

**CATCHES OF JUVENILE BLUEFIN TUNA (*THUNNUS THYNNUS* L.) AND SWORDFISH
(*XIPHIAS GLADIUS* L.) IN THE ITALIAN SEAS DURING THE ALBACORE FISHING SEASON**

*Metrio*¹, *G. de, A. Potoschi*², *L. Sion*¹, *M. Cacucci*¹, *P. Sturiale*²

SUMMARY

Fishing data were collected during the 1995 albacore fishing season to study the impact of such fishing activities on the recruitment of bluefin tuna and swordfish. The investigation was carried out both by means of on-board observers on some boats and in three landing pilot ports. The investigated areas were the northern and southern Ionian Sea and the southern Tyrrhenian Sea. The results of the investigations showed that there are some differences between the quantities of young fishes declared by fishermen and the ones really fished, that reach several thousands of specimens. This means that the total amount of young swordfish and bluefin tunas caught on albacore longlines in on the order of several thousands.

RÉSUMÉ

Des données de pêche ont été collectées au cours de la saison de 1995 de pêche au germon afin d'étudier l'impact de telles activités sur le recrutement du thon rouge et de l'espadon. L'étude a été menée à bien à la fois au moyen d'observateurs à bord de quelques bateaux, et dans trois ports pilotes de débarquement. Les zones étudiées sont la mer Ionienne Sud et Nord et la mer Tyrrhénienne. Les résultats des études montrent qu'il existe quelques différences entre les quantités de juvéniles déclarées par les pêcheurs et celles qui sont réellement pêchées ; cette différence s'élève à plusieurs milliers de spécimens. Ceci signifie que le nombre total d'espadons et de thons rouges juvéniles pris par les palangres ciblant le germon est de l'ordre de plusieurs milliers.

RESUMEN

Durante la temporada de pesca de atún blanco en 1995 se recolectaron datos de pesquerías para estudiar el impacto de tales actividades de pesca en el reclutamiento del atún rojo y el pez espada. La investigación se llevó a cabo por medio de observadores situados a bordo en algunos barcos y en tres puertos piloto de desembarco. Las áreas investigadas fueron el Jónico, norte y sur, y el sur del Tirreno. Los resultados de las investigaciones mostraron que hay algunas diferencias entre las cantidades de peces jóvenes declaradas por los pescadores y las cantidades reales, que alcanzan a varios miles de especímenes. Esto significa que el volumen total de pez espada juvenil y atún rojo capturado en palangres para atún blanco es del orden de varios miles de individuos.

Keywords: albacore, swordfish, bluefin, Ionian, Tyrrhenian

INTRODUCTION

The incidence of the albacore long-line fishing on the catch of different species of by-catch, turtles, sharks, as well as young swordfishes and other species of Teleostei in the Gulf of Taranto had been known since the beginning of the 80s (De Metrio *et al.*, 1981, 1982a, 1982b, 1982c, 1984a, 1984b). Starting in 1984, with the beginning of systematic research on biology and fishing of large pelagic fish, financed by the Italian Ministry of Marine Merchant within the evaluation of resources required by the sea-fishing 3 year plans, historical data started being collected in larger areas which, in time, led to the acquisition of greater information on accidental catches due to long-line fishing, mainly concerning young (class 0) swordfishes (*Xiphias gladius* L.) and bluefin tunas (*Thunnus thynnus* L.) (Marano *et al.* 1987; 1988; De Metrio *et al.* 1988; Potoschi *et al.* 1992; Di Natale *et al.* 1992).

A better knowledge of the amplitude of this phenomenon led scientists to take the problem into serious account and to promote research in order to obtain a real picture of the present situation.

With this aim, a research programme was promoted to investigate the phenomenon of swordfish and bluefin tuna accidental recruitment through the use of observers both on board

¹ Department of Animal Production, University of Bari, Via Amendola 165/A, 70126 Bari, Italy.

² Department of Animal Biology and Marine Ecology, University of Messina, Italy.

and in pilot ports in the Italian Southern seas, which are traditionally considered as nursery areas.

MATERIAL AND METHODS

Investigations were carried out in some pilot ports in the Northern Ionian (Gulf of Taranto), the Southern Ionian (Eastern coast of Sicily), the Southern Tyrrhenian (Northern coast of Sicily and Aeolian Islands), which previous investigations had indicated as the most adequate ones (Fig. 1).

Porto Cesareo was chosen as a pilot port in the Northern Ionian, with its 19-boat fleet that seasonally carries out albacore long-line fishing. Acitrezza was chosen as pilot port in the Southern Ionian, with its 17-boat fleet, whereas Lipari, with its 12-boat fleet, was chosen for the Southern Tyrrhenian.

Two observers were recruited for each pilot port: one for observations at landing and the collection of data in the cooperatives of fishermen; the other for observations on board.

In Porto Cesareo, the observer at landing daily collected the data on catches and effort of 7 boats in September and of 9 boats in October. He also measured the fork length (LF) of 54 tunas, as well as the LJFL (fork length from the lower jaw) of 136 swordfishes. In Acitrezza, the observer at landing collected data on all 17 boats, measuring the length of 534 swordfishes and 167 tunas, whereas in Lipari he observed all 12 boats, measuring the length of 513 swordfishes and 384 tunas.

To send the observers on board, a boat was chosen in each pilot port, having almost the same size and fishing equipment as most boats in the fleet. In Porto Cesareo, the on-board observer took part in 8 fishing days in the period between October 3rd and 29th, collecting data on catches and effort and identifying all the species caught. Moreover, he measured the length of 195 swordfishes and 23 tunas. In Acitrezza, the on-board observer joined 4 fishing days in October, 3 in November, and 3 in December, measuring the length of 61 swordfishes and 74 tunas. In Lipari, the on-board observer took part in 11 fishing days, carried out between October 1st and 30th. In this span of time, the length of 150 swordfishes and 224 tunas was measured.

On the basis of the data collected by the observers, both at landing and on board, the total catches in number, the effort ($E \times 1000$ hooks) and the catches for unit of effort (CPUE) in number of specimen were calculated for each month and for each pilot port.

RESULTS

In 1995, due to adverse weather and sea conditions, the fishing season in both the Northern Ionian and the Southern Tyrrhenian was very short, and limited to two months only (September and October in the Northern Ionian; October and November in the Southern

Tyrrhenian). In the Southern Ionian, on the contrary, it went on from September 1995 to February 1996.

Effort (E) and CPUE in number of specimen at landing

The results obtained, both for the target species (albacore) and for the two most important species of by-catch (swordfish and bluefin tuna), are reported in Table 1 for the Northern Ionian, in Table 2 for the Southern Ionian and in Table 3 for the Southern Tyrrhenian.

Table 1 - Porto Cesareo - Northern Ionian, 1995. Monthly values of effort (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected at landing.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE(N)	N	CPUE(N)	N	CPUE(N)
September	20.6	193	9.4	4	0.2	7	0.3
October	162.8	1506	9.3	132	0.8	48	0.3
Total	183.4	1699	9.3	136	0.7	55	0.3

Table 2 - Acitrezza - Southern Ionian, 1995. Monthly values of effort (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected at landing.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE(N)	N	CPUE(N)	N	CPUE(N)
September	111.0	1640	14.8	-	-	-	-
October	135.0	1995	14.8	210	1.6	255	1.9
November	105.0	882	8.4	90	0.9	126	1.2
December	57.0	420	7.4	45	0.8	70	1.2
January	149.6	1107	7.4	117	0.8	54	0.4
February	88.3	744	8.4	168	1.9	152	1.7
Total	645.0	6788	10.5	630	0.9	657	1.0

Table 3 - Lipari - Southern Tyrrhenian, 1995. Monthly values of effort (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected at landing.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE(N)	N	CPUE(N)	N	CPUE(N)
October	435.2	10415	23.9	1533	3.5	1470	3.4
November	241.4	6207	25.7	535	2.2	634	2.6
Total	676.6	16622	24.6	2068	3.0	2104	3.1

Effort (E) and CPUE in number of specimen on board

The results concerning the total effort (E x 1000 hooks), the catches in number and the CPUE in number of specimen for the whole period of on-board observations are reported in Table 4 for the port of Porto Cesareo, in Table 5 for the port of Acitrezza and in Table 6 for the port of Lipari.

Table 4 - Porto Cesareo - Northern Ionian, 1995. Monthly values of E (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected on board.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE(N)	N	CPUE(N)	N	CPUE(N)
October	17.6	138	7.8	195	11.1	24	1.4

Table 5 - Acitrezza - Southern Ionian, 1995. Monthly values of effort (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected on board.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE(N)	N	CPUE(N)	N	CPUE(N)
October	12.0	107	8.9	24	2.0	18	1.5
November	9.0	78	8.7	20	2.2	32	3.6
December	7.5	84	11.2	17	2.3	24	3.2
Total	28.5	269	9.4	61	2.1	74	2.6

Table 6 - Lipari - Southern Tyrrhenian, 1995. Monthly values of effort (x 1000 hooks), catches in number and CPUE (N) obtained from the data collected on board.

	E(x 1000 hooks)	<i>T. alalunga</i>		<i>X. gladius</i>		<i>T. thynnus</i>	
		N	CPUE (N)	N	CPUE (N)	N	CPUE (N)
October	37.4	1439	38.5	150	4.0	224	6.0

As the number of sampled boats can be considered representative of the corresponding fleets of the three areas we used the values of effort and of CPUE (N), obtained both at landing and on board, to extrapolate the catches and effort for the whole fleets. The results are reported in Table 7.

Table 7 - Data on the total catches in number obtained by relating the values of CPUE (N) collected at landing and on board and increments rates in percentage of the three investigated areas, to the effort carried out by the fleets of the whole areas during the whole fishing campaign.

AREA	EFFORT (x 1000 hooks)	SWORDFISH			BLUEFIN		
		L	B	Increment rate (%)	L	B	Increment rate (%)
N. IONIAN	713.2	499	7916	1486%	214	998	366%
S. IONIAN	2950.4	2663	6215	133%	2960	7694	160%
S. TYRRHENIAN	2029.8	6089	8119	33%	6292	12178	93%

Size frequency distribution

The size distribution of the swordfishes and bluefin tunas measured both at landing and on board in all three pilot ports, are reported in Figures 2 and 3.

It is evident that swordfishes captured by albacore longline were all very young specimen and the 98% of them were of class age 0. While the bluefin tunas of the class age 0 were about the 60%.

CONCLUSIONS

Investigations on the fishing-derived mortality of young swordfishes had already been carried out by De Metro et al (1984a) in the Gulf of Tarot. In the five-year period between 1978 and 1982, they investigated the accidental catches obtained by long-line fishing whose target species was albacore. The authors found out that the CUP of young swordfishes captured with albacore long-lines, in the five-year period under investigation, ranged between 0.36 and 1.39, with an average value of 0.68. When comparing these values with the ones collected in the same area during the present investigation, it can be asserted that, in terms of CUP values, present data can be overlapped to the old ones.

Of course, this regards only the observations carried out at landing, as there are no data for comparison for the observations carried out on board.

As to the results obtained from the 1995 on-board observations, it seems possible to assert that the real data, mainly for the Northern Ionic, are highly different from those reported by fishermen. Due to the checks at landing, that in recent years have been remarkably intensified, fishermen hide most undersized animals, by cutting them into pieces and by removing their skin, to make recognition harder. As a consequence, a large number of caught swordfishes escapes control, just like it happens for the thousands of juvenile swordfishes that are annually caught in recreational fishing and whose number, on the Ionic coast of Calibre only, was estimated around 650,000 units in 1984, 270,000 in 1985 and 380,000 in 1986 (De Metro et al. 1987).

As the investigation suggests, the impact of albacore long-line fishing does not seem to raise particular concerns for the catches of young blurring tunas in the North Ionic, instead they

reach interesting values in the Southern Ionic and Southern Tyrrhennian. The international scientific Community, though, has expressed its concern for the number of catches that, although with different equipment, are made every year, and one of the ICCAT recommendations is to place particular care in reducing the fishing-derived mortality of class 0 specimen. (SCRS, 1993).

REFERENCE

- ANONYMOUS (1993) - International Commission for the Conservation of Atlantic Tunas Report of Biennial period (1992-1993) Part I (1992):171.
- DE METRIO G., PETROSINO G., LO PRESTI M., TERIO E. (1981)- Andamento della pesca del pesce spada (*Xiphias gladius* L.) nel triennio 1978-1980 al largo delle coste del Salento. Atti e Relaz. Accad. Pugl. Scienze, n.s., vol. XXXIX parte II.
- DE METRIO G., PETROSINO G., TURSÌ A. (1982a) - Catture di tartarughe marine (*Caretta caretta* L. e *Dermochelys coriacea* L.) lungo le coste del Salento. Atti XIV Cong. SIBM, Boll. Mus. Ist. Biol. Univ. Genova, 50 suppl. 382.
- DE METRIO G., PETROSINO G., TURSÌ A. (1982b) - Captures de tortues marines (*Caretta caretta* L. e *Dermochelys coriacea* L.) dans la mer Ionienne. Communication au XXVIII Congrès-Assemblée Plénière CIESM Cannes. Comité Scientifique Vertébrés Marins et Céphalopodes.
- DE METRIO G., PETROSINO G., TURSÌ A. (1982c) - La pesca di *Prionace glauca* (Pisces, Chondrichthyes) lungo le coste del salento nel quadriennio 1978-1981. Atti XIV Congr. SIBM Boll. Mus. Ist. Biol. Genova, 50 suppl. 381.
- DE METRIO G., TURSÌ A., PETROSINO G. (1984a) - Catture di giovani esemplari di pesce spada (*Xiphias gladius* L.) nelle acque dello Ionio. Nova Thalassia, 6, suppl., 511-516, 1983-84.
- DE METRIO G., PETROSINO G., MONTANARO C., MATARRESE A., LENTI M., CECERE E. (1984b) - Survey on summer-autumn population of *Prionace glauca* (Pisces, Chondrichthyes) in the Gulf of Taranto (Italy) during the four year period 1978-1981 and its incidence on swordfish (*Xiphias gladius* L.) and albacore (*Thunnus alalunga* Bonn.) fishing. Oebalia, vol. X, ns.
- DE METRIO G. (1987) - Valutazione sull'entità, la composizione strutturale e la dinamica biologica degli stocks dei Grandi scombroidei (*Thunnus thynnus* L., *Thunnus alalunga* Bonn., *Xiphias gladius* L.) nel Golfo di Taranto. Rapporto 1984-1986 per MMM.
- DE METRIO G. (1988) - Valutazione sull'entità, la composizione strutturale e la dinamica biologica degli stocks dei Grandi scombroidei (*Thunnus thynnus* L., *Thunnus alalunga* Bonn., *Xiphias gladius* L.) Rapporto 1987-1988 per MMM.

DI NATALE A. (1990) - Bluefin (*Thunnus thynnus* L.) and Albacore (*Thunnus alalunga* Bonn.) fishery in the southern Tyrrhenian sea: 1985-1989 Surveys. ICCAT Vol. XXXV (2): pp.231-240.

DI NATALE A., LABANCHI G., MANGANO A., MAURIZI A., MONTALDO L., NAVARRA E., PEDERZOLI A., PINCA S., PLACENTI V., SCHIMENTI G., SIENI E., TORCHIA G., VALASTRO M. (1992) - Gli attrezzi pelagici derivanti utilizzati per la cattura del pesce spada (*Xiphias gladius*) adulto: valutazione comparata della funzionalità della capacità di cattura, dell'impatto globale e della economia dei sistemi e della riconversione. Rapp. MMM Dir. Gen. Pesca Maritt., Roma, 350 pag. + 60 suppl.

MARANO G., ROSITANI L., UNGARO N., DE ZIO V. (1987) - Cours des prises avec palangre de surface dans l'Adriatique du Sud (Cotes italiennes), triennat. 1984-86 FAO Fisheries Report N. 394.

MARANO G., ROSITANI L., UNGARO N., DE ZIO V. (1988) - Attività di pesca con "long-line" nel basso Adriatico: Grandi Scombroidei 1984-1985. Atti CNR, 1.

POTOSCHI A., CAVALLARO G., STURIALE P., LO DUCA G. (1992) - Valutazione degli stocks di pesce spada (*Xiphias gladius*), tonno (*Thunnus thynnus*) ed alalunga (*Thunnus alalunga*) nel Mar Ionio relativamente alle marinerie siciliane. Rapporto 1990-1992 per MMM.

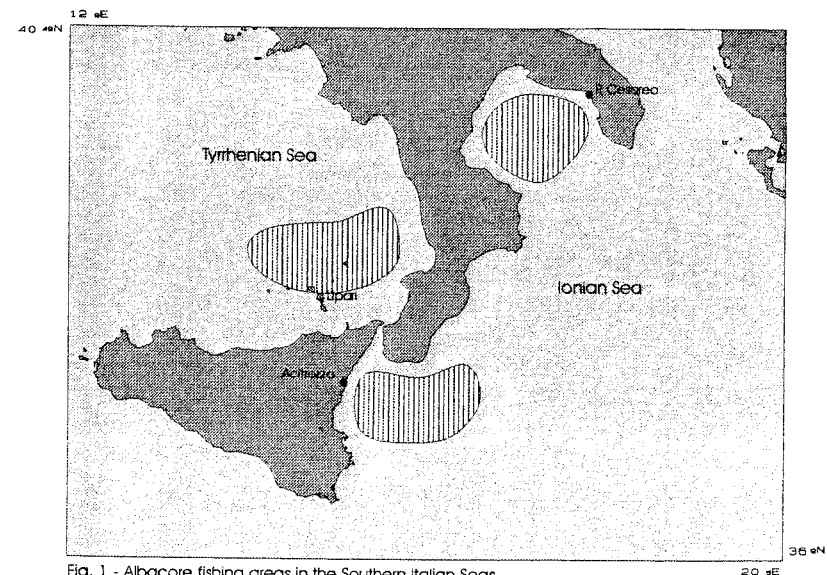


Fig. 1 - Albacore fishing areas in the Southern Italian Seas

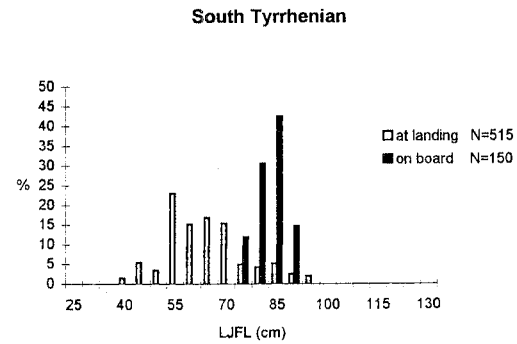
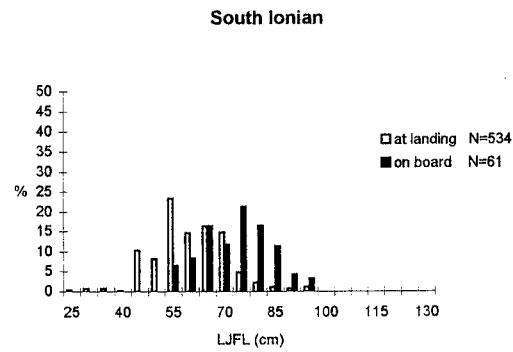
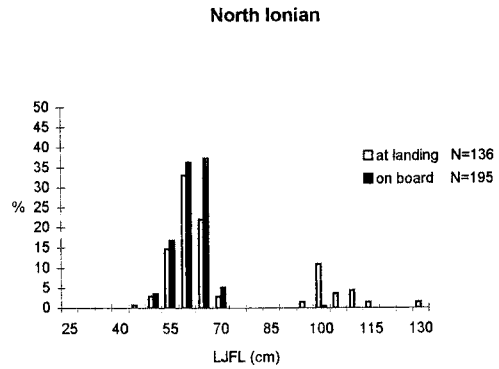


Fig. 2 - Size frequency distribution of swordfish sampled in the three pilot ports at landing and on board during the albacore fishing in 1995.

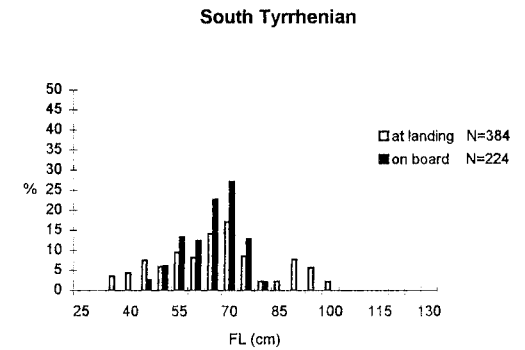
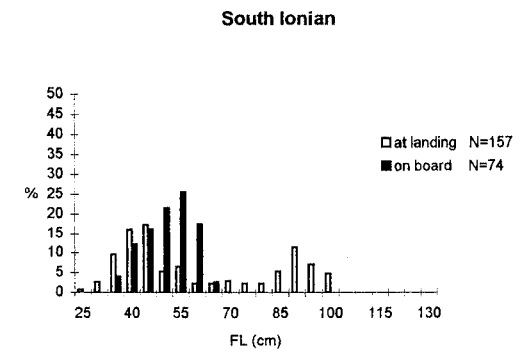
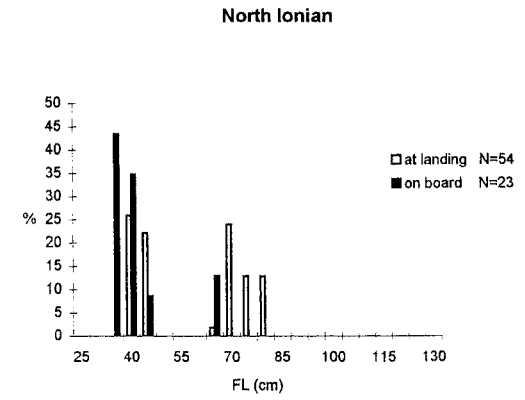


Fig. 3 Size frequency distribution of bluefin sampled in the three pilot ports at land during the albacore fishing in 1995.