

Guide for port sampling program of Japanese tuna purse seine fishery

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Outline of Japanese tuna purse seine fishery

Our catch collecting system and port sampling program (since 1995)

Application of the port sampling data for the correction of catch in accordance with the paragraph 15, CMM 2008-01

Vessel size 3 categories

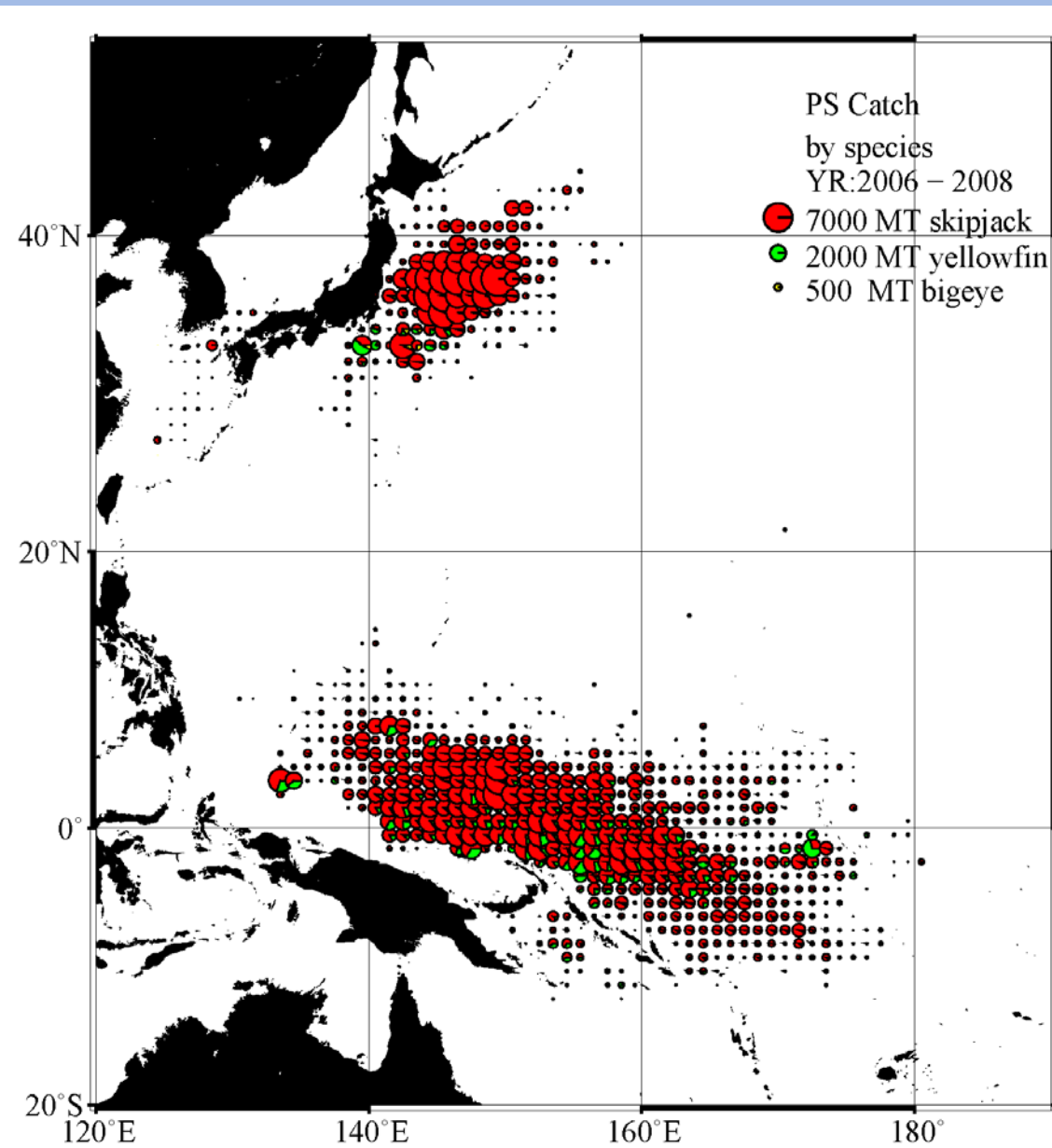
Small < 5 G.T. (gross tonnage)

Medium < 15 G.T.

Large { 80 – 150 G.T. (92 vessels)
 Japan Sea
 the Pacific Ocean around Japan
 { 349 -761 G.T. (35)
 the tropical Pacific Ocean
 seasonally around Japan
 the Indian Ocean

The proportion of the large class to total purse seine catch
was 99.5% in 2008

Geographical distribution of catch from 2006 to 2008

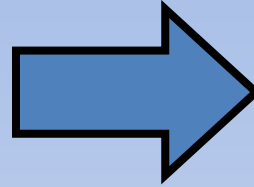


Almost 80 % of the total catch were obtained from tropical water and the remains were caught in the vicinity of Japan

Operation (20 - 60 days per a trip)



Post the log sheet after their return port



Landing at five ports



Log-sheet

Market slip

Compile the both data set

In regard to the species composition of a cruise is cross checked

Coverage

log book 100.0 % (3593 cruises)

market check 98.6 % (3543 / 3593 cruises)

Based on cruises of which the return date are from Apr. 1995 to Dec. 2009, operated in the tropical area of the Pacific Ocean.

Port sampling

We conducted port sampling in Yaizu, Makurazaki and Yamagawa markets, where almost of catch are unloaded.

Purposes

1. Research on the market categories

To confirm the accuracy of species identification and to estimate the catch by species

2. Research on informative fish from a fish well

To collect useful size data, which are associated with the fishing date, position, school type

Selecting trips

In general, the trips for the port sampling were selected randomly

In order to avoid seasonal bias, two or three landings were sampled in every month

Research in the market categories

Process of sorting and scaling by size

Sorting and weighing process begins as landing starts at a port. Fish from vessel is unloaded on conveyors for selection (Fig 1).

First, bigeye and yellowfin are sorted out from skipjack. The dominated catch – skipjack will be scaled by size thereafter at the same place.

Second, bigeye and yellowfin are sorted out by size. Each port has its own sizing category based on commercial practice.



Fig 1 Fish are offloaded with a net

port	species	market category		number of sampling times*	number of specimen	average number of fish in one sampling	%frequency	species composition (YFT/(YFT+ BET))	
							number of occurrence of mixture / number of sampling times	%num ber	%wei ght
Yaizu	SKJ	B / PS	1.8 down	311	33387	107	0.0%		
			1.8 up	310	32760	106	0.0%		
			2.5 up	313	32903	105	0.0%		
			4.5 up	297	30072	101	0.0%		
			7.0 up	133	11342	85	0.0%		
			KIZU	6	886	148	0.0%		
	YFT		1.5 down	300	32993	110	92.0%	81.6%	81.0 %
			1.5 up	299	32193	108	90.6%	76.0%	75.8 %
			2.5 up	304	30099	99	19.1%	99.3%	99.6 %
			10.0 up	275	22590	82			
			KIZU, OOKIZU, OSARE and TSUGISINA	0	-	-			
	BET		2.5 up	301	28061	93	9.6%	1.3%	0.3%
			10.0 up	2	52	26			

Makurazaki	SKJ	B / PS	0.5 down	59	6986	118			
			1.8 down	151	19168	127			
			1.8 up	152	18063	119			
			2.5 up	153	18062	118			
			4.5 up	151	15678	104			
			6.0 up	137	11650	85			
			8.0 up	41	2899	71			
			KIZU	105	23052	220			
	YFT		1.5 down	143	18373	128	77.6%	85.7%	85.1%
			1.5 up	146	15460	106	15.4%	98.7%	99.2%
			3.0 up	132	11915	90	9.8%	99.7%	99.7%
			5.0 up	73	5772	79			
			10.0 up	141	10011	71			
			KIZU, OOKIZU and HENKEI	1	121	121			
	BET		1.5 up	134	13927	104	39.6%	5.3%	3.7%
3.0 up		133	12411	93	16.5%	1.5%	0.7%		
10.0 up		51	2381	47					

B : brine freezing, PS : good quality fish which are frozen well

The market category of "1.5 up" is applied the fish weighting from 1.5 kg to the next category.

The market categories of "KIZU, OOKIZU, OSARE" and so on" are applied the fish of low quality due to crused or not frozen well.

* : From Feb. 1995 to Feb. 2010, the total number of sampling times for Yaizu and Makurazaki markets are 313 and 153 times , respectively.



Fig. 2 Each sorted and categorized fish are carried with a metal box to a flat space for sampling.

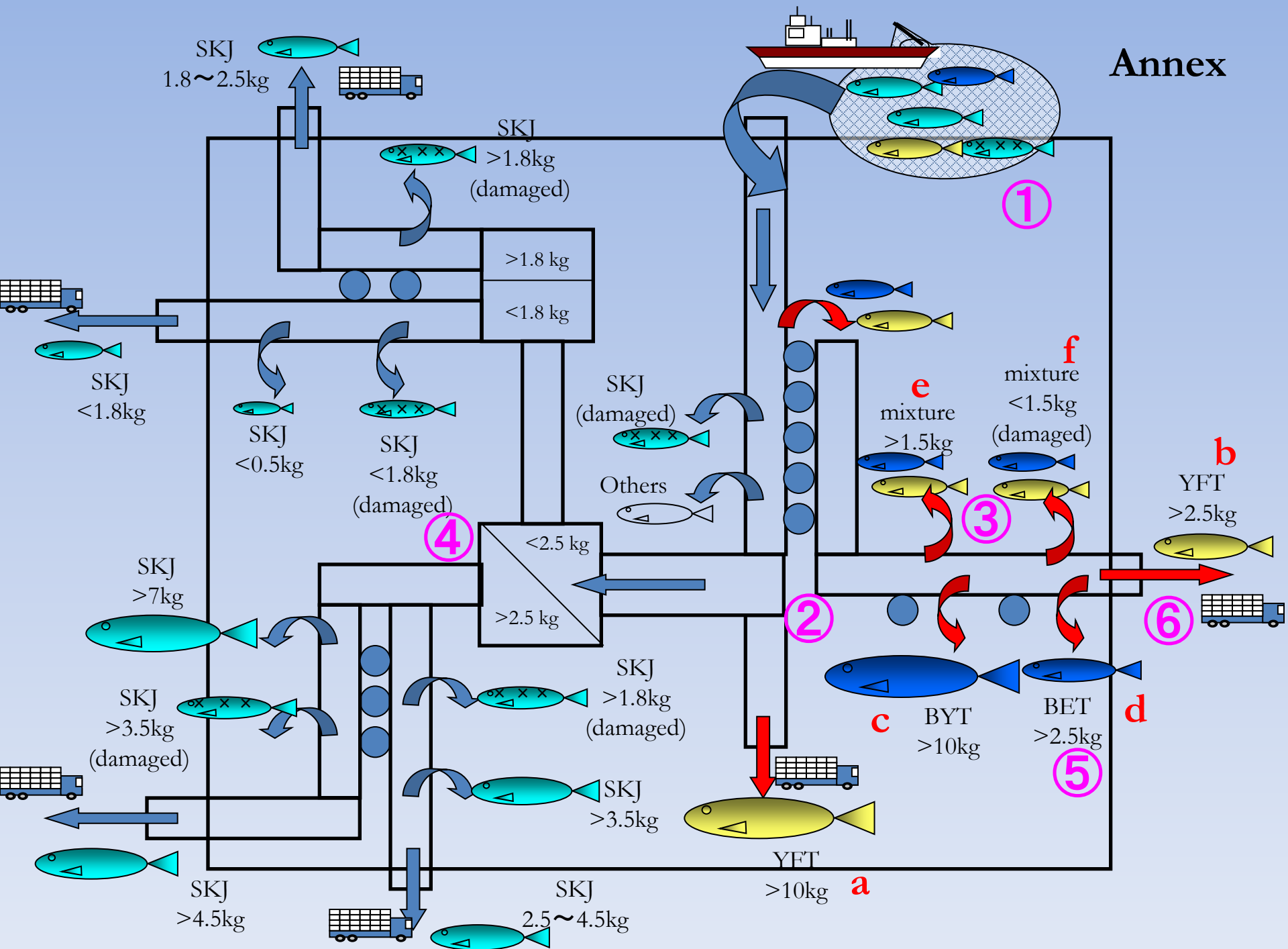


Fig. 3 In general, **one hundred fish** for each category are loaded on the ground for identifying species and weighting by species. Occasionally the number of specimen did not reach 100 (Table 1).



Fig. 4 Identify species and getting in a line by species for ease of measuring body length and then weighted by species.





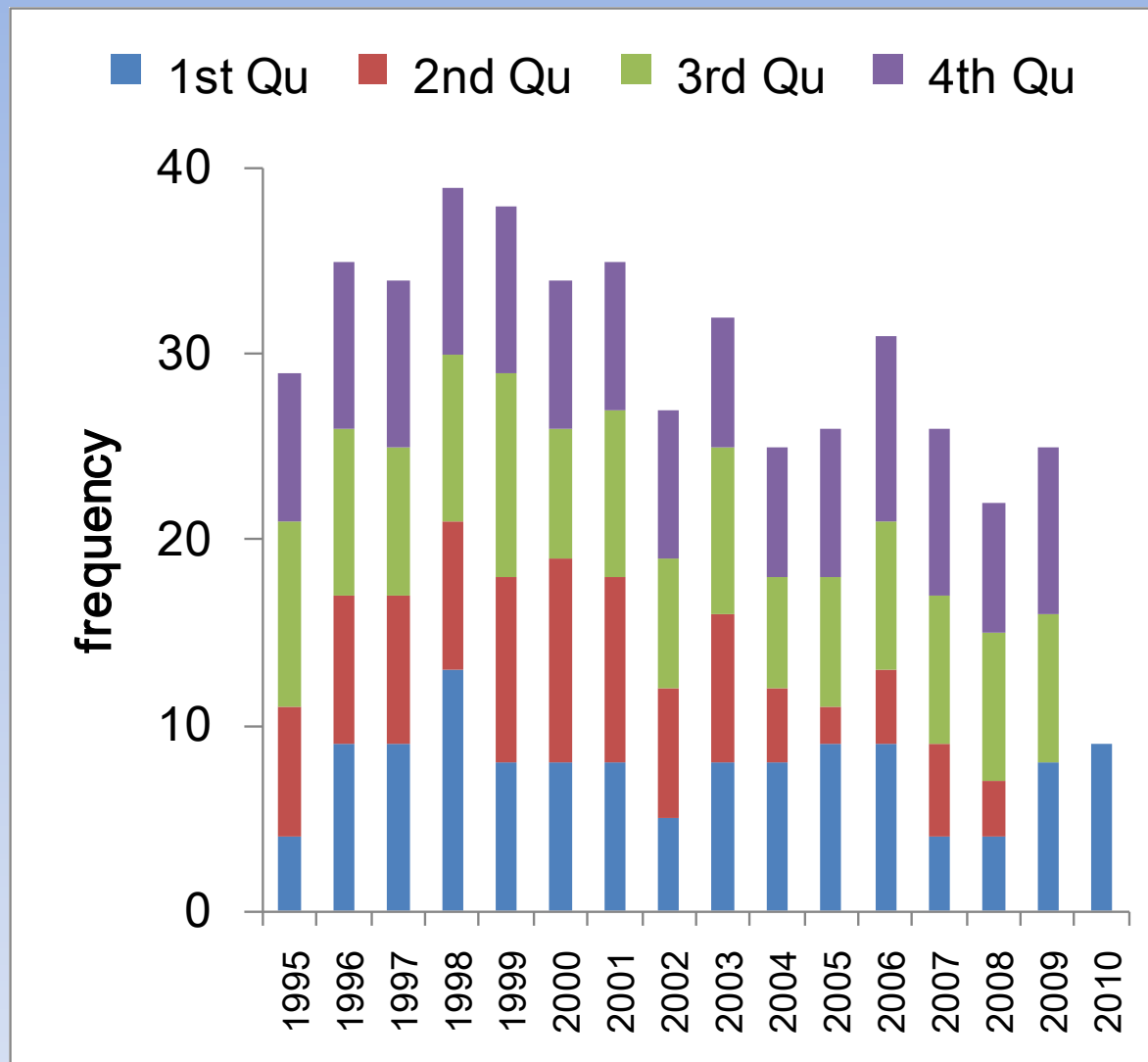


Fig. 5 Annual frequency of port sampling from 1995 to 2010. Two or three times samplings per year have been conducted.

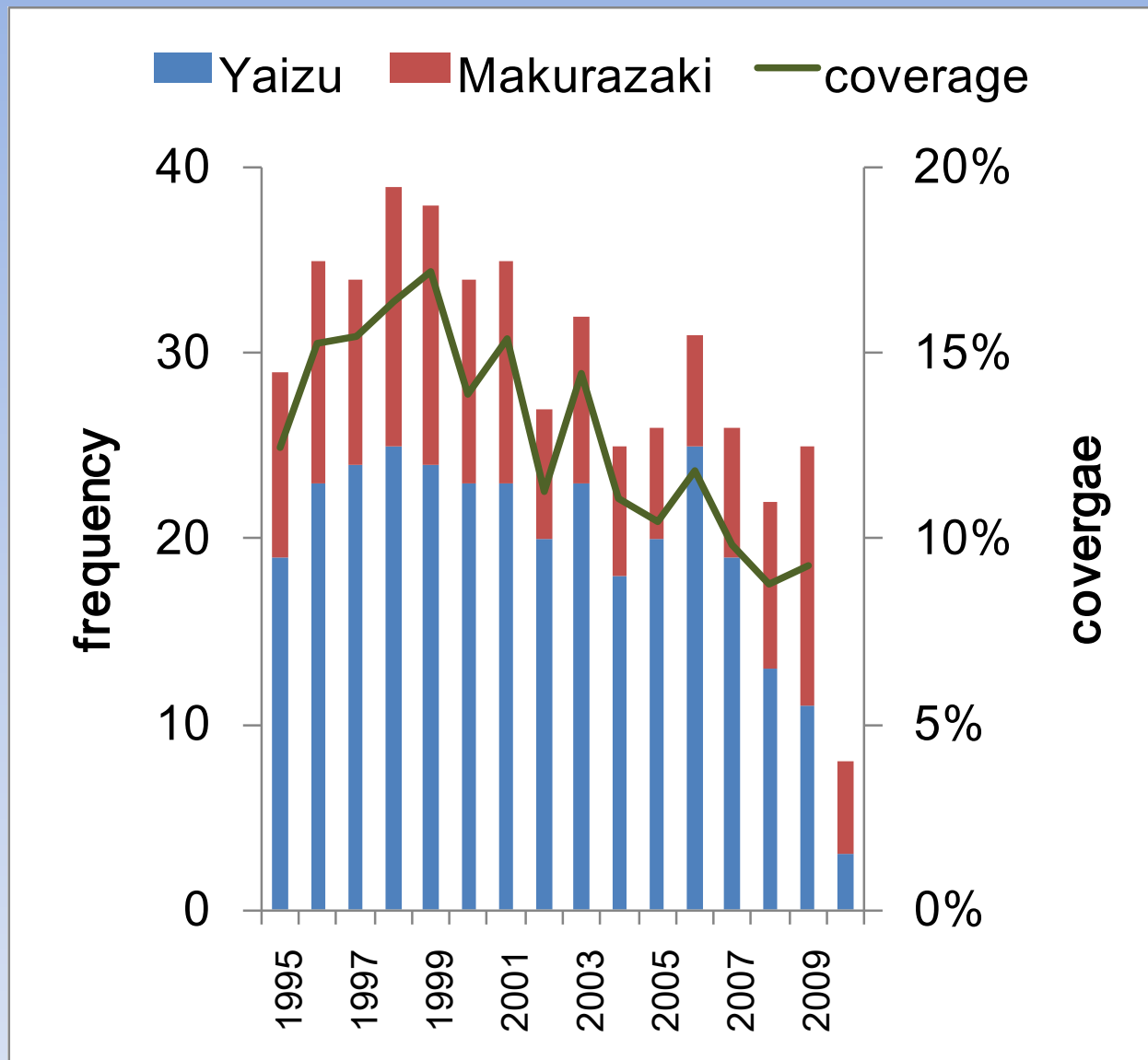


Fig. 6 Annual frequency of port sampling by each market and the sampling coverage (sampling times / total number of cruise) from 1995 to 2010.

Length frequency - market category - SKJ

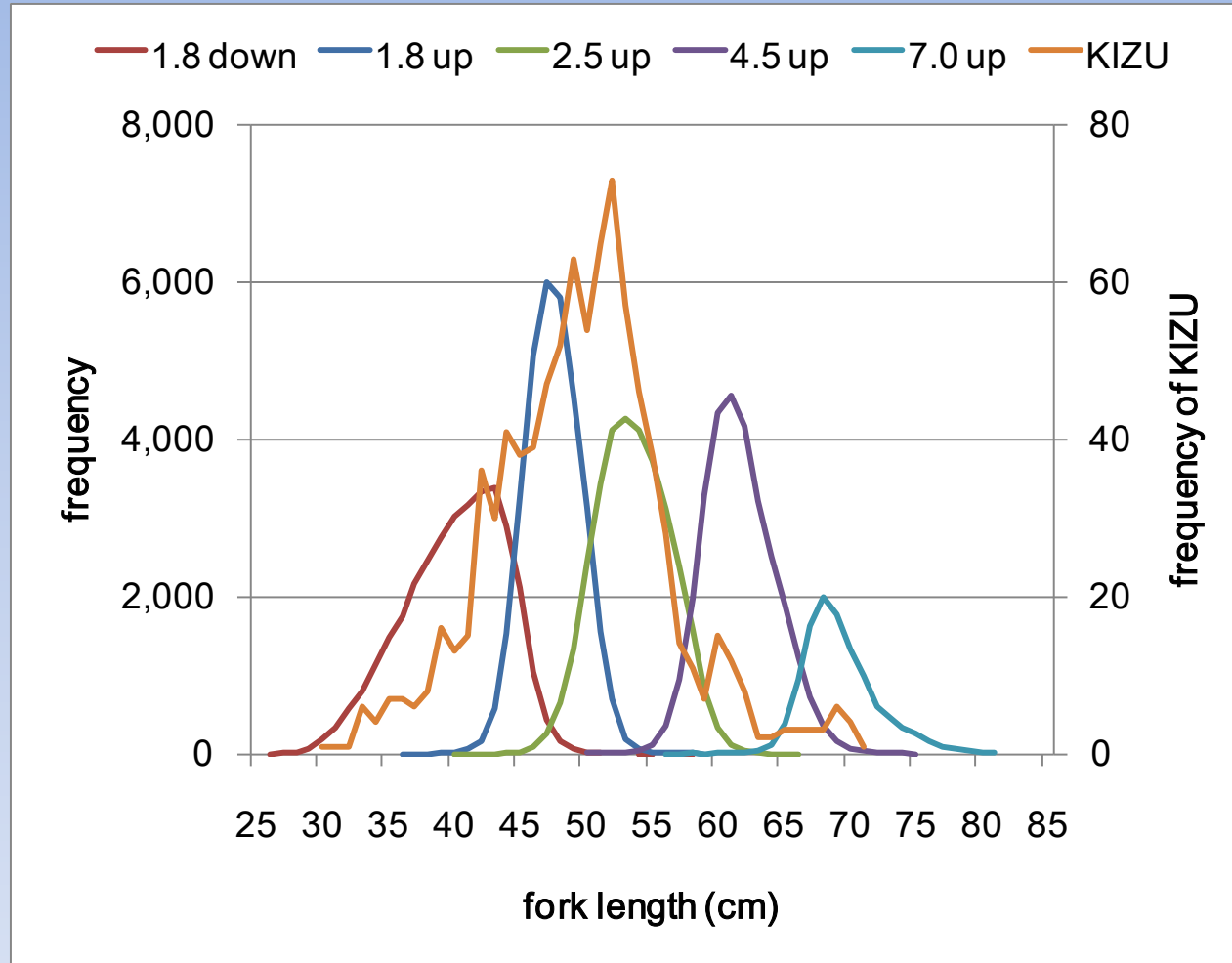


Fig. 7 Length frequency of skipjack of each market category of Yaizu based on result of port sampling from 1995 to 2010.

Length frequency - market category - YFT

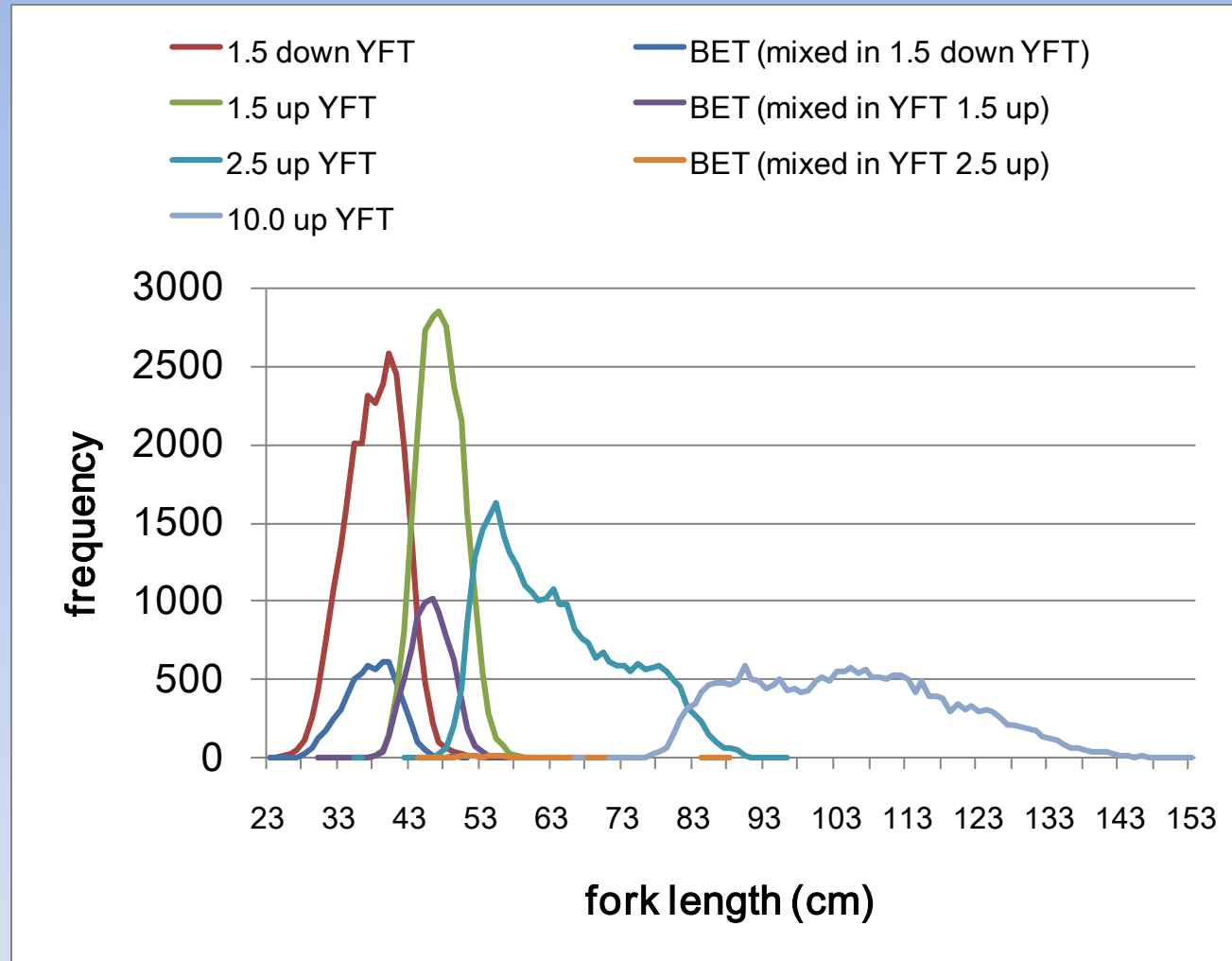


Fig. 8 Length frequency of yellowfin of each market category of Yaizu from 1995 to 2010. The two market categories of the smallest size contained bigeye.

Length frequency - market category - BET

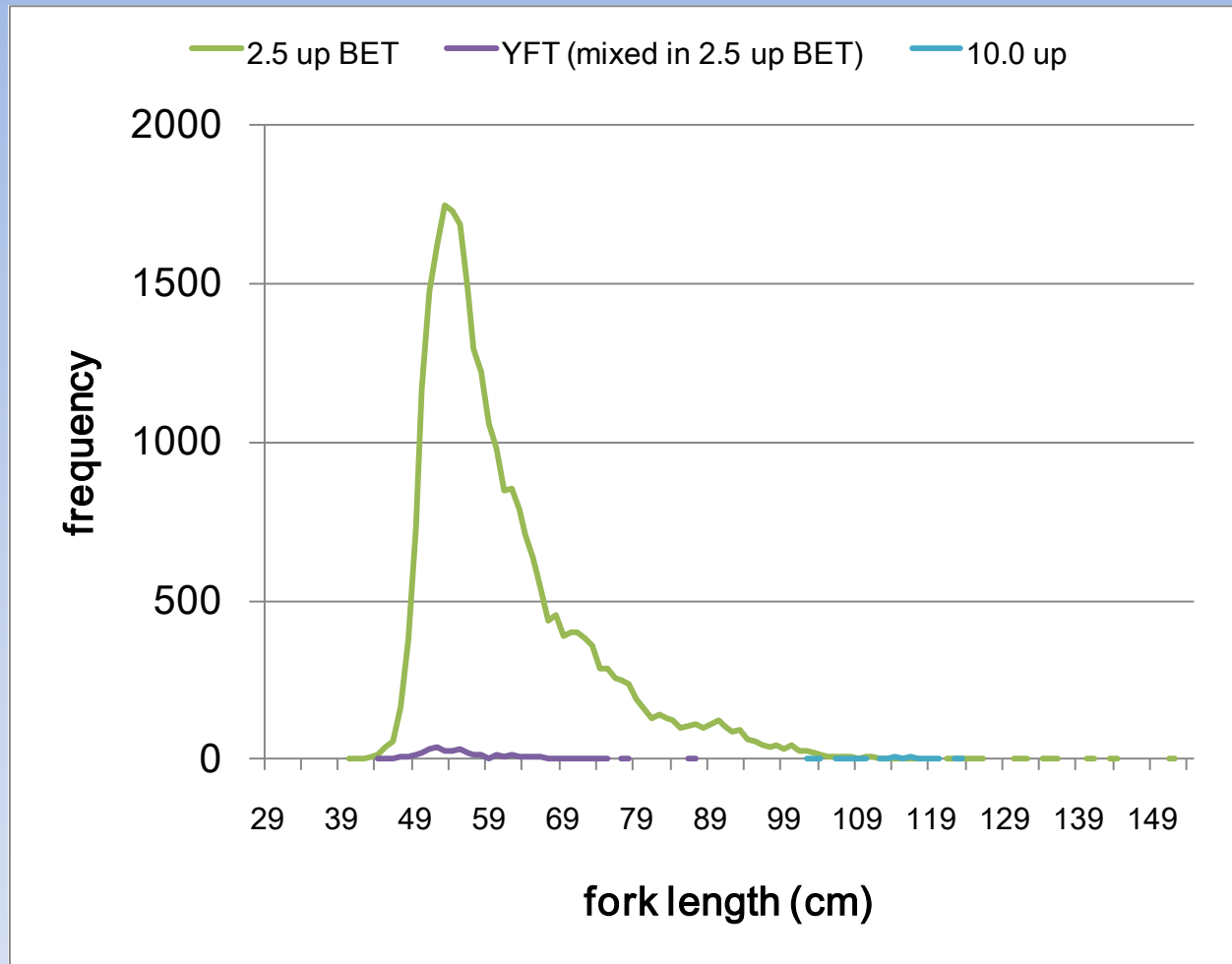


Fig. 9 Length frequency of bigeye of each market category of Yaizu from 1995 to 2010.

Species composition - market category

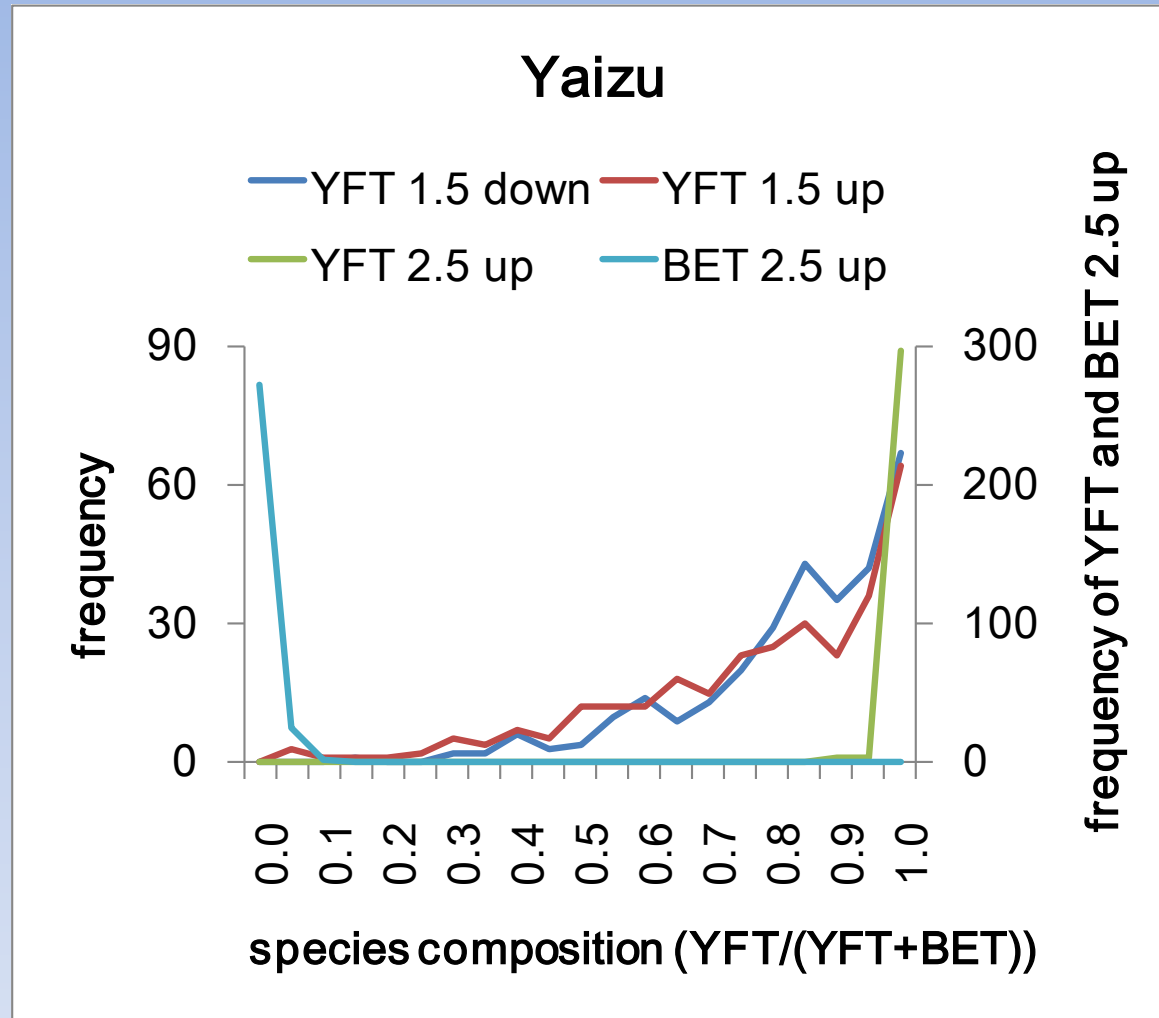


Fig. 10 Distribution of species composition (weight, $YFT/(YFT+BET)$) of yellowfin of each market category of Yaizu.

Species composition seasonal - 1

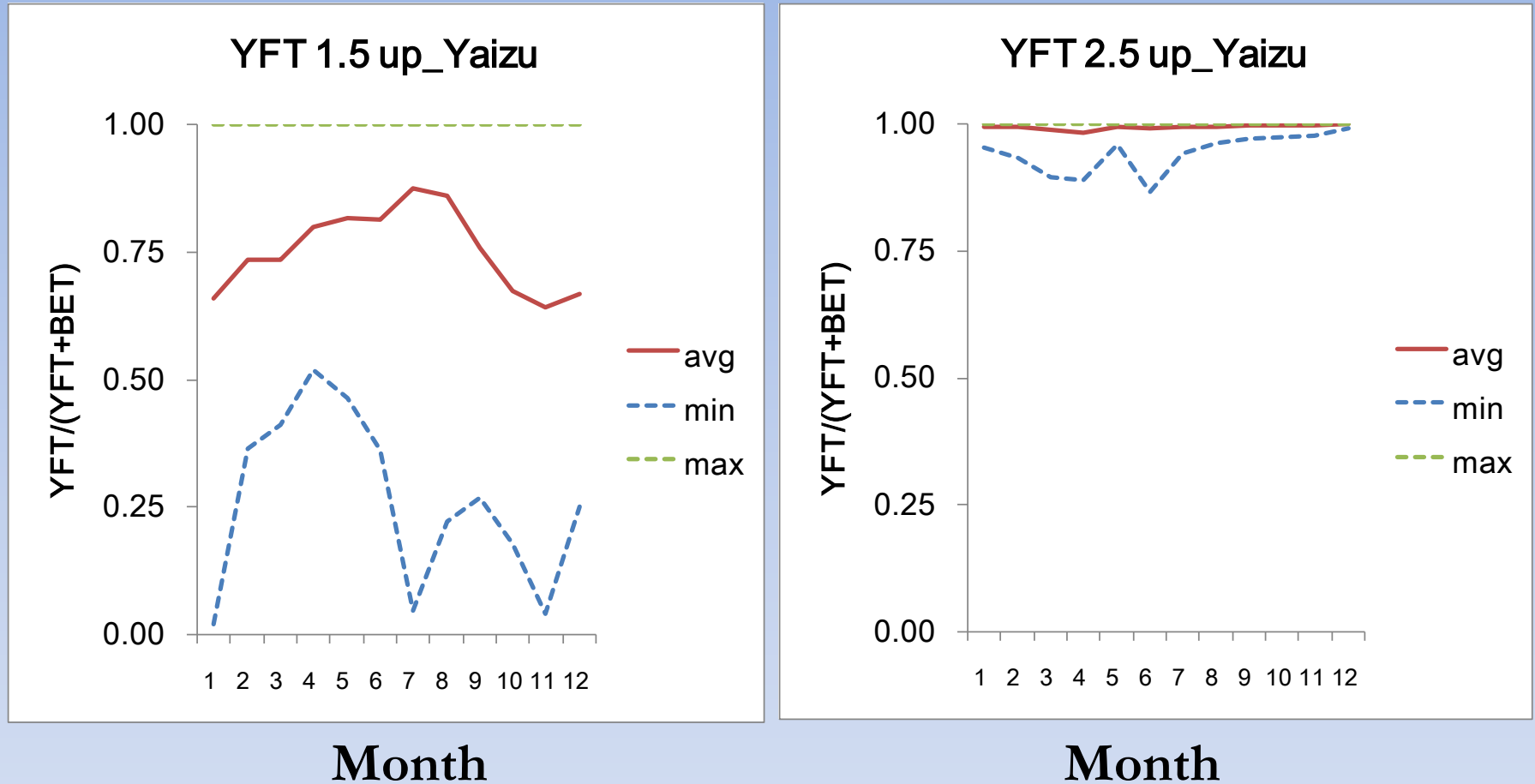


Fig. 11 Seasonal changes of species composition (weight, $YFT/(YFT+BET)$) of the two market categories, YFT 1.5 up and YFT 2.5 up of Yaizu. The former is the unsorted category and the latter is the sorted one.

Species composition seasonal - 2

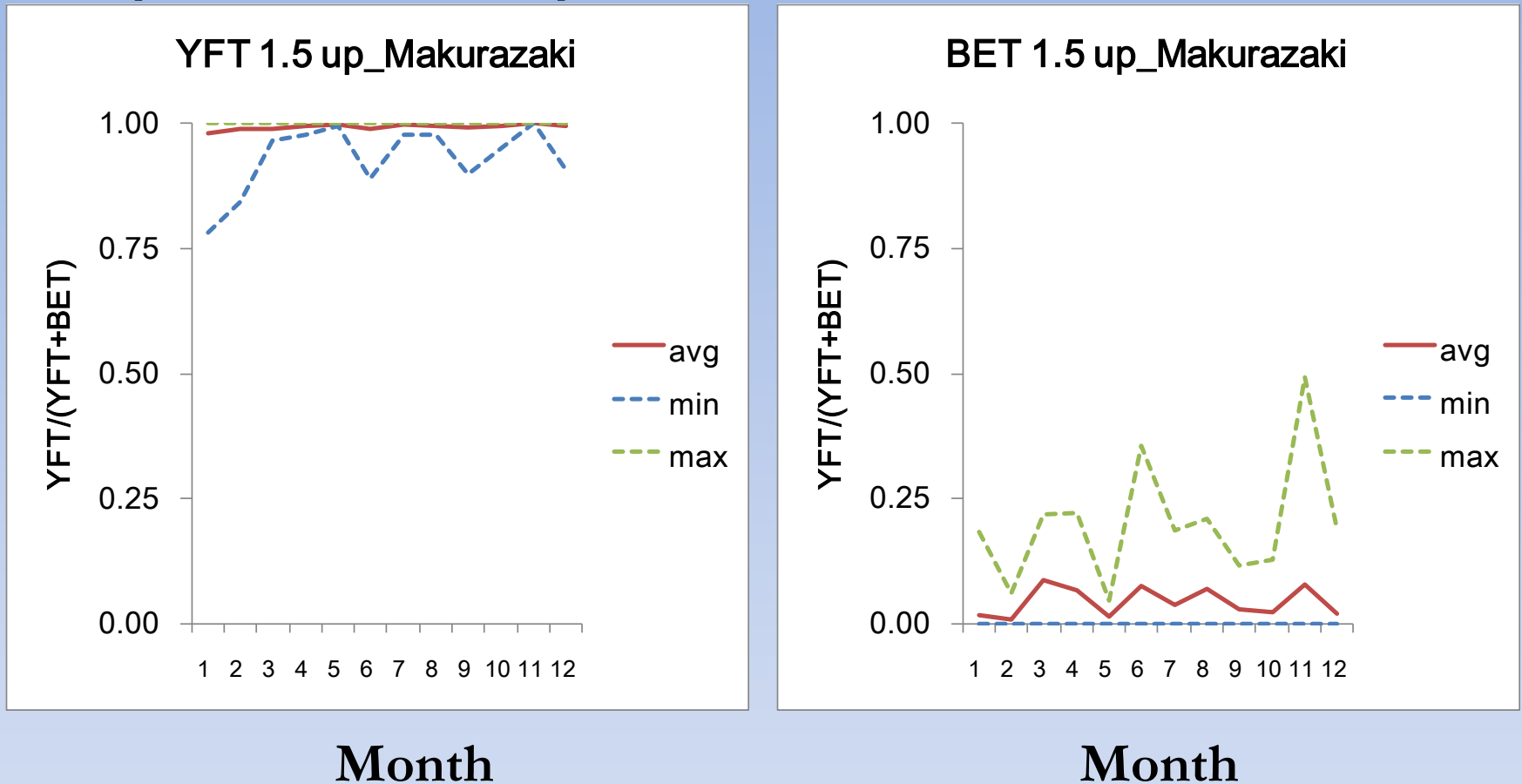


Fig. 12 Seasonal changes of species composition (weight, $YFT/(YFT+BET)$) of the two market categories, YFT 1.5 up and YFT 2.5 up of Makurazaki. The both are the sorted category.

Annual

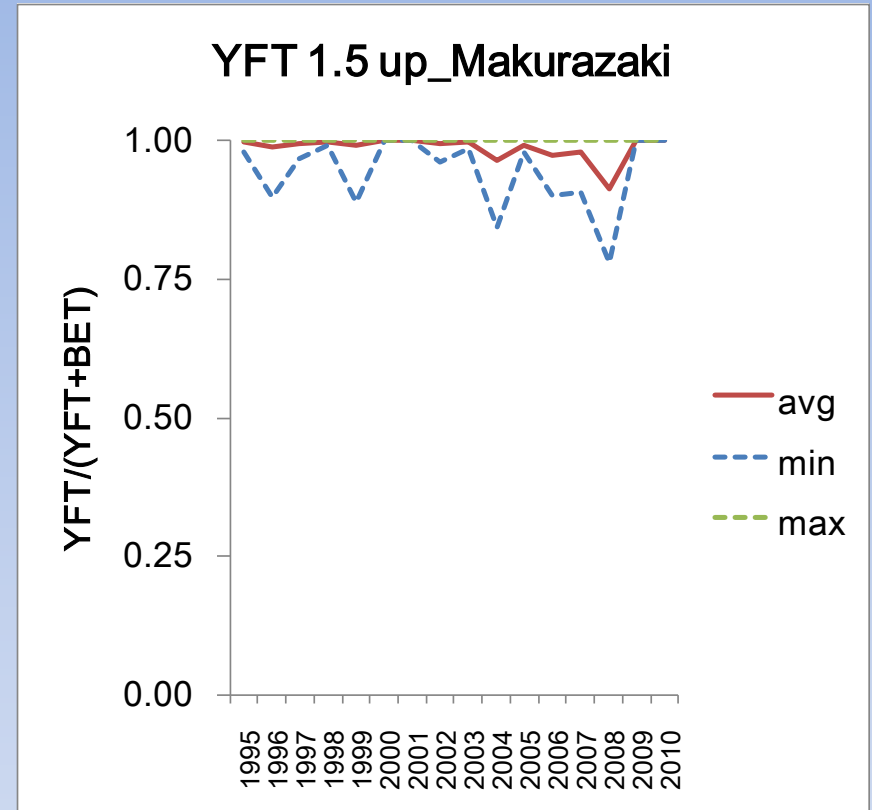
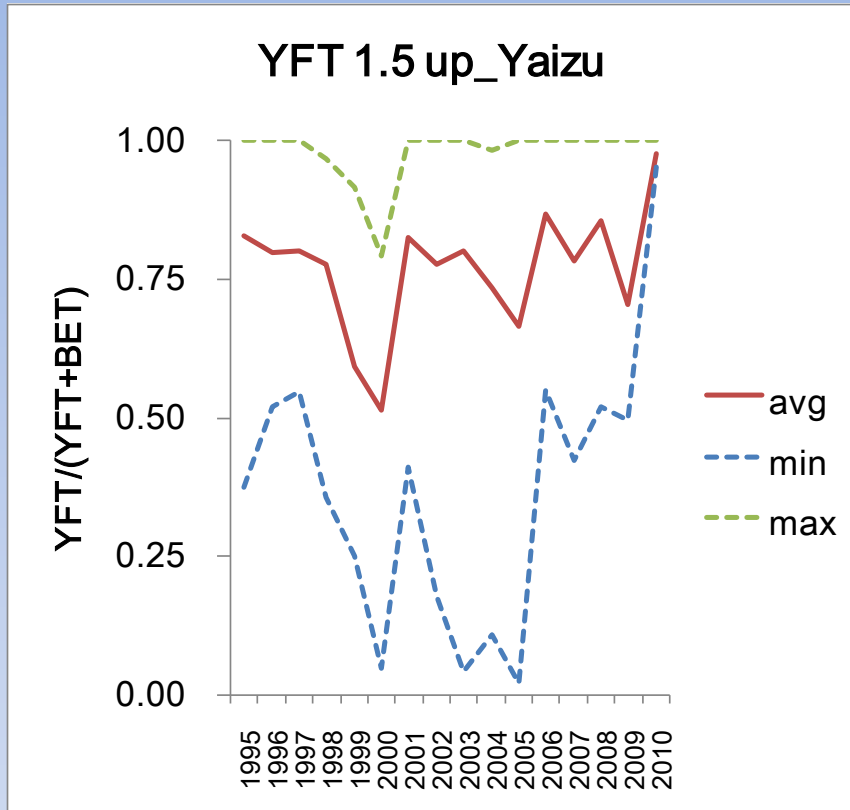


Fig. 13 Annual changes of species composition (weight, $YFT/(YFT+BET)$) of the two market categories, YFT 1.5 up of Yaizu and Makurazaki. The former is the unsorted category and the latter is the sorted one.

Summary for the investigation into the market category

The mixture of species have been occurred in several small size category of YFT and BET in both markets (Yaizu and Makurazaki)

The BET is contained in the category of YFT, and vice versa

However, the high mixture rate is mainly observed in the unsorted categories (YFT 1.5 down, YFT 1.5 up in Yaizu, and YFT 1.5 down in Makurazaki)

There are some seasonal and annual changes in the mixture rate

Research in a fish well

1. Receive the hatch plan

The vessel notify us of name of the port it intends to enter and date of its entry, and also send the hatch plan (Fig. #), which included the hatch name, fishing date, position and school type.

**Fishing date,
position**

ID of the fish well

No.	左	側
操業月日:	12月	24日 29.7°C
位置	S09° -07'	E155° -42'
群れの性情	跳ね群れ	School type
魚種:	カツオ	species
7	7.0k上	Amount of fish by market category
	4.5k上	
	2.5k上	29.0t
	1.8k上	3.0t
	1.8k下	
1回の操業の合計トン数		165.0 トン

Fig. 14 Example of the hatch plan. In the red rectangle, the free-swimming fish were caught in 24 Dec. 2009 at S09 °07', E155°42'. The fish are stored in the No.7 fish well of port side, and the amount of the fish is 32.0 t, which are composed of skipjack of 2.5 up and 1.8 up. The total amount of catch of the set was 165 t.

Fish are offloaded from the selected fish well by the net of three times and then loaded on the ground for identifying species and weighting by species.

We selected three fish wells per a sampling at maximum.



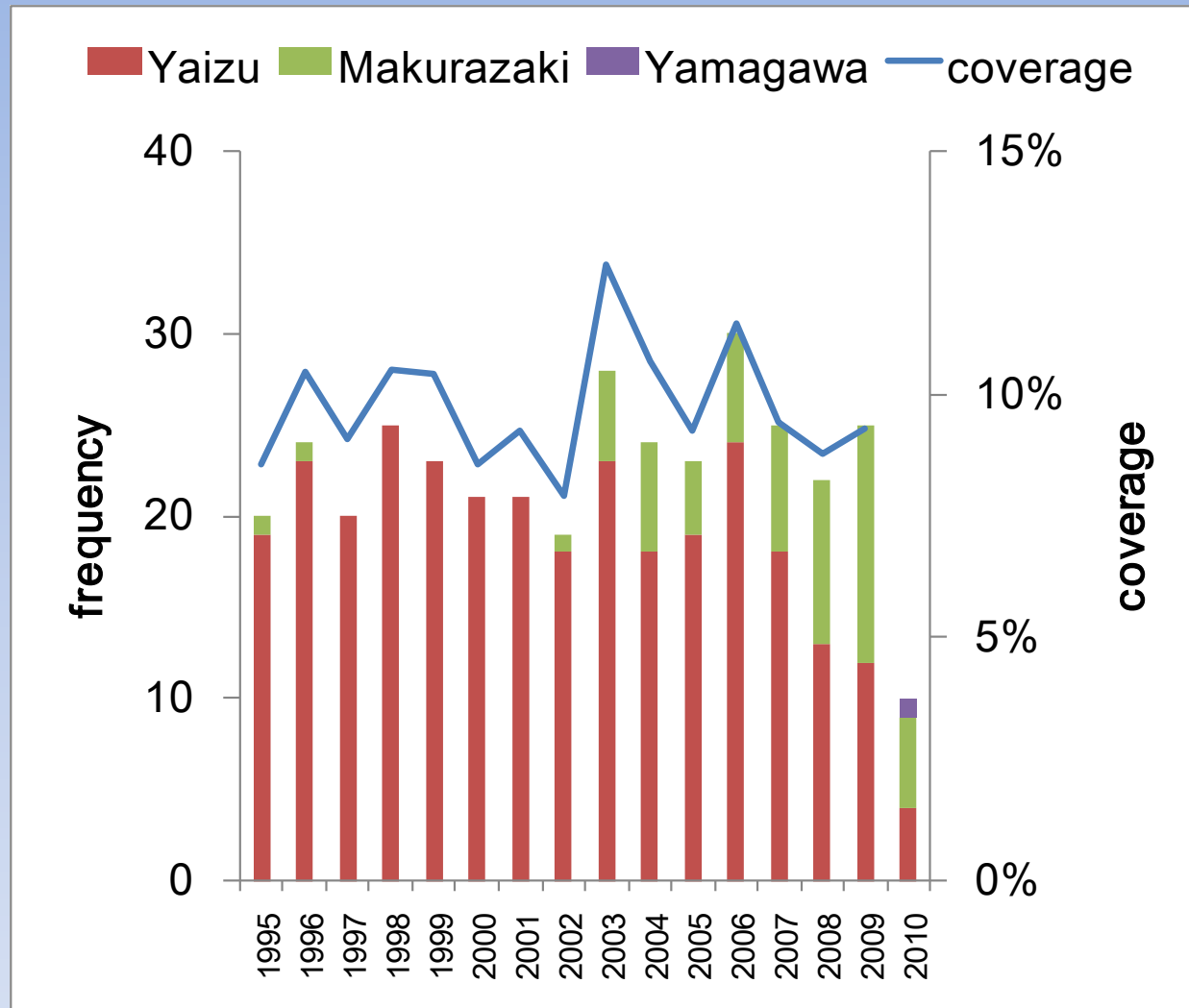


Fig. 15 Annual frequency and coverage (sampling times / total number of cruise) of port sampling for the fish well from 1995 to 2010.

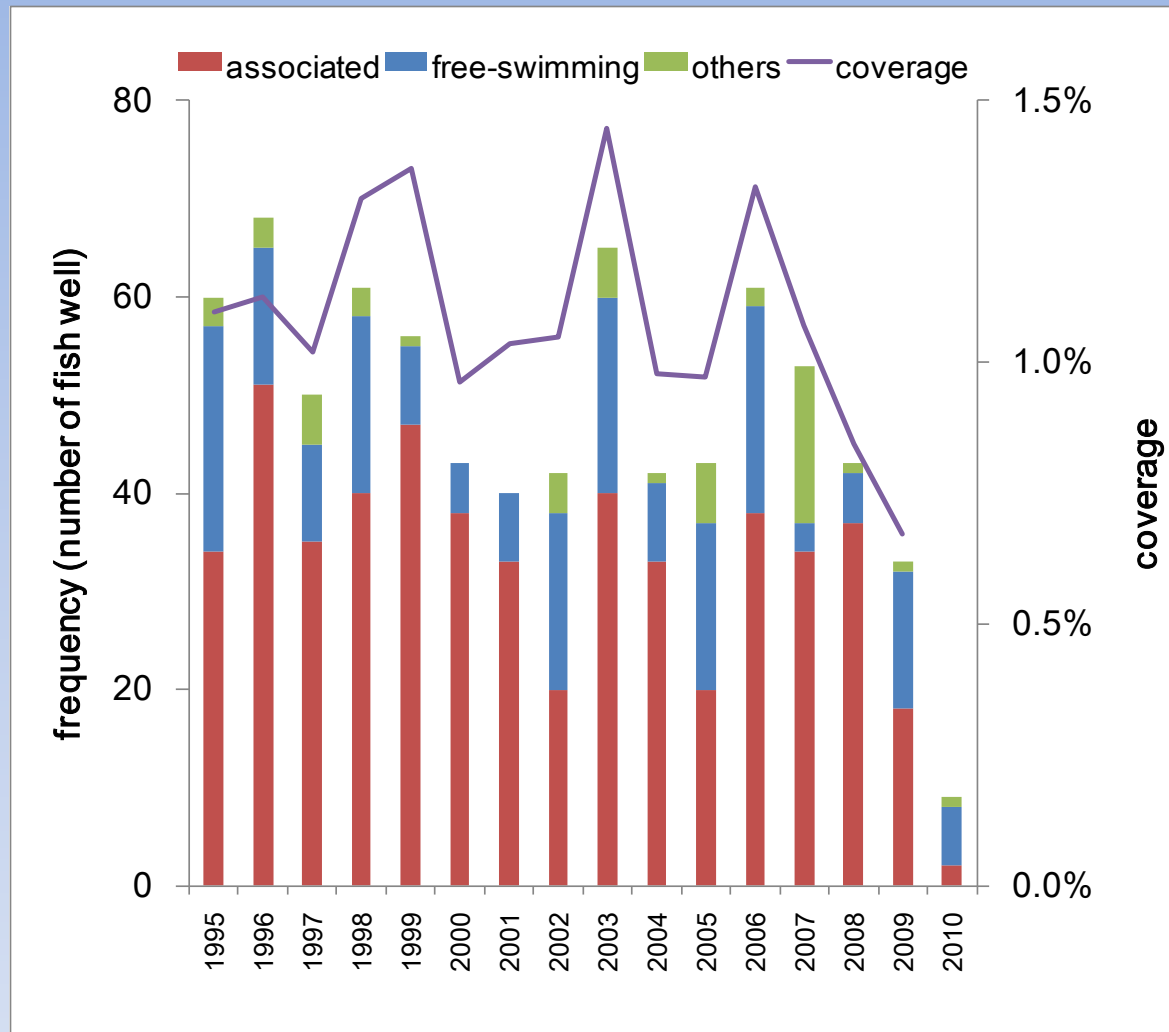


Fig. 16 Annual frequency and coverage (number of sampled fish well / total number of set) of port sampling for the fish well from 1995 to 2010.

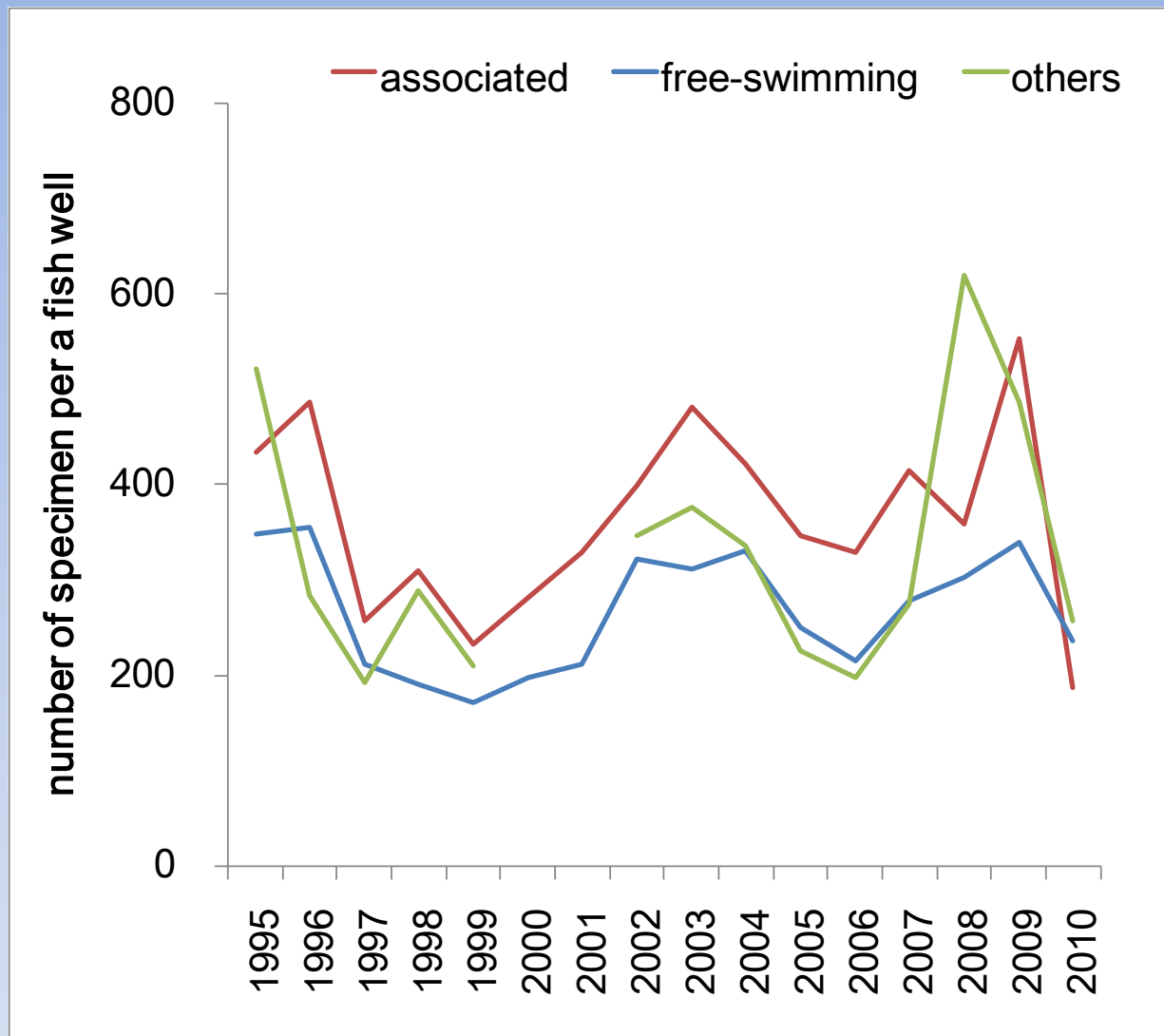


Fig. 17 Annual changes of number of specimen per a fish well.

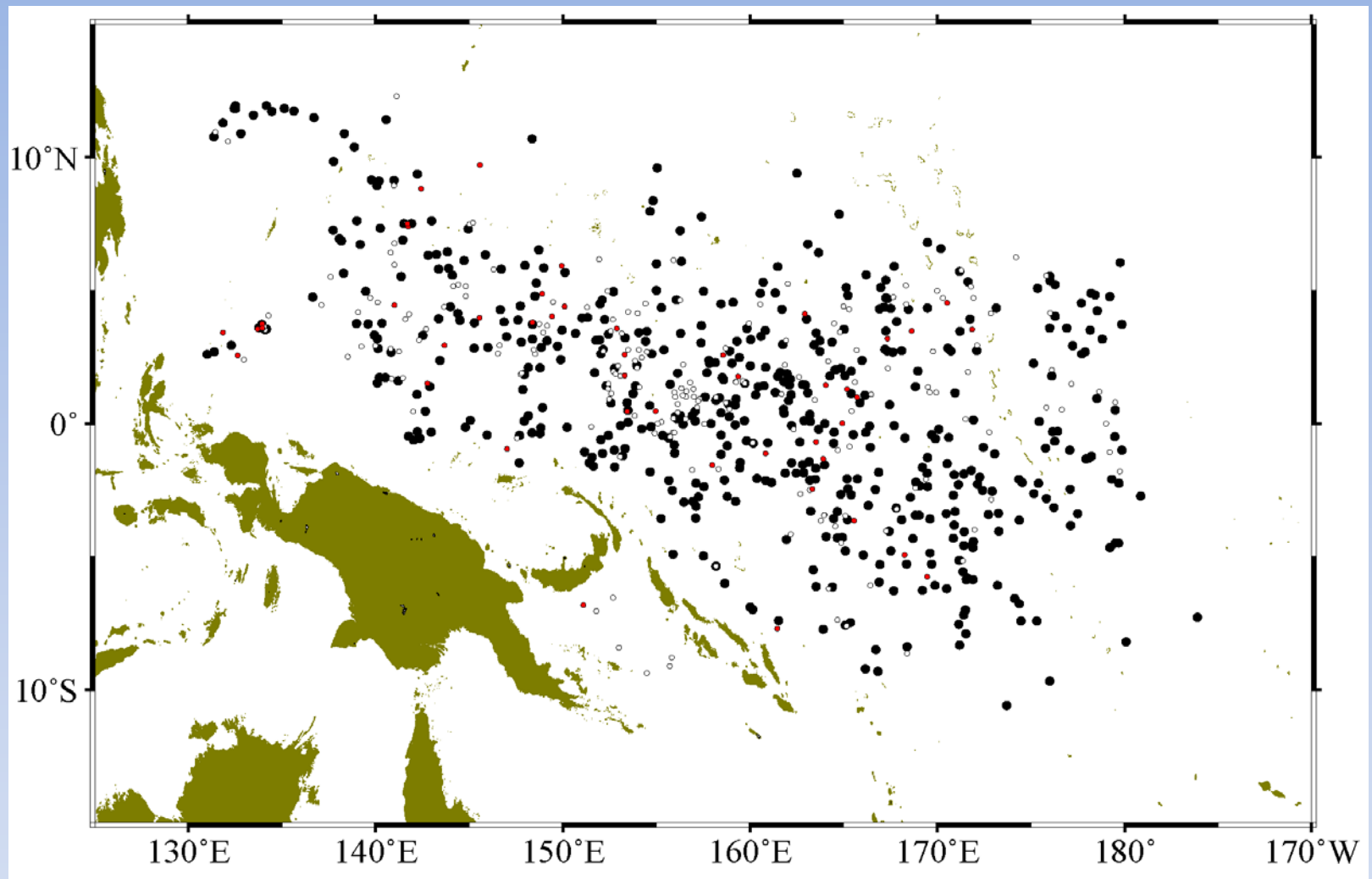


Fig. 18 Geographical distribution of fishing positions of the port sampling for the fish well from 1995 to 2010.

● : associated school, ○ : free-swimming school, red circle : others (associated with animal, unknown)

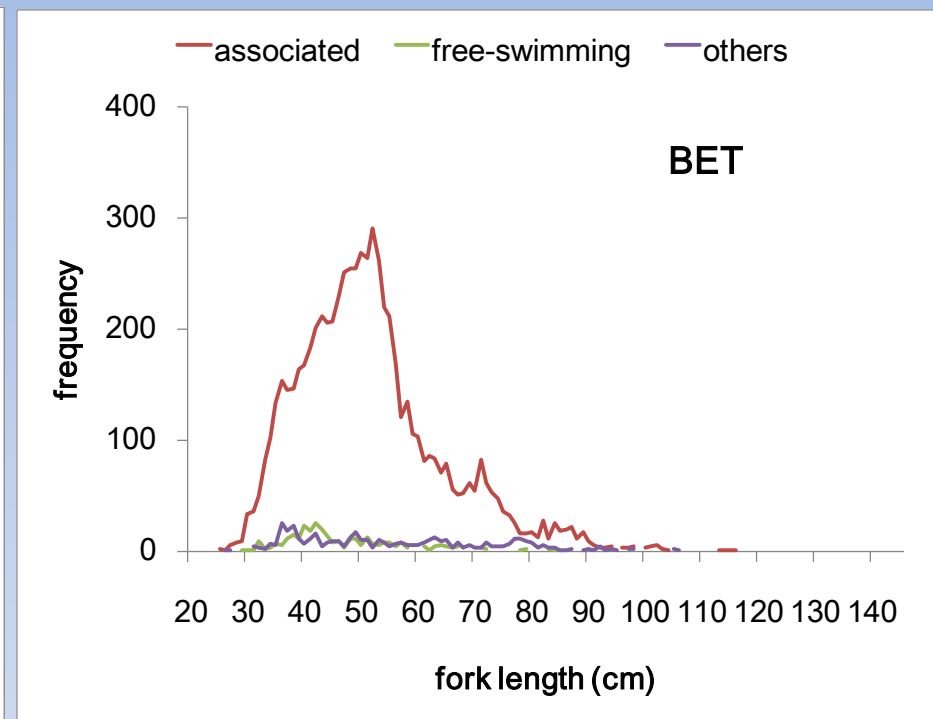
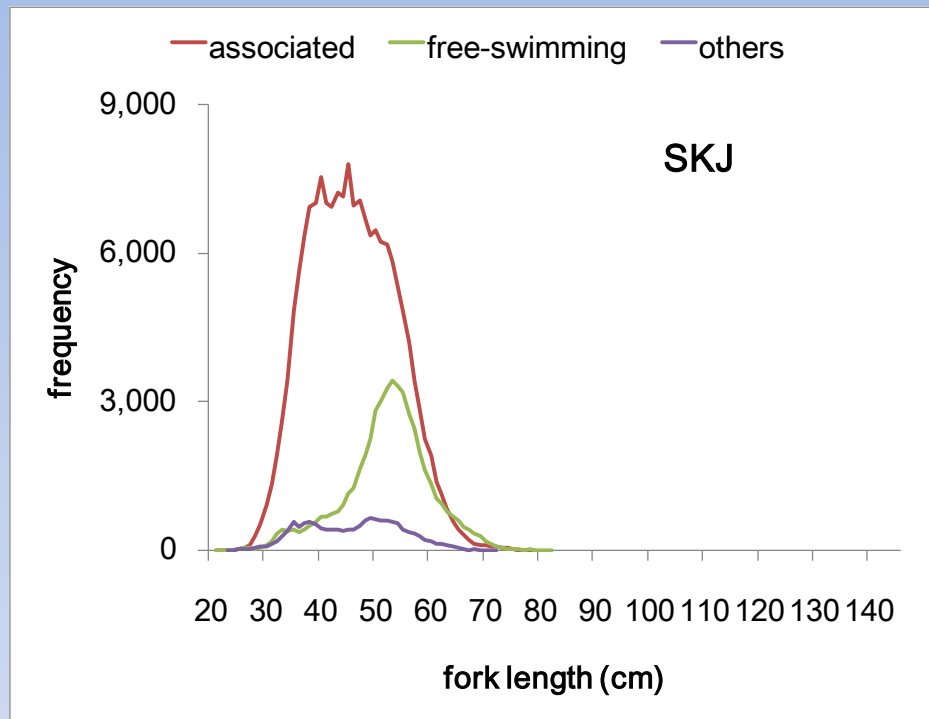


Fig. 18 Distribution of fork length by species and school types resulted from the port sampling for the fish well from 1995 to 2010.

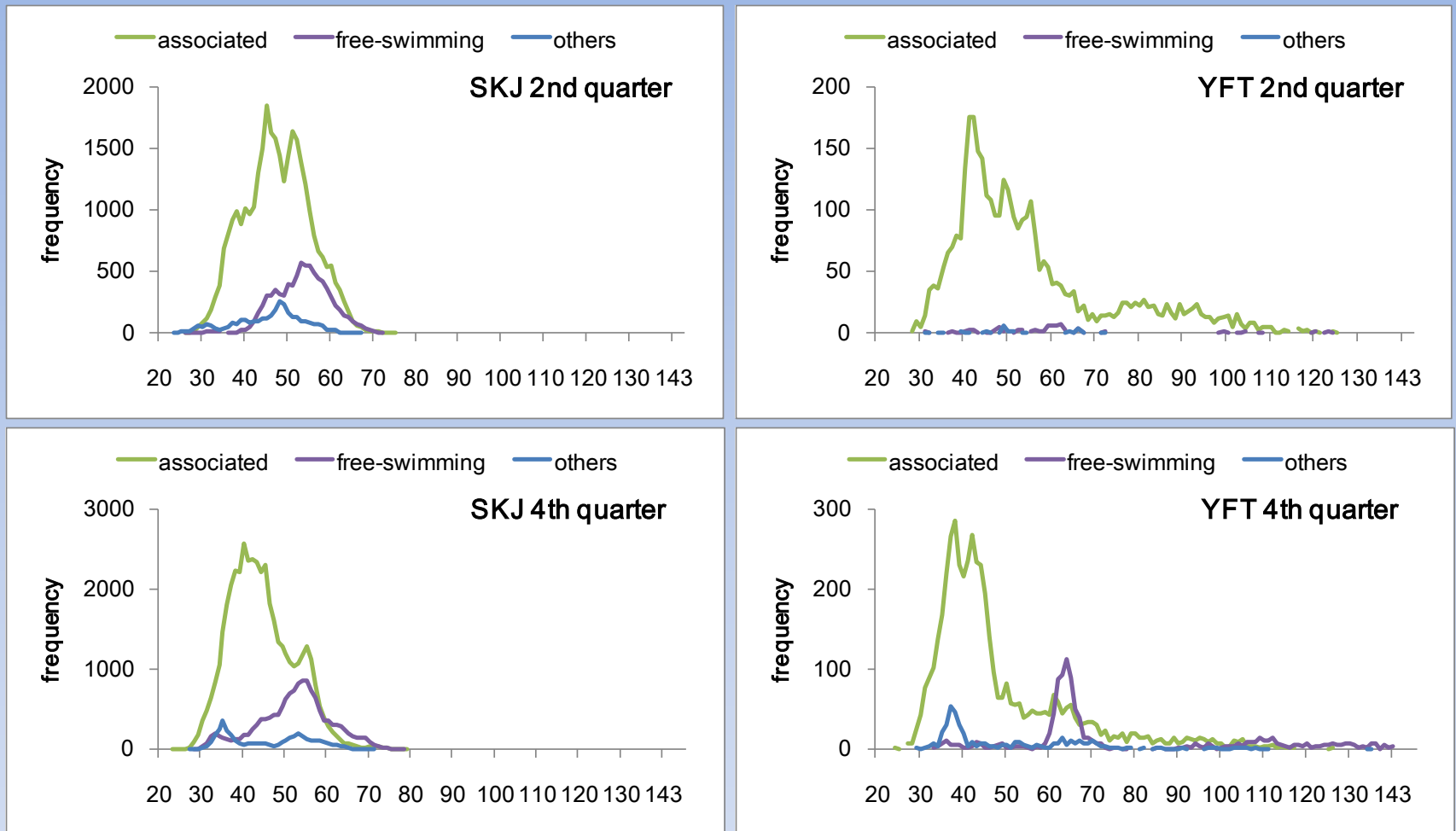


Fig. 19 Seasonal changes of distribution of fork length by species and school types resulted from the port sampling for the fish well from 1995 to 2010.

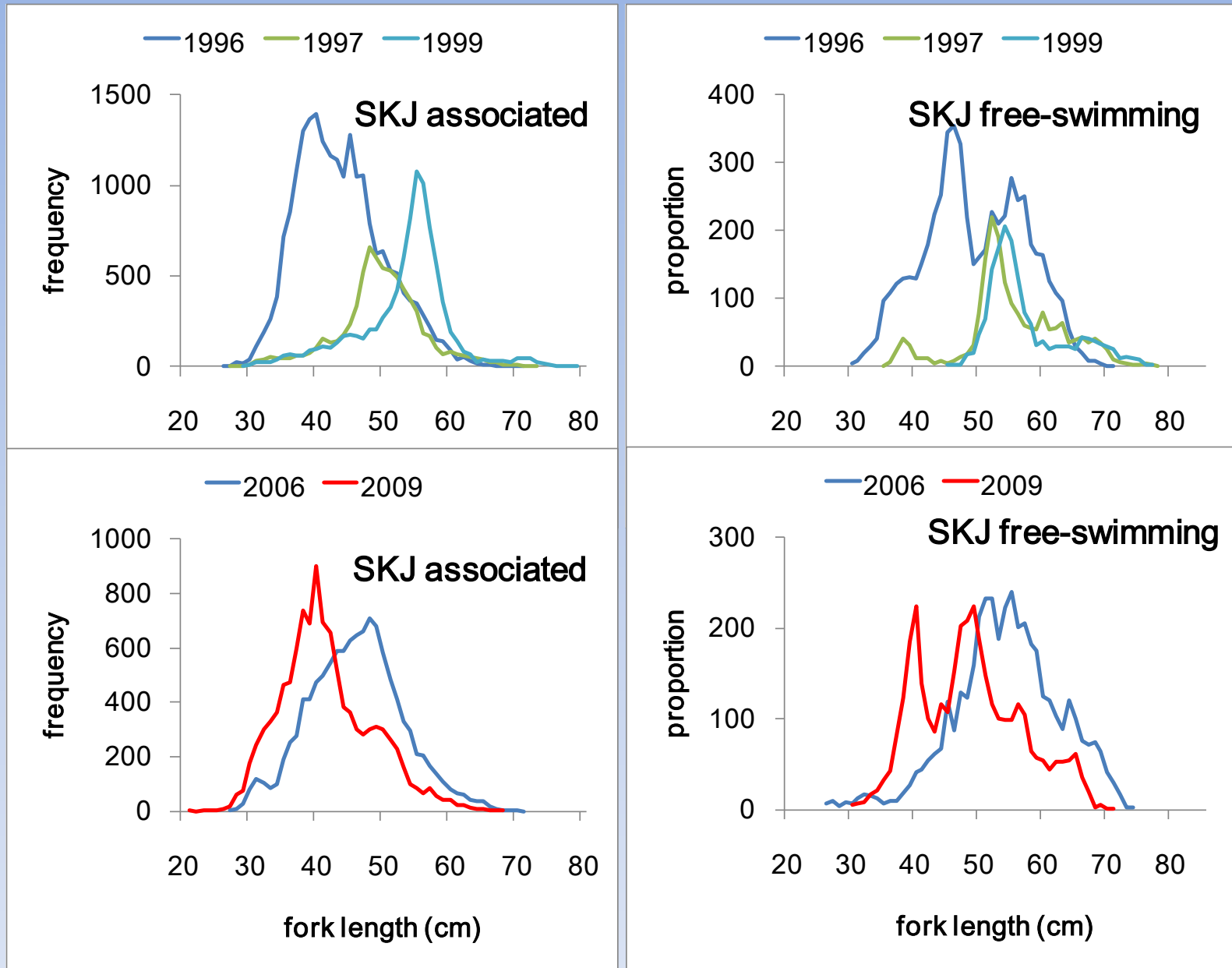


Fig. 20 Comparison of fork length of skipjack by year and school type.

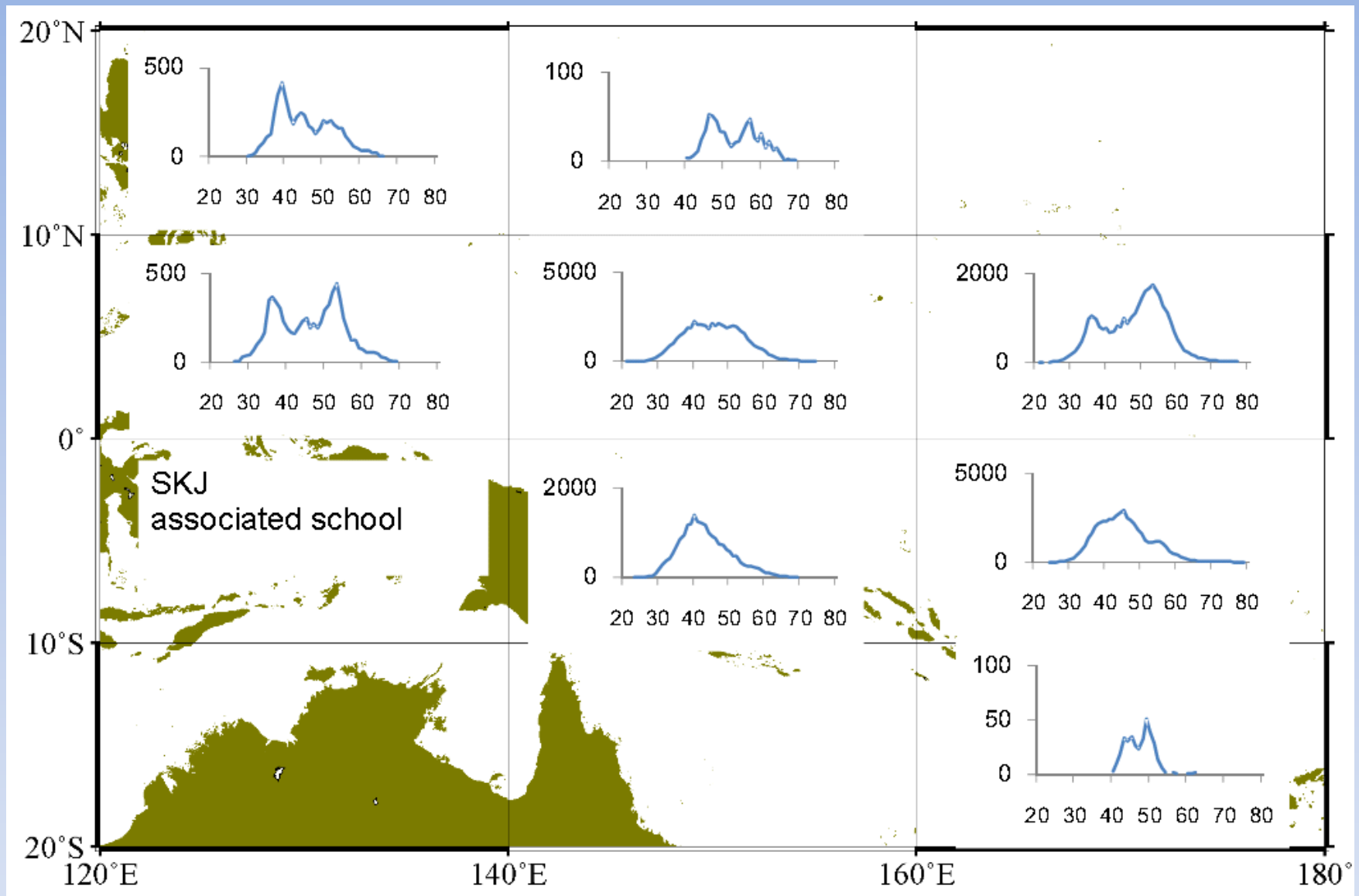


Fig. 21 Geographical distribution (10 latitude by 20 longitude) of fork length of skipjack in the associated school.

Summary for the research on products of fish well

About 300 fish per one sampling from one fish well were weighted and measured their length by species.

The sampling coverage is about 10 % in the cruise based and estimated as 1 % based on the number of set.

There are annual and seasonal differences of length distribution in some cases.

The catch at size for skipjack of the fishery could be estimated from the data set of the port sampling.

Application of the port sampling data for the correction of catch in accordance with the paragraph 15, CMM 2008-01

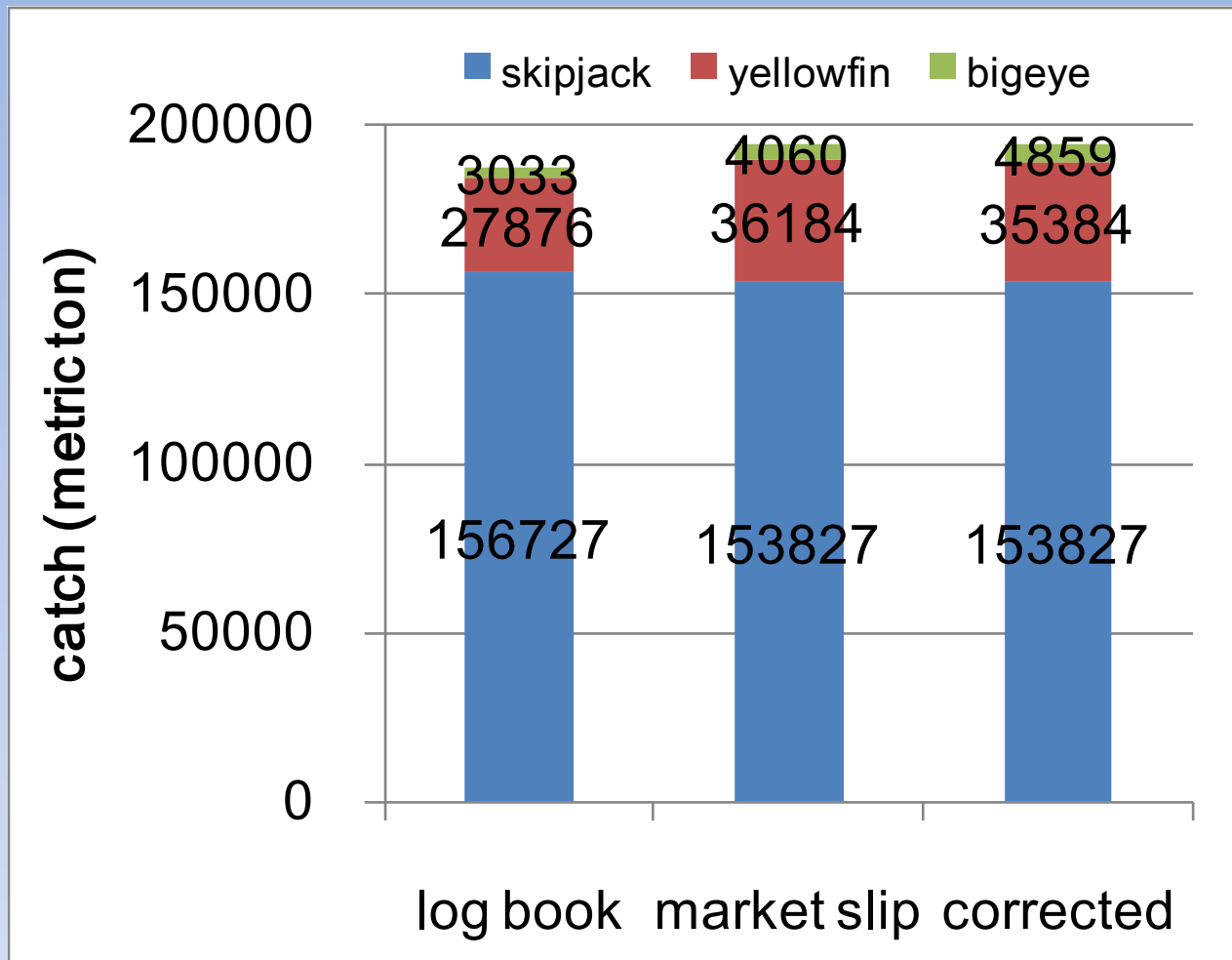
$\text{YFT ratio} = \text{weight of YFT} / (\text{weights of YFT} + \text{BET})$

$\text{Actual landed catch of bigeye} = \text{BET catch} + \text{YFT catch} \times (1 - \text{YFT ratio})$

YFT ratios by quarter and market category calculated by 78 times port sampling from 2006 to 2008.

The ratios were applied the catch correction of this year.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Yaizu 1.5 down	0.874	0.841	0.835	0.878
Yaizu 1.5 up	0.746	0.889	0.890	0.807
Makurazaki / Yamagawa 1.5 down	0.908	0.992	0.810	0.947



corrected / log book

Bigeye 1.60, yellowfin 1.27, skipjack 0.98, total 1.03

Fig 22. Comparison of species composition between the log book and the corrected catch.

Table 1 Number of landings by month and port
(return date from 2009/2/1 to 2010/2/9)

	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov	Dec	Jan	Feb	Total
Onagawa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ishinomaki	0	0	0	0	1	0	0	0	0	0	0	(1)	0	2
Yaizu	15	14	15	15	14	11	15	13	13	19	9	13	3	169
Makurazaki	4	5	4	5	4	5	2	5	4	8	1	6	0	53
Yamagawa	3	5	5	5	1	2	4	5	5	5	2	3	1	46
Total	22	24	24	25	20	18	21	23	22	32	12	22	4	269

One vessel landed at Ishinomaki (parenthetic number in Jan.)
and Yaizu in one cruise.



Table 3 Number of port sampling by month and port
(from Feb. 2009 to Feb. 2010)

	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov	Dec	Jan	Feb	Total
Onagawa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ishinomaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yaizu	1	0	0	0	0	2	0	1	2	2	2	1	2	13
Makurazaki	2	0	0	0	0	4	0	1	1	1	1	1	4	15
Yamagawa	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Coverage 9.7 % = 26 times / 269 cruises

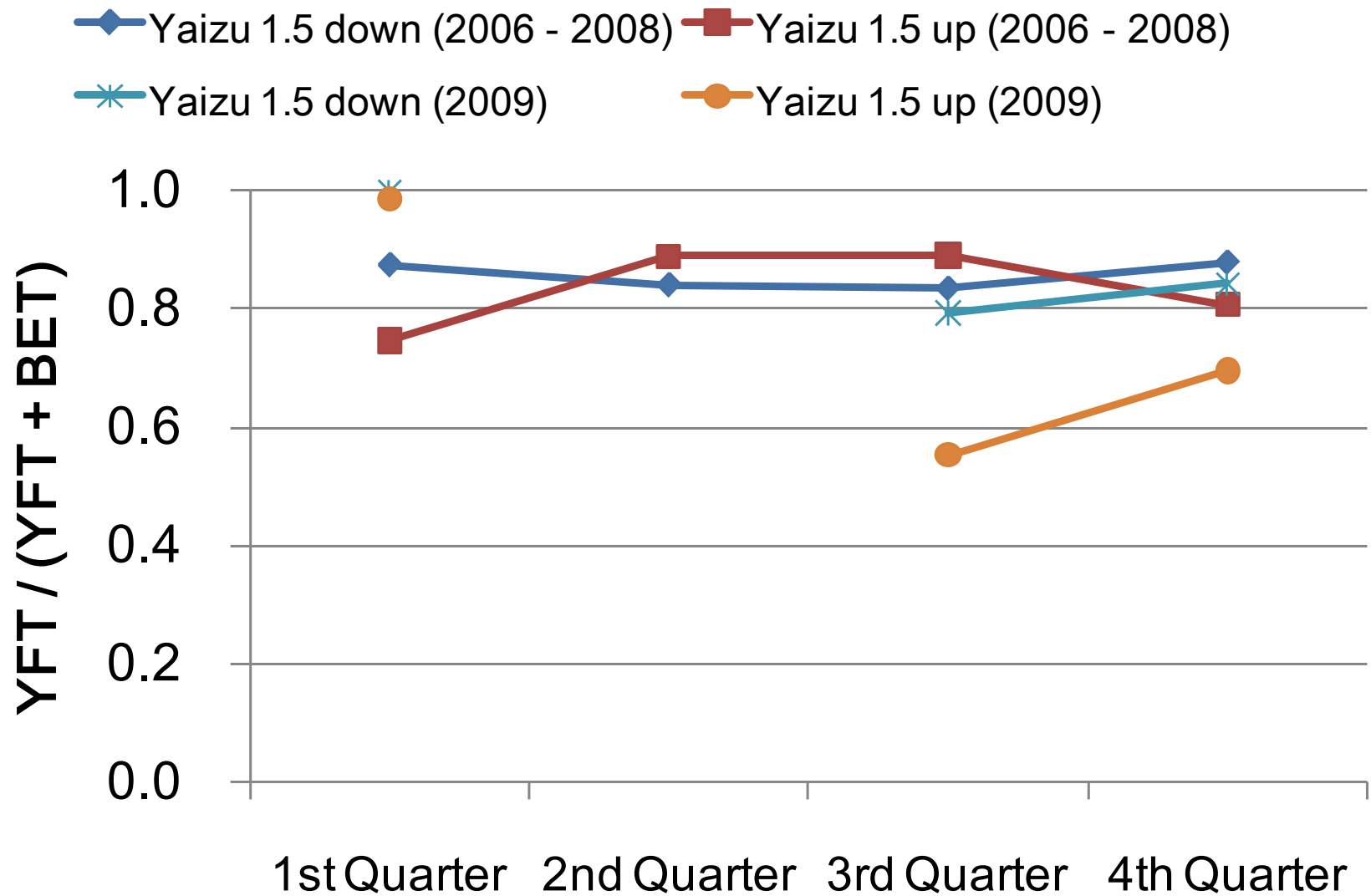


Fig 23. YFT ratios of from 2006 to 2008 and those of derived from the port samplings this year.

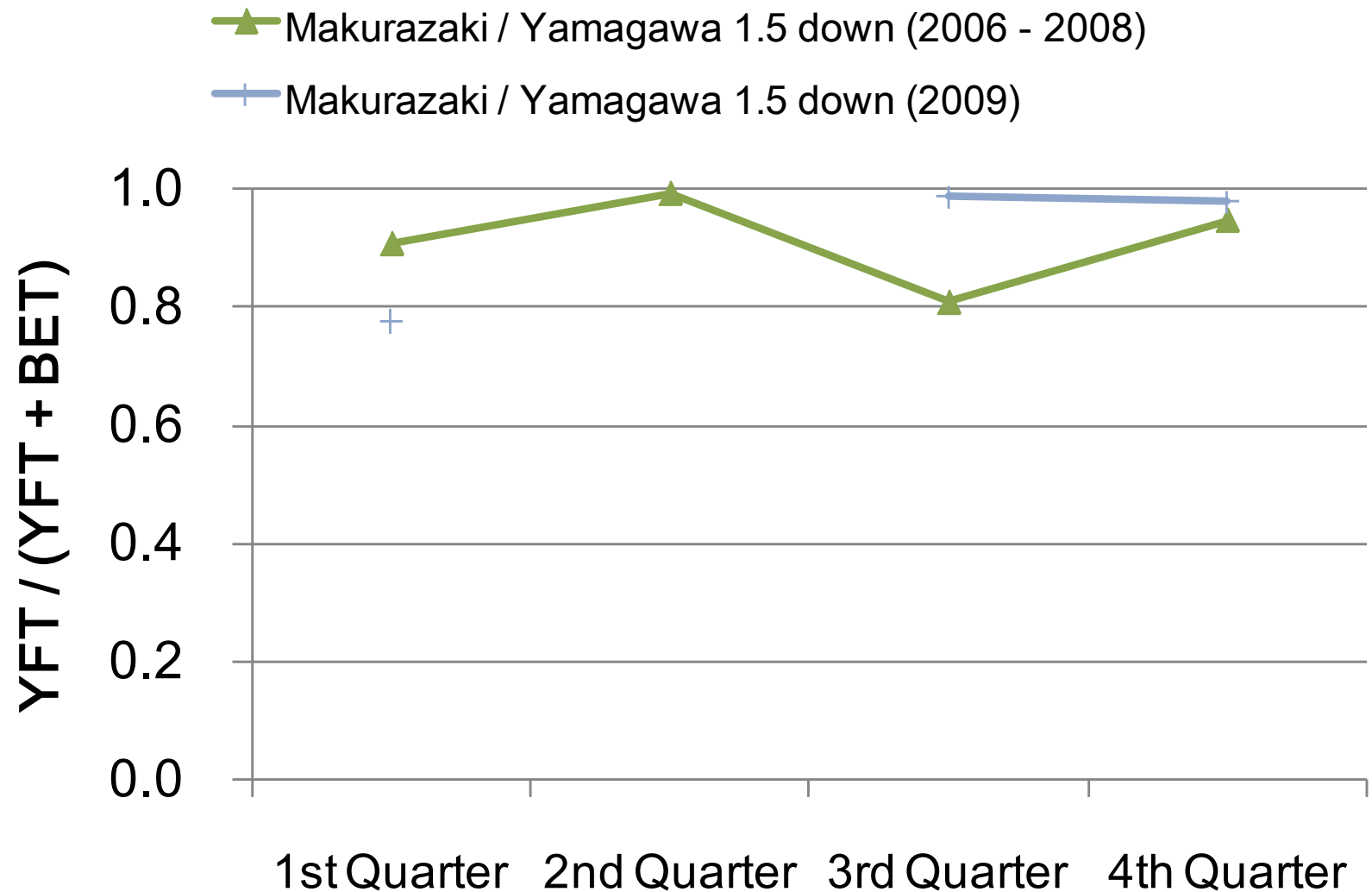


Fig 24 YFT ratios of from 2006 to 2008 and those of derived from the port samplings this year.