# THE GEAR SELECTIVITY EFFECT ON GROWTH PARAMETERS OF AXILLARY SEABREAM, *PAGELLUS ACARNE (SPARIDAE)* AT THE MOROCCAN WESTERN MEDITERRANEAN

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## Abstract

We examined the effects of gear selectivity on the estimation of growth parameters of Axillary seabeam from western Mediterranean. For longline and trawl nets, there were differences between the von Bertalanffy growth estimates derived from the two fishery's mean values of length-at-age. For longline fishery, a selectivity-related bias in the estimation of growth parameters was recorded, yielding unrealistic estimates of $t_0$.
*Keywords: Fisheries, Fishes, Growth, Western Mediterranean*

## Introduction

The axillary seabeam, *Pagellus acarne* (L.) (Sparidae), is widely distributed along the continental shelf at the Atlantic and Mediterranean waters [1]. Abundant in Moroccan Mediterranean waters, this species is commercially exploited at depths between 80 and 150 meters by longliners (up to 20 % of landings in weights) using gill nets and hooks and also with trawlers by means of deep trawl net (about 80 % of landings in weights) [2].

## Materials and methods

The area of study covered the sparidae fisheries located at the Strait of Gibraltar region of Morocco which extends from M'diq to Larache. The samples of data were collected in 2004 and 2005 at the fish auction of Larache by using a stratified random sampling of Axillary seabream monthly landings of trawlers and longliners .

Samples of 510 individuals, ranging in size between 10 to 28 cm fork length were measured to the nearest centimeter; for age determination, 5 scales by length class of 1 cm, were removed, washed, viewed with a magnification of 50x; fish were considered to be 1 year old after the formation of the first winter ring. Fish age was determined by two different readers with no knowledge of fish length or month and gear of capture. If the two readings agreed, then the age was adopted as definitive. If the two readings differed, the scale was omitted from further analysis.

The Von Bertalanffy theoretical growth parameters and the corresponding variances were estimated separately for trawl and longline fisheries by using FISHPARM program [3]. To test for the selectivity effect on the estimation of growth parameters, we undertook a comparison of the growth parameters derived separately from data of trawl and longline fisheries and the corresponding variances. The Hotlling's $T^2$ test [4], was also used to compare the parameters of both fisheries.

The three theoretical Von Bertalanffy growth parameters and the corresponding variances were estimated separately by type of fishery (Table 1).

Tab. 1. The Von Bertalanffy growth parameters ($L_\infty$, K, $t_O$) with the corresponding variances estimated by type of fishery

| Year | Sample size | Length Interval | Age interval | $L_\infty$ value | $L_\infty$ variance | K value | K variance | $t_0$ value | $t_0$ variance |
|------|------|------|------|------|------|------|------|------|------|
| | | | | **Trawl fishery** | | | | | |
| 2004 | 780 | 10 – 28 (cm) | 0 – 8 (year) | 34,82 | 1,42 | 0,152 | 0,00172 | -1,942 | 0,24 |
| 2005 | 809 | | | 33,63 | 2,10 | 0,187 | 0,000557 | -1,889 | 0,0529 |
| | | | | **Longline fishery** | | | | | |
| 2004 | 198 | 21 – 29 (cm) | 4 – 8 (year) | 32,58 | 7,55 | 0,146 | 0,00276 | -4,071 | 2,66 |
| 2005 | 205 | | | 32,74 | 13,8 | 0,137 | 0,00359 | -4,495 | 3,40 |

## Results and Discussion

Results showed that trawlers caught fish with ages ranging between 0+ and 8 years; in contrast, longliners were targeting only bigger fish of age 4 to 8 years. Moreover, we found significant differences for all three growth parameters obtained by type of fishery (Hotlling's $T^2$ test, P <0.001). The examination of the parameters of growth obtained in table 1, shows a $t_0$ strongly negative; by comparison to trawl fishery, the variances associated with the estimated parameters of growth for longline fishery are rather high. Therefore, it appeared that the $t_0$ parameter is very sensitive to the first age groups. In fact, gear selectivity can influence estimates of growth parameters [5]. It is difficult to obtain samples representative of the population's age structure when using a single gear because of the size selectivity of most gears [6]. To allow for obtaining more reliable estimates of growth parameters of a stock, the data representing the whole range of fish length should be used [7].

## References

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