

**OBSERVATIONS ON REPRODUCTION AND FECUNDITY OF *Sphoeroides pachygaster* (PISCES - TETRAODONTIDAE) FROM THE SICILIAN CHANNEL (MEDITERRANEAN SEA)**

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**Abstract**

Ovaries of 210 females of *Sphoeroides pachygaster* trawled in the Sicilian Channel were analysed to get first information on reproduction and fecundity. Ovaries features were observed and gonosomatic index (GSI) were computed as the proportion of ovaries weight on somatic weight. The number and size of the oocytes were recorded. GSI values up 0.43 were obtained and advanced ovaries were observed in winter and late summer. A maximum egg size of 0.75 mm and an average eggs number of  $1540.5 \times 10^3$  were recorded. in mature females. Present results suggest that *S. pachygaster* is a high fecundity-total-spawner with a prolonged spawning period.

*Keywords* : *Sphoeroides pachygaster*, reproduction, spawning, Sicilian Channel

Information about reproduction and fecundity represent a key feature in the dynamics of a marine population [1;2]. It becomes more relevant when the species is an intruder such as the "blunthead blaasop" *Sphoeroides pachygaster* (Muller & Troschel, 1884), about which the biological knowledge is scant [3]. Its presence was reported in the Mediterranean for the first time in 1979 and records of the species were continuous in the last decades [3], suggesting a high spreading ability. Although the diffusion of a species is related also to an implicit reproductive success, no information is available on the reproductive patterns of these populations. The aim of this note is to present first data on ovaries features, gonosomatic index and fecundity of *S. pachygaster* from the Sicilian Channel.

A total of 210 *S. pachygaster* females over a period of 5 years (1990-1995) were recovered from commercial (on a voluntary base) bottom trawlers operating in the Sicilian Channel. Defrosted fish were measured (standard length, SL; 1 mm) and weighed (somatic weight, SW; 0.1 g). Ovaries were weighed (GW; 0.1 g) and gonosomatic index (GSI) was computed as GW/SW. Fifty specimens (124 to 405 mm SL) were selected to analyze total number of oocytes (herein eggs) and eggs size and length frequency distribution (LFD). An empirical maturity scale of three stages (table) was employed, based on macroscopic features. Ovaries being asymmetrical (the left one is larger) in gravid females, but eggs being of similar size in both ovaries [crf.4], only the left one was considered. A sample of the median portion was placed in Gilson's solution for 3 months to digest ovarian tissue. Eggs were then placed in a graduated cylinder and water added to bring the volume to 100 ml. Large size eggs (>0.3 mm) subsamples were placed in plastic petri dishes and eggs counted at 20x magnification. Small size egg subsamples were placed in Counting Chambers of Jessen (25 square cells of 1 mm<sup>2</sup> each; 16 squares of 0.25\*0.25 mm). Eggs diameters were measured on randomly taken subsamples of 100 eggs with an ocular micrometer at 40x. Total number of eggs in the ovary was estimated by expanding the mean count per subsample to the total volume of the egg suspension. A rough estimate of absolute fecundity as the average number of eggs in the ovaries of mature females was obtained. The geometric mean of the stage 3 GSI was employed to estimate the instantaneous rate of natural mortality (M/year) according to the linear approximation  $M = 0.03 + 1.68 * GSI$  [5].

GSI ranged between 0.001 and 0.433. Only values less than 0.05 were observed in fish smaller than 140 mm SL, whereas in larger specimens GSI varied highly according to the sampling month. Higher GSI values (>0.2) were observed in February and August-October, but ripe and recovering females were present all over the year. The mean eggs size by stage ranged between 0.095 and 0.404 mm (Table) and the corresponding LFD (Figure) presented a multimode shape with one more prominent component. The rough estimate of absolute fecundity resulted in  $1540.5 \times 10^3$  eggs (Table) and the natural mortality coefficient (M/y), based on a GSI of 0.166, was 0.309.

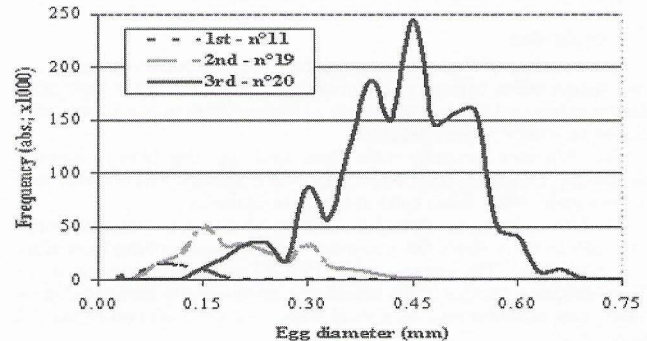


Figure - Length frequency distribution of eggs by maturity stage in *Sphoeroides pachygaster*

The newly employed maturity scale needs to be validated but it worked out its purpose, allowing a preliminary analysis of reproduction in the investigated species. Results obtained indicate a quite prolonged reproductive periodicity with variable seasonal peaks as already reported for the congener *S. nephelus* [6] and *S. maculatus* [6;7]. Data on eggs size and their LFD also are consistent with those reported for *S. maculatus* [4] (egg size ranging between 0.35 and 0.7 mm and an "approximately unimodal" LFD), while fecundity resulted higher in the present case (eggs number ranging between 288.000 and 350.000 in *S. maculatus*). The natural mortality coefficient obtained (0.309) is also high and indicates a population with a relatively high turnover rate. All these elements indicate a quite efficient reproductive pattern, which may be a key factor for the quick spreading ability of the Mediterranean populations.

**References**

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Table - Eggs size and number and GSI values of *Sphoeroides pachygaster* from the Sicilian Channel.

Maturity status (*)	N	Size range (SL; mm)	Gonosomatic index (GSI) range		Mean egg size (mm)	St. dev. (mm)	Mean eggs number (x1000)
1 - Immature	11	124-295	0.006-0.04	0.015	0.095	0.0333	53.4
2 - Maturing or recovering	19	237-360	0.02-0.086	0.044	0.210	0.0618	274.4
3 - Mature and spawning	20	245-405	0.089-0.43	0.166	0.404	0.0680	1540.5

(\*) 1 - Ovaries inconspicuous, whitish or pale pink. Eggs scarcely visible.  
 2 - Ovaries still symmetrical, medium swollen. Vascularization evident but not diffuse. Eggs visible.  
 3 - Ovaries asymmetrical, fully swollen, highly vascularized. Eggs round, orange and translucent.