Impact of purse seine clupeoids fishery on juveniles bluefin tuna (Thunnus thynnus) in the southern Italian seas

Deflorio M., Santamaria N., Cirillo F., Di Summa A., Terio E., De Metrio G.

in

Bridges C.R. (ed.), García A. (ed.), Gordin H. (ed.).
Domestication of the bluefin tuna Thunnus thynnus thynnus

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 60

2003
pages 53-56

Impact of purse seine clupeoids fishery on juveniles bluefin tuna (*Thunnus thynnus*) in the southern Italian seas

M. Deflorio, N. Santamaria, F. Cirillo, A. Di Summa, E. Terio and G. de Metrio
Department of Animal Health and Welfare, University of Bari,
Str. Prov. Casamassima km 3, Valenzano, 70010 Bari, Italy

SUMMARY – In the framework of the EU Project No 96/093, data concerning the accidental catches of tuna and tuna-like species in the clupeoids fishery, carried out by purse seine using light, were collected in the central Mediterranean during 1997-1998. The total amount of the bluefin tuna can be considered negligible since only a few hundreds of them were caught, especially in the South Tyrrhenian Sea and South Ionian Sea. Their catches consisted mainly of juveniles, which fork lengths ranged from 8.5 to 44.5 cm. Since the bluefin tuna was scarcely represented in the catches obtained by clupeoids purse seine, this kind of fishery does not seem to affect the stock in the southern Italian seas. Moreover, due to the great interest for the bluefin tuna domestication in the last period, the possibility to use the accidental catches of juveniles bluefin tuna could be evaluated for aquaculture experiments.

Key words: Bluefin tuna, juvenile, by-catch, purse seine, Mediterranean Sea.

RESUME – *"Impact de la pêche à sennes tournantes des clupéidés sur les juvéniles de thon rouge (*Thunnus thynnus*) dans les mers du sud de l'Italie". Dans le cadre du projet nº 96/093 de l'UE, les données concernant les captures accidentelles de thons et thonidés dans les pêcheries de clupéidés, effectuées par des senneurs munis de lumières, ont été collectées en Méditerranée centrale en 1997-1998. La quantité totale de thons rouges peut être considérée négligeable car uniquement quelques centaines sont capturés, spécialement dans le sud de la mer Tyrrhénienne et le sud de la mer Ionienne. Leurs captures consistaient principalement de juvéniles, dont la longueur à la fourche allait de 8,5 à 44,5 cm. Etant donné que le thon rouge était à peine représenté dans les captures faites par les senneurs de clupéidés, ce type de pêcherie ne semble pas affecter le stock dans les mers du sud de l'Italie. En outre, étant donné le grand intérêt que suscite la domestication du thon rouge lors des dernières années, on pourrait étudier la possibilité d'utiliser les captures accidentelles de thons rouges juvéniles pour des expériences d'aquaculture.*

Mots-clés : *Thon rouge, juvénile, capture accessoire, senneur, mer Méditerranée.*

Introduction

Clupeoids fishery is generally carried out by purse seine using light. This gear may therefore catch accidentally juveniles of large pelagic species, as tuna and tuna-like species, because they are attracted both by light and by presence of small pelagic fish, which represent an important portion of their feeding. During the three-year period 1997-1999 investigations were carried out in several western, central and eastern Mediterranean areas in order to study the incidence of the aforementioned gear on the accidental catches of juveniles of tuna and tuna-like species. In the present work, the results obtained in the central Mediterranean (South Tyrrhenian Sea, South and North Ionian Sea, Channel of Otranto and South Adriatic Sea) are reported.

Materials and methods

Three categories of boats fishing clupeoids by purse seine were considered, small (8 mean gross tonnage), medium (32 mean gross tonnage) and large (84 mean gross tonnage). The fishing areas were grouped into three areas: the South Tyrrhenian and the South Ionian seas, the North Ionian Sea and the Channel of Otranto, and the Adriatic Sea. A total of 709 fishing hauls were observed: 489 on board and 220 at landing. Due to the high number of specimens, catch data were obtained only in biomass for target and other by-catch species, whereas both in biomass and number of specimens for the bluefin tuna (*Thunnus thynnus*, L.) and for the other tuna-like species. A total of 328 bluefin tuna

specimens were measured and their fork length frequency distribution was calculated using a length class of 1 cm (i.e. class 5 = 5 ≤ FL < 5.9).

Results and discussion

The percentage of the target species in biomass was very high, ranging from 91.46% (total catches 392.7 t in 1998) to 97.47% (total catches 214.2 t in 1999) in all the areas investigated, and the percentage of bluefin tuna in biomass ranged from 0.13% (total catches 3.4 t in 1999) to 5.84% (total catches 5.5 t in 1997) of the whole by-catch of tuna and tuna-like species. The composition of the aforementioned catches for the whole period and areas under study is shown in Fig. 1. The total number of the specimens belonging to all tuna and tuna-like species and their percentage in the catches are shown in the Fig. 2. The presence of the bluefin tuna in the catches was more abundant in the South Tyrrhenian Sea and South Ionian Sea: the catches consisted mainly of juveniles. Bluefin tuna was also caught in a very small quantity in the North Ionian Sea and in the Channel of Otranto. No bluefin tunas were caught in the Adriatic Sea.

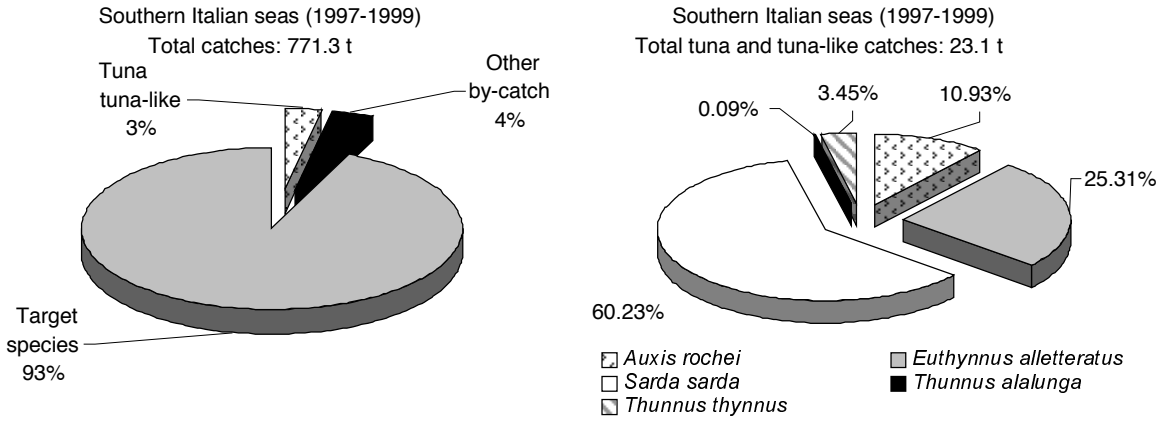

Fig. 1. Composition of the total catches and of the total tuna and tuna-like catches obtained by the purse seine clupeoids fishery in the investigated southern Italian areas from 1997 to 1999.

The catch composition obtained by observed boats seemed to be affected by different fishing strategies according to the size of the boats. In fact, the small boats, which operated in the first grouped area, captured not only the clupeoids but also several different species, which varied with the season and the local market demand. The boats of medium tonnage, which operated in the second grouped area, were interested in several species but with a greater attention to the clupeoids. Lastly, the large boats, which operated in the Adriatic Sea, addressed their effort to catch clupeoids with great attention to the anchovies.

The fork length of the bluefin tuna caught during the whole period investigated ranged from 8.5 to 44.5 cm, in the South Tyrrhenian and in the South Ionian seas, and from 54.0 to 64.5 cm in the North Ionian Sea and in the Channel of Otranto. The monthly and annual size distributions of these specimens are shown in the Fig. 3.

Conclusions

The southern Italian boats involved in the clupeoids fishery use different strategies, according to the size of the boats, which affect the catch composition. However, the total amount of juveniles bluefin tuna can be considered negligible since only a few hundreds of them were caught almost exclusively in the South Tyrrhenian and South Ionian seas. Since the bluefin tuna specimens were scarcely represented in the total catches obtained by clupeoids purse seine, this kind of fishery does not seem to affect the stock in the southern Italian seas. The monitoring of this fishing activity could

be a reliable tool for obtaining information on the recruitment of large pelagic species and, in particular, of bluefin tuna. In fact, the values of catch per unit of effort, which can be considered as an index of abundance for the recruitment evaluation, showed that the best year for the recruitment of this species was the 1997 in the South Tyrrhenian Sea. This is traditionally considered one of the most important areas in the Mediterranean for the bluefin tuna reproduction (Cavallaro *et al.*, 1996; Piccinetti *et al.*, 1996; Nishida *et al.*, 1997; Sarà, 1998) and the presence of juveniles confirms its importance also as nursery areas. Moreover, since during the last years the interest for the bluefin tuna domestication is growing up, it could be evaluated the possibility to use the accidental catches of juveniles bluefin tuna for aquaculture experiments.

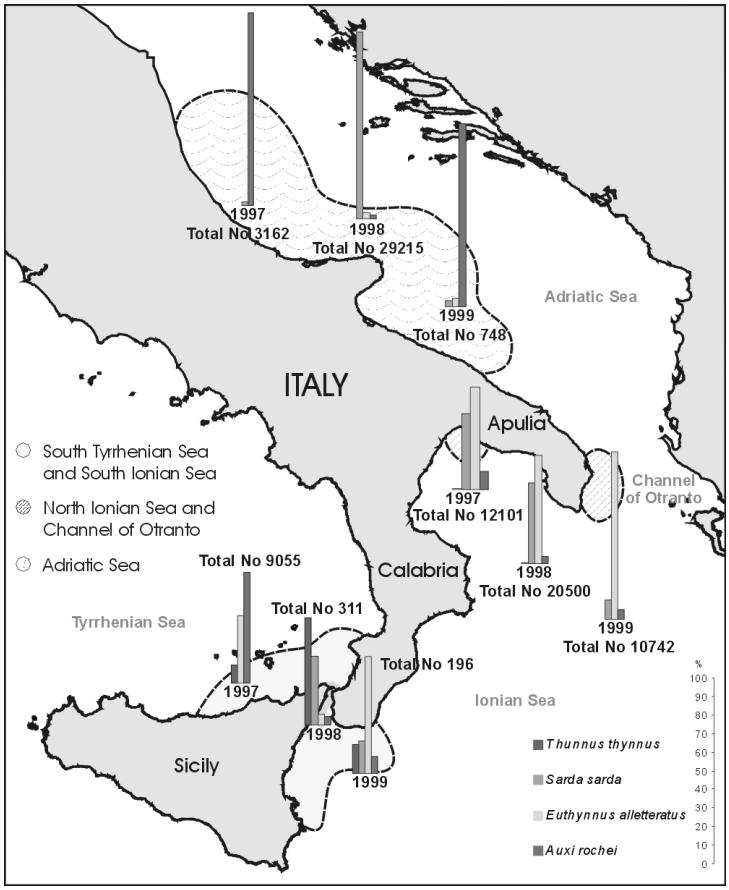

Fig. 2. Total number and percentage of tuna and tuna-like specimens caught in the southern Italian areas during 1997-1999.

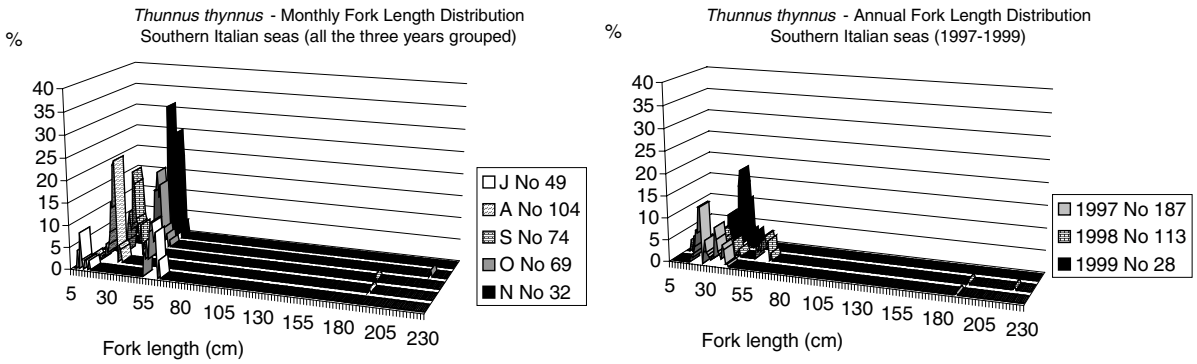

Fig. 3. Monthly and annual length frequency distribution of bluefin tuna, caught in the investigated areas by clupeoids purse seiners during 1997-1999.

Acknowledgements

Financial support provided by EU grant CFP - Project No. 96/093 *"Incidence of the clupeoids purse seines on small tunas and tunas (by-catch quantification in the Mediterranean, biology and dynamics of their early life)"*.

References

Cavallaro, G., Manfrin, G., Lo Ducca, G. and Cavallaro, M. (1996). The presence of tuna larvae in the Strait of Messina. *SCRS/96/60*: 222-224.

Nishida, T., Tsuji, S. and Segawa, K. (1997). Spatial data analyses of Atlantic bluefin tuna larval surveys in the 1994 ICCAT BYP. *ICCAT, Collective Volume of Scientific Papers,* 68(1): 107-110.

Piccinetti, C., Piccinetti-Manfrin, G. and Soro, S. (1996). Résultats d'une campagne de recherche sur les larves de thonidés en Mediterranée. *SCRS/96/57*: 207-214.

Sarà, R. (1998). *Dal Mito all'Aliscafo, Storie di Tonni e di Tonnara: Migrazioni e Biologia, Leggende, Tradizioni e Socialità*, Chapter X. Arti Grafiche Siciliane, Palermo, p. 211.