

LENGTH COMPOSITION OF BIGEYE TUNA CAUGHT BY MADEIRAN BAITBOAT FISHERY, 1979-1984

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SUMMARY

The main purpose of this report is to present all available data on the size composition of bigeye tuna (Thunnus obesus) caught by the Madeiran baitboat fishery from 1979 to 1984.

RESUME

Le but principal de ce rapport est de présenter toutes les données disponibles de composition de longueur sur le thon obèse (Thunnus obesus) capturé durant la période 1979 à 1984 par la pêcherie de canneurs de Madère.

RESUMEN

El motivo principal de este informe es el de presentar todos los datos disponibles sobre composición por talla del patudo (Thunnus obesus) capturado por la pesquería de cebo de Madeira desde 1979 a 1984.

1. SAMPLE LENGTH FREQUENCY

Data compiled in this report were collected from commercial boats at the time of unloading at port, during the period from 1979 to 1984.

Sampling data were taken almost everyday at the unloading port, just before the fish auction, in Funchal, whenever it was possible.

Each length sample consisted of 50 fish from one vessel, sampled at random, and if the amount of specimens unloaded did not reach that number, we measured the total catch.

All Tuna were measured in Fork Length (FL), a distance from the upper jaw to the posterior tip of the shortest caudal fork, and were recorded by 1 cm size class intervals every month.

All measurements were made using a steel measuring tape from 1979 to 1983. Since 1984 we have been using calipers and nowadays this is the equipment adopted for taking the measures.

2. CATCH IN NUMBER BY LENGTH CLASS

When sample fish number by month was few or none, some substitutions were made, as indicated in Tables (1a., 1b., 1c., 1d., 1e., 1f.,) and following the criteria below:

(1) Same time-area-strata of a different year (the last or the following year).

(2) The previous and/or the following month in the same time-area-strata.

(3) When fish were landed one or two at a time, generally during low catch month, catch records in weight were used and were converted into fork length by using the FL/W relationship for BET, from SANTOS GUERRA 1980, ($w=2.15 \times 10^{-5} \times FL^{2.984}$).

This species is normally landed in the gilled and gutted condition. The correction of weight recorded were made by using the conversion factor of 1.13, adopted by ICCAT for this purpose.

The sample size frequencies were raised to total catch, using the weighting factor. This was obtained from the relation between total catch in weight and sample weight in each time-area-strata.

Catch/Quarter and Catch/year in number by length class is presented in Table (2) and Figures (1,2,3).

3. BRIEF EXPLANATION ON THE RESULTS

Most of the catch comprises the fish between 52 cm and 190 cm. The average length obtained in each time-area-strata (by quarter and by year) is presented in Tables (3a., 3b.) and Figures (4,5).

It seems that we had a higher proportion of large sized fish caught during 1979 and 1980 (130.99 cm and 141.32cm). Since 1982 the FL average in total catch/year have shown a tendency to decrease, reaching a minimum in 1984, around 91.85cm.

Small sized fish were abundant during I-II quarters of the Year, sometimes II-III quarters, while the largest fish were caught during III-IV or IV-I quarters.

REFERENCES:

- ICCAT, 1978 - "Field Manual for statistics and sampling Atlantic Tunas and Tunas like-fishes" - 2nd Edition.
- ICCAT, 1984 - "Data Record", Vol 23.
- SOKAL and Rohlf, 1969 - *Biometria: Principios e métodos estadísticos en la Investigacion biológica*, H. Blume Ed.

ACKNOWLEDGMENTS

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Table 1a. Sample size and substitution of data for calculating catch by length class/month, 1979.

BET -1979- CATCH AT LENGTH DATA

MONTH	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT (kg)	RAISING FACTOR	WEIGHT (kg)	No.	
JAN	14266.5	10.29	1386.36	17	SAMPLING JAN 88
FEB	29585.4	14.38	2051.31	36	SAMPLING JAN 88+MARCH 88
MAR	12383.4	18.5	664.95	19	SAMPLING MARCH 88
APR	121385.7	6.58	18448.81	597	
MAY	512612.1	49.72	10318.67	218	
JUN	285926.5	38.28	9443.48	128	
JUL	48935.8	9.28	5278.46	61	
AUG	6611.6	3.1	2134.94	17	
SEP	2393.3	2.67	894.96	17	SAMPLING SEP 79+OCT 79+SEP 88+OCT 88
OCT	4256.7	4.76	894.96	17	SAMPLING OCT 79+SEP 79+SEP 88+OCT 88
NOV	9184.11	2.99	1836.9	14	SAMPLING NOV 79+NOV 88
DEC	1893.9	2.28	838.46	13	

TOTAL:	1843191		53367.46	1138	

Table 1b. Sample size and substitution of data for calculating catch by length class/month, 1980.

BET -1980- CATCH AT LENGTH DATA

MONTH	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT (kg)	RAISING FACTOR	WEIGHT (kg)	No.	
JAN	5129.87	3.7	1386.36	17	
FEB	3138.81	1.53	2051.31	36	SAMPLING JAN 88+MAR 88
MAR	3491.7	5.25	664.95	19	
APR	2648.72	4.48	591.5	14	
MAY	46308.26	31.81	1528.25	38	
JUN	9818.64	27.96	3229.97	46	
JUL	51724.62	17.37	2977.95	44	
AUG	6778.98	5.66	1195.42	21	
SEP	1389.67	1.46	894.96	17	SAMPLING SEP 88+OCT 88+SEP 79+OCT 79
OCT	1219.27	1.36	894.96	17	SAMPLING OCT 88+SEP 88+OCT 79+SEP 79
NOV	18172.26	9.85	1836.9	14	SAMPLING NOV 88+NOV 79
DEC	113				FL/W RELATION (1 FISH UNLOADED)

TOTAL:	224482.16		16444.53	275	

FL/W RELATION - (SANTOS BUEPRA, 1988)

Table 1c. Sample size and substitution of data for calculating catch by length class/month, 1981.

BET -1981- CATCH AT LENGTH DATA

MONTH	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT(Kg)	RAISING FACTOR	WEIGHT(Kg)	Nc.	
JAN	511.89				FL/W RELATION (UNLOADED FISH)
FEB	794.39	7.25	109.5	4	
MAR	43942.31	32.58	1346.36	64	
APR	223249.58	119.95	1861.25	69	
MAY	148665.79	98.93	1547.81	28	
JUN	28465.83	21.67	1377.4	24	
JUL	546.92	1.23	445.94	15	SAMPLING JUN 82
AUG	167.58				FL/W RELATION (UNLOADED FISH)
SEP	337.87				FL/W RELATION (UNLOADED FISH)
OCT	133.34				FL/W RELATION (UNLOADED FISH)
NOV	88.6				FL/W RELATION (UNLOADED FISH)
DEC	1887.4	1.54	654.27	9	

TOTAL:	439923.7		7344.23	213	

FL/W RELATION - (SANTOS GUERRA, 1988)

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Table 1d. Sample size and substitution of data for calculating catch by length class/month, 1982.

BET -1982- CATCH AT LENGTH DATA

MONTH	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT(Kg)	RAISING FACTOR	WEIGHT(Kg)	Nc.	
JAN	3675.34	13.63	279.11	7	
FEB	1175.72	13.37	88.26	4	
MAR	2835.17	21.61	131.2	4	
APR	93687.51	156.94	596.46	34	
MAY	384496.93	114.84	2669.98	188	
JUN	139564.84	312.57	445.94	15	
JUL	145778.46	25.4	5739.17	146	
AUG	6285.59	41.93	149.37	38	
SEP	2262.34	12.94	176.29	15	
OCT	438.44				FL/W RELATION (UNLOADED FISH)
NOV	4428.11	11.4	388.28	11	
DEC	1348.18	2.83	473.83	12	SAMPLING DEC 82+NOV 82

TOTAL:	786113.85		11137.89	391	

FL/W RELATION - (SANTOS GUERRA, 1988)

Table 1e. Sample size and substitution of data for calculating catch by length class/month, 1983.

BET -1983- CATCH AT LENGTH DATA

	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT (kg)	RAISING FACTOR	WEIGHT (kg)	Nc.	
JAN	1223.79				FL/W RELATION (UNLOADED FISH)
FEB	166.11		56.5	2	SAMPLING FEB 83 + FL/W RELATION (UNLOADED FISH)
MAR	2770.76	2.22	1259.1	59	
APR	287654.45	22.87	9877.86	489	
MAY	275148.22	23.65	11633.34	289	
JUN	184474.76	42.86	4383.8	122	
JUL	45863.61	6.65	6784.41	129	
AUG	1185.37	1.58	758.32	14	SAMPLING SEP 83+FL/W RELATIONATION
SEP	2244.69	2.94	758.32	14	
OCT	14219.92	9.85	1444.36	48	
NOV	2386.82	4.73	505.11	7	
DEC	3628.59	18.34	369.51	6	

TOTAL:	748348.97		36925.63	1889	

-5 2.984

FL/W RELATION - (SANTO GUERRA, 1966) => $W=2.15 \times L^3 \times FL$
 WEIGHT CORRECTED WITH CONVERSION FACTOR FROM ICCATFOP BET=1.13

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Table 1f. Sample size and substitution of data for calculating catch by length class/month, 1984.

BET -1984- CATCH AT LENGTH DATA

	CATCH		SAMPLING DATA		SUBSTITUTIONS
	UNLOADED WEIGHT (kg)	RAISING FACTOR	WEIGHT (kg)	Nc.	
JAN	595.51	2.58	238.53	7	
FEB	586.24	2.2	238.53	7	SAMPLING JAN 84
MAR	18933.72	13.43	1336.38	68	SAMPLING MAR 84+MAR 83+FL/W RELATION
APR	254595.38	39.16	6498.69	319	
MAY	478546.69	45.58	10324.26	625	
JUN	48927.76	4.74	10324.26	625	SAMPLING MAY 84
JUL	3138.49	8.46	6888.37	138	SAMPLING JUL 84+JUL 83
AUG	21746.85	2.87	7588.79	155	SAMPLING AUG 84+JUL 83+SEP 83
SEP	5184.21	6.8	758.32	14	SAMPLING SEP 83
OCT	5896.3	2.85	1922.47	57	SAMPLING OCT 84+OCT 83
NOV	931.12	1.43	658.88	9	SAMPLING NOV 84+NOV 83
DEC	185.89				FL/W RELATION (FISH UNLOADED)

TOTAL:	838192.36		46737.42	2888	

CLASSES	1979					1980					1981					1982					1983				1984				
	I	II	III	IV	TOTAL	I	II	III	IV	TOTAL	I	II	III	IV	TOTAL	I	II	III	IV	TOTAL	I	II	III	IV	TOTAL				
102-103.9	14	199		3	216	6	28	10	44	98	600	2	2	702		676	25		651	2	687			689	14	2299			2313
104-105.9		149			149		36		36	33	91	9		133	13	926	25		944	6	344	7		357	41	1240	3		1277
106-107.9		240		3	251			10	10	137	211	2		350		1467	25		1555	1	160			161		1206			1206
108-109.9		205			205		64		64	66	360			426	13	927	102		1042	2	200			210	13	793			806
110-111.9	33	176		5	216	7			7	72	400			552	27	542	202	14	704	9	296	14		321	64	1123	6		1193
112-113.9	63	298		2	383	17	107		204	33		2		35	14	854	496		1344	4	207			211	20	1000			1100
114-115.9	66	228		0	294	14	107		201		261	1		262		855	25	29	000		229	13		242	14	1063	3	3	1087
116-117.9	66	491		4	561	14	152		166		360			360		157	102	29	200		207	7		214		509	3		512
118-119.9	33	395			426	7	92	17	116	65	331			396		420	102	15	505	2	279	7		286	16	502	3		521
120-121.9	33	496			529	7	120	11	130		211			211		305	152		537	6	393	7		400	16	350	3		377
122-123.9		426			426		4	6	10		21	1	2	24		114	254	20	304		570	26		604		655	14	1	670
124-125.9	58	577			635	12	9	40	61		404			404	14	470	76		540	2	553	26		581	15	140	14		169
126-127.9	33	624			657	7	32	17	56	7	21			28		271	102		300	3	390	53		452	13	325	26		364
128-129.9	33	632			665	7	32	17	56	33	633	1	1	660	14	501	100	16	711	2	500	20		596		206	13		299
130-131.9	99	279	10		396	21	56		77		613			613	22	114	102	14	250		662	00		742		447	00	3	490
132-133.9		616	10		634		32	52	84	100	702		2	804		228		14	242	5	741	52	10	800		156	33		109
134-135.9	33	495			528	7	112	6	125	65	360	1		424	14	313			320	2	702	75		779	20	51	52	6	129
136-137.9	33	411	10	3	465	7			17		364		1	365	14	342	25	2	304		204	27	10	241		102	13	4	119
138-139.9		516			516		00	35	129		372		2	375			25		25	2	300	52	10	453	13	39	33	3	00
140-141.9	33	309	10	4	364	7	60	45	112		21			21		220	76		300	5	375	21	10	411	5	70	33		116
142-143.9		349	9		356		64	20	92	1	102		5	100		114	51	1	164		299	25	20	344		90	20	6	116
144-145.9		560	19		579		4	35	39		153	1		154		427	25		452		337	40		377		90	20	3	113
146-147.9		249	28	3	280		60	34	100		42			42		000			000		224	30	5	267			27	4	31
148-149.9		136	21	7	164		92	19	112	2	203			205		727	51	1	779		93	13	10	116		39	7	3	40
150-151.9		301	28		329		20	17	45		21			21			102		102		295	27		322		51	13	1	65
152-153.9		275	12	5	292		144	77	222			1		1		114	101		215		113	10	10	141		51	17	3	71
154-155.9		119	20	3	150		20	34	72		112			112			101		101	2	47	20	5	74	13	51	10	1	75
156-157.9		200	28	2	230		116		116				2	7		153		153		06	10	20	124			17	3	20	
158-159.9	14	159	20	3	204	6	32		40		91			91		127		130	4	71	20	5	106			14	2	16	
160-161.9	14	449	59		522	6	32	17	55		91			91		114	25		139		166	20	20	212		51	14	6	71
162-163.9		301	3	3	307		32		42	34	102			216			76		76		118	13	13	146			7	4	11
164-165.9	14	251	12	3	260	6	20	17	61		91		2	93						1	164	12	25	202			9	7	16
166-167.9		530	3	6	539			17	37	33				33			50		50		47	7		54			7		7
168-169.9	28	171	70	7	296	12	60	60	133					133						2	71	13	5	91	13			1	14
170-171.9		390	12	5	415			2	3		91			91			102		102		40		20	06			7	5	12
172-173.9		201	27	10	310		56	21	79		117			117			50		50		24	13	10	47			7	3	10
174-175.9	64	167	25	10	266	16	00	43	150		21			21			76		76		24	7	5	36			3	1	4

Table 3a. Fork length average (\bar{X}), standard deviation (SX) and number of fish (n) caught in Madeira by year from 1979 to 1984.

	1979	1980	1981	1982	1983	1984
\bar{X}	130.99	141.32	119.98	103.07	109.99	91.05
SX	30.37	27.36	24.67	28.48	30.93	20.87
n	19882	3814	13231	27447	23083	43579

Table 3b. Fork length average (\bar{X}), standard deviation (SX), and number of fish (n) caught in Madeira by quarter from 1979 to 1984.

		I	II	III	IV
1979	\bar{X}	129.86	129.82	161.67	144.57
	SX	25.89	30.24	19.59	40.47
	n	920	19153	655	154
1980	\bar{X}	134.46	138.77	147.42	145.13
	SX	28.52	22.90	33.27	30.77
	n	230	2303	1124	157
1981	\bar{X}	100.27	116.11	185.23	141.91
	SX	21.75	24.50	13.25	22.18
	n	1835	11328	43	23
1982	\bar{X}	111.98	101.62	198.38	121.88
	SX	18.75	35.46	38.93	11.86
	n	238	22003	5034	172
1983	\bar{X}	103.72	104.73	134.75	107.03
	SX	26.15	31.25	25.07	41.55
	n	145	21434	56	576
1984	\bar{X}	100.47	91.09	137.53	109.15
	SX	21.87	20.77	28.83	40.52
	n	662	43553	593	171

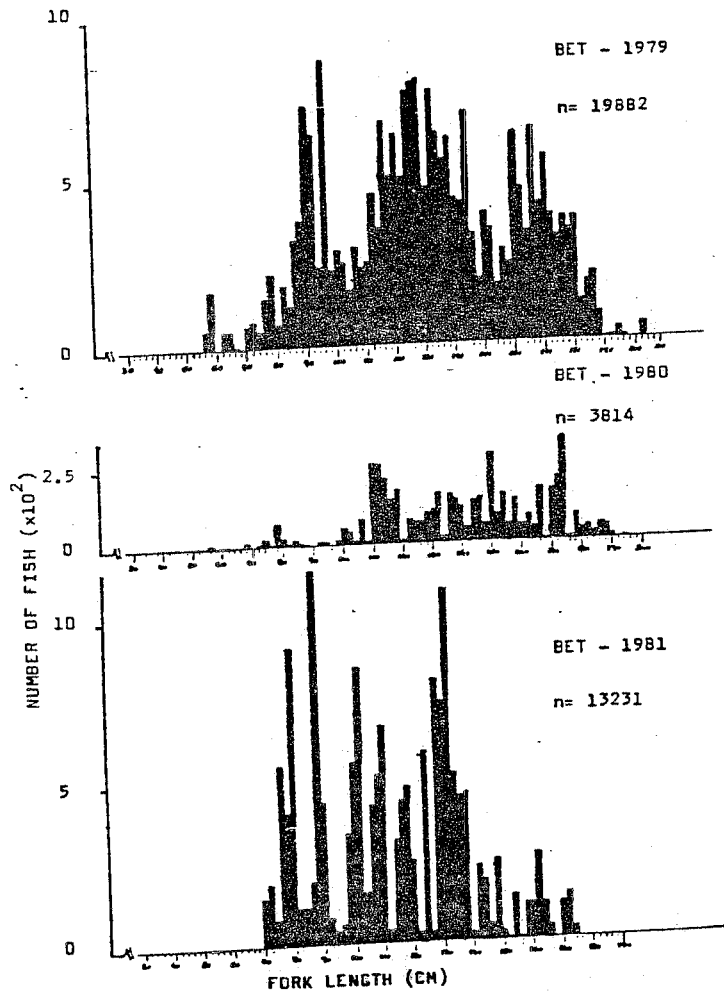


Figure 1. Length composition of Bigeye Tuna caught by Madeiran fishery, 1979-1981.

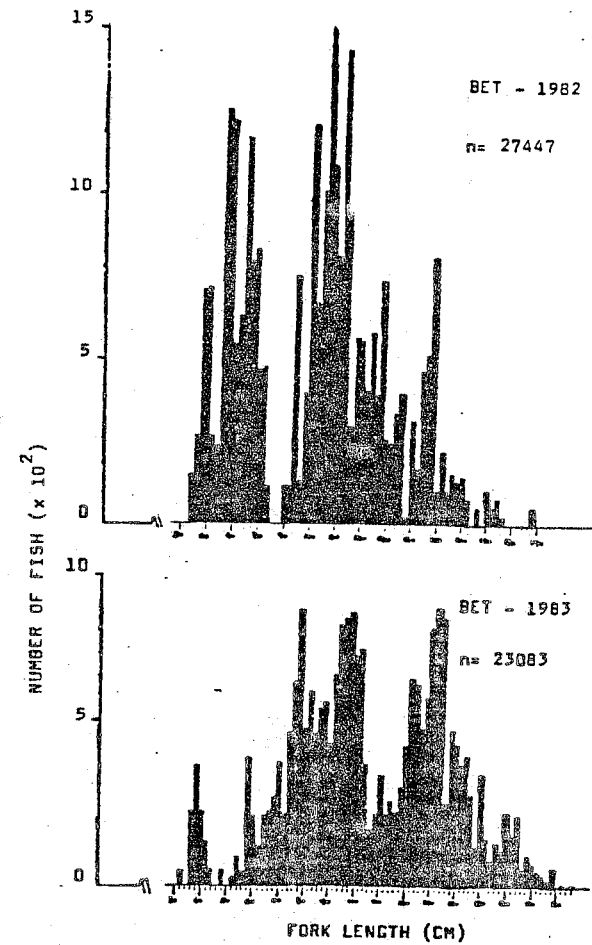


Figure 2. Length composition of Bigeye Tuna caught by Madeiran fishery, 1982-1983.

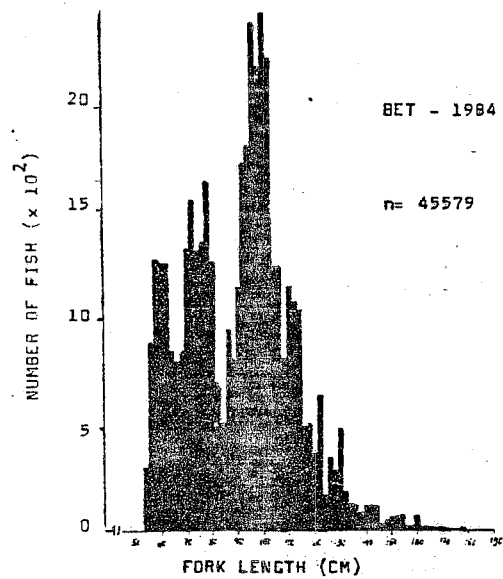


Figure 3. Length composition of Bigeye Tuna caught by Madeiran fishery, 1984.

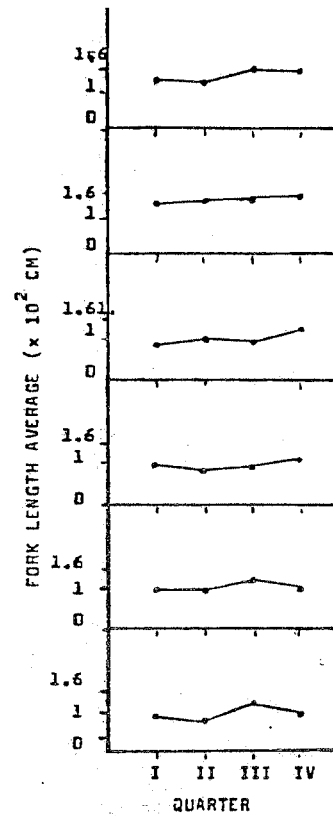


Figure 4. Fork length average/quarter of BET caught by Madeiran fishery, 1979-1984.

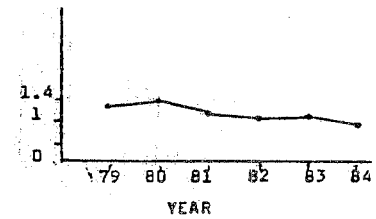


Figure 5. Fork length average/year of BET caught by Madeiran fishery, 1979-1984.