

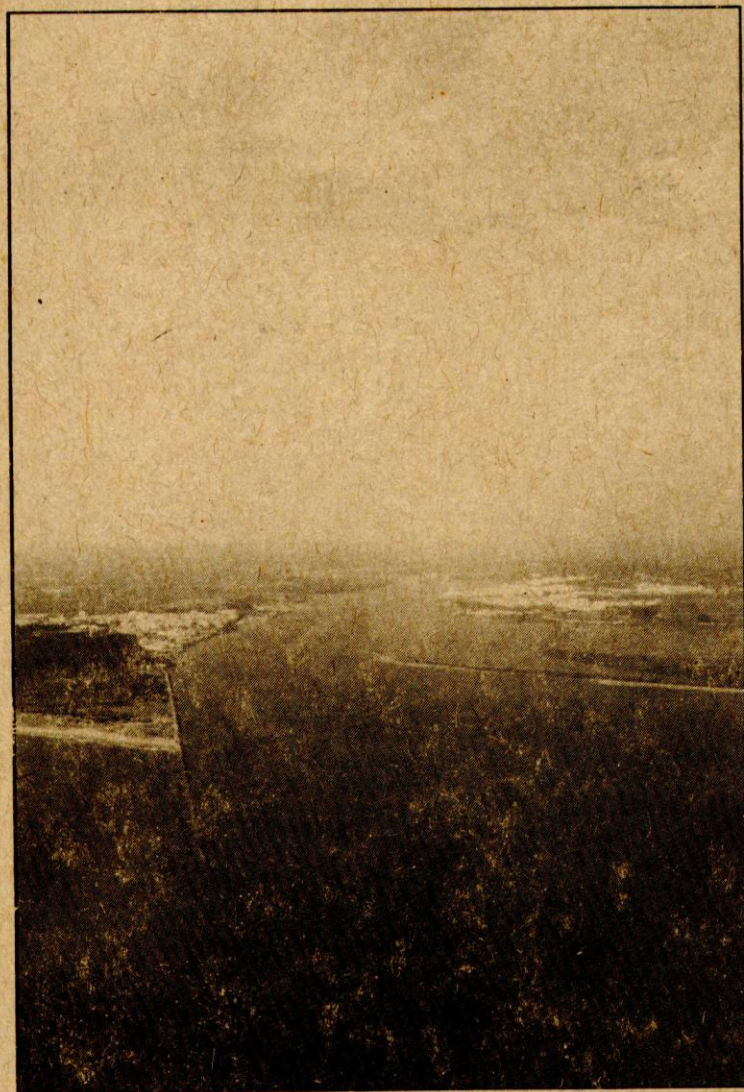
Actas

Proceedings

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Estuarinos**

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DYNAMICS OF GREEN ALGAE AND ITS ASSOCIATED FAUNA IN THE RIA FORMOSA: IS HERBIVORY IMPORTANT ?

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Key words: Ulvales, herbivory, detritivory, bottom up control, Ria Formosa

The Ria Formosa is a system of salt marshes and tidal flats, separated from the Atlantic by a belt of sand dunes that extends for 55 km along the southern coast of Portugal. It comprises an area of 170 km², from which 8 km² are covered by *Spartina*, 8.2 km² by *Zostera* + *Cymodocea* and 2.5 km² by macroalgal mats. Tidal amplitude varies from 0.5 m (neap tide) to 3.5 m (spring tide), maintaining an average depth of 2 m inside the lagoon. The lagoon does not receive a significant freshwater input, and it has a rather intensive exchange of 50-75% of the water mass during each tide. The temperature in the water column ranges between 11.9 and 27°C (Falcão *et al.*, 1991), and salinity between 35.5 and 36.9, except after heavy rainfall, when surface salinity can be lower.

A striking phenomenon, which has been registered every winter since 1988, is an intense bloom of green macroalgae, mainly Ulvales (*Ulva* spp. and *Enteromorpha* spp.). These blooms appear after the first rain falls in autumn and disappear gradually during the following spring (Sprung, 1994). A distinct community of benthic fauna is associated with these green algae.

The objective of this work was to study in the western part of Ria Formosa, if the Ulvales were controlled by herbivorous macroepifauna.

Monthly, between February 1996 and February 1997, samples were taken from 6 stations. The stations were selected for representativity of distinct habitats (according to preliminary surveys). At each station samples of the Ulvales and its related macroepifauna were taken, using 0.5 mm mesh nets and sieves. After being sorted and conserved in a 4% formalin solution, the species were identified, sized, and their ash-free dry weight (AFDW) were determined. The algal production was estimated by the difference in biomass between consecutive samples. If possible, secondary production was calculated by the increment summation method (Winberg, 1971), else biomass was converted to production using the equation described by Schwinghamer *et al.* (1986).

Biomass of the Ulvales was highest in winter and spring months, and lowest in summer. The highest values of primary production (1.8 g AFDW/m²/d) were calculated in autumn, just after the first rain falls. The minimum in biomass registered during summer can be related with high temperature and dessication. At a station at Faro beach, the Ulvales persisted even during summer. This may be explained by the input of nutrients from anthropogenic origin.

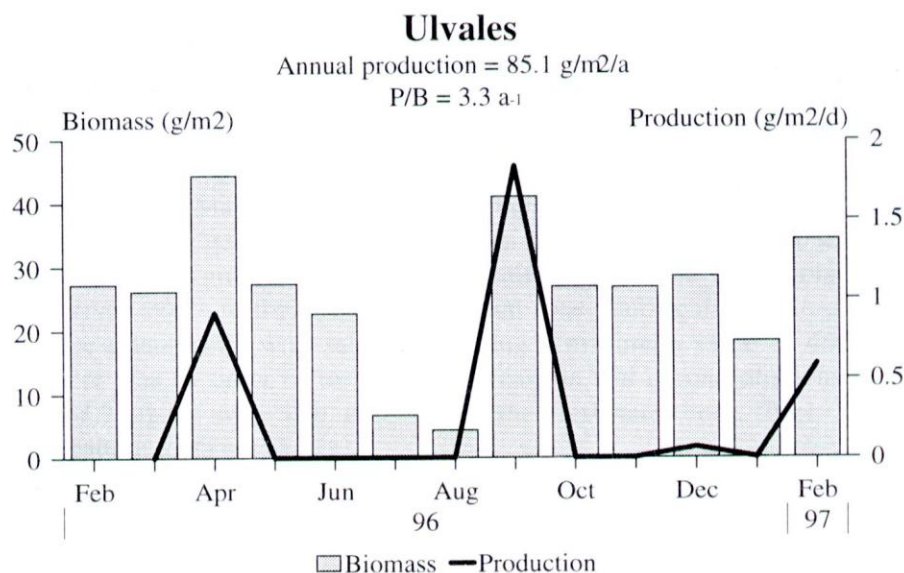


Figure 1: Mean biomass (g AFDW/m²) and production (g AFDW/m²/a) of the Ulvales in the study area.

44 taxa of macroepifauna were identified, from which 5 dominated: *Hydrobia ulvae* (Mesogastropoda), *Melita palmata* (Amphipoda), *Gibbula umbilicalis* (Archaeogastropoda), *Carcinus maenas* (Decapoda) and *Nassarius pfeifferi* (Neogastropoda).

Macroepifauna

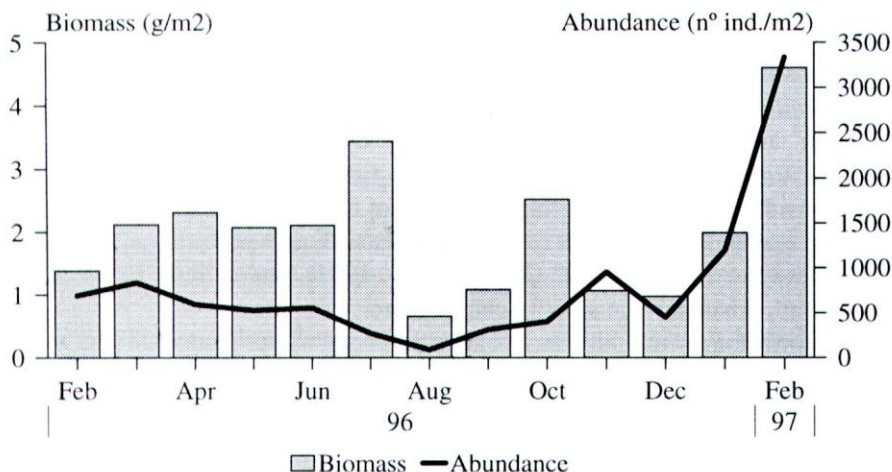


Figure 2: Mean biomass (g AFDW/m²) and abundance (n° ind./m²) of the macroepifauna in the study area.

Almost all macroepifauna species have dynamics similar to those of the Ulvales, but for different reasons. From the species that are associated to the algae, almost all of them are detritivorous, possibly because the algae detritus is more easily assimilated by the individual gastric system, since it is already conditioned by micro-organisms. There are some species that feed on the epiphytes on the algae (*Hydrobia*) and others just seek for refuge from its predators (juvenile fishes) or adverse abiotic conditions.

It is concluded from this study that the dynamics of the green macroalgae is mainly controlled by rain (related with the availability of nutrients) and temperature (bottom up control). Although the dynamics of macroepifauna is similar to that of the Ulvales, its impact is low. Trophic relations are mainly based on the detritus derived from decaying algae.

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