THE ROMANIAN BLACK SEA MACROALGAE UNDER CURRENT ENVIRONMENTAL QUALITY OF COASTAL WATERS

Sava Daciana [1]* and Bologa s Alexandru [2]
[1] Faculty of Natural and Agricultural Sciences, "Ovidius" University - daciana.sava@gmail.com
[2] 2National Institute for Marine Research & Development "Grigore Antipa", Mamaia 300, RO-900581, Constanta 3, Romania

Abstract
The authors present an updated assessment of the present state of the macroalgal flora from the Romanian Black Sea waters, after a study that took place between 1999-2009. The research shows that the current algal communities consist of a small number of species, but with considerable biomass. The perennial associations mentioned have declined and the free substratum is now covered by opportunistic species with a short life cycle. Appropriate ways of conservation would be the improvement of physicochemical conditions of coastal waters and maintenance of the under water Marine Reserve "Vama –Veche" in the south part of our coast.
Keywords: Black Sea, Phytobenthos

The Black Sea ecosystem, mainly in its northwestern sector, has changed under the influence of harmful factors which also affected the qualitative and quantitative state of macrophytobenthos [1, 2]. The present paper shows the data obtained after a 10 year survey, compared with previous data [3], in order to point out the changes of this major component of the Black Sea ecosystem. The algae were collected from various types of hard substratum. From each sample, algae were identified and representative individuals were kept for the herbarium collection. For biomass estimation three samples were randomly taken from a surface of 100 cm^2 at depths between 0.5 - 7 m, the algal material was than dried and weighed, in order to obtain the values of dried biomass. In the collected samples, 16 Chlorophyta, 5 Phaeophyta and 10 Rhodophyta were found. Compared with previously reported results, it is quite evident that the number of species from each phylum decreased over the years (Table 1).

Tab. 1. Evolution of macroalgal species between 1977-2002

Phyllum	Bavaru, 1977	Vasiliu, 1980-1995	Sava,1995-2002
Chlorophyta	31	22	16
Phaeophyta	14	9	4
Rhodophyta	41	24	10
Total	86	55	30

The relatively high number of Chlorophyta, compared with other groups can be explained by the fact that eutrophication seems to favor the development of green algae. The quantitative data emphasized that green and red algae were dominant, with a significant decrease after 2004 that can be related to the amelioration of the state of the marine ecosystem along the Romanian shore in recent years, which could have beneficial consequences on the whole algal vegetation. Generally, our present observation confirms previous studies: qualitative decline, high biomass of *Enteromorpha*, *Cladophora* (Chlorophyta) and *Ceramium* (Rhodophyta), the almost disappearance of perennial species (brown alga *Cystoseira*) [4, 5]. The continuous observation of the evolution of physicochemical parameters of shallow waters, and the continuous biodiversity monitoring will allow us to estimate the trend in the near future, because anthropogenic factors are still present and are likely to disturb directly and indirectly the ecosystem and community structure in the Black Sea.

References
1 - Bologa A.S., Bodeanu N., Petran A., Tiganus V., Zaitzev Y., 1995.: Major modifications of the Black Sea benthic and planktonic biota in the last three decades In: *Les mers tributaires de Mediteranee* - F.Briand (ed) -Bulletin de L'institute oceanographique Monaco, no special 15: 85-110

2 - Petran A., Mukader A., Bodeanu N., Bologa A.S., Dumitrache C., Moldoveanu M., Gheroghe R., Tiganus V.,1999: Status and evolution of Romanian Black Sea Coastal Ecosystem In: *Environmental Degradation of the Black Sea*, S.T.Besiktepe et al. (Eds.), NATO Scienc Series, 2.Env.Security-vol.56: 175-195, Kluwer Acad.Press, Dordrecht/Boston/London,

3 - Bavaru A., Bologa A.S., Skolka H.V., 1991: A cheklist of benthic marine algae (except the Diatoms) along the Romanian shore of the Black Sea *Oebalia* - International Journal of Marine Biology and Oceanography, Taranto, Italy 17, 2 suppl.19:535-551

4 - Sava D., Doroftei E, Bavaru A., 2001: Major modifications of the macrophytic algal flora under the influence of anthropogenic factors in coastal Romanian Black Sea waters -*Phycologia* -Journal of the International Phycological Society, pp 110

5 - Sava D., Arcus M., Doroftei E., Busuricu F., Balaban D.P., 2003 – The latest data on the qualitative structure of macrophytobenthos from the Romanian Black Sea shore. *4th Int. Conf. PH students*, Miskolc, Hungary: 365-370