LAGOONS AND COASTAL WETLANDS IN THE GLOBAL CHANGE CONTEXT: IMPACTS AND MANAGEMENT ISSUES

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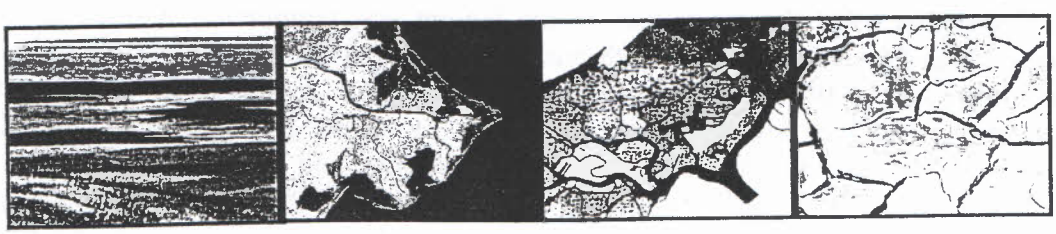

Dynamics of the angiosperm *Ruppia maritima* L. in a temporary Mediterranean lagoon (Drana lagoon, Northern Aegean)

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Drana lagoon has been isolated from the sea, due to its opening obstruction. As a result the lagoon is subject to extended drainage periods, depending on the highly variable winter and spring rain. The macrophytobenthos of this lagoon is mainly composed of the submerged angiosperm *Ruppia maritima* L., which occurs world-wide in a variety of ephemeral or permanent habitats partly due to different reproductive strategies (Koch & Seeliger, 1988; Dunton, 1990). The purpose of this study is to give more information on *R. maritima* dynamics in a temporary brackish habitat and its net production.

Macrophyte samples were monthly collected from one station at SW of Drana lagoon during March 1998 to February 1999 and seasonally from May 1999 to January 2002 whenever the lagoon was flooded. Three replicates were taken at each sampling using a 20 diameter corer (e.g. Silberhorn et al., 1996). Dry weight of the vegetative and reproductive leaves, rhizomes, roots and reproductive organs were measured in the laboratory. Shoot and leaf density, the number of leaves per shoot, the number of bare nodes per shoot and several morphometric parameters were also measured.

Ruppia maritima was continuously traced from March 1998 up to August 1998 at SW of Drana lagoon. During this period the standing crop of vegetative leaves and their sheaths, of rhizomes and of roots and the shoot and leaf density continuously increased from May to August 1998; that increase was temporarily interrupted in July, when the highest temperatures (34°C) occurred possibly due to high respiratory rates. Moreover, several morphometric parameters (length and width of leaves, length of rhizomes and of internodes) increased from May onwards. Reproductive leaves and organs were continuously observed from May to August. Their biomass increased in June, slightly decreased in July and peaked in August; the decline in July was possibly influenced by high summer temperatures (e.g. Verhoeven, 1979). During the growth period (May – August 1998) losses as sloughed leaves were estimated by the mean number of bare nodes m^{-2}, keeping the dead – plus lost of the longest shoots and the number of leaves per shoot. Net primary production of *Ruppia maritima* leaves was estimated by the number of live and lost leaves per m^{-2} and the average leaf weight (e.g. Kiørboe, 1980; Peduzzi & Vukonič, 1990); it was found to be 93.21 g DW m^{-2} y^{-1} and the turnover rate (P / B_{max}) to 1.407. The total net production of leaves, rhizomes and roots was calculated to 136.64 g DW m^{-2} y^{-1}. This estimation was much lower than the annual one found for a perennial population of this species in a neighboring lagoon (Monolimni lagoon, Evros Delta) (Malea & Kevrekidis, in preparation).

In September 1998 the major part of the lagoon was temporarily drained for 3 weeks. The lagoon was flooded in Ocrober1998 but was drained again from July 1999 to December 1999 and from June 2000 to December 2000. Seed germination was observed right after each dry period (e.g. Koch & Seeliger, 1988). However, successful germination and establishment were observed only during spring, at increasing temperature and low salinity (e.g. Koch & Seeliger, 1988). During 1999 – 2000 drainage occurred earlier and extended longer, growth of *R. maritima* was earlier interrupted and its biomass decreased. The following year (2001) the southern part of the lagoon was drained before the beginning of the growth period (in April)

and in late May 2001 the whole lagoon were drained and remained dry till the end of samplings. Therefore, if the obstruction of the lagoon opening continues, the survival of *Ruppia* population will depend on rainfall.

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