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of the Black Sea Against Pollution

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CLIMATE CHANGE IN THE **BLACK SEA** –  
**HYPOTHESIS, OBSERVATIONS, TRENDS,**  
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# Paper Abstracts



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The results obtained enhance the possibility of opening new directions in the process of valorification of the resources offered by the Black Sea, in the research of medicines produced from natural resources.

### BIOLOGICAL CHARACTERISTIC OF ROCK GOBY *GوبيUS PAGANELLUS*, IN THE SOUTH EASTERN BLACK SEA

Semih Engin and Kadir Seyhan\*

Rize University, Faculty of Fisheries, 53100, Rize. (e-mail:engin.semih@gmail.com)

\*Karadeniz Technical University, Faculty of Marine Sciences, 61080 Trabzon,

(sevhan@ktu.edu.tr)

**Key words:** *Gobius paganellus*, age and growth, reproduction, diet, Black Sea.

The rock goby *Gobius paganellus* Linnaeus, 1758 is a Mediterranean gobiid species and very common in the south coast of Black Sea. The present study provides information on age structure and growth, length at first maturity, annual cycle of gonad development and diet of rock goby in the Black Sea. The maximum age was 7 and 6 years for males and females respectively. The von Bertalanfy growth parameters estimated from the mean monthly age-length data for males and females (males:  $L_{\infty} = 13.1$  cm,  $k = 0.34$ ,  $t_0 = -0.11$ ; females:  $L_{\infty} = 18.2$  cm,  $k = 0.18$ ,  $t_0 = -0.07$ ). The estimated length at first maturity was 5.20 and 5.50 cm for males and females respectively. The spawning season was from March to May. Total fecundity ranged from 1550 to 5839, with an average of  $4322 \pm 1109$  ripe eggs/fish. The rock goby feeds on a wide variety of prey items, particularly on Gammaridae, Brachyura, Natantia, Bivalve, Isopod and fish.

### LONG-TERM TENDENCIES IN THE CHANGE OF SEA WATER TRANSPARENCY AT ZMEINYI ISLAND

Yevgen Gazetov<sup>a</sup>, Natalia Kovalova<sup>b</sup>, Vladimir Medinets<sup>c</sup>

Odessa National Mechnikov University, Odessa, Ukraine

<sup>a</sup>gazetov@e-mail.com, <sup>b</sup>n\_kovalyova@freemail.ru, <sup>c</sup>medinets@te.net.ua

**Key words:** water transparency, Danube mouth region, Zmeinyi Island

Since 2003 monitoring of sea water transparency has been conducted by measuring the Sekki disk depth at the Island of Zmeinyi (Black Sea) by specialists of the Odessa National Mechnikov University (ONU). The collected material (more than 1500 measurements) allowed to perform analysis of transparency values in 2003-2007 in comparison with previous periods of observations.

According to data of the Marine Hydrophysical Institute [1], in the Danube mouth area of the Black sea, where the Zmeinyi Island is located, in 1925-1997 a progressive decreasing tendency of water transparency was observed from year to year.

As a result of ONU research the seasonal changes of visibility depth (water transparency) at the Zmeinyi Island in 2003-2007 were found comparable with the values from [1] (Fig.1.)

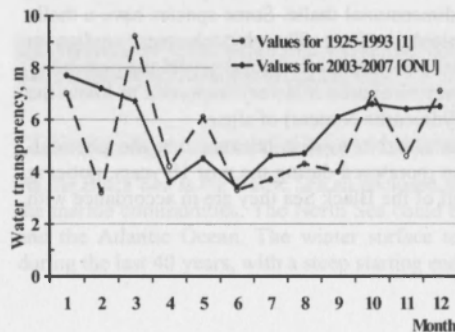


Figure 1. – Seasonal changes of visibility depth measured by Sekki disk in the Danube mouth area of the Black sea in 1925-1993 and at the Zmeinyi Island in 2003-2007.

Lower monthly averages of water transparency at the Zmeinyi Island in 2003-2007 in comparison with 1925-1993 were calculated for the first half of the years. For the period July - December the monthly averages of water transparency in 2003-2007 almost always exceeded the long-term averages established for 1925-1993.

Substantial negative correlation between water transparency and bacteria biomass was established: the coefficient of correlation was  $-0.60$ ; while between water transparency and concentration of chlorophyll "a" the coefficient of correlation was  $-0.40$ .

The bacteria/transparency correlation well corresponds to the negative dependence of water transparency at the Zmeinyi Island on the Danube river discharge [2] ( $-0.62$ ) and it is connected, presumably, to increase of organic matter stemming from the Black Sea from the Danube river, significantly stimulating microorganisms propagation.

At present time water transparency at the Zmeinyi Island is determined by the increasing tendency of the Danube river discharge for the first half of the years under the climate influence.

1. Environmental conditions of the Danube mouth region and Zmeinyi Island: Modern state of ecosystem / Edited by V.A. Ivanov, S.V. Goshovskiy. 1999. – Sevastopol: Marine Hydrophysical Institute. – 268 p. (in Russian)

2. Velikova, V., Cociasu, A., Popa, L., Boicenco, L., Petrova, D. 2005. Phytoplankton community and hydrochemical characteristics of the Western Black Sea. J. Water Science Techn. Vol. 79, N 6, p.77-87.

#### VARIABILITY OF *CALANUS EUXINUS* IN THE MARMARA SEA AS A PREDICTION OF WARMING EVENTS IN THE BLACK SEA.

Isinibilir, M.<sup>a1</sup>, Svetlichny, L.<sup>b2</sup>, Hubareva, E.<sup>b3</sup>, Kideys, A.E.<sup>c4</sup>

<sup>a</sup> Istanbul University, Faculty of Fisheries, Laleli, Istanbul, Turkey

<sup>b</sup> Institute of Biology of the Southern Seas, Sevastopol, Ukraine

<sup>c</sup> Middle East Technical University, Institute of Marine Science, Erdemli, Turkey

<sup>1</sup>[mlekis@istanbul.edu.tr](mailto:mlekis@istanbul.edu.tr), <sup>2</sup>[svetlichny@mail.ru](mailto:svetlichny@mail.ru), <sup>3</sup>[hubareva@ibss.iuf.net](mailto:hubareva@ibss.iuf.net), <sup>4</sup>[kideys@gmail.com](mailto:kideys@gmail.com)

**Key words:** *Calanus euxinus*, Black Sea, abundance

In the Black Sea the abundance, biomass, body size and lipid content in *C. euxinus* are the greatest among the representatives of the genus *Calanus* from the Mediterranean basin. During last twenty years maximum abundance (10000 - 20000 ind.m<sup>-2</sup>) and biomass (up to 10 g.m<sup>-2</sup>) of *Calanus* population have not been changing significantly even after the invasion of *Mnemiopsis*.

In the Marmara Sea, where the temperature of subsurface layer is permanently close to 15 °C, annual number of *C. euxinus* was 47 times lower than in the Black Sea during 2001 - 2007. Its growth is faster but body size and amount of lipid reserves are smaller in the Marmara Sea. During the warm period *Calanus* does not develop in this sea.

We suggest that large body size and extremely high lipid content of *C. euxinus* are due to unique hydrological structure of the Black Sea where cold (6 – 8 °C) intermediate layer (CIL) with higher water density limiting hydrogen sulfide zone stays all year round. According to the recent studies of Russian scientists (the report of M. Flint, P.P. Shirshov Institute of Oceanology, at the session of the Presidium of Russian Academy of Sciences, 2006), global warming events resulted in almost