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MORPHOLOGICAL OBSERVATIONS ON SEEDLINGS OF *POSIDONIA OCEANICA* (L.) DELILE GERMINATED "IN SITU"

OSSERVAZIONI MORFOLOGICHE SU GERMOGLI DI *POSIDONIA OCEANICA* (L.) DELILE GERMINATI "IN SITU"

Abstract

Distribution and morphological features of seedlings of Posidonia oceanica *(L.) Delile (Angiospermae, Potamogetonaceae) germinated "in situ" are reported. Seedlings, observed in August 1995, were settled on hard substrates from 0.5 m to 2 m depth in two sites located along the southern coast of the island of Favignana (Egadi archipelago, Western Sicily). Mean number of leaves (5.6), of scales (15.5) and scars (5.6) yielded a total mean number of 26.1 leaves produced after germination. Comparison with literature data suggests that the seedlings found were at least one-year old.*

Key-words: *Posidonia oceanica*, germination, seedlings, morphology, Southern Tyrrhenian Sea.

Introduction

Records on occurrence of germination and on abundance and distribution of seedlings of *Posidonia oceanica* (L.) Delile "in situ" are still too scarce to evaluate the reproductive success and the role of sexual reproduction in the potential of colonization at medium and large scale of this key-species. The relatively scanty information on "in situ" germination actually available (Gambi *et al.*, 1996; Piazzi *et al.*, 1996 a), seems however to testify an increasing frequency of records in these last 3-4 years, probably due to an increasing occurrence of flowering events, evident also along the italian coasts (Calvo *et al.*, 1995; Balestri *et al.*, 1995; Boyer *et al.*, 1996), but also to the previous scarcity of observation, generally lacking in quantitative or phenological data (Giaccone e Sortino, 1974; Brambati *et al.*, 1980). For this reason it is worthwhile reporting the occurrence of several seedlings of *P. oceanica* germinated "in situ" in the island of Favignana (Egadi archipelago, Western Sicily), and give some data on their distribution and morphological features.

Materials and methods

The seedlings of *P. oceanica* were observed in middle August 1995 along the southern coast of the island of Favignana (37° 58' long. N; 12° 20' lat. E) at two different sites: Cala Monaci and Cala Rotonda. Both sites are characterized by rocky shores and by the presence of *P. oceanica* beds starting at about 3-4 m depth. The bed at Cala Monaci is continuous, while at Cala Rotonda the *P. oceanica* meadow shows a patchy distribution. A number of about 50 seedlings were collected at both sites; some seedlings were still bearing the seed at the

base of the rhizome, while in others seeds were lacking. Phenological and morphological measurements and leaf biomass estimated (dry weight) were performed on 9 specimens with seed and 11 without seed, respectively. Differences between two groups (mean ± standard deviation) were tested in pairs (t-test).

Results and discussion

Seedlings were observed between 0.5 m and 2 m depth, settled on rocky bottom and big stones colonized by photophilic algae, mainly the Phaeophyta *Padina pavonica* (L.) Lamouroux. Several seedlings were dispersed as isolated shoots, while others were grouped in 3-4 specimens.

In the shoots still bearing the seed, this latter was black coloured with clear traces of decay; the primary root was always broken (Fig. 1). Data about

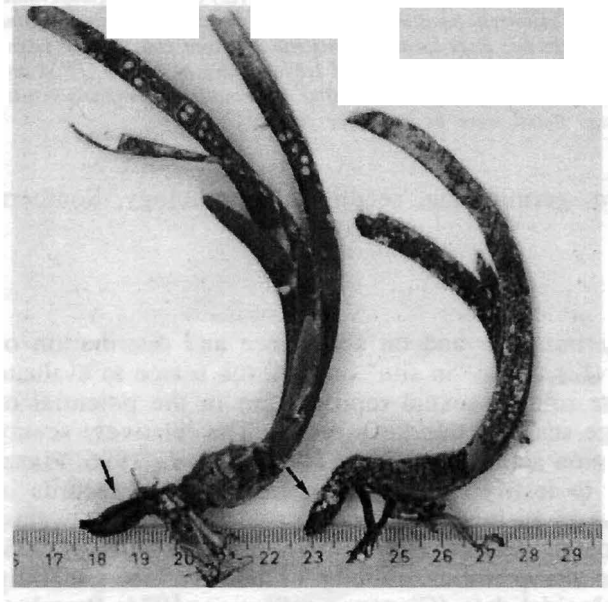

Fig. 1 - Seedlings of *P. oceanica* collected at Favignana, and still bearing the seed (arrows).
Germogli di *P. oceanica* osservati a Favignana e portanti ancora il seme (frecce).

phenology, morphology and leaf biomass are reported in Table 1. As no significant differences (t-test) were found between the shoots with and without seed, the values of the measured parameters have been pooled. All the seedlings showed a well developed root system. The leaf apices had often brown tissues (48%) or were eroded (34%), and showed a heavy covering of epiphytes, mainly characterized by encrusting corallinaceous algae and egg capsules of molluscs. In some cases shoots were observed in division. Considering the number of leaves together with that of scales and scars, a total mean number of 26.1 leaves per shoot were produced after germination (Table 1). These results have been compared with literature information on seed germination and culture in aquaria and with the scarse "in situ" data available. Various authors observed a high number of leaves produced during the first months after germination, both in laboratory conditions

Table 1 - Mean values ± standard deviations of morphological parameters and leaf biomass of the analyzed *P. oceanica* seedlings (N= 20)
Medie ± deviazioni standard dei parametri morfologici e della biomassa fogliare dei germogli di *P. oceanica* analizzati (N= 20)

Parameters	
leaf length (cm)	9.5 ± 5.9
length of the longest leaf (cm)	15.7 ± 3.4
leaf width (cm)	0.67 ± 0.08
leaf number per shoot	5.6 ± 1.5
adult leaves (%)	50
intermediate leaves (%)	22
young leaves (%)	28
leaves with eroded apex (%)	34
leaves with brown tissue (%)	48
scales number per shoot	15.5 ± 5.2
scars number per shoot	5.6 ± 1.7
total number of leaves produced per shoot after germination	26.1 ± 5.5
secondary root number	6.0 ± 2.9
leaf biomass (mg d.w. per shoot)	132.4 ± 56.6

(Cooper, 1979; Caye & Meinesz, 1989; Bedini *et al.*, 1997), and "in situ" (Buia & Piraino, 1989; Gambi *et al.*, 1996; Piazzi *et al.*, 1996 b). Caye (1989), in 13 months old seedlings cultured in artificial sea water, observed in June a total mean production of 22 leaves. This comparison suggests that the seedlings recorded at Favignana are at least one year old and derived from seeds settled in late spring or early summer 1994 and produced by a flowering in the autumn-winter of the previous year. Literature information on the *P. oceanica* beds of the Western coast of Sicily (Calvo *et al.*,1995) and of the areas around the Egadi archipelago (Giaccone & Sortino, 1974), confirm that in these zones flowering and fruiting are quite regular and diffuse phenomena, and that a conspicuous fruiting has been recorded just in 1994 (Calvo *et al.*, 1995). Furthermore, a previous record of a *P. oceanica* seedling has been observed by Buia & Piraino (1989) in the Marettimo island (Egadi), near to Favignana. In May 1995 decaying pericarps of *P. oceanica* fruits have been observed floating in the harbour of Favignana (Gambi M.C., pers. observ.), and in June of the same year further *P. oceanica* seedlings were found at Cala Rotonda (Badalamenti F., pers. comm.). These findings demonstrate once more the regular flowering events and high sexual reproductive effort of *P. oceanica* beds occurring in this zone. Following time evolution of *P. oceanica* seedlings settled in the area, it should be extremely important to evaluate the actual sexual reproductive success of the species, and the potential formation of new meadow patches by its off-springs.

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