

VERTICAL DISTRIBUTION, AGE, GROWTH and MORTALITY OF PAGELLUS ERYTHRINUS ON
TRAWLED COASTAL AREAS OF THE LIGURIAN SEA

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Résumé - On a étudié l'âge, la croissance et la mortalité du Pagellus ery-
thrinus employant une série d'échantillons mensuels recoltés par
chalut dans la mer Ligure, sur des fonds de 20 à 90 m de profon-
deur.

Summary - Age (by sagitta readings), growth and mortality of Pagellus ery-
thrinus were studied in a series of monthly samples collected by
otter-trawl between 20 and 90 m depth in the Ligurian sea.

Pandora (Pagellus erythrinus) is one of the commonest species in otter-trawl catches and its biology has been studied in several Mediterranean areas: nevertheless, either because its main biological features are mouldable by local environmental conditions, or since the age readings are susceptible to various interpretations, the subject does not yet seem to be exhausted. Over the last two years we have collected data on distribution, age and growth of P. erythrinus in the Gulf of Genoa, in a research programme coordinated by the Italian "Ministero della Marina Mercantile" and the I.R.Pe.M. (C.N.R.) under the title "Presupposti bioecologici e tecnici per una nuova regolamentazione della pesca a strascico entro le tre miglia dalla costa". Sampling was carried out at monthly intervals in 1982 and 1983 by means of a commercial otter-trawl, with a mesh of 6 mm side in the cod end, on fishing grounds off Chiavari (Eastern Ligurian Riviera). Each daily catch was taken over a period of four hours of diurnal trawling, on the bottom at 20,30,50 and 90 m depth; the aim was to compare the catch composition in depths that are supposed to be forbidden to trawlers by the law now in force (20+30 m) with those where it's allowed (50+90 m): nevertheless it must be noted that the provisions of the law are frequently broken in the area. The fish were measured as to total length (from the snout to the line joining the tips of the caudal lobes) and sexed if possible by macroscopic inspection; the sagittae were removed, dry-stored, and read for age in tap water under the dissecting microscope.

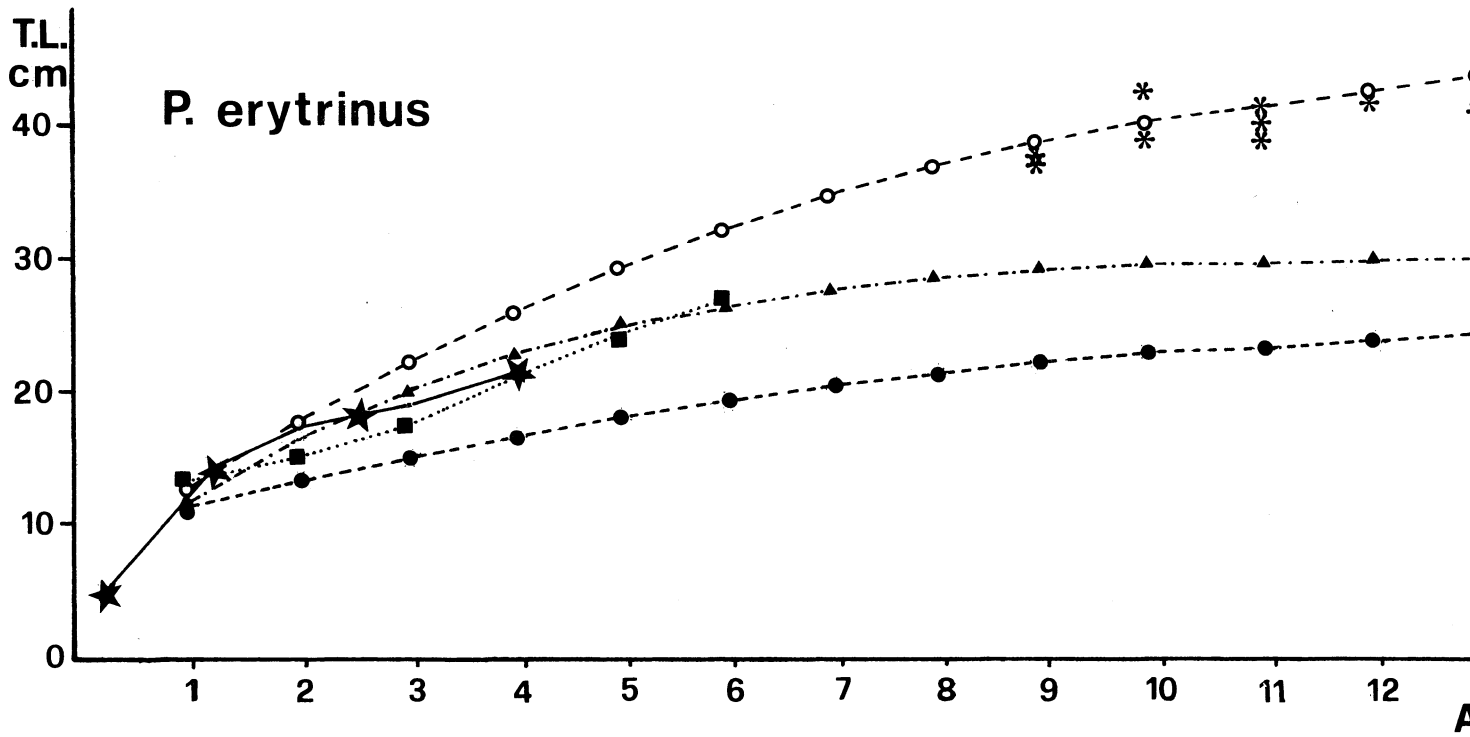


Fig. 1. Growth of *P. erythrinus* in middle Adriatic Channels ■ (Rijavec and Zupanovic 1965); in the coast of Castellon ○ (Larraneta 1967); in the Gulf of Lion ▲ (Girardin 1978); in the Ligurian sea (fish obtained by ottertrawl ★ and by 1 ● (Ghorbel 1981)).

The first two levels proved very rich in young P. erythrinus. A massive recruitment was observed on 29/7/82 and a lesser one on 10/8/83. These small fish (about 5 cm total length) could be easily identified in length-frequency distributions and have been used to describe the prepubertal growth in their nursery area (Orsi Relini et alii 1984). Sexual maturity was never observed in fish under two years of age.

We have now studied age and growth in the older fish and compared the growth in the Ligurian sea with the literature data (fig. 1). As the fish are generally distributed from 10 to 100 m depth (Larraneta 1964, Rijavec and Zupanic 1965), we chose three levels (-20, -50 and -90 m) to cover the vertical range and analysed the age of all fish caught in 16 samples for each level; the average total length for each age group (in the August samples for age groups 0 and 1) and the standard deviation were also calculated (tab. 1). Males and females were combined for average lengths, but males were only 5.05% of the total number of sexed fish.

Tab. 1. Pagellus erythrinus of the Ligurian sea: number of specimens trawled on different levels and age/length distribution.

Level	Age 0	1	2	3	4	5	6	7	8
-20	4814	258	20	2	3	3	1		
-50	23	5	7	13	4				1
-90	2			1	1	1			
Totals	4839	263	27	16	8	4	1		1
Average total length cm	5.1 ⁺	14.5 ⁺	17.4	18.53	21.56	21.5	29		30
s.d.	0.77	1.31	1.59	1.78	1.93	4.92			

⁺ (in August samples)

A serious reduction in the numbers of adult fish is evident; supposing the absence of migrations outside of the area, instantaneous total mortality (Z) was obtained by the regression age/ln numbers in each age group (Pauly 1982).

Being $r = -0.9449$

$Z = 1.5$

The age/length correlations contained in tab. 1 were used for the graph in fig. 1. For the sake of comparison the age was read also in some big fish obtained by long lines on non-trawlable muddy bottoms. These latter age readings are indicated by single asterisks. For the trawled area some agreement with the observations of Rijavec and Zupanovic (1965) and Girardin (1978) can be observed. The fish obtained by lines, on the other hand, are nearest to the growth curve of Larraneta; since the two fishing areas have many environmental parameters in common, we can suppose that in trawled areas a selection of smaller-sized fish takes place.

BIBLIOGRAPHY

- GHORBEL, M. - 1981 - Contribution à l'étude morphologique et biologique des poisson Pagellus et Lithognathus de Tunisie; étude dynamique préliminaire du pageau dans le Golfe de Gabès. Diplôme d'études approfondies de biologie marine et d'océanographie. Université de Tunis, Faculté des sciences, 139 pp. (non vidi)
- GIRARDIN, M. - 1978 - Les Sparidae du Golfe du Lion. Ecologie et biogéographie. Diplôme d'études approfondies. Univ. sci. et tech. du Languedoc, Montpellier, 140 pp. (non vidi)
- GIRARDIN, M. - 1980 - Etat de la pêche des Sparides du Golfe du Lion. Application de deux modèles de gestion (Schaefer, 1957, Beverton et Holt, 1957) aux stocks de Pagellus erythrinus et Boops boops. Rev. Trav. Inst. Pêches Marit., 44 (3), 221-233.
- LARRANETA, M.G. - 1964 - Sobre la biologia de Pagellus erythrinus (L.), especialmente del de las costas de Castellon. Invest. Pesq., 27, 121-146.
- LARRANETA, M.G. - 1967 - Crecimiento de Pagellus erythrinus de las costas del Castellon. Invest. Pesq., 31 (2), 185-258.
- ORSI RELINI, L. - RELINI, G. - ROMEO, G. and TUNESI, L. - 1984 - Reclutamento e primo accrescimento degli Sparidi del genere Pagellus sui fondi strascicabili costieri del Mar Ligure. Nova Thalassia, 6, suppl.
- PAULY, D. - 1980 - A selection of simple methods for the assessment of tropical fish stocks. FAO Fisheries Circular n. 729: 1-54.
- RIJAVEC, L. and ZUPANOVIC, S. - 1965 - A contribution to the knowledge of Pagellus erythrinus (L.) in the middle Adriatic. Rapp. P.V. Reun. Comm. Int. Explor. Sci. Mer Médit., Monaco 18, 195-200.