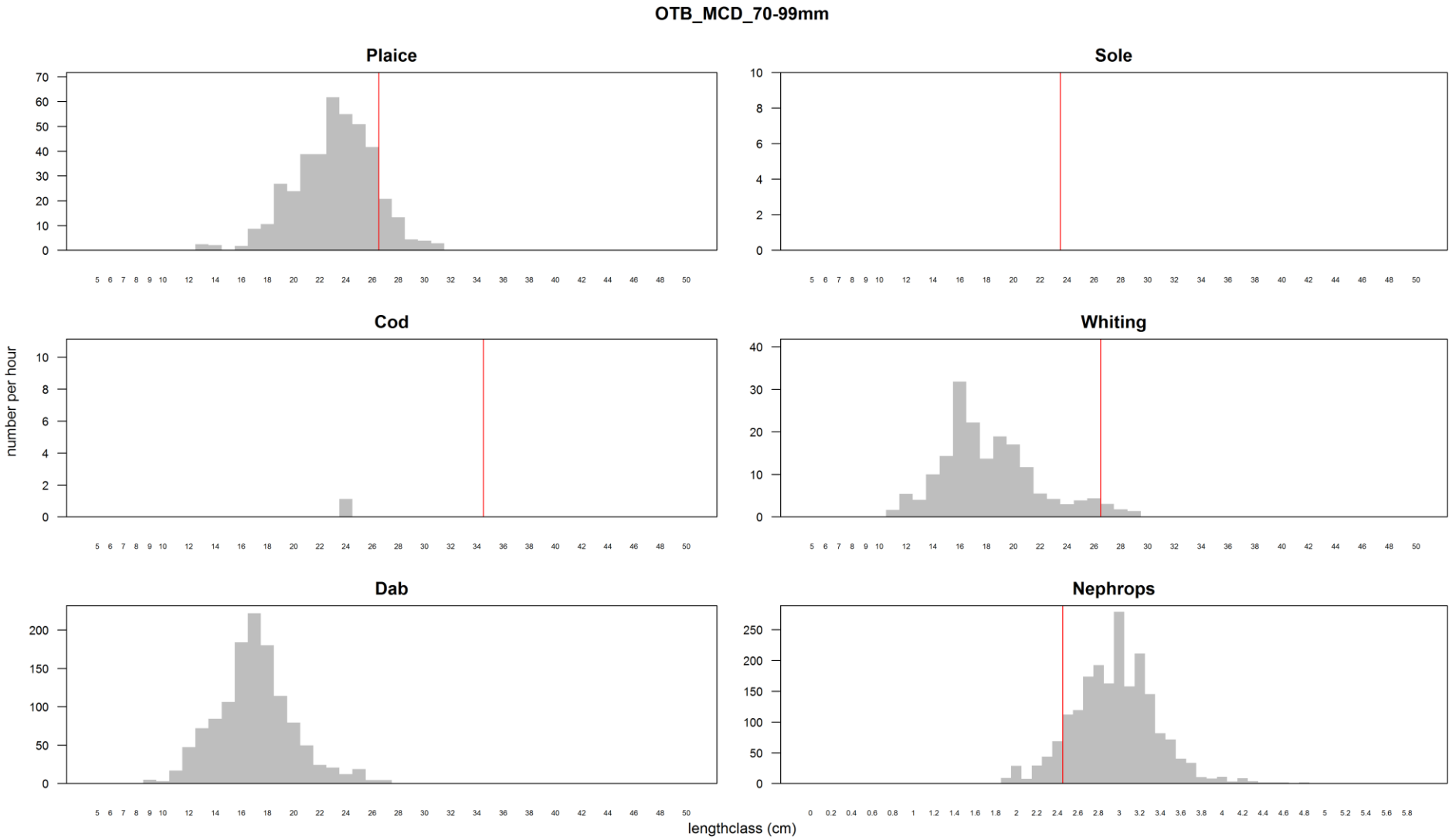
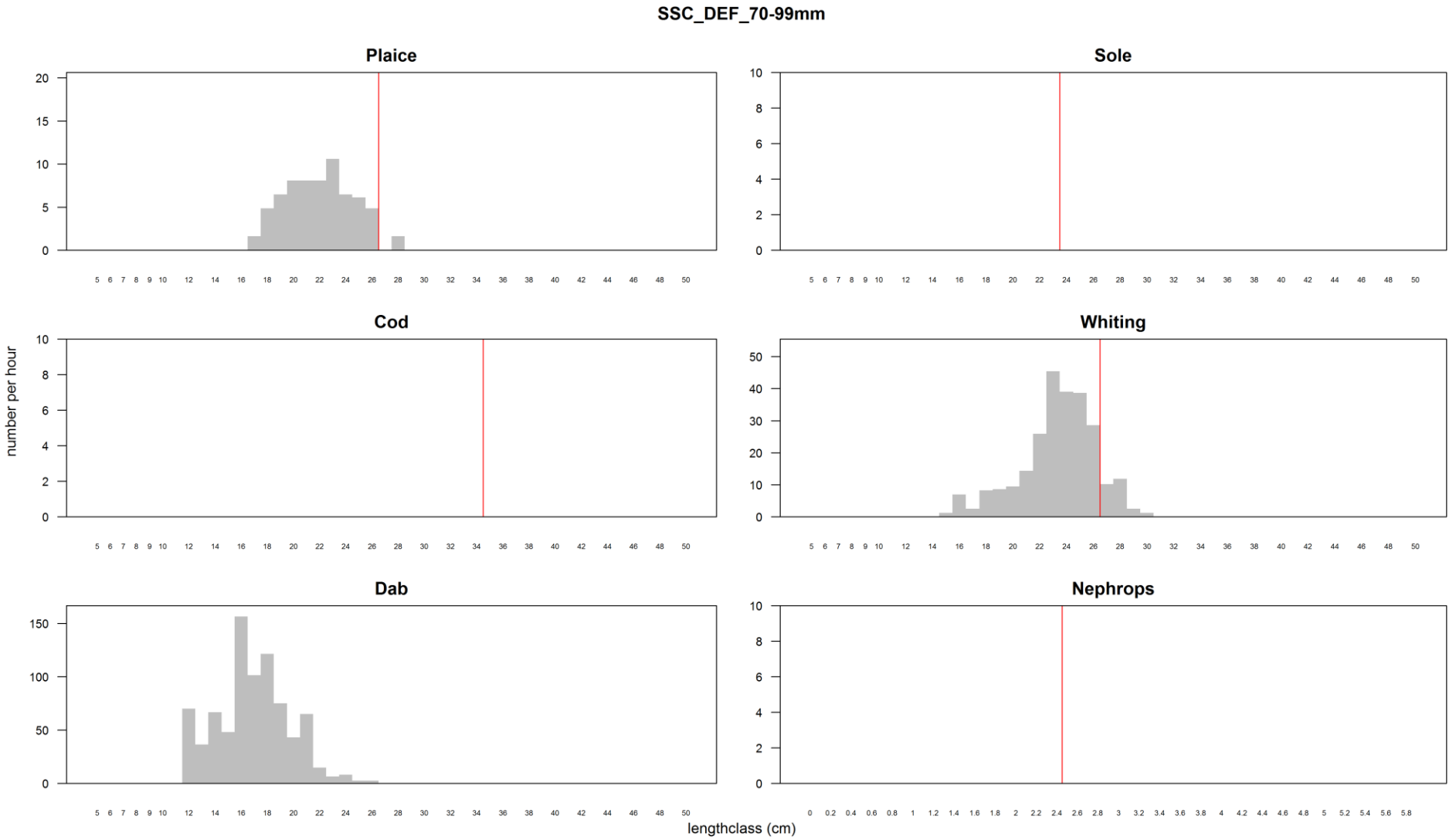


Figure 4c. Continued.



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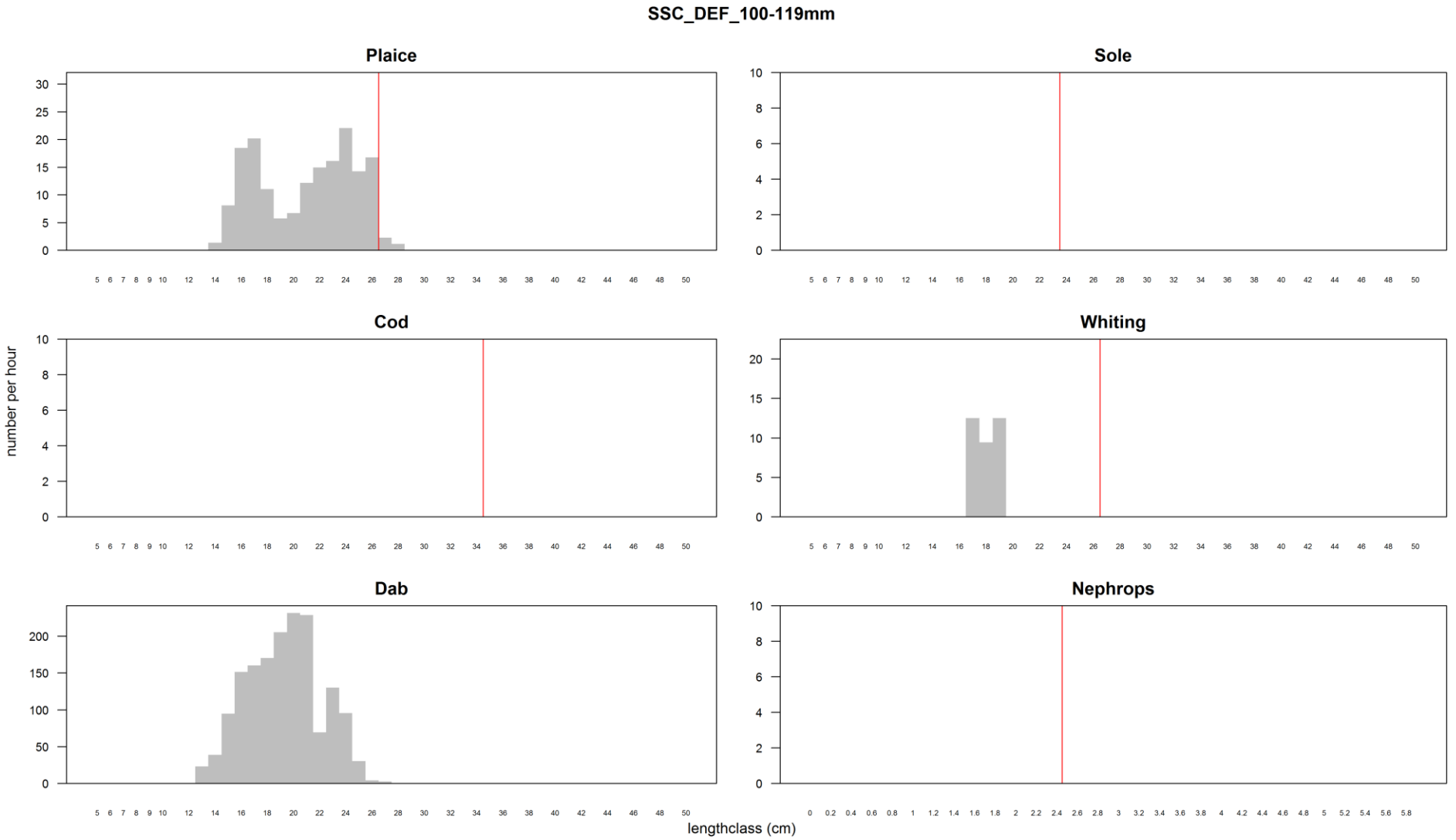

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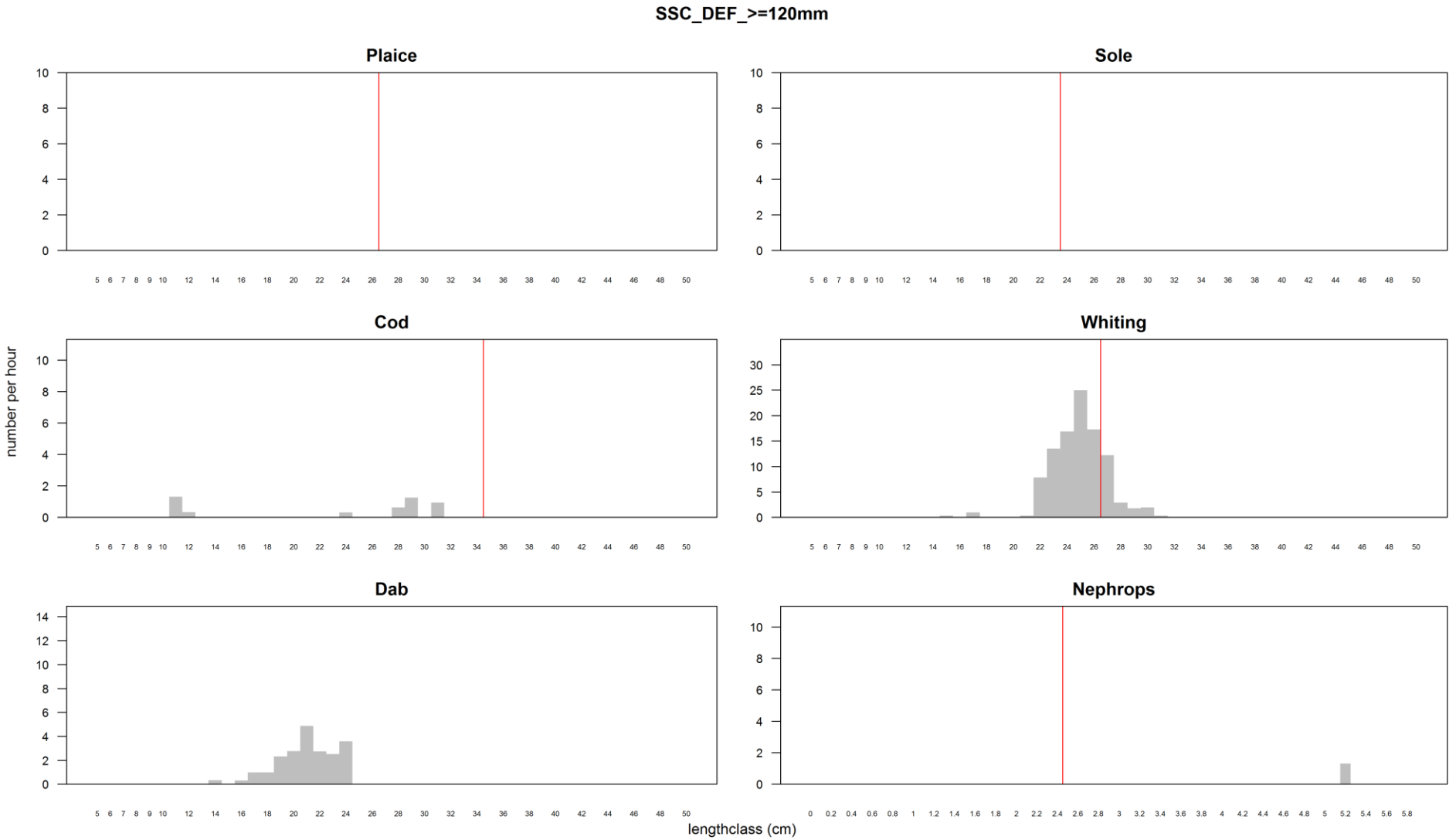

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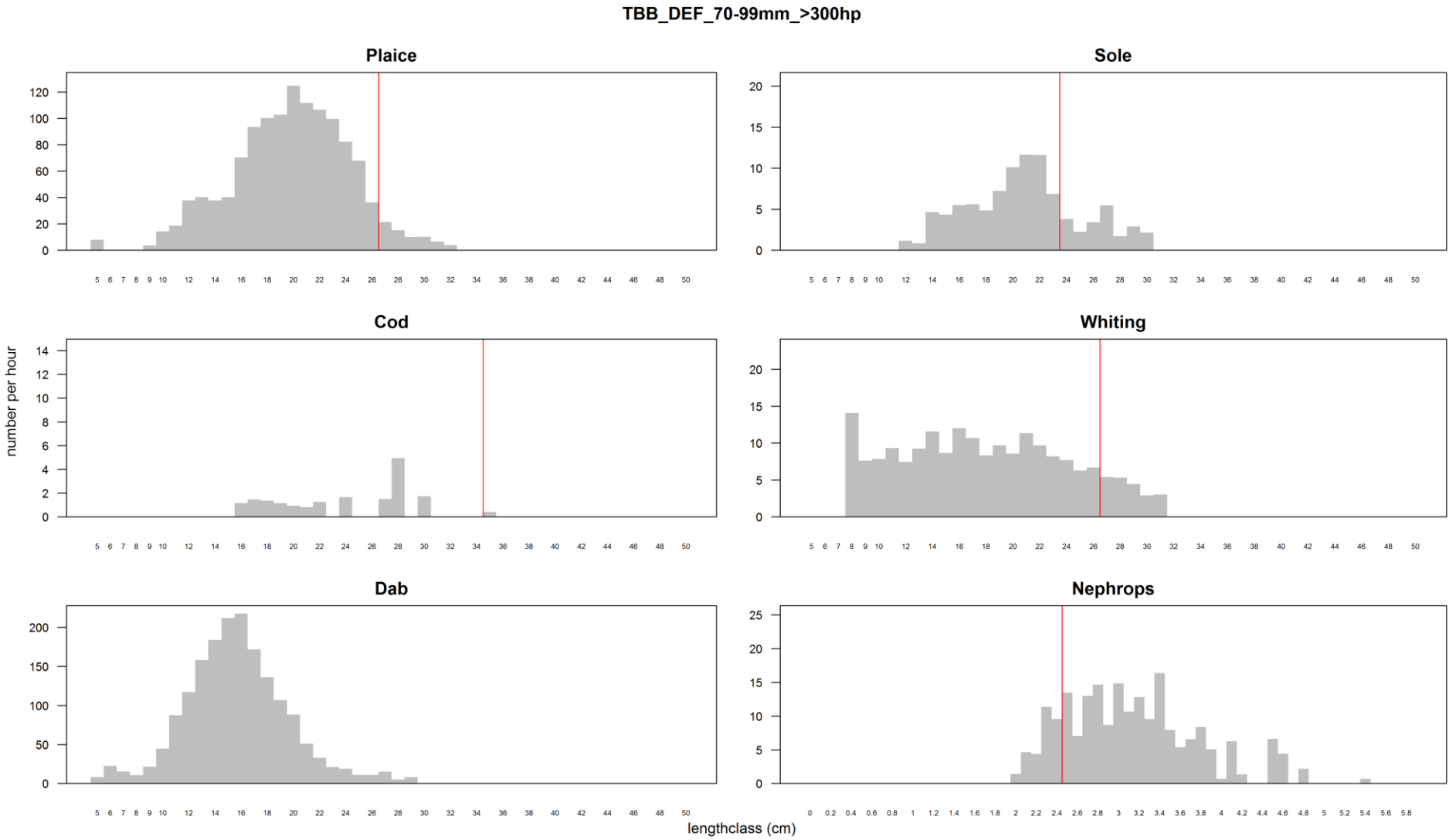

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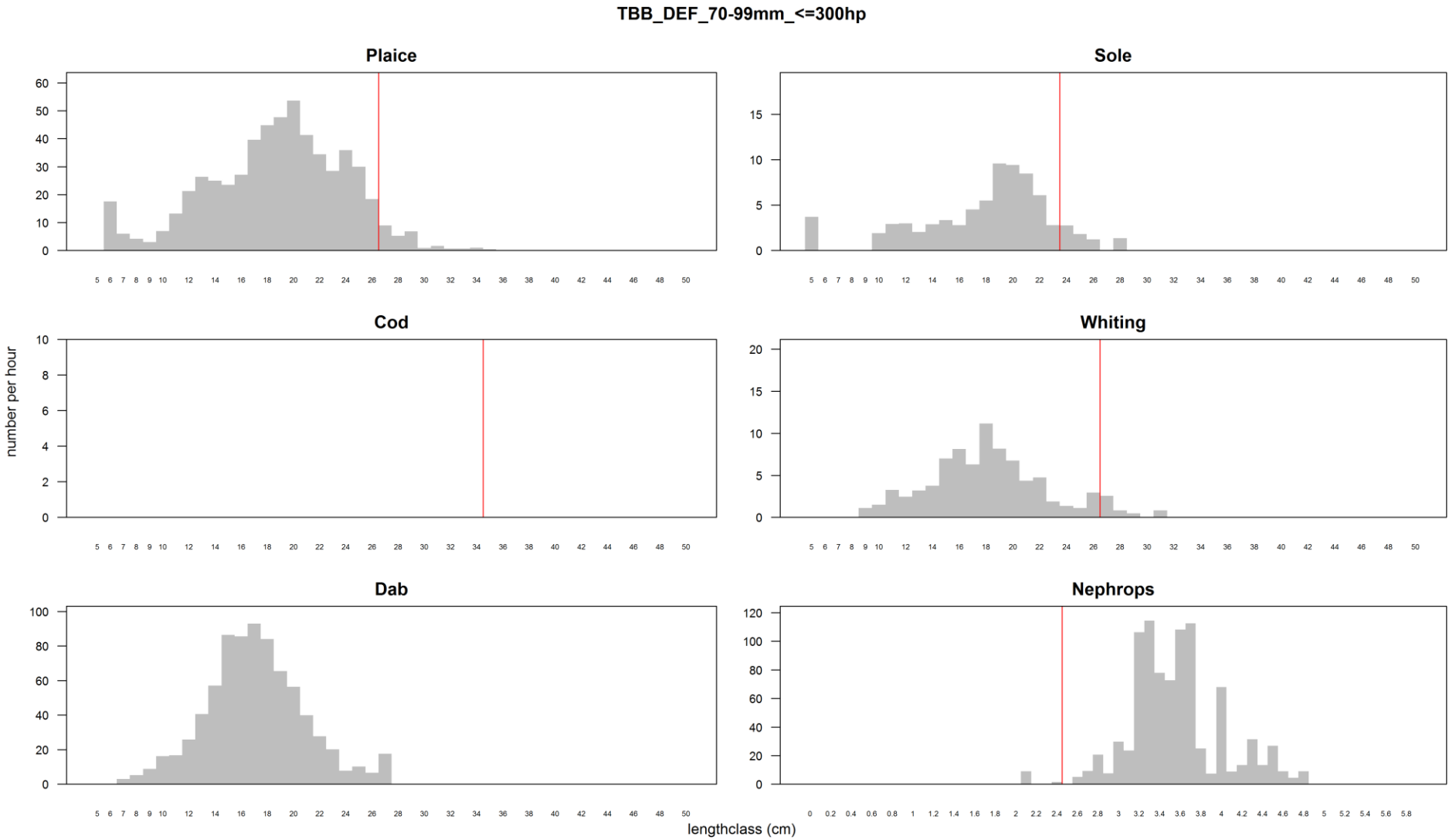

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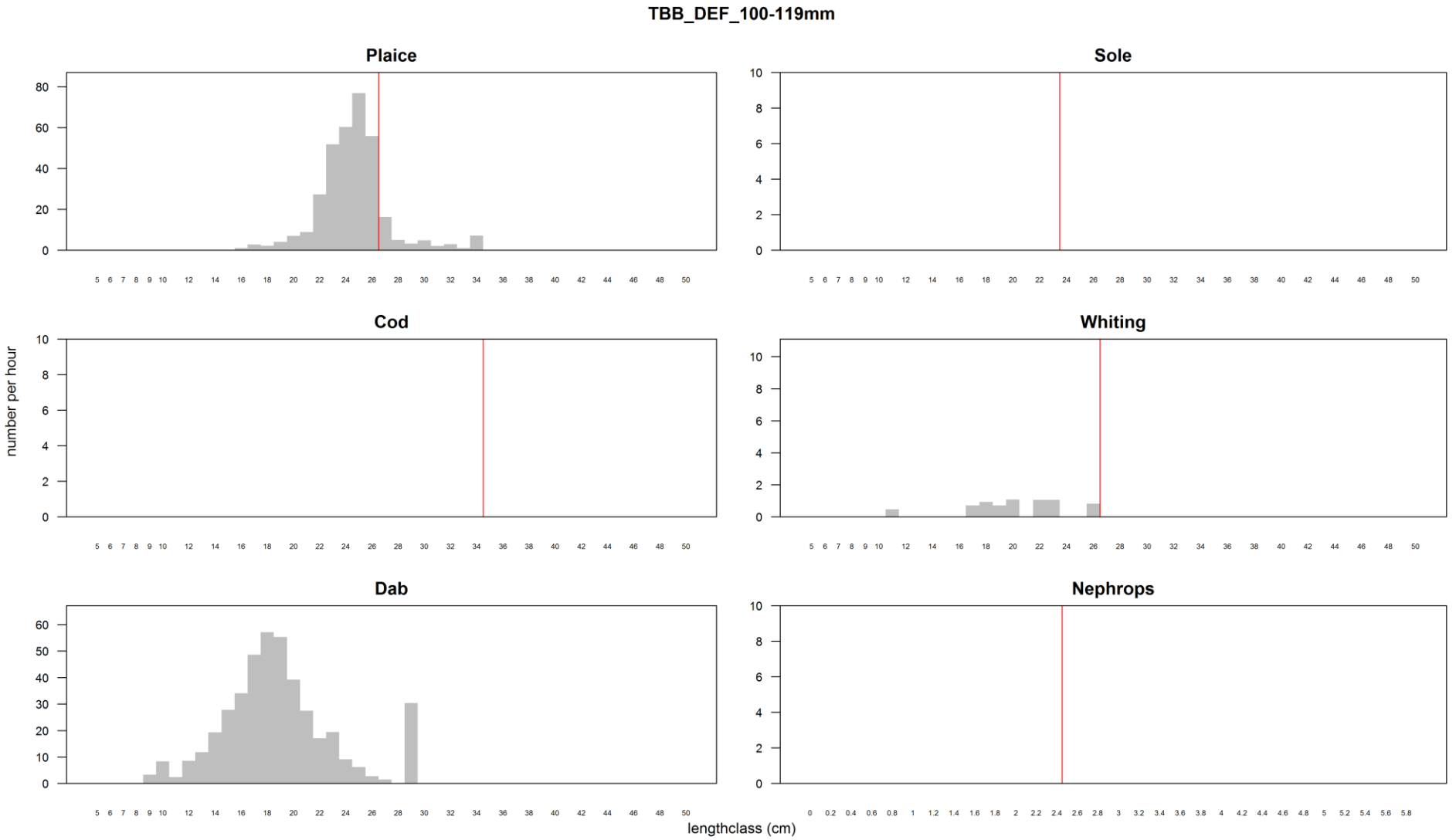

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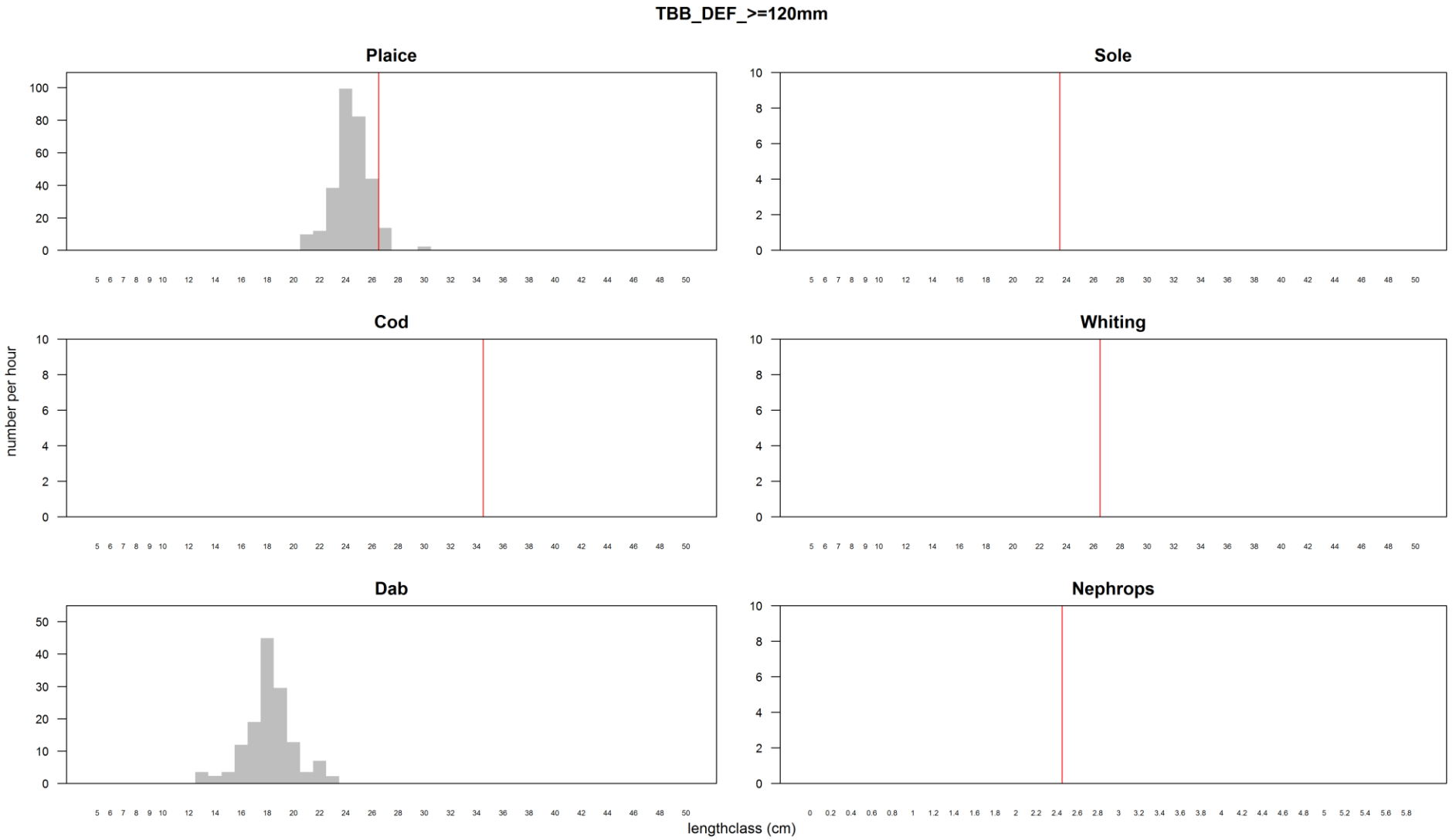

Figure 4c. Continued.

Quality assurance

CVO utilises an ISO 9001:2008 certified quality management system (certificate number: 187378CC1-2015-AQ-NLD-RvA). This certificate is valid until 15 September 2018. The certification was issued by DNV GL Business Assurance B.V.

Signature

CVO Report: 18.007
Project number: 4311213024

The scientific quality of this report has been peer reviewed by a colleague scientist and Head WOT, Centre for Fisheries Research.

Approved by: Drs. A.T.M. van Helmond
Fisheries Scientist

Signature:

Date: April 26th, 2018

Approved by: Ing. S.W. Verver
Head WOT, Centre for Fisheries Research

Signature:

Date: April 26th, 2018