

EVIDENCE OF THE ANNUAL CHARACTER OF CYCLIC CHANGES OF
POSIDONIA OCEANICA SCALE THICKNESS (ERECT RHIZOMES)

Alain CROUZET°, Charles F. BOUDOURESQUE°,
 Alexandre MEINESZ°, Gérard PERGENT°

° Laboratoire d'Ecologie du Benthos et de Biologie Végétale
 Marine, Faculté des Sciences de Luminy, 13288 Marseille
 cedex 9, France

° Laboratoire de Biologie et d'Ecologie Marines, Université
 de Nice, 06034 Nice, France.

RESUME : Les cycles de variation de l'épaisseur des écailles, mis en évidence le long
 des rhizomes orthotropes de *Posidonia oceanica*, correspondent à une année. Le minimum
 d'épaisseur se situe en février-mars, et le maximum en septembre-octobre.

INTRODUCTION : *Posidonia oceanica* (Linnaeus) Delile (Potamogetonaceae)
 leaf sheaths are persistent on rhizomes after the shedding of leaf
 blades, and then called scales. CROUZET (1981) has reported the occur-
 rence of cyclic changes of scale thickness along erect rhizomes. The
 question now arised is the chronological meaning of these cycles.

MATERIAL AND METHODS : Erect rhizomes were collected at Banyuls (Pyré-
 nées-Orientales, 0.5 to 10 m depth), Port-Cros Bay (Var, 0.5 to 23 m

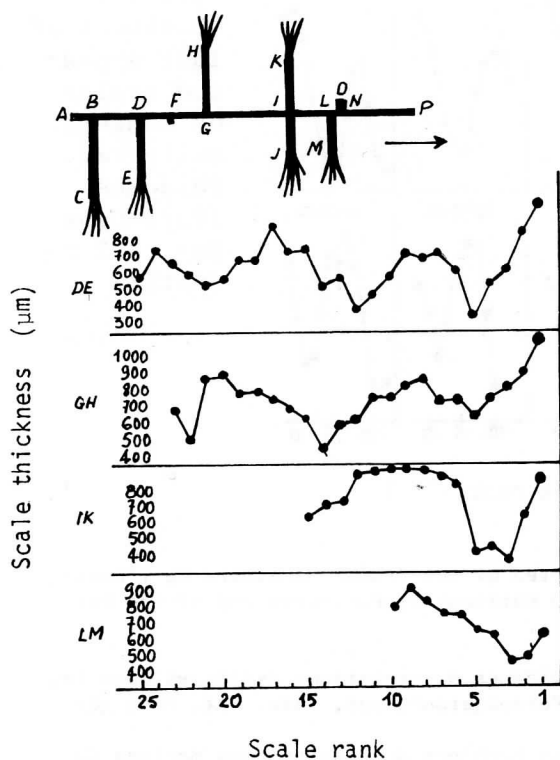


Fig. 1 : Diagrammatic fi-
 guration of a creeping
 rhizome with erect lateral
 rhizomes (above). Scale
 thickness along four erect
 rhizomes (below). The
 creeping rhizome apex was
 growing rightwards (arrow).

depth) and *Galeria* (Corsica, 9 m depth). The scale thickness was measured on fine transverse sections in their widest part (the midrib level), between 12 to 15 mm from their base. Scales are cut off according to their distichous arrangement, starting from older ones (rhizome base) towards the younger ones (rhizome apex). As a rule, we define a cycle as scales occurring between two consecutive thickness minima. The chronological meaning of cyclic changes of scale thickness was elucidated by two different methods : (i) The *in situ* tagging of rhizomes at a definite level (Fig. 1 : F); at *Galeria*, rhizomes were tagged 5 cm below the oldest leaf ligula in June 1979 and collected in September 1981. (ii) The measure of thickness of the last appeared scale on monthly collected rhizomes; 10 to 20 rhizomes were collected each month at 4 sites in Port-Cros Bay, April 1981 to April 1982.

RESULTS : Whatever site the rhizomes were collected at, or season considered, cyclic changes of scale thickness occurs (100 to 1300 μm). Lateral branches appeared posteriorly to tagging and therefore of known age show two complete scale thickness cycles for the older ones (Fig.1: GH, two years and three months maximum age) and only one cycle for the younger ones (Fig.1 : IK). An annual thickness cycle of the last appeared scale, with a February or March minimum, and a September or October maximum (Fig. 2) is to be found. These annual cycles give rise to an accurate method for studying the chronology of submarine terrace edification ("mattes") by *Posidonia oceanica*.

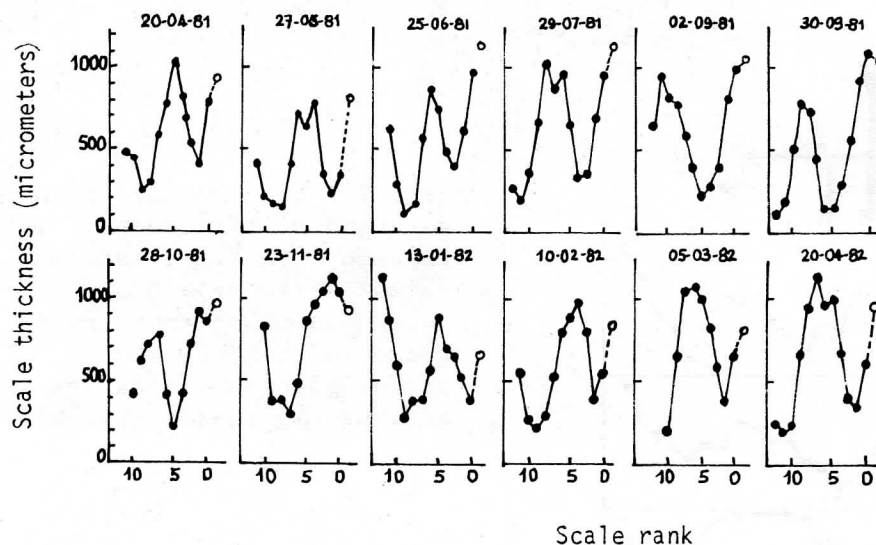


Fig. 2 : Thickness of last appeared scales on monthly collected rhizomes (Port-Cros Bay, 2.2 m depth).

ACKNOWLEDGMENTS : This investigation was supported by the French Ministère de l'Environnement through research programs of the Parc National de Port-Cros and of the Parc Naturel Régional de Corse.

LITERATURE CITED : CROUZET A., 1981. Mise en évidence de variations cycliques dans les écailles des rhizomes de *Posidonia oceanica* (Potamogetonaceae). *Trav. sci. Parc nation. Port-Cros, Fr.*, 7 : 129-135.

MOLINIER R., PICARD J., 1952. Recherches sur les herbiers de phanérogames marines du littoral méditerranéen français. *Ann. Inst. océanogr.*, Fr., 27(3) : 157-234.