

## REPORT OF JAPAN'S SCIENTIFIC OBSERVER PROGRAM FOR THE TUNA LONGLINE FISHERY IN THE ATLANTIC OCEAN IN THE FISHING YEARS 2010 AND 2011<sup>1</sup>

### SUMMARY

*Japan's scientific observer program for longline fishery in the Atlantic Ocean has been continuously carried out in 2011 fishing years (FY). This document mainly provides the summary of collected data by observers in 2011 FY, and the summary in 2010 FY were also updated. In 2011 FY, 11 observer trips were conducted on Japanese tuna longline vessels in the entire Atlantic Ocean, while observers had 16 trips in 2010 FY. Total number of fishing operations with observers was 448 (1,299,581 hooks) in 2011 FY, whereas 657 (1,907,505 hooks) were monitored in 2010 FY. In each FY, more than 13,000 individuals were recorded by observers. Details of trips and catch records were shown, and nominal CPUE (number of fish caught per 1000 hooks) by fishing area for major species were calculated.*

### RÉSUMÉ

*Le programme japonais d'observateurs scientifiques pour la pêche palangrière dans l'océan Atlantique a été réalisé sans interruption pendant l'année de pêche de 2011. Ce document fournit essentiellement un résumé sur les données collectées par les observateurs au cours de l'année de pêche de 2011 ; le résumé de l'année de pêche de 2010 a également été mis à jour. Au cours de l'année de pêche de 2011, 11 sorties d'observateurs ont été réalisées sur des palangriers thoniers japonais dans l'ensemble de l'océan Atlantique, tandis que les observateurs ont effectué 16 sorties au cours de l'année de pêche de 2010. Le nombre total d'opérations de pêche avec observateurs s'est élevé à 448 (1.299.581 hameçons) pendant l'année de pêche 2011, tandis que 657 opérations (1.907.505 hameçons) ont fait l'objet d'un suivi au cours de l'année de pêche 2010. Au cours de chaque année de pêche, plus de 13.000 spécimens ont été enregistrés par des observateurs. Les détails des sorties et les registres des captures ont été présentés, et la CPUE nominale (nombre de poissons capturés pour 1.000 hameçons) par zone de pêche pour les principales espèces a été calculée.*

### RESUMEN

*El programa de observadores científicos de Japón para la pesquería de palangre en el océano Atlántico se desarrolló de forma continua durante el año pesquero (FY) 2011. Este documento proporciona sobre todo un resumen de los datos recopilados por los observadores en el año pesquero 2011; también se ha actualizado el resumen del año pesquero 2010. En el año pesquero 2011, se realizaron once mareas con observadores en los buques de palangre de atún japoneses en todo el océano Atlántico, mientras que en el año pesquero 2010 hubo dieciséis mareas con observadores. El número total de operaciones de pesca con observadores ascendió a 448 (1.299.581 anzuelos) en el año pesquero de 2011, mientras que en el año pesquero 2010 se observaron 657 operaciones de pesca (1.907.505 anzuelos). En cada año pesquero, los observadores registraron más de 13.000 ejemplares. Se presentó información detallada sobre los registros de captura y las mareas, y se calculó la CPUE nominal (número de ejemplares capturados por 1.000 anzuelos) por zona de pesca para las principales especies.*

### KEYWORDS

*Longline, Japan, observer CPUE, scientific observer, tuna fisheries*

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## **1. Introduction**

Japan has continuously conducted its national scientific observer programs on Japanese tuna longline vessels in the Atlantic Ocean since the mid 1990s, and this program have played a major role in response to the recommendations made by ICCAT since 1996. Various data have been collected through the observer programs, and that includes vessel attributes, gear configuration, species identification, biological sampling and various measurements on all observed catches. These collected data have been summarized until 2010, and been reported to SCRS meetings (Matsumoto and Miyabe, 1997, 1998, 1999, 2000, 2001; Matsumoto *et al.*, 2002, 2003, 2004, 2005; Matsumoto, 2006; Semba *et al.* 2007, 2008; Japan, 2011).

This document overviews Japan's scientific observer programs conducted in the entire Atlantic Ocean, and provides the summary of collected data mainly from September 2011 to December 2011 which were in 2011 fishing years (FY, thereafter, fishing year starts from August to next July). The summary which were already reported in 2011 (Japan, 2011) was revised, because some additional observer data in 2010 FY were newly compiled. In accordance with the 2010 Recommendation [Rec. 10-10] on minimum standards for fishing vessel scientific observer programs, catch rates, the coverage level, and its details were also contained in this document.

## **2. Outline of the observer program**

In principal, all observers attended a training class held by National Research Institute of Far Seas Fisheries before the departure for the cruises. The observer training program included keys for species identification, data recording protocols for information on fishing operation and catches, and protocols for taking various measurements for catches. During fishing operations the observers recorded various information, and collected as many data and biological samples as possible. When there were substantial numbers of catch, priority on the observers' records was given to tunas and billfishes but the number of catch was counted for all species.

## **3. Contents of observers' records**

### ***3.1 General information of fishing operations***

Various information of observed fishing activities were recorded. The name and attributes of the observed fishing vessel, and oceanographic and weather condition were recorded. At each fishing operation, date, location, the number of radio-buoys, hooks, gear configuration and bait used were also recorded. In addition, the number of sea birds flown during line setting were observed once in several days.

### ***3.2 Identification of species and related information***

All catches taken on the deck were identified its species and recorded while the observers were on the deck for their research. The catches which were not hauled up on the deck were also recorded. For double check of species identification, digital photos of observed catches were sometimes taken.

For each catch, retrieving time, the branch number on which the catch was hooked, and the life status of the catch (alive or dead; "alive" was further separated into "no details", "vigorous", "sluggish" or "injured") were recorded as much as possible. The life status was immediately identified on the deck or at the deck side for releasing.

### ***3.3 Measurement of catch***

Lengths were measured for all intact catches by 1cm interval (round up) and the following measurements were applied for different fish groups; fork length for tunas, post-orbit fork length (POFL) for billfishes, precaudal length for sharks, disk length for rays, total or fork length for other teleosts. A caliper was used for the measurement. Clasper inner length (between the anterior margin of the cloaca and the posterior clasper tip) was measured and recorded for male sharks by 0.1 cm interval.

Whole body weight (to the nearest 0.1kg in principal), processed weight (to the nearest 1 kg) and gonad weight (for tunas and billfishes; to the nearest 0.1kg) were measured as much as possible.

### **3.4 Sex determination and biological sampling**

Sex determination was conducted through the observation of genital gland for teleosts and with or without of clasper for sharks and rays. Biological sampling mainly for tunas and sharks was sometimes conducted for muscle, stomach contents, otolith and hard parts.

## **4. Results**

### **4.1 Trip and observer coverage**

Japan's observer program has been continuously carried out through 2011 FYs. Details of observer trips, which were defined equal to the number of vessels with observers, by fishing year were shown in **Table 1**. In 2010 FY, two trips in the southern Atlantic Ocean were newly complied and added to the original results in the previous report (Japan, 2011). In 2010 and 2011 FYs, observers had 16 and 11 trips on Japanese tuna longline vessels in the entire Atlantic Ocean (the ICCAT convention area), respectively. In the north Atlantic, 12 and 11 trips were observed in 2010 and 2011 FYs, respectively. The trips in the south Atlantic monitored a part of fishing activities for southern bluefin tuna, and 4 trips were carried out in 2010 FY. The data in 2011 FY are not available at present.

The coverage level achieved within Japanese longline vessels was calculated by dividing the number of trips with observers by the total number of operating trips in the entire Atlantic. Total number of operating trips, which were defined equal to the number of active vessels, were 102 and 97 in 2010 and 2011 FYs, respectively. Japan's observer programs covered 11.3% trips in the entire Atlantic Ocean in 2011 FY, while it was 11.8% in 2010 FY.

### **4.2 Observed operations**

Total number of observed fishing operations was 657 and 448 during 799 and 591 days in which observers were on board in 2010 and 2011 FYs, respectively. Total hooks in all operations with observers were 1,907,505 and 1,299,581 hooks in 2010 and 2011 FYs, respectively.

The distribution of hooks in all operations with observer was shown in **Figure 1**. The area of operation was divided into six areas; off Ireland, central north, off Grand Bank, off Florida, tropical area, and off Cape Town. Main observed areas were off Ireland and central north, and the numbers of trips were 10 and 9 in 2010 and 2011 FYs, respectively. Both 2009 and 2010 FYs, off Grand Bank were monitored by 2 vessels. Tropical area and off Cape Town were observed by 6-7 vessels through 2010 to 2011 FYs.

### **4.3 Catch records**

The lists of species recorded by scientific observers in 2010 and 2011 FYs were shown in **Table 2**. The lists were compiled mainly for tunas, and billfishes. The number of observed individuals was 13,013 in 2011 FY, while 16,003 were recorded in 2010 FY. In 2010 FY, about 50% of individuals were observed in the area off Ireland or central north, whereas about 60% of individuals were recorded in the tropical area in 2011 FY. This is mainly due to the shorter fishing season of Atlantic bluefin with a higher catch rate in 2011 FY (**Table 4**), thus more operations in the tropical areas were monitored by observers compared to other fishing years.

**Figure 2** shows that species composition in each area by fishing year for 6 main species which constituted the majority of total observed catch: albacore, yellowfin, bigeye, Atlantic bluefin, southern bluefin, and blue shark. In the area off Ireland, Atlantic bluefin and blue shark were the dominant species, which accounted for 66% and 33% of total catch of main 6 species in terms of number of fish in 2010 FY, and 91% and 9% in 2011 FY. The occurrence of other species was few (less than 1%). In the central north, blue shark was the most dominant species and accounted for 54-67%.

In the area off Grand Bank, blue shark was the dominant species in both 2010 (36%) and 2011 FYs (35%). Atlantic bluefin were consistently observed and accounted for 20% of the total catch of main 6 species. Bigeye was also dominant species in 2011 FY (42%), whereas albacore, yellowfin, and bigeye were commonly observed in 2010 FY. In the area off Florida, there was no trip with observers in both 2010 and 2011 FYs.

In the tropical area, bigeye was also the most dominant species in 2010 (45%) and 2011 FYs (32%), while albacore, yellowfin, and blue shark were similarly observed, which accounted for 17-26%. In the area off Cape

Town, blue shark was the most dominant species (81%), while southern bluefin (13%) and albacore (6%) were also observed. The data has been collecting in 2011 FY, and the information would be updated in 2013.

The number of fish measured, recorded or sampled by species through 2010 to 2011 FYs was indicated for each item in **Table 3**. Lengths of tunas and billfishes were measured for 84% and 94% of total observed catch in number in 2010 and 2011 FYs, respectively. More than 93% of tunas and billfishes were measured its processed weight. Biological sampling was made mainly for bluefin, southern bluefin and sharks.

#### **4.4 Catch ratio of main species**

CPUE (catch number per 1000 hooks) of 6 main species by area was calculated for the period between 2010 and 2011 FYs (Table 4). Total hooks in all operations with observers by area by fishing year were used as effort for the calculation. The CPUE of albacore was the highest in the tropical area in 2011 FY, whereas the highest CPUE was observed in the off Grand bank followed by the tropical in 2010 FY. For tropical tunas, the CPUEs of bigeye and yellowfin were the highest in the tropical area in 2010 and 2011 FYs, while a high CPUE was observed for bigeye in the area off Grand Bank in 2011 FY.

For Atlantic bluefin tuna, significant CPUE values (CPUE>3 fish per 1000 hooks) were observed in the areas off Ireland and central north in 2010 FY, and especially in 2011 FY (CPUE>7 fish per hooks). In the area off Grand Bank, high CPUE was also obtained in 2010 FY. Southern bluefin tuna was caught in the area off Cape Town, and the CPUE in 2010 FY was 0.43. The CPUE of blue shark was significant mainly in the central north in both 2010 and 2011 FYs. High CPUEs were also observed in the area off Grand Bank, off Cape Town, and tropical area.

#### **Acknowledgement**

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**Table 1a.** Updated information on the trip of the scientific observer for Japanese tuna longline in the Atlantic Ocean during 2010 FY. The trips: RT1003 and RT1004 were newly compiled and added in 2011 FY.

Trip ID	Main fishing ground	Range of latitude	Range of longitude	Start date of operation	End date of operation	Number of operation	Number of hooks observed
AT1001	off Grand Bank	35.9-46.3N	45.7-69.9W	2010/8/7	2010/11/19	92	272,058
AT1002	off Ireland	51.4-55.2N	16.4-18W	2010/9/24	2010/10/23	27	80,664
AT1003	off Ireland	51-60.5N	14.1-26W	2010/9/29	2010/10/30	27	82,615
AT1004	off Ireland, central north	50.8-60N	15.1-38.2W	2010/9/30	2010/11/24	23	67,072
AT1005	off Ireland, central north	50.6-59.6N	17.1-33.7W	2010/9/30	2010/11/20	39	118,456
AT1006	off Ireland, central north	50.6-59.5N	16.2-34W	2010/10/1	2010/11/16	36	109,464
AT1007	off Ireland	52.2-59.8N	14.8-19.4W	2010/10/1	2010/11/5	32	100,367
AT1008	off Ireland	29.3-59.6N	14.2-36.3W	2010/10/6	2010/11/25	42	133,540
AT1009	off Ireland, tropical area	17.1-60N	15.7-37W	2010/10/8	2010/12/6	47	147,039
AT1010	off Ireland	50.9-60.1N	13.7-36.9W	2010/10/9	2010/11/17	31	87,970
AT1011	off Ireland, central north	50.9-59.6N	17.1-34.5W	2010/10/14	2010/11/20	29	87,760
AT1012	off Grand Bank, tropical area	7.3-44.4N	17.8-53.7W	2010/12/19	2011/3/7	64	174,158
RT1001	off Cape Town	42.2-43.3S	0.1-2.6W	2010/8/1	2010/8/12	16	29,050
RT1002	off Cape Town	41.1-43S	17.2-18.4E	2011/4/19	2011/4/30	11	35,500
RT1003	off Cape Town	29.1-45.7S	3.5-31.1E	2011/4/26	2011/7/5	40	122,595
RT1004	off Cape Town	39.4-39.4S	12.6-12.6E	2011/4/27	2011/7/29	101	259,197

**Table 1b.** Information on the trip of the scientific observer for Japanese tuna longline in the Atlantic Ocean during 2011 FY.

Trip ID	Main fishing ground	Range of latitude	Range of longitude	Start date of operation	End date of operation	Number of operation	Number of hooks observed
AT1101	off Grand Bank	28.1-47.5N	15.4-53.6W	2011/9/8	2011/11/30	69	190,128
AT1102	off Ireland	45.9-60N	24.3-44.7W	2011/9/25	2011/10/15	15	43,744
AT1103	off Ireland	8.9-60N	22-79.9W	2011/9/28	2011/10/24	20	59,168
AT1104	off Ireland, tropical area	10-60N	5.8-35W	2011/10/1	2011/12/9	56	174,020
AT1105	off Ireland, tropical area	5.6-59.1N	10-35.1W	2011/10/8	2011/12/12	50	152,190
AT1106	off Ireland, tropical area	9.4-59.4N	15.4-31.1W	2011/10/9	2011/12/7	39	115,430
AT1107	off Ireland, tropical area	6.3-59.7N	14.8-35.6W	2011/10/13	2011/12/6	36	103,216
AT1108	off Ireland, tropical area	10.6-59.8N	18.2-76W	2011/10/20	2011/12/18	44	133,450
AT1109	off Ireland, central north, tropical area	10-56.9N	17.2-32.1W	2011/10/20	2011/12/10	37	101,027
AT1110	off Grand Bank	10.4-42.7N	47.7-78.7W	2011/10/22	2011/12/25	55	141,294
AT1111	off Ireland, tropical area	10.2-55.5N	15.3-33.9W	2011/10/30	2011/12/10	27	85,914

**Table 2a.** Updated list of species recorded by the Japanese tuna longline observer in the Atlantic Ocean during 2010 FY.

Species	off Ireland	central north	off Grand Bank	off Florida	tropical area	off Cape Town	Total
Albacore	44	38	592	-	189	87	950
Bigeye tuna	-	10	327	-	511	4	852
Bluefin tuna	2781	674	857	-	-	-	4312
Southern bluefin tuna	-	-	-	-	-	194	194
Yellowfin tuna	-	1	332	-	221	9	563
Other tunas	-	-	-	-	-	-	-
Blue marlin	-	-	4	-	9	-	13
Longbill spearfish	-	-	32	-	17	1	50
Sailfish	-	-	1	-	3	-	4
Swordfish	6	5	186	-	48	1	246
White marlin	-	-	7	-	-	-	7
Other teleosts	83	33	107	-	261	1217	1701
Blue shark	1390	1438	1172	-	217	1244	5461
Other sharks	875	69	133	-	119	166	1362
Sea birds	6	2	1	-	-	127	136
Sea turtles	-	4	5	-	6	-	15
Dolphins	-	-	10	-	116	-	126
Unidentified	5	1	3	-	1	1	11
Total	5190	2275	3769	-	1718	3051	16003

**Table 2b.** List of species recorded by the Japanese tuna longline observer in the Atlantic Ocean during 2011 FY.

Species	off Ireland	central north	off Grand Bank	off Florida	tropical area	off Cape Town	Total
Albacore	-	5	33	-	955	-	993
Bigeye tuna	-	-	889	-	1790	-	2679
Bluefin tuna	2440	148	434	-	-	-	3022
Southern bluefin tuna	-	-	-	-	-	-	0
Yellowfin tuna	-	-	13	-	1467	-	1480
Other tunas	-	-	1	-	5	-	6
Blue marlin	-	-	-	-	124	-	124
Longbill spearfish	-	-	2	-	34	-	36
Sailfish	-	-	-	-	34	-	34
Swordfish	-	1	171	-	164	-	336
White marlin	-	-	1	-	42	-	43
Other teleosts	54	1	26	-	1151	-	1232
Blue shark	238	179	742	-	1414	-	2573
Other sharks	17	1	113	-	279	-	410
Sea birds	4	-	-	-	2	-	6
Sea turtles	-	-	1	-	32	-	33
Pinnipedia	1	-	-	-	-	-	1
Dolphins	-	-	3	-	2	-	5
Total	2754	335	2429	-	7495	-	13013

**Table 3a.** Updated the number of individuals measured or sampled by species in 2010 FY.

Species	Number of observed/measured individuals						Biological sampling			
	Length	Processed weight	Whole weight	Sex	Gonad weight	Maturity	Otolith	Muscle	Stomach	Gonad
Albacore	585	810	325	38	68	83	-	-	1	-
Bigeye tuna	670	805	459	666	10	167	9	8	7	17
Bluefin tuna	4101	4095	522	3866	296	820	229	10	14	32
Southern bluefin tuna	182	182	-	182	-	-	-	-	-	-
Yellowfin tuna	258	489	32	372	9	84	1	1	5	8
Other tunas	-	-	-	-	-	-	-	-	-	-
Blue marlin	6	12	2	11	3	5	-	1	-	-
Longbill spearfish	33	46	8	34	1	3	-	-	-	1
Sailfish	1	3	-	3	-	2	-	-	-	-
Swordfish	194	221	36	201	21	49	-	7	6	3
White marlin	5	7	-	5	-	-	-	-	-	-
Teleosts	631	410	159	353	84	99	-	-	1	2
Blue shark	3288	2335	100	3425	510	1635	-	52	4	383
Other sharks	1075	862	33	1088	56	137	-	27	8	49
Sea birds	61	6	-	5	9	1	-	-	-	-
Sea turtles	3	-	1	4	-	-	-	-	-	-
Dolphins	118	28	43	29	-	-	-	-	-	-
Unidentified	3	-	1	-	1	1	-	-	-	-
Total	11214	10311	1721	10282	1068	3086	239	106	46	495

**Table 3b.** The number of individuals measured or sampled by species in 2011 FY.

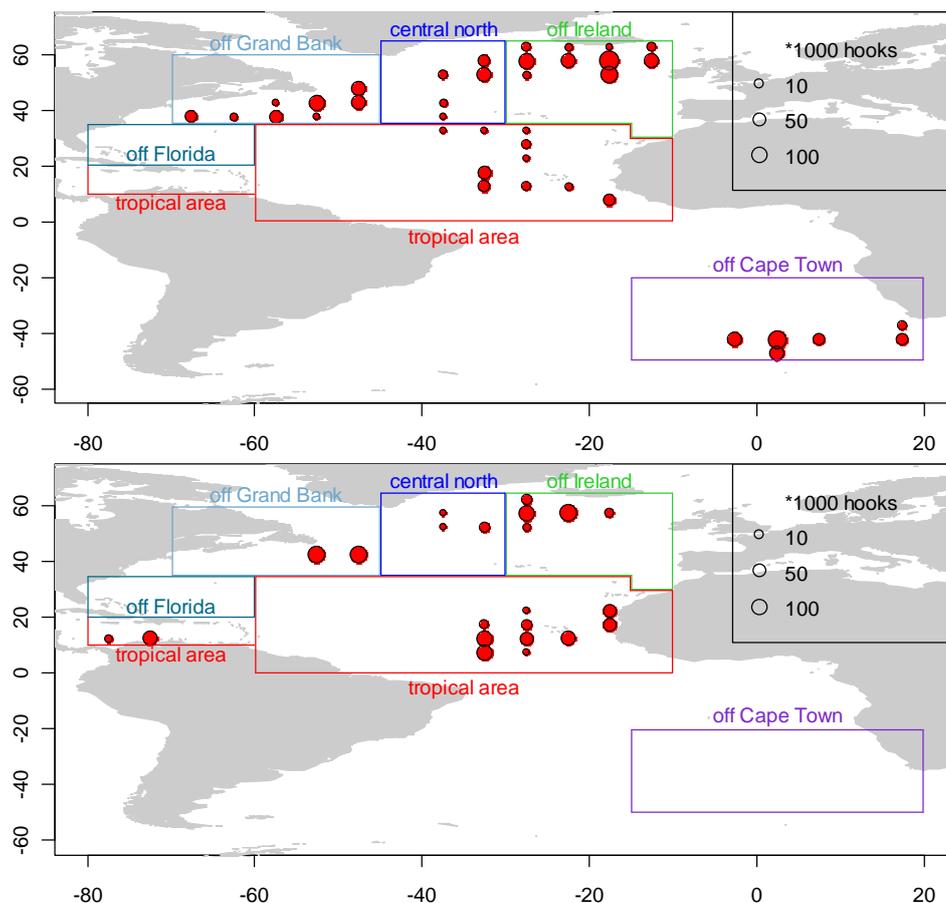
Species	Number of observed/measured individuals						Biological sampling			
	Length	Processed weight	Whole weight	Sex	Gonad weight	Maturity	Otolith	Muscle	Stomach	Gonad
Albacore	974	972	-	298	-	8	-	13	-	-
Bigeye tuna	2425	2585	-	2522	-	172	76	242	93	-
Bluefin tuna	2827	2812	-	2631	-	190	130	376	82	-
Southern bluefin tuna	-	-	-	-	-	-	-	-	-	-
Yellowfin tuna	1462	1447	-	1412	-	20	55	59	1	-
Other tunas	6	5	-	2	-	-	-	-	-	-
Blue marlin	117	117	-	112	-	3	-	1	1	-
Longbill spearfish	36	36	-	33	-	1	-	-	-	-
Sailfish	33	31	-	23	-	-	-	-	-	-
Swordfish	313	318	-	290	-	15	-	21	20	-
White marlin	44	42	-	33	-	3	-	-	-	-
Teleosts	538	523	-	388	-	4	-	-	-	-
Blue shark	2152	2272	-	2425	-	504	1	313	3	-
Other sharks	203	184	-	230	-	32	-	54	2	-
Sea birds	4	2	-	1	-	-	-	-	-	-
Sea turtles	4	1	-	2	-	-	-	-	-	-
Pinnipedia	-	-	-	-	-	-	-	-	-	-
Dolphins	-	-	-	-	-	-	-	-	-	-
Total	11137	11346	-	10401	-	952	256	1051	202	-

**Table 4a.** Updated catch ratio (/1000hooks) of main species in 2010 FY.

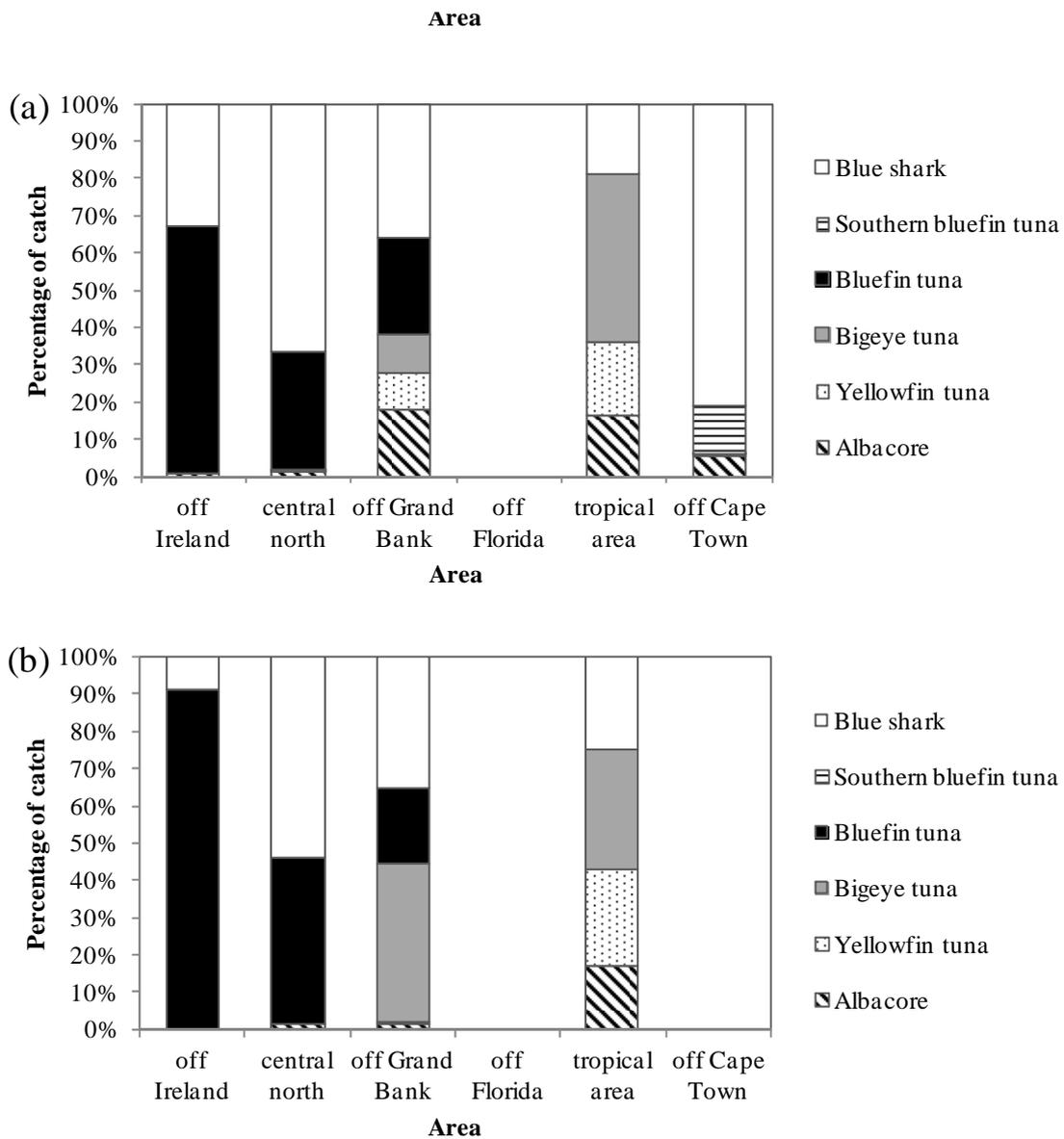
	Albacore	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Southern bluefin tuna	Blue shark
off Ireland	0.05	0.00	0.00	3.38	0.00	1.69
central north	0.29	0.01	0.08	5.13	0.00	10.94
off Grand Bank	1.64	0.92	0.90	2.37	0.00	3.24
off Florida	0.00	0.00	0.00	0.00	0.00	0.00
tropical area	1.29	1.51	3.49	0.00	0.00	1.48
off Cape Town	0.19	0.02	0.01	0.00	0.43	2.79

**Table 4b.** Catch ratio (/1000hooks) of main species in 2011 FY.

	Albacore	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Southern bluefin tuna	Blue shark
off Ireland	0.00	0.00	0.00	7.44	0.00	0.73
central north	0.24	0.00	0.00	7.12	0.00	8.61
off Grand Bank	0.10	0.04	2.68	1.31	0.00	2.24
off Florida	0.00	0.00	0.00	0.00	0.00	0.00
tropical area	1.66	2.55	3.11	0.00	0.00	2.46
off Cape Town	0.00	0.00	0.00	0.00	0.00	0.00



**Figure 1.** Distribution of total hooks with observers in the Atlantic Ocean by fishing year, and definition of 6 areas: off Ireland, central north, off Grand Bank, off Florida, tropical area, off Cape Town. Upper panel shows 2010 FY, and lower panel shows 2011 FY.



**Figure 2.** Catch composition of main species in the 6 areas by fishing year ((a) updated 2010 and (b) 2011FYs).