

TUNA FISHERY STATISTICS OF MADEIRA, 1986-1996

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SUMMARY

This document updates the Madeiran tuna statistics for recent years such as the total catch by species, the baitboat fleet composition, and the sampling size frequencies for the main species of tuna landed. Traditional fishing grounds used by the local fleet are shown. Fishery seasonality is also referred to and sea surface temperature anomalies are given, from 1986 to 1996.

RÉSUMÉ

Ce document actualise les statistiques thonnières de Madère des récentes années telles que la prise totale par espèces, la composition de la flotte de canneurs et les fréquences d'échantillonnage de tailles des principales espèces de thonidés débarqués. Les lieux traditionnels de pêche exploités par la flotte locale sont présentés. Il est aussi traité du caractère saisonnier de la pêche, et les anomalies de la température de la surface de l'eau sont présentées, de 1986 à 1996.

RESUMEN

Este documento actualiza las estadísticas de tónidos en Madeira para los años recientes, tales como la captura total por especies, la composición de la flota de cebo y las frecuencias de muestreo de tallas de las principales especies de tónidos desembarcados. Se muestran los caladeros tradicionales utilizados por la flota local. También se hace referencia a la estacionalidad de la pesquería, y se facilitan anomalías de temperatura de la superficie del mar, desde 1986 a 1996.

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Tuna catch has been an important fishery resource in Madeira for a long time. Local fishing boats use the traditional pole and line gear with live bait to catch tuna around the islands.

In the catches of tuna and tuna-like species, bigeye (*Thunnus obesus*) and skipjack (*Katsuwonus pelamis*) are the most important species (Tab.I; Fig.1), representing more than 95% of the total in the years 1960-1996. Up to 1990, bigeye is the dominant species, being replaced by skipjack in recent years. Low catches of tuna have occurred between 1979 - 1987 and this seems to be due to an alteration on the availability of tuna resources in the area, and not to a general decrease in the stock abundance. From 1990 to 1994 catches sharply increased mainly due to skipjack catches but this did not occurred in the last two years where we observed an increase of bigeye tuna and other non traditional species such as albacore and bluefin tuna.

Local tuna fleet composition, classified by gross tonnage, is given (Tab.II; Fig.2). In recent years it is observed that larger fishing boats operate in the area, but the amount of small vessels that usually catch tuna remains constant for the last seventeen years.

Fishing grounds are located around the South coast of Madeira, Desertas and Porto Santo islands (Fig.3). However, important fleet displacements occurred towards Selvagens islands (160 nautic miles South) or Seine seamount (135 nautic miles Northeast) in the period between 1986-1989.

Catch seasonality is significant all the year round, defining a typical fishing period for each dominant species (Tab. III, Fig. 4). Bigeye landings mainly occur during second and third quarter of the year and the skipjack take place in the last two quarters. This pattern was not observed for bigeye during last year and unusual landings occurred all the year round. The strong inter-annual variability of the catches observed is most likely due to the variation in the local hydrological conditions.

Sea surface temperature anomalies were calculated for the period 1986-1996, based on a time series of forty six years (1960-1996). Strong variability on SST anomalies are shown in particular years (Fig. 5). The most striking aspect of this variability is a warming trend all along the period since October 1994 to 1996 reaching a maximum of 2 ° C in May 1995.

Size sampling frequencies of bigeye and skipjack are given for the period 1986-1996. There is an increase in the average size of bigeye caught in recent years, for a fork length range between 40 to 180 cm (Tab.IVa; Fig. 6a.). Skipjack length usually ranges from 40 to 74 cm long and size composition is highly variable in each year (Tab.IV b; Fig.6 b.).

Year	BET	SKJ	OTH	TOTAL
1960	1,554.0	158.0	0.0	1,712.0
1961	1,129.0	34.0	0.0	1,163.0
1962	2,621.0	958.0	0.0	3,579.0
1963	2,686.0	573.0	0.0	3,259.0
1964	2,901.0	830.0	0.0	3,731.0
1965	2,583.0	933.0	6.0	3,522.0
1966	3,337.0	321.0	15.0	3,673.0
1967	2,396.0	1,359.0	12.0	3,767.0
1968	938.0	776.0	13.0	1,727.0
1969	2,615.0	758.0	11.0	3,384.0
1970	2,160.0	835.0	9.0	3,004.0
1971	1,959.0	1,491.0	11.0	3,461.0
1972	1,244.0	781.0	21.0	2,046.0
1973	3,031.0	750.0	37.0	3,818.0
1974	5,708.0	446.0	219.0	6,373.0
1975	5,008.0	491.0	831.0	6,330.0
1976	1,959.0	1,240.0	622.0	3,821.0
1977	3,582.0	255.0	86.0	3,923.0
1978	2,791.0	129.0	137.0	3,057.0
1979	1,014.7	38.9	83.6	1,137.2
1980	224.0	29.6	61.8	315.4
1981	439.2	76.7	17.0	532.9
1982	707.5	151.7	141.8	1,001.0
1983	740.6	21.2	77.3	839.1
1984	830.6	174.3	237.6	1,242.5
1985	1,403.2	285.2	180.0	1,868.4
1986	1,698.5	329.3	64.2	2,092.0
1987	593.1	78.9	87.5	759.5
1988	1,395.4	356.9	158.8	1,911.1
1989	2,188.5	1,751.2	53.9	3,993.6
1990	2,455.4	1,666.3	121.2	4,242.9
1991	2,474.7	5,474.7	118.0	8,067.4
1992	2,891.2	4,862.2	514.2	8,267.7
1993	1,199.8	3,336.1	303.1	4,839.0
1994	881.1	4,135.7	353.5	5,370.3
1995	4,412.1	4,356.9	310.5	9,079.5
1996	3,723.3	2,000.0	931.1	6,654.4

Tab. I - Tuna catch by main species (MT), Madeira, 1960-1996.

<i>Year</i>	<i>(-50)GT</i>	<i>(51-150)GT</i>	<i>(151-)GT</i>	<i>TOTAL</i>
1979	35	6		41
1980	13	4		17
1981	18	5		23
1982	18	3		21
1983	14	5		19
1984	16	6	1	23
1985	21	5		26
1986	26	6		32
1987	19	7		26
1988	22	10		32
1989	20	11	4	35
1990	22	13	2	37
1991	27	10	3	40
1992	20	15	3	38
1993	11	14	7	32
1994	18	14	8	40
1995	18	18	9	45
1996	25	20	8	53

Tab. II - Fishing tuna fleet composition by Gross Tonnage (GT), Madeira surface fishery, 1979-1996

	<i>ALB</i>	<i>BET</i>	<i>SKJ</i>	<i>BFT</i>	<i>YFT</i>	<i>BON</i>	<i>FRI</i>	<i>SWO</i>	<i>BIL</i>	<i>TOTAL</i>
JAN	5,973.20	272,716.25	11,979.60	0.00	59.89	0.00	0.00	7,022.28	0.00	297,751.22
FEB	17,229.80	624,326.78	857.00	476.53	167.69	184.20	0.00	10,894.56	0.00	654,136.56
MAR	14,085.20	630,728.77	0.00	2,752.91	0.00	21.00	0.00	13,563.60	0.00	661,151.48
APR	22.00	429,919.64	0.00	2,735.51	0.00	3.80	0.00	9,758.40	0.00	442,439.35
MAY	0.00	506,525.28	470.00	160.78	0.00	13.00	0.00	2,567.04	0.00	509,736.10
JUN	0.00	102,663.58	0.00	0.00	345.55	30.60	0.00	523.92	0.00	103,563.65
JUL	19,340.00	171,558.47	720,463.00	25,625.10	6,685.31	11.00	0.00	0.00	0.00	943,682.87
AUG	49,068.60	62,833.20	874,842.70	21,509.14	9,040.79	455.00	0.00	1,289.64	181.92	1,019,220.99
SEP	185,174.80	189,078.39	281,303.00	0.00	0.00	14.20	0.00	2,194.92	371.76	658,137.07
OCT	285617.40	303,403.57	75,172.60	798.10	656.98	13.20	0.00	1,927.56	1,060.56	668,649.97
NOV	123,791.20	324,101.55	28,910.10	797.85	495.84	0.00	0.00	592.80	0.00	478,689.34
DEC	99,465.20	105,430.91	5,988.20	5,054.35	748.96	0.00	0.00	613.32	0.00	217,300.94
TOTAL	799,767.40	3,723,286.39	1,999,986.20	59,910.26	18,201.01	746.00	0.00	50,948.04	1,614.24	6,654,459.54

Tab. III - Monthly tuna catch by species (Kg), Madeira, 1996.

FL (cm)	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
40	0	8	0	0	0	0	0	0	0	0	0
45	0	20	0	0	0	0	0	0	0	0	0
50	0	1	12	11	0	0	0	0	0	0	1
55	4	4	49	43	0	0	0	0	3	0	4
60	29	9	66	120	0	1	0	1	7	5	2
65	48	34	98	157	6	38	2	0	18	2	4
70	105	51	150	253	32	24	8	18	48	6	14
75	201	61	193	324	78	93	32	59	98	41	20
80	76	40	114	145	37	149	67	65	71	91	26
85	32	22	98	75	60	170	67	61	124	89	27
90	16	16	132	41	124	196	70	66	127	64	33
95	19	27	113	27	136	119	56	63	74	28	47
100	10	35	117	18	40	121	41	39	34	56	101
105	5	23	66	18	24	66	32	41	15	44	164
110	1	32	52	24	38	43	54	22	13	21	200
115	3	69	34	58	34	43	49	21	4	12	202
120	1	71	27	51	31	54	50	26	4	17	206
125	1	66	21	22	38	45	49	16	3	11	187
130	2	58	23	15	28	41	33	41	3	13	166
135	0	56	20	6	6	18	25	31	7	3	159
140	1	46	19	2	9	5	16	14	8	8	182
145	0	51	17	0	10	3	14	6	8	2	181
150	0	40	16	0	6	0	2	4	12	0	199
155	0	31	13	0	3	0	0	1	7	2	162
160	0	21	14	0	4	0	0	0	5	0	194
165	0	25	10	0	1	0	0	0	5	0	138
170	0	9	11	0	2	0	0	0	8	0	77
175	0	9	1	0	0	0	0	0	3	0	29
180	0	2	0	0	0	0	0	0	0	0	12
185	0	1	2	0	1	0	0	0	0	0	1
190	0	2	0	0	0	0	0	0	0	0	0
TOTAL	554	940	1488	1410	748	1229	667	595	709	515	2738

Tab. IV a. - Bigeye length composition / year (5 cm class), Madeira, 1986-1996.

FL(cm)	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
38	1	0	0	2	0	0	0	0	2	0
39	8	0	8	2	0	0	0	0	1	0
40	17	0	31	7	0	0	4	0	0	0
41	16	4	94	7	2	0	4	0	2	2
42	12	9	115	21	1	0	4	0	10	7
43	13	23	126	9	4	0	20	0	10	14
44	15	36	106	31	13	4	10	0	19	23
45	47	50	136	36	16	5	4	0	23	24
46	62	48	122	39	21	6	13	3	26	24
47	57	42	114	37	27	14	20	6	30	19
48	73	48	86	28	34	29	17	7	67	18
49	121	35	60	35	22	24	15	15	116	10
50	124	31	55	37	34	37	30	16	103	14
51	144	37	29	37	32	23	25	22	82	13
52	138	51	16	34	32	20	19	13	53	10
53	125	26	12	33	33	10	19	18	28	3
54	78	39	4	24	34	22	14	20	27	3
55	66	25	8	26	42	25	11	13	16	4
56	26	30	4	21	21	17	4	14	14	1
57	28	41	2	7	9	25	2	9	3	0
58	9	38	1	13	11	22	5	9	4	0
59	4	19	1	6	7	16	3	6	4	2
60	1	24	0	4	7	5	8	5	2	0
61	2	31	0	1	3	5	10	3	4	0
62	0	35	1	5	1	1	8	1	1	1
63	0	28	0	1	1	2	12	1	2	0
64	0	19	0	3	0	0	21	0	1	1
65	0	17	0	0	0	0	28	0	0	1
66	0	24	0	1	0	0	22	0	0	3
67	0	18	0	0	0	0	28	0	0	1
68	0	9	0	0	0	0	20	0	0	2
69	0	11	0	0	0	0	13	0	0	0
70	0	11	0	0	0	0	12	0	0	0
71	0	6	0	0	0	0	10	0	0	0
72	0	0	0	0	0	0	4	0	0	0
73	0	1	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	1	0	0	0
75	0	1	0	0	0	0	1	0	0	0
76	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	1	0	0	0
TOTAL	1187	867	1131	507	407	312	442	181	650	200

Tab. IV b. - Skipjack length composition/year (1 cm class), Madeira, 1986-1995.

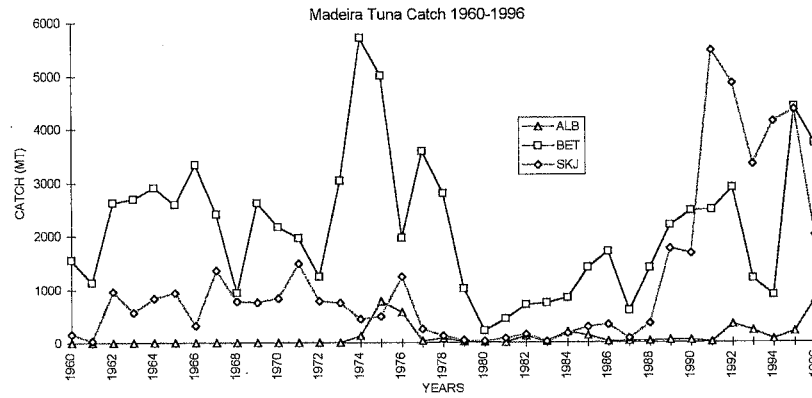


Fig. 1 - Tuna catch by main species (MT), Madeira, 1960 - 1996.

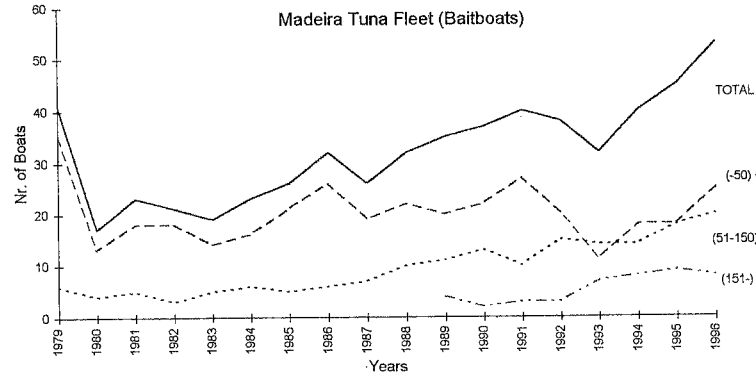


Fig. 2 - Fishing tuna fleet composition by Gross Tonnage (Gt), Madeira surface fishery, 1979 - 1996.

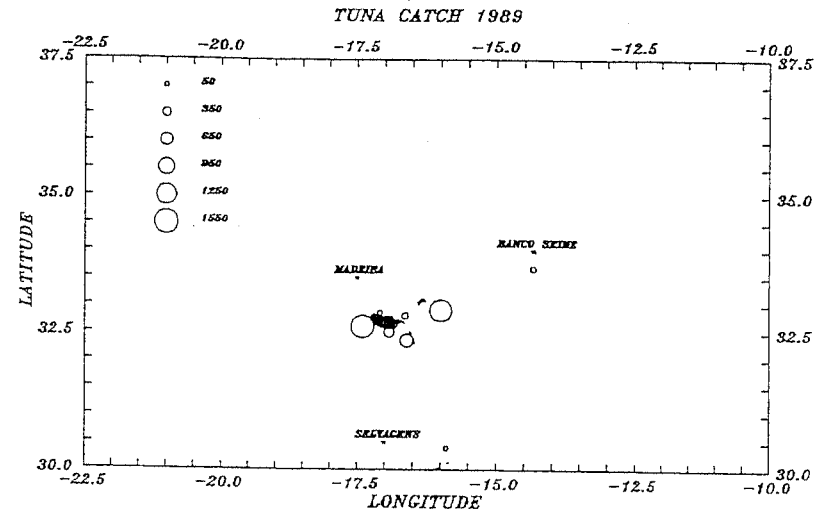


Fig. 3 - Tuna catch by fishing grounds around Madeira, 1989. Tuna catch in recent years show the same fishing ground pattern.

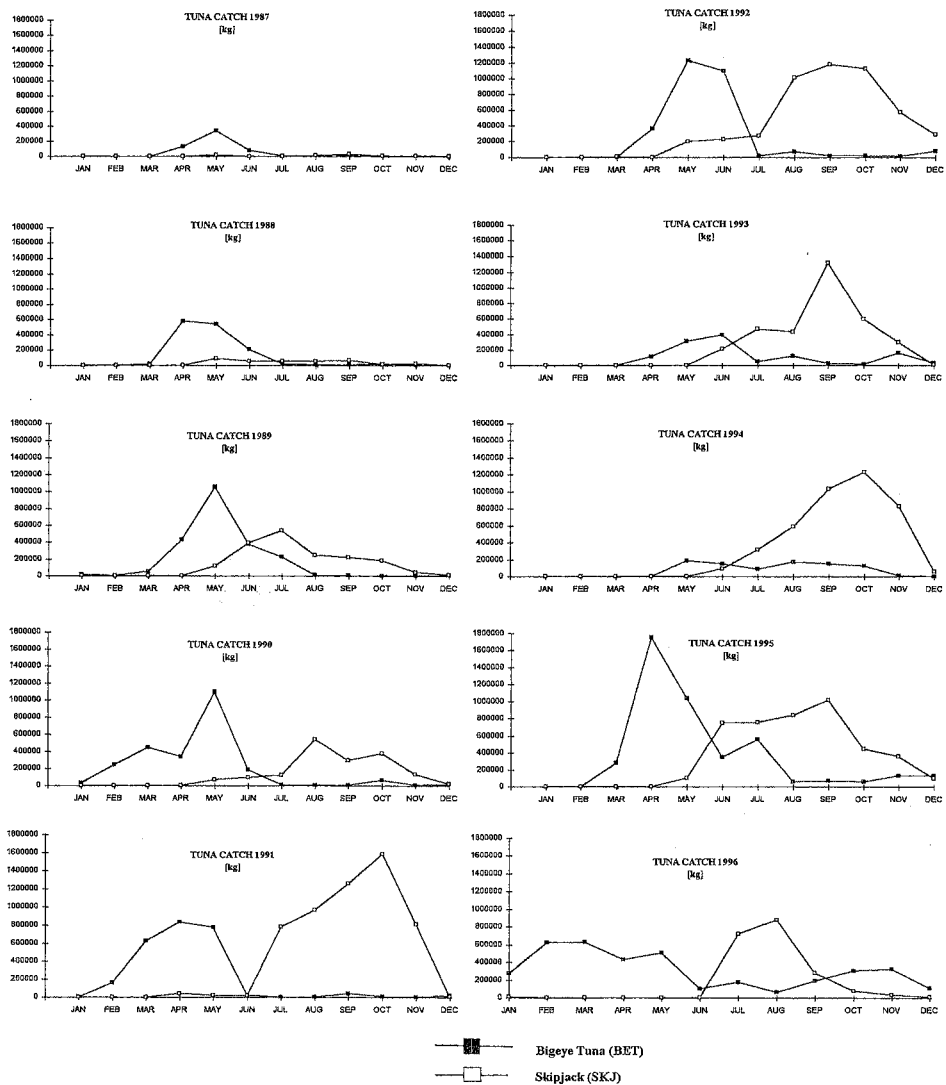
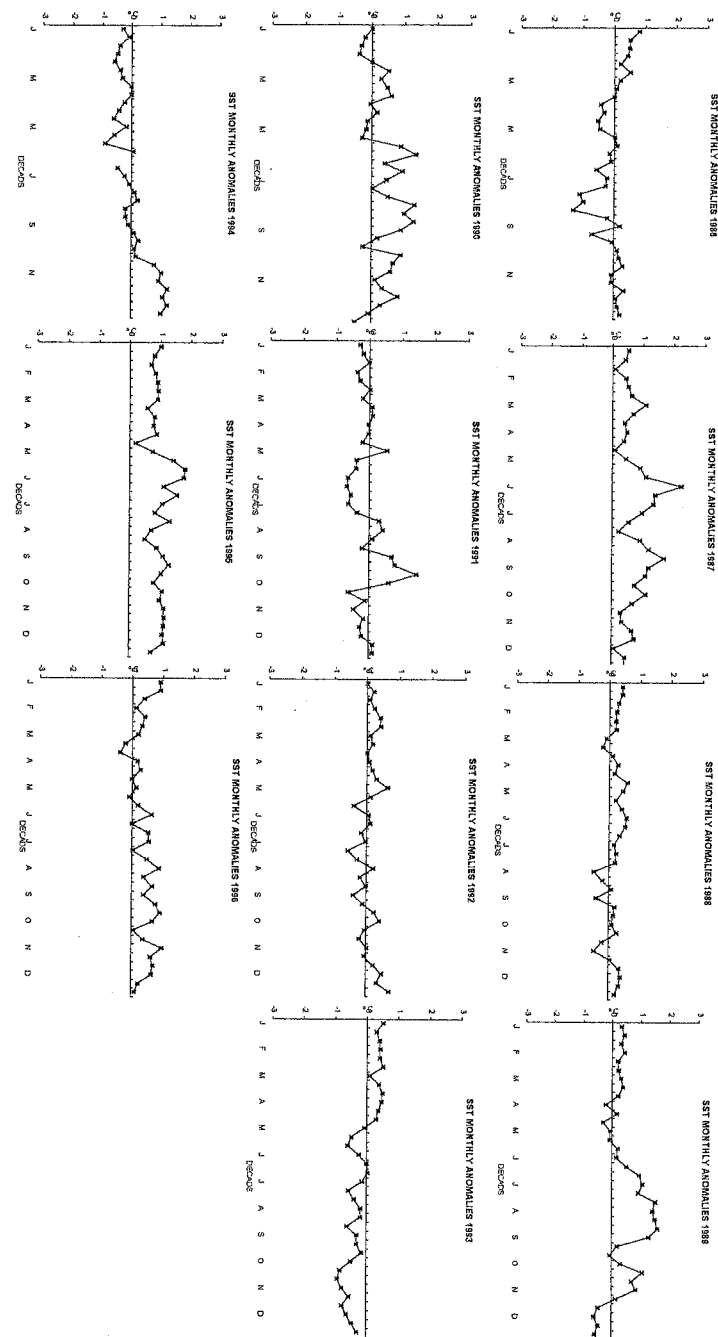


Fig. 4 - Tuna catch seasonality for major species (BET and SKJ) caught in Madeira, 1987 - 1996.

Fig. 5 - Sea surface temperature anomalies, Madeira, 1986 - 1996.
Source: Observatório Meteorológico do Funchal.



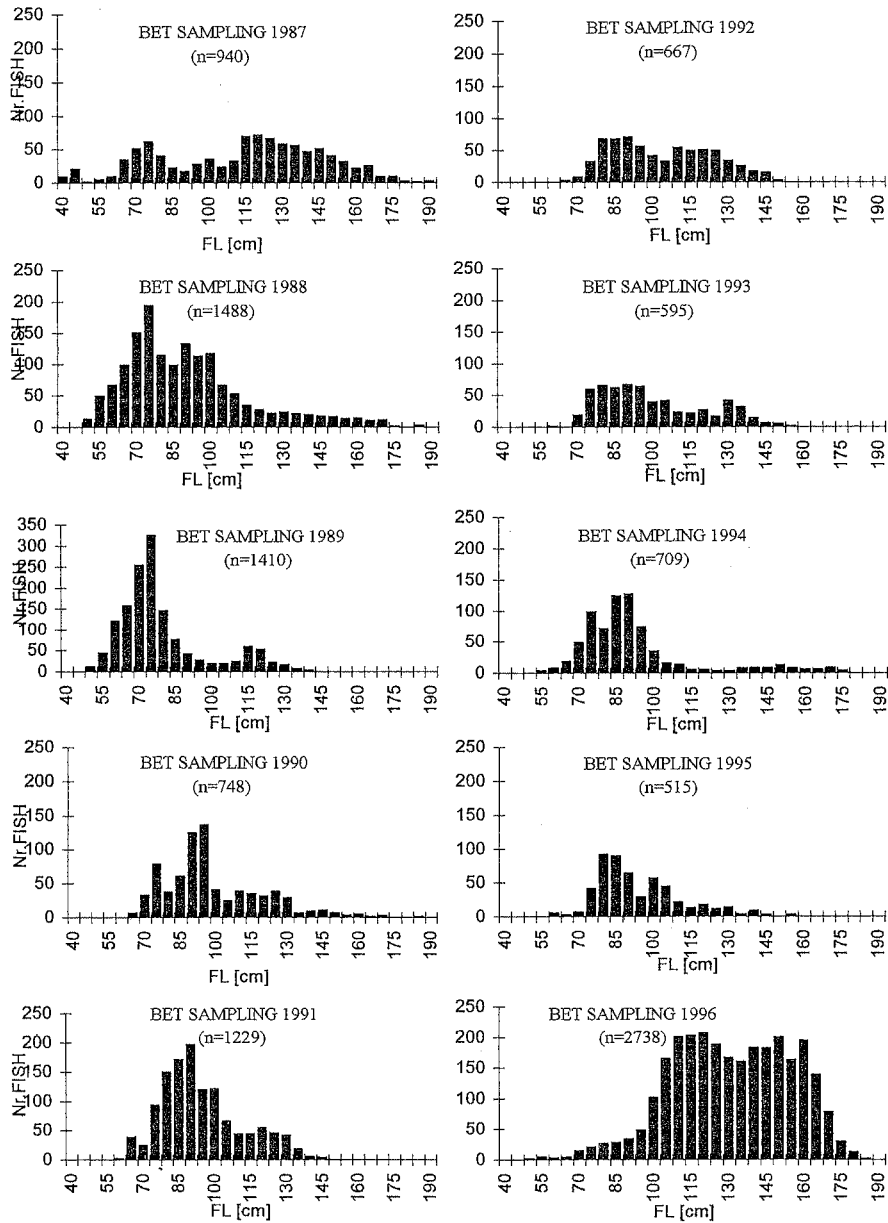


Fig. 6a - Bigeye length composition / year, Madeira, 1987 - 1996.

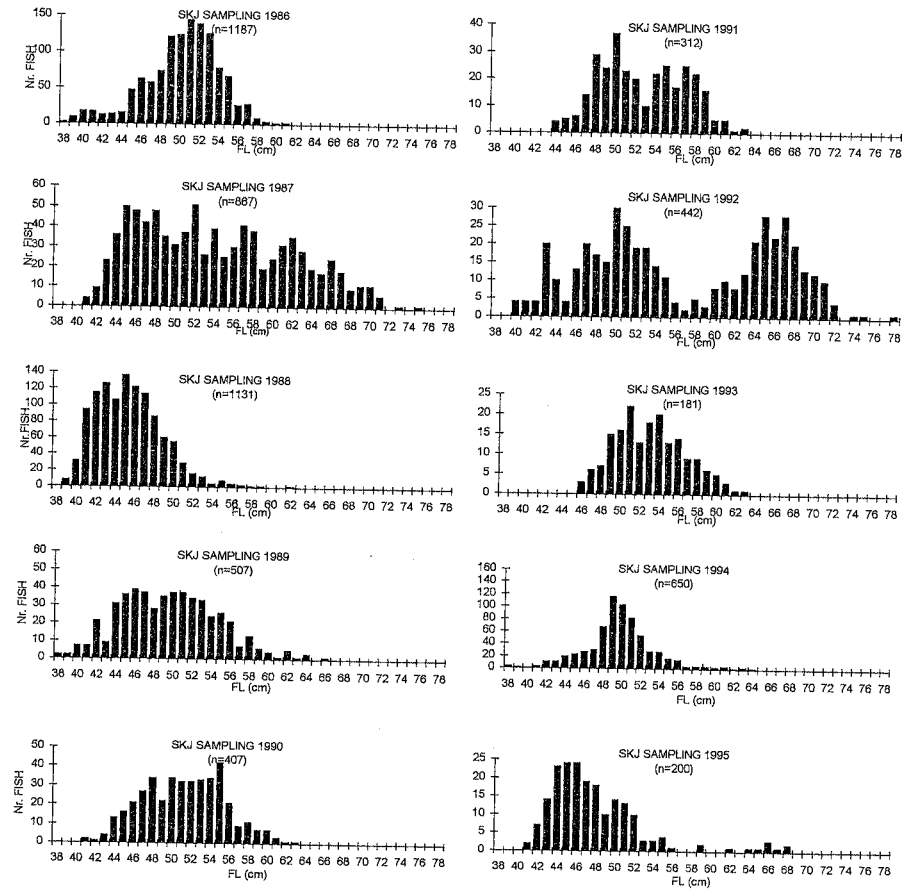


Fig. 6b - Skipjack length composition / year, Madeira, 1986 - 1995.