

LIFE HISTORY STRATEGIES OF NON-INDIGENOUS *UPENEUS PORI* AND CONFAMILIAL *MULLUS BARBATUS* IN THE NORTHEASTERN (NE) MEDITERRANEAN

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Abstract

In this study, allocation of energy and time for growth and reproduction of *M. barbatus* and *U. pori* were investigated to understand life history strategies adapted by a native and non-indigenous confamilial species based on multidisciplinary survey data collected in three successive years in the NE Mediterranean. The results indicated that the species seem to fulfill their biological activities within a short period of time when the highest productivity is reached in the area. The native fish exhibits fast growth, early maturation and short reproduction season while its counterpart spawns during two different time period (dual spawning) on the bathymetric slot (upper thermocline) that *M. barbatus* abandons during summer.

Keywords: Demersal, North-Eastern Mediterranean, Fishes, Lessepsian migration, Life cycles

Introduction

The Mediterranean Sea is in a metaphoric change mainly due to anthropogenic interferences and natural perturbations. The life history traits adopted by the native components and those successfully established are among the most important weapons in the modern Mediterranean arena. In this study, patterns in life history strategies (timing and energy allocation for growth and reproduction) of *M. barbatus* (Red mullet) and lessepsian *U. pori* (Por's goatfish) were investigated to improve ecological understanding of demersal fish assemblages of the Northeastern Mediterranean Sea.

Material and Method

The data used in the study were collected during the monthly fisheries surveys between May 2007 and May 2010 at six different depths (Figure 1) where temperature and salinity profiles at each station were measured.

The energy allocation is evaluated by i) the parameters of seasonally oscillating von Bertalanffy Growth function, ii) length at first maturity, iii) sex-ratio and size differences by sex and iv) biological indices, namely GSI, HSI and Somatic K.

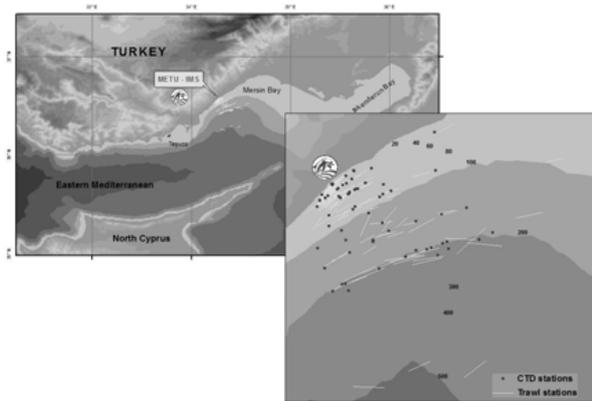


Fig. 1. The study area including bathymetry of the region as well as the position of the trawl hauls and CTD profiler. Lines show the trawl hauls while points show the CTD sampling cast performed during the study period.

Results

The parameters of seasonalized vBGF approximated based on monthly length frequencies of *M. barbatus* (n=18894) and *U. pori* (n=3577) indicated that the both species displays strong seasonality in growth ($C = 0.40$) while former grows faster ($K = 0.56$) and larger ($L_{\infty} = 26$ cm) with early-summer deceleration in growth ($WP=30$). The latter species is smaller in size ($L_{\infty} = 20.0$, $K = 0.45$) and slow growth state is displayed earlier than the former. The analyses indicated that both species reaches sexual maturity in the first year of life when male red mullets reaches to 11.6 cm and females reaches 12.6 cm total length on average. The length at first maturity for *U. pori* is reached at smaller total length

(9.5 cm and 10.0 cm for males and females respectively). A significant difference was observed in the spawning season of *M. barbatus* and *U. pori* (Figure 2).

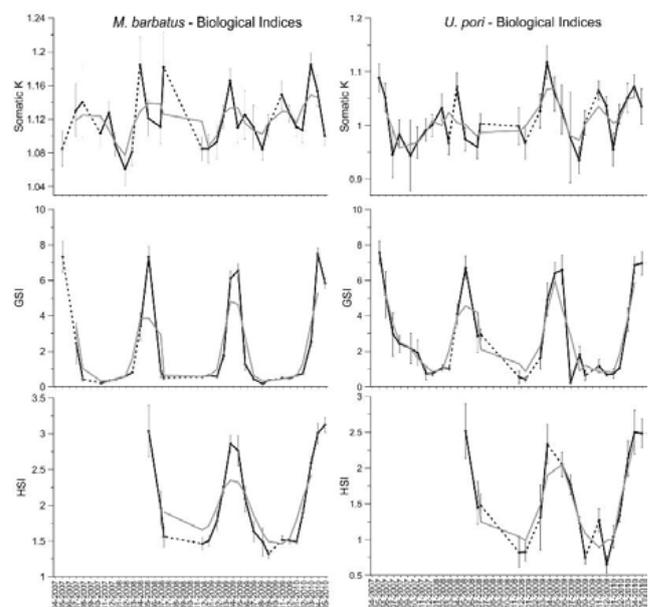


Fig. 2. Time series of calculated biological indices of *M. barbatus* and *U. pori*. Continuous grey lines are the 3x running averages.

The red mullet develops its gonads fast and spawns within a month between May and June. The data clearly showed that gonad development in *U. pori* occurs two times a year starting from late February - early July and early July to late December indicating the existence of secondary spawners within the population. As for bathymetric preference, *U. pori* almost exclusively occupied the depths shallower than 20 m depth while the native confamilial occupied deeper waters down to 220 meters. The very warm (> 27 °C) waters of the upper summer thermocline seem to limit the distribution of *M. barbatus* on the shallow littorals. *U. pori* successfully occupies this area left by the *M. barbatus* and gets the most benefits by high seasonality in growth, fast and multiple gonadal development and smaller maturation size. Golani (1994) has already reported similar niche partitioning on the bathymetric distribution axis.

References

1 - Golani D., 1994. Niche separation between colonizing and indigenous goatfish (Mullidae) along the Mediterranean coast of Israel. Journal of Fish Biology 45, 503-513.