

Standard Procedure for the study of *Posidonia oceanica* Leaf Litter

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While leaf litter is recognized as one of the key compartments in the dynamics of terrestrial ecosystems (JOLSON, 1963; KARKANIS, 1975), for the *Posidonia oceanica* bed it has only been studied sporadically (WITTMANN *et al.*, 1981; FRANCOUR, 1990).

As part of a general survey of the functioning of the *Posidonia oceanica* ecosystem ("A functional approach to the *Posidonia oceanica* ecosystem of the Mediterranean"), a standard procedure has been worked out for determining the structure, chemical composition and fragmentation and degradation mechanisms of *Posidonia* leaf litter.

Sampling is carried out by scuba diving, using a suction device. A quadrat 35 cm square is set up in a homogeneous area that is representative of the *Posidonia* bed under investigation. Within this quadrat, the living leaves are cut off at a height of 3 to 5 cm from the base and removed, and the shoots are counted. The leaf litter is collected in bags (1 mm mesh). Sampling is repeated three times for each station. The samples are transported from the sampling site to the laboratory in damp medium.

In each sample, non-litter elements (eg. living leaves, shell debris, algae, animals etc) are removed by hand. Dead rhizomes, with or without scales, and whole scales are separated from the litter, and constitute the RHIZOME FRACTION. Sorting by gravity is carried out to separate the litter from the sediment, which is discarded. Two sieves of different mesh size are used to sort the litter into a COARSE FRACTION (leaves larger than 8 mm) and a FINE FRACTION (leaf debris of between 1 mm and 8 mm).

The three fractions obtained for each sample are placed in the dryer at a temperature of 70°C, until a constant weight is obtained (usually 48 hours). After drying, the samples are weighed on precision scales (mg).

Leaf fragmentation experiments are carried out in situ. Aged adult leaves, that are still in place in the shoots, are collected and brought back to the laboratory. They are weighed (sub-samples of 30 +/- 0.5 g) and placed in bags (1 mm mesh) sealed with strips of Velcro. The bags are returned to the environment beneath the leaf cover in series of three. The series of bags are collected after a predetermined period of time (1, 2, 3, 4, 8, 12, 16 and 24 weeks). The samples collected are separated into three size classes: leaves with a length of > 5 cm (LARGE LEAVES); leaves with a length of between 5 cm and 8 cm (BROKEN LEAVES), and leaf debris of between 8 mm and 1 mm (DEBRIS). Each fraction is dried in the dryer at 70°C (constant weight), then weighed.

The totality of the samples is powdered (pulveriser) and sieved (0.63 µm mesh). The CHN content (Micro CHN Determinator, CHN 800), the percentage of ash (Thermolyne Sybron type 2000, 8 hours at 550°C) and the Phosphorus content (Induction Coupling Plasma, after acid digestion according to DELGADO, 1986) are measured for each fraction.

Our preliminary results (ROMERO *et al.*, sous-pressé) would appear to suggest that the distribution patterns of leaf litter are subject to considerable variation according to the depth, time and site of sampling. At Ischia (Italy), leaf litter maxima (coarse fraction + fine fraction) are found at intermediate depths (Figure 1).

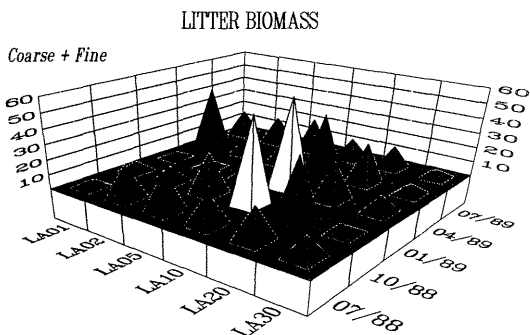


Figure 1: Mean litter biomass (in mg dry weight per quadrat) at Ischia (Italy), at various depths according to sampling date.

An investigation of degradation in situ, at -5 m and -20 m, has shown that depth does not appear to have any influence on the rate of degradation. On the other hand, the rate of degradation does depend on the time of year of the investigation (higher degradation rate in July). The curve of decline is of the exponential type:

$$y = \exp(-0.0066x + 1.63) : -5 \text{ m} - \text{October 1988 experiment.}$$

$$y = \exp(-0.0087x + 1.78) : -20 \text{ m} - \text{July 1988 experiment.}$$

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