Reproductive cycle of *Posidonia oceanica*

Lucia MAZZELLA and Maria Cristina BUIA

Laboratorio di Ecologia del Benthos, Stazione Zoologica di Napoli, 80077 Ischia (Italy)

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Studies on the reproductive cycle of Posidonia oceanica were conducted in situ in a meadow off Lacco Ameno, Ischia (Gulf of Naples) along a depth transect from 1m to 32m for several years. Occurrence of both flowering and fruiting were recorded over a long temporal scale. Simultaneous measurements of leaf biomass and production were performed in different stands of the same meadow.

P. oceanica flowering had occurred almost every year since 1979. Fruiting was not always recorded, and dead inflorescemces at an initial fruiting stage were often found. Between shallow (up to 15m) and deep stands (from 15m to 28m) P. oceanica showed a persistent phase-difference, whereby there was a flowering delay of about two months in the deep meadows, always following the summer maximum temperature. In shallow beds the first flowers were usually recorded in September, occasionally at the beginning of October. In the deep meadows this stage was observed in November or beginning of December. Fruit developed from December to March-April in shallow stands, and from February to May-June, sometimes to July, in deep stands (Fig. 1). After fruit maturation, this floats on the water surface transported by water movements and once opened, the seed might germinate in areas far from the mother meadows. Germination was studied only once at environment light and temperature. This phenomenon seems to be succesfull and almost 70% of collected fruits germinated. At the time of collection (end of May) the seeds already beared the cotyledon, very young leaves and a primitive root. This finding excludes seed dormancy. After one month the seedlings had an average of 5 leaves and 2 roots per shoot. The maximum leaf number (11) in seedlings kept in an aquarium was found after 3 months (August) following germination (BUIA & MAZZELLA, in press).

In situ, production of new leaves on mature plants occurs almost continuosly. However the maximum leaf appearence was recorded from August to October in shallow stands and from October to November in deep stands. The leaf growth also showed a persistent phase-difference between stands at different depths. Two peaks in leaf production have been found at 5m, one in October-November and one in March-April for the shallow plants, while for the deep plants only one peak has been recorded in April-June. The lowest growth rate was found to be in summer at shallow stands and in autumn for deep ones. In shallow meadows the highest leaf biomass was consequently found from March to June reaching 965mg per shoot, while at deep stands the maximum was reached from April-May to July-August with 899 mg per shoot. The lowest values of biomass were found from September to November in shallow waters, after the period coinciding with maximum leaf shedding and after the minimum growth rate, and from November to February in the deep stations, preceeding the maximum growth period (Fig. 2a, 2b). These minimum biomass values seem to coincide with the appearence of flowers. The epiphyte biomass trends reflected those of the leaves, but in following years great differences in values were found in both stations (Fig. 2a, 2b) (BUIA et al., in press).

Rhizome growth, followed in a shallow stand of the same prairie, differed according to rhizome type. The plagiotrope rhizome had a **growth** of 4.1cm per year while the orthotrope showed an elongation of **1.5-1.8**cm per year (PIRC, 1983). In the same stand, similar findings

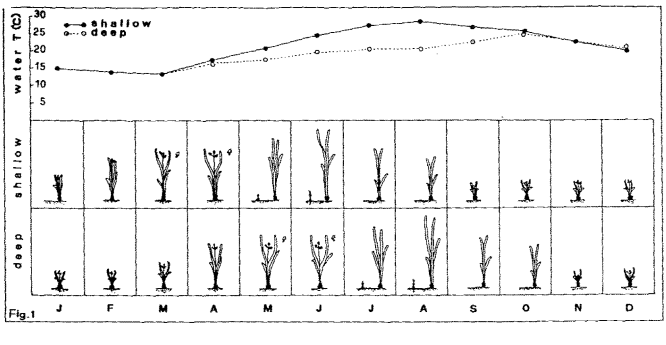

Fig.1

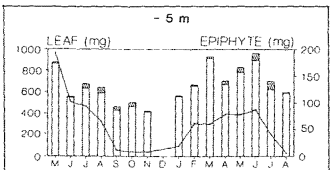

Fig.2a

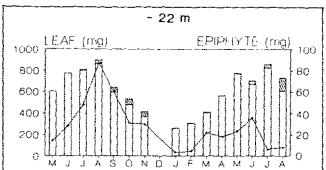

Fig.2b

were recorded by WITTMANN (1984): yearly production of 274mg per shoot for plagiotrope rhizomes and 30mg for the orthotropes.

Temperature and quantum irradiance changes during one year seem to regulate the reproductive cycle of P. oceanica. Moreover, sedimentation rate can be of fundamental importance for growth processes.

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