

MODELLING TEMPORAL EVOLUTION OF THE PRODUCTION FROM COASTAL FISHERY AND BOTTOM TRAWLING DURING ONE DECADE (1995-2006) IN THE GULF OF GABES (TUNISIA).

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Abstract

In the Gulf of Gabès, coastal fishing and bottom trawling are the two predominant fishing activities providing the main part of the fishing production. So far, no study has attempted to model the temporal evolution of the production from these two fisheries. The objective of this study was to propose an explanatory model of the evolution of the production from these two fishing activities during one decade (1995-2006) using time series analysis. The fitted models were both adequate but those explaining bottom trawling's production was more significant than those of coastal fishing. This can be explained by the different practices of coastal fishing on the contrary to bottom trawling. For the latter, the seasonal effect was more pronounced.

Keywords: Tunisian Plateau, Coastal management, Fisheries, Models, Time series

Introduction

The Gulf of Gabès is the most important fishing area in Tunisia (south-western Mediterranean Sea) where bottom trawling and coastal fishery are the most predominant fishing activities. Fisheries management not only requires the knowledge of the biological and the dynamics parameters of the resources but also needs a fine description of the temporal evolution of fishing production. Many authors used time series analysis to explain the production and abundance of species ([4], [5]) and the dynamics of fisheries ([2]). The purpose of this study was to describe data series of the production from coastal fishery and bottom trawling activity in the gulf of Gabès during one decade.

Material and methods

The database for this study obtained from the General Direction of Aquaculture and Fisheries of Tunisia, contains monthly production data from bottom trawling and coastal fishery from 1995 to 2006 in the gulf of Gabès; A classical time series decomposition was used. The bases of this method were described in details in the works of Kendall and Stuart [1] and Makridakis and Wheelwright [3]. Fitted models were implemented in 3 steps: first, the deseasonalized time series data was determined using centered moving average, then this series was adjusted with the adequate model and finally the seasonal components was identified. The established model appears as follows:

$$Y_t = S_t * T_t * E_t$$

With: t the period; Y : the production; S : the seasonal component; T : the trend cycle component and E : the irregular component.

Results and discussion

1. Temporal evolution of coastal fishery and bottom trawling production

For coastal fishing (Fig 1, top), the adjusted trend of the production shows two phases: an important decrease of the production followed-up by a low increase. For the bottom trawling activity (Fig 1, down), it shows also two phases but opposite to coastal fishing: a considerable increase of the production of this activity followed-up by a low decrease of catches.

2. Seasonal components

Regarding the seasonal components, we notice that the both fishing activities had the same evolution: an increase of the production from September to January. Besides, the seasonal effect is more important for bottom trawling activity.

Conclusion

This study allowed us to establish the first model which explains the production from coastal fishery and bottom trawling activity in the gulf of Gabès. The adjustments of the models were significant, besides those for coastal fishery was less significant due to the various techniques and fishing areas. The two activities had similar seasonal effect on the production, but the variance was less marked for the coastal activity which present a great capacity to maintain a stable production by changing fishing gears in response to resources availability.

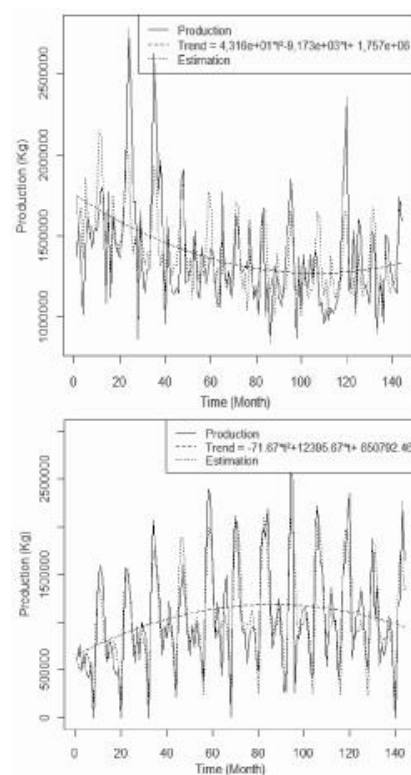


Fig. 1. Trend and fitted model of the temporal evolution of production from coastal fishery (top) and bottom trawling (down) (1995-2006).

References

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