

*L.B.M.E.B., Faculté des Sciences de Luminy, MARSEILLE (France)

**CEVAREN, UFR des Sciences et Techniques, CORTE (France)

There has been a considerable amount of research into the kinetics of decomposition (fragmentation, chemical composition and nutritional value) of the dead leaves of marine phanerogams (litter) (RUBLEE & ROMAN, 1982; WAHBEH, 1988), but relatively few studies have been devoted to *Posidonia oceanica* litter (FRANCOUR, 1990; PERGENT-MARTINI *et al.*, 1990). Despite this, the litter compartment does play a role of primary importance in the functioning of the *Posidonia oceanica* ecosystem (ROMERO *et al.*, in press).

The aim of the present study, which is part of an extensive European Communities Commission programme (STEP Programme), is twofold :

(i) to quantify the amount of the leaf litter, and its variation in space and time (monthly samplings in several stations);

(ii) to analyse the kinetics of decomposition of the leaves.

The findings presented in the present article deal only with the second of these aims.

These *in situ* decomposition investigations were carried out in the Marseilles (France) area. In all, three stations were used : two stations at - 10 m depth (Riou 10 and Cortiou 10) and one station at - 18 m depth (Riou 18). The investigations took place from the 9th July to the 4th December 1991.

Material for incubation was collected from living plants; the oldest senescent leaf of each shoot was chosen in order to simulate a natural leaf abscission. It was weighed (sub-samples of 30 +/- 0.5 g fresh weight) and was enclosed in bags (mesh size : 1 mm) sealed with strips of velcro. The bags were then placed in the meadow under foliar canopy and collected at increasing time intervals (1, 2, 3, 4 weeks; 2, 3, 5 months). Three series of bags were placed at both Riou 10, Cortiou 10, and Riou 18, in July 1991.

At each sampling time, three bags were collected at random and taken to the laboratory. There, the samples were washed, the fauna was eliminated and the foliar debris was separated into three size classes: leaves with a length of > 5 cm (large leaves); leaves with a length of between 5 cm and 8 mm (broken leaves), and leaf debris with a length of between 8 mm and 1 mm (debris). Each fraction was dried in the dryer at 60°C (constant weight), then weighed.

The totality of the samples was powdered (pulveriser). These results are only preliminary, and the carbon, nitrogen, and phosphorus content, and the percentage of ash, must be determined by subsequent analyses.

The findings were compared with those resulting from similar investigations carried out (i) at Ischia (Bay of Naples, Italy) from July 1988 to July 1989, and at Marseilles (stations Riou 10 and Riou 18) from June to December 1989. Hydrological conditions in the bay of Lacco Ameno (Ischia, Italy) are generally calm (MAZZELLA *et al.*, 1986), whereas the stations at Cortiou and especially Riou are much more exposed, and subject to very strong currents.

A weight loss with time was apparent in the incubated material. The loss followed a simple negative exponential model, (linear after logarithmic transformation of the data). Highly significant correlations were found between the total dry weight (in g) and the decomposition rate on the one hand, and between the dry weight of large leaves (leaves > 5 cm) and the decomposition rate on the other.

These preliminary findings confirm the patterns of decomposition kinetics observed not only (i) during previous investigations at Riou, but also (ii) during experiments at Ischia :

- at similar depths, the rate of decomposition of leaves is comparable whatever the site (no significant difference between the slopes of the various regression lines);
- decomposition is faster in the surface stations and in those subject to strong hydrodynamic forces (e.g. Riou) (fig.); - in addition to fragmentation resulting from purely mechanical factors (e.g. hydrodynamism forces), evidence is also provided of biological fragmentation (e.g. amphipodes). The period when the experiments are set up (summer or winter) also appears to influence the decomposition kinetics (ROMERO *et al.*, in press). A further series of experiments using litter bag was started in January 1992 at the same stations with a view to providing confirmation for this hypothesis.

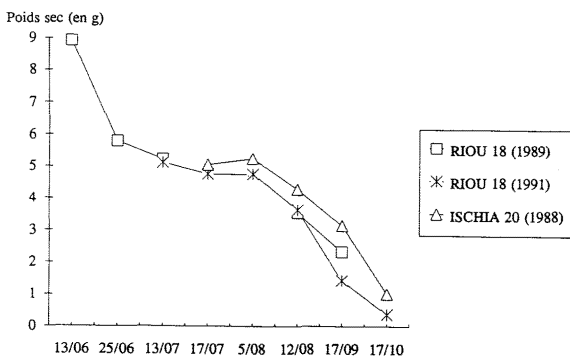


Figure : Dry weight (in g) of large leaves (leaves > 5 cm), at two stations: Riou (-18m) and Ischia (- 20m).

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