

AGE, GROWTH AND REPRODUCTION OF PIPER GURNARD, *TRIGLA LYRA* IN SAROS BAY, THE NORTHERN AEGEAN SEA

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Abstract

The age composition, growth parameters, spawning season, length at first sexual maturity of piper gurnard, *Trigla lyra* caught in the Northern Aegean Sea (Saros Bay) from September 2006 to September 2008 were investigated. The total length ranged from 7,9 to 51,4 cm (mean 28,5±0,25) and from 4,4 to 3400 g (mean 213,4±6,03). Length–weight relationships were estimated as $W=0.0114*L^{2,87}$. The age data derived from otolith readings were used to estimate the growth parameters of the von Bertalanffy equation; $L_{\infty}=69,9$ cm, $K=0.13$ and $t_0=-0.89$. The maximum age was 9 years. Males matured at a total length of 21,9 cm, while females matured at 22,7 cm. The monthly values of the gonadosomatic index indicated that spawning period occurred mainly between January and February. The male to female ratio is usually 1:3.

Keywords: Aegean Sea, Saros Bay, Growth, Reproduction

The piper gurnard (*Trigla lyra*) is commercially important demersal species, living mostly in sand and muddy bottoms at depths ranging from 100 m to 700 m. It is a Mediterranean-Atlantic species, distributed along the Mediterranean Sea, the Black Sea and the Eastern Atlantic Ocean from North of British Isles and North Sea to the west African coast.

Published information on the comprehensive biology and ecology of the piper gurnard in the Mediterranean Sea and especially the Aegean Sea and is scarce. [1] studied the age, growth in Saronikos Gulf, Greece. [2] provided some information on the feeding behaviour of the species in the Saronikos Gulf. [3] studied its reproduction and gonadal structure in the Costa Brava, Northwestern Mediterranean. [4], [5] [6] provided some informations on the age and growth of the species in the Aegean Sea. The present work is a contribution to our knowledge of the age and size distribution, growth, sex ratio and reproduction of the piper gurnard in the Saros Bay, in the northern Aegean Sea.

Monthly trawl surveys were carried out during daytime at depths ranging from 0 to 500 m between June 2005 and September 2008. Length–weight relationship was calculated by applying exponential regression $W=a \times L^b$, where W is the total weight (g), L is the total length (cm). Growth type (isometric and allometric) was determined by the student's t -test ($P<0.05$). The spawning season was determined following the monthly changes in the gonadosomatic index (GSI). Size at maturity (L_{50}) was defined as the size at which 50% of individuals were spawning [7]. Age was determined by counting the annual growth rings on sagitta otolith. Growth was expressed in terms of the von Bertalanffy equation: $L_t=L_{\infty} (1-e^{-K(1-t_0)})$. Growth parameters were estimated according to the non-linear method by using the FiSAT package program.

The total length of 1063 specimens caught in the Northern Aegean Sea (Saros Bay) ranged from 7,9 to 51,4 cm (mean 28,5±0,25) and from 4,4 to 3400 g (mean 213,4±6,03). The length–weight relationships were calculated including both sexes and juveniles, $W=0.0114*L^{2,865}$. The slope b was significantly different from 3.0 (t -test, $P>0.05$), indicating negative allometric growth.

Otoliths from 202 pipers were used for age determinations. Age classes ranged from 1 to 9 years. The estimated von Bertalanffy growth parameters for the piper gurnard were; $L_{\infty}=69,9$ cm, $K=0.13$ and $t_0=-0.89$ for both sexes combined. The piper gurnard is a relatively long-lived species. In this study, the oldest specimen from Saros bay was 9 years old (51.4 cm total length). [1] found the oldest specimen on the Saronikos Gulf to be 7 years old (46 cm fork length). [4] reported that the oldest specimen from Turkish waters of Aegean Sea was 8 years old (54.2 cm total length). Based on the derived length at age data, the asymptotic length of $L_{\infty}=69,9$ cm in the present study is lower than the asymptotic length for the Saronikos Gulf, $L_{\infty}=74$ cm [1] and higher than the asymptotic length for the Turkish coast of Aegean Sea, $L_{\infty}=59,7$ cm [4]. The growth coefficient of *T.lyra* in the Saros Bay lies in the mid-range of those calculated by several authors for piper gurnard stocks inhabiting the Aegean Sea. The differences in growth rates and asymptotic lengths might be attributed to different bio-ecological conditions and food availability.

The overall male to female ratio was determined as 1:3. Examination of the male and female maturity stages indicated that males of *T.lyra* matured

at about 23 cm total length and females at about 22 cm total length (Fig. 1).

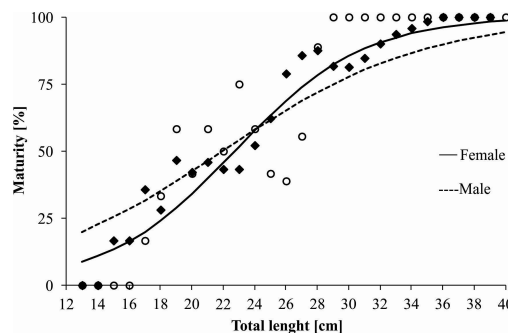


Fig. 1. Logistic regression model for the estimated percent of sexually mature of *Trigla lyra* as a function of the total length

The GSI results revealed that spawning occurred from January to March after the GSI for both sexes reached its highest level. [3] detected mature oocytes and postovulatory follicles in January and February and reported an prolonged spawning period of piper gurnard up to March. Also they stated that the standart length at first maturity was 20 cm for the females and 18 cm for males.

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