

ON A SPAWNING AGGREGATION OF THE BROWN MEAGRE *SCIAENA UMBRA* L., 1758 (SCIAENIDAE, OSTEICHTHYES) IN THE MALTESE WATERS (SICILIAN CHANNEL-CENTRAL MEDITERRANEAN)

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**Abstract**

A spawning aggregation of *Sciaena umbra* was sampled, during an experimental trawl survey, in low-exploited fishing-grounds off Maltese coasts (Sicilian Channel). The Gonado-somatic index was calculated and used to estimate the natural mortality rate (M; year<sup>-1</sup>). The age structure was estimated by otolith thin section reading, resulting a maximum age in the samples of 17 and 26 years in males and females respectively. The total mortality rate (Z) was estimated with the catch curve. The comparison between M (0.20) and Z (0.24) supports the hypothesis that the sample was gathered on slight exploited or totally unexploited fishing grounds.

*Keywords: Sciaena umbra, spawning, mortality, Sicilian Channel.*

**Introduction**

The Brown meagre, *Sciaena umbra* Linnaeus, 1758, is a moderate size fish (up to 50 cm of total length; TL), occurring in the coastal waters of the Mediterranean and the Eastern Atlantic [1]. Once a very common species, both experimental observations [2] and historical statistics [3] evidenced clear signs of depletion in the Mediterranean populations. However, any assessment of the actual status of the stocks in the area is hampered by the poor knowledge on the biology of the species. An unusual considerable catch of spawners of Brown meagre allowed deriving information on the maturing condition, demographic structure of spawners and mortality rates.

**Material and Methods**

A total of 234 specimens (total weight of 127 kg) of *S. umbra* were caught in one half-hour haul performed off the Maltese coast (35°60' N; 14°27' E; mean depth of 47 m). The haul was carried out during an international experimental bottom trawl survey [4], on 7 June 2000 from 04:40 to 05:10 (solar time). The specimens proved to be mature and hence 180 fish were randomly selected for the laboratory analyses. Total length (0.5 cm; TL), somatic and gonad weights (0.1 g; SW; GW), and sex were determined after defrosting. The Gonad-somatic index (GSI=GW/SW\*100) was calculated. For females showing fully developed ovaries, the mean value of GSI was used to estimate the instantaneous coefficient of natural mortality (M; year<sup>-1</sup>) according to the empirical equation:  $M = 0.03 + 1.68 * GSI$  [5]. Thin transverse sections of otolith were read in water under reflecting light. Ages were determined by counting the number of dark zones [6]. Total mortality rate (Z) was estimated by the catch curve method on combined sex.

**Results**

In both sexes (51 females and 129 males) the gonads were in advance stages of maturation or fully mature; the plot of GSI vs. TL shows also that the samples were composed of large individuals (fig. 1). GSI up to 15.7 and 11.9 % were observed in females and males, respectively.

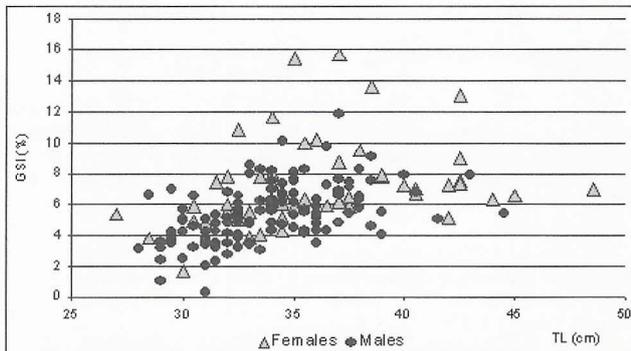


Fig 1- Gonado-somatic index vs. total length in females and males of *Sciaena umbra*

Considering only the fully mature female (13 individuals), GSI values ranged between 6.5 and 15.7% with a mean of 10.3 (standard error =3.3); this corresponds to an empirical M value of 0.20 (fiducial interval of 0.17-0.24).

Up to 14 age groups were identified, resulting in a maximum age in the samples of 17 (1 male) and 26 years (1 female). The age groups used for the catch curve are reported in tab.1. Beside the oldest speci-

mens, one male of 14 years and two females aged 2 and 18 years respectively, were also excluded from the catch curve computation.

The regression of log<sub>e</sub> of number at age (Y) versus age (X) resulted in a straight line ( $Y = -0.2377X + 4.354$ ;  $R^2 = 0.84$ ) and, consequently, the Z estimate was 0.24 (se = 0.034).

Tab. 1 – Age group abundance of *Sciaena umbra* used in the catch curve estimation

Age (years)	3	4	5	6	7	8	9	10	11	12	13
Females	9	7	8	5	2	4	4	2	3	2	2
Males	31	16	24	20	12	11	1	2	4	4	2

**Discussion**

Present results agreed with the reproductive period (March-August) reported for the Mediterranean populations [1;2], and also with the aggregation behaviour of spawners of *S. umbra* [7]. The similarity between Z (0.24) and M (0.20), considering also the uncertainties in the estimates, supports the hypothesis that the sample was gathered on slight or exploited totally unexploited fishing grounds.

The presence of several age groups in the spawners and the relatively low gonadic investment indicates *S. umbra* as a slow growing and long living species; in fact the observed maximum age (26 years) is higher than the value previously reported (21 years) for the Mediterranean [2]. Although limited, these findings suggest that the high fishing pressure could be the most important factor in the declining of the Brown meagre of the Mediterranean Sea and that this species should be protected in some manner [2;7].

**References**

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