

FORK-LENGTH AND MEAN AGE STRUCTURE OF SOUTH TYRRHENIAN PURSE SEINE
BLUEFIN TUNA CATCH FOR THE YEARS 1982 AND 1984 TO 1988.

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With the aim to contribute for more extensive studies on Bluefin tuna (*Thunnus thynnus* (L.)) stocks of the Atlantic and Mediterranean, in the past years we made available to ICCAT Data Bank a number of sets of fork-length data, mostly collected in the south tyrrhenian spring-summer fishery and pertaining to the following ensembles of fish:

- a) tuna caught by coastal tuna traps during the years 1959-1961-1963-1965-1966-1967-1968, also including weight values in the latter year (ICCAT Data Record, no. 8);
- b) tuna caught by the tyrrhenian purse seiners fleet during years 1975-1977-1978-1979-1980-1981 (ICCAT SCRS 81/51).

Furthermore, we can give new sets of fork-length data collected during years 1982-1984-1985-1986-1987-1988 from samples of bluefin tuna catches achieved by purse seiners, still in the south tyrrhenian area (Tab. I).

It necessary to point out here that the first set of data (1982) was collected in the course of a research on tuna and tuna-like fishes supported by the Italian National Research Council, while the others (1984 to 1988) have arisen from surveys being part of a plan on pelagic fish resources investigations granted by the Italian Ministry of Merchant Marine.

The fork-length values are presented here by class intervals of 5 cm., while the frequency values are drawn up on histograms of Fig. 1 to 6. Besides, the frequency values of the corresponding mean ages are shown into Fig. 7 to 12.

A rough age structure of the catch is reported for each year into Tab. II.

From the ensemble of data and values presented here, it can be seen that many bluefin tuna enter in the tyrrhenian spring-summer fishery at the age of 3 years. Sometimes they form at sea homogenous separate schools; but often they enter also in the breeding schools of older fishes, where usually they keep some distinct emplacements and behavioural features, together with tunas of 4 years old.

Gonads development and maturative stages of the above mentioned age groups of tuna resulted to our observations well advanced in many cases; but it seemed that eggs don't reach full maturity (the translucent and floating ones were lacking) and that only in a few instances initial spawning apparently took place, with a very partial depletion of the ovaries.

Tentative estimates of Z.

On the base of the above reported fork-length data series we are making here an attempt to estimate the hypothetical values of total mortality (Z) by utilizing the descendent parts of the catch curves and plotting values against age (t) in the form of the following linear regression (PAULY, 1983):

$$\log_e (N/\Delta t) = a + bt \quad (\text{where } b \text{ is estimator of } Z)$$

For such an aim, we consider comparatively the parameters values (VB growth curve) estimated by ARENA, CEFALI & MUNAO' (1980):

$$L_{\infty} = 455,89; \quad K = 0,00507; \quad t_0 = -1,6128$$

and those estimated by FARRUGIO (1980):

$$L_{\infty} = 351,13; \quad K = 0,080; \quad t_0 = -1,087.$$

Owing to the bimodal shape of the catch curve, as can be seen from the fork-length and age frequency figures, we consider also two portions of the whole diagram: the one pertaining to small and medium sized tuna and the other pertaining to giant tuna.

The resulting values are the following:

Year	Small & medium tuna		Giant tuna	
	(A)	(F)	(A)	(F)
1982	0,69	0,77	0,66	0,41
1984	0,61	0,62	0,82	0,50
1985	0,86	0,97	0,92	0,80
1986	0,41	0,31	0,89	0,70
1987	0,65	0,74	0,37	0,37
1988	1,03	1,03	0,82	0,67

(A) and (F) respectively indicate series of Z obtained by utilizing growth parameters values of ARENA & Oth. and those of FARRUGIO.

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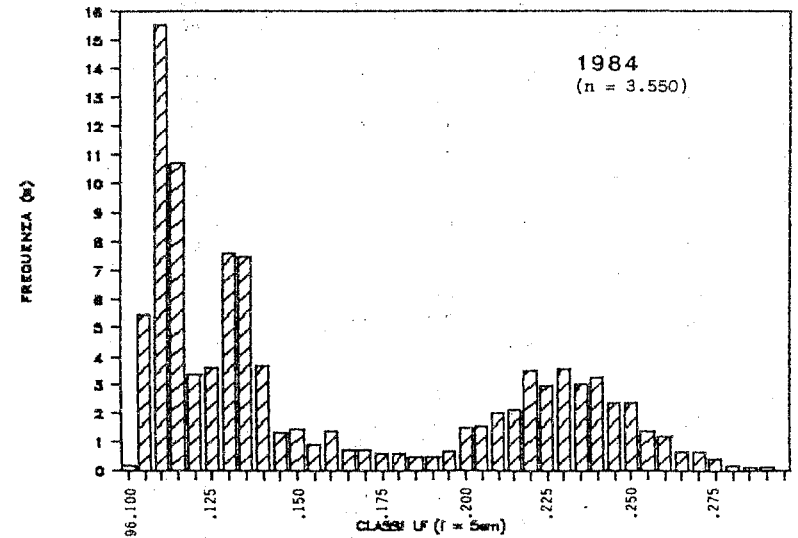
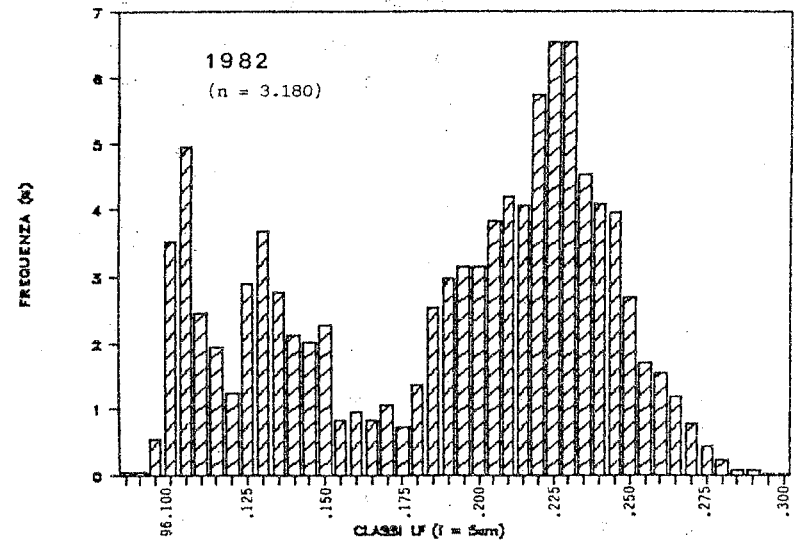
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FORK-LENGTH (i = 5 cm)	1982 (n.)	1984 (n.)	1985 (n.)	1986 (n.)	1987 (n.)	1988 (n.)
80 - 84.9	2	-	-	-	-	-
85 - 89.9	2	-	4	-	-	-
90 - 94.9	18	-	12	-	-	-
95 - 99.9	112	7	22	-	2	7
100 - 104.9	157	194	37	-	6	10
105 - 109.9	78	551	32	2	8	8
110 - 114.9	38	380	44	5	20	2
115 - 119.9	40	120	131	41	53	11
120 - 124.9	92	129	176	32	67	18
125 - 129.9	117	269	192	21	64	25
130 - 134.9	88	264	196	33	69	12
135 - 139.9	68	130	98	64	46	11
140 - 144.9	64	47	80	47	38	4
145 - 149.9	73	51	74	64	39	6
150 - 154.9	27	33	46	39	22	4
155 - 159.9	31	50	35	34	23	4
160 - 164.9	27	26	37	42	19	3
165 - 169.9	34	26	23	35	9	6
170 - 174.9	23	21	10	34	18	4
175 - 179.9	44	21	18	22	13	8
180 - 184.9	81	17	29	17	17	7
185 - 189.9	95	18	22	21	11	7
190 - 194.9	101	23	21	17	16	8
195 - 199.9	101	53	30	45	23	15
200 - 204.5	122	55	60	23	22	19
205 - 209.9	133	71	71	41	21	20
210 - 214.9	129	77	109	40	19	22
215 - 219.9	183	124	120	75	32	35
220 - 224.9	208	106	160	106	28	30
225 - 229.9	208	126	141	144	30	45
230 - 234.9	144	107	131	100	30	41
235 - 239.9	140	116	97	117	27	42
240 - 244.9	126	85	78	85	16	29
245 - 249.9	80	84	41	70	17	18
250 - 254.9	55	48	34	46	13	14
255 - 259.9	50	42	20	22	10	17
260 - 264.9	38	23	14	11	-	4
265 - 269.9	25	23	8	11	1	5
270 - 274.9	14	15	2	-	-	2
275 - 279.9	8	8	1	4	-	-
280 - 284.9	3	5	1	2	-	-
285 - 289.9	3	4	-	1	-	1
290 - 294.9	1	1	-	-	-	-
295 - 299.9	1	-	-	-	-	-
Total Samples	3.180	3.550	2.458	1.513	851	524

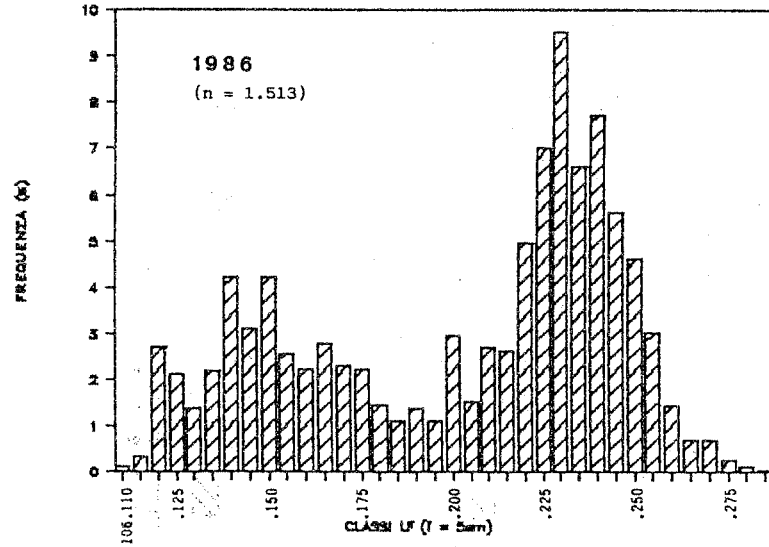
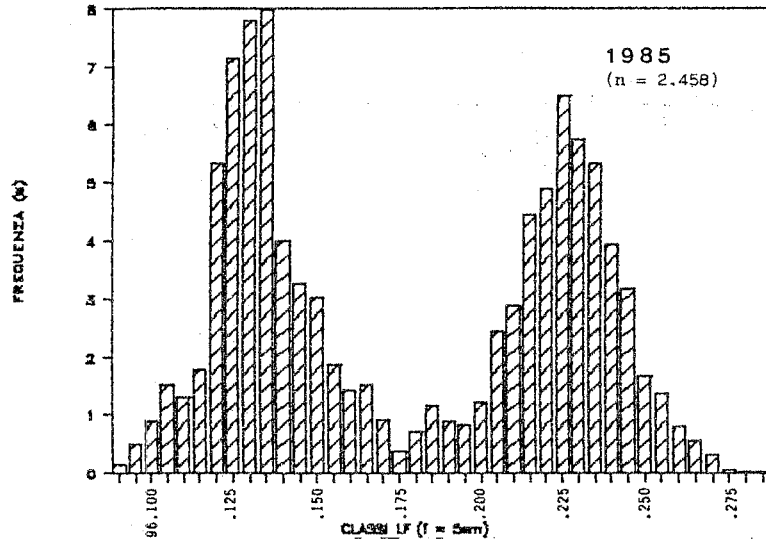
TAB. I - Fork-length distribution of sampled Bluefin tuna.

AGE (years)	1982 (n.)	1984 (n.)	1985 (n.)	1986 (n.)	1987 (n.)	1988 (n.)
2	146	-	92	-	-	-
3	2.556	9.968	778	43	208	101
4	2.237	6.886	4.008	771	1.460	246
5	1.361	2.008	1.453	1.063	710	78
6	564	960	680	698	369	41
7	670	599	294	553	231	67
8	1.839	511	415	334	254	82
9	1.480	951	519	413	260	127
10	1.739	1.302	1.038	492	231	156
11	2.596	2.025	1.615	1.099	346	242
12	2.337	2.052	1.568	1.481	346	321
13	1.699	1.770	1.009	1.226	248	265
14	936	1.162	433	704	173	119
15	584	572	196	200	68	78
16	259	335	57	67	6	26
17	73	114	11	37	-	-
18	20	35	-	6	-	4
19	7	9	-	-	-	-
20	6	-	-	-	-	-
Total catch	21.109	31.260	14.174	9.187	4.910	1.953

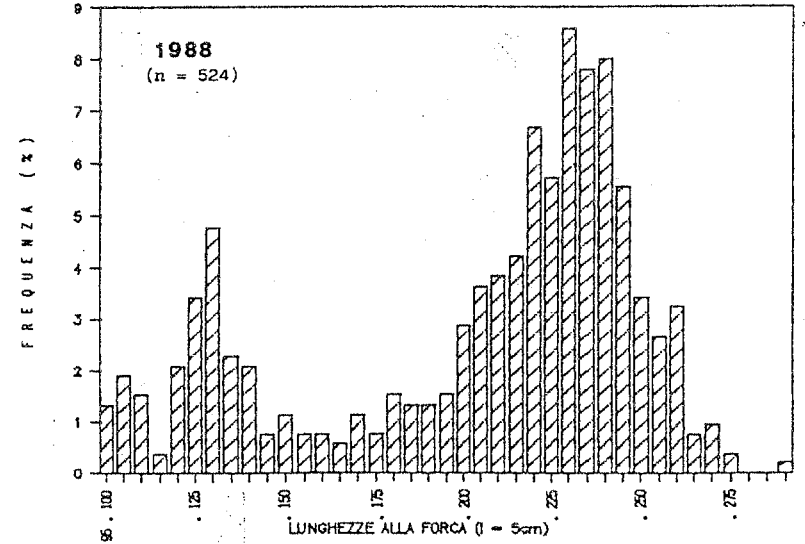
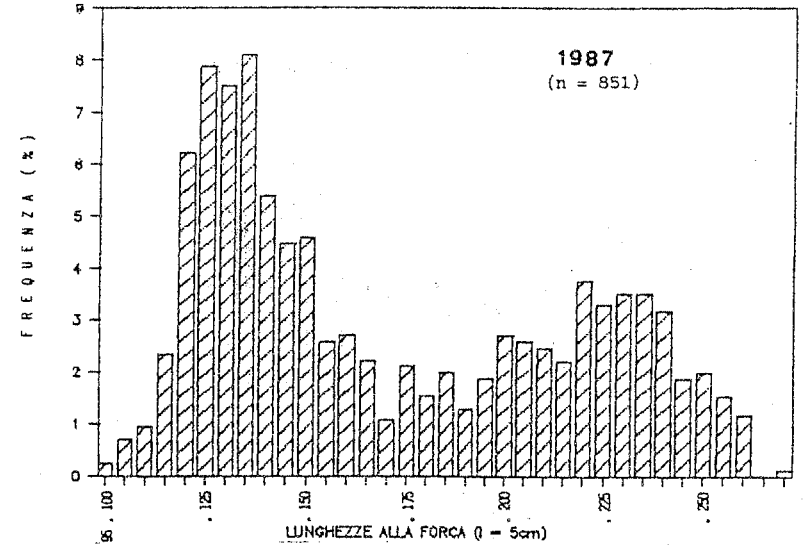
TAB. II - Distributive figures by approximate ages of Bluefin tuna caught in South Tyrrhenian by Italian purse-seiners.



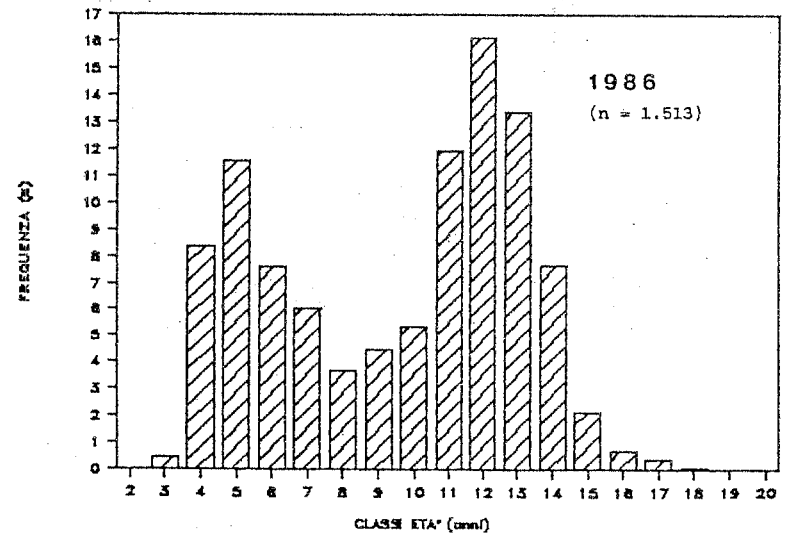
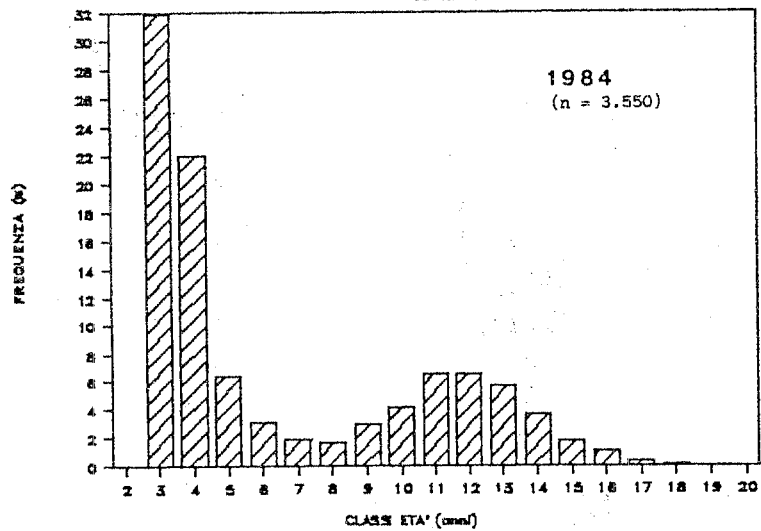
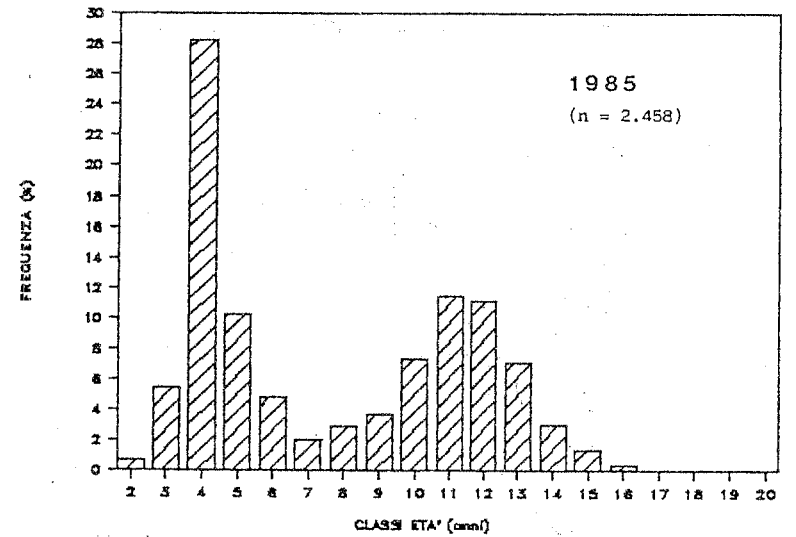
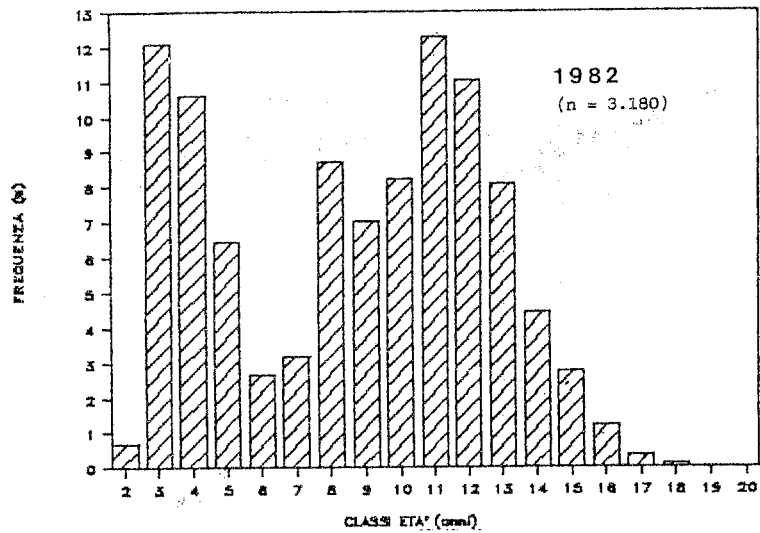
FIGG. 1 - 2 : BFT fork-length frequencies (5 cm. class. in %)



FIGG. 3 - 4 : BFT fork-length frequencies (5 cm. class in %)

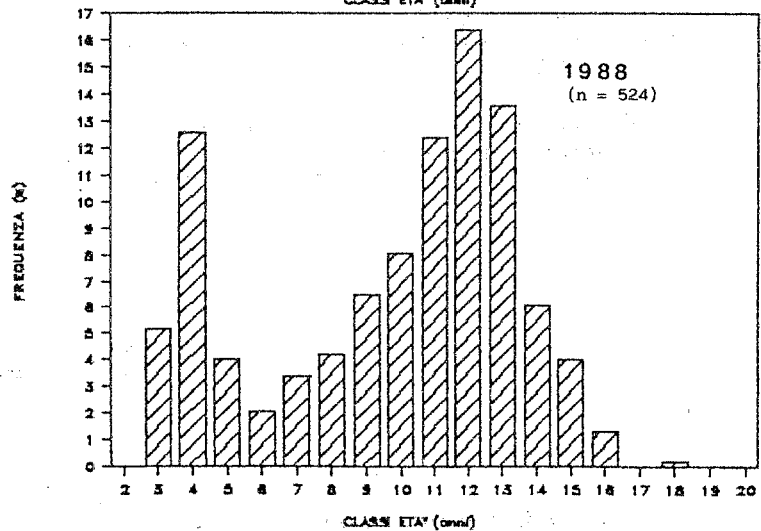
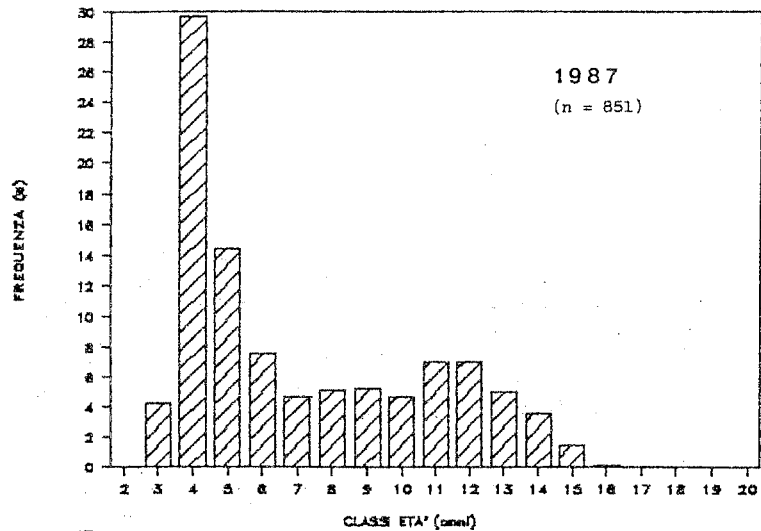


FIGG. 5 - 6 : BFT fork-length frequencies (5 cm. class in %)



FIGG. 7 - 8 : BFT mean ages frequencies (5 cm. class in %)

FIGG. 9 - 10 : BFT mean age frequencies (5 cm. class in %)



FIGG. 11 - 12 : BFT mean ages frequencies (5 cm. class in %)