

## Variations in the concentration of phenolic compounds in the seagrass *Posidonia oceanica* under conditions of competition

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### Abstract

The concentration of phenolic compound was measured in the seagrass *Posidonia oceanica* when interacting with two Bryopsidophyceae, *Caulerpa taxifolia* and *Caulerpa racemosa*, between May 1999 and May 2000. These measurements were performed on adult and intermediate leaves and in sheaths of the seagrass. Sampling was carried out at three stations subject to increasing levels of interaction with *Caulerpa*. The number of tannin cells was also analysed. Five phenolic compounds were identified in *P. oceanica*, with a predominance of caffeic acid in the adult and intermediate leaves. For a given level of interaction (and for both *Caulerpa* sp.), a significant seasonal variation in phenolic compounds was shown in the adult leaves (higher in November and lower in September and March for example for the interaction with *C. taxifolia*). Only for two compounds (corresponding to a mixture containing ferulic acid and the ester methyl 12-acetoxyricinoleate) were significant differences observed as a function of the level of interaction with *C. taxifolia*, and only in the adult leaves: higher concentrations of phenols were observed with increasing level of interaction. Thus, adult leaves gave values of  $55.5 \pm 14.1 \mu\text{g g}^{-1} \text{dm}$  without interaction (0Ct) and  $94.9 \pm 23.4 \mu\text{g g}^{-1} \text{dm}$  with high interaction (2Ct), corresponding to an increase of 70%. No significant difference was observed with intermediate leaves and sheaths, or for interaction with *C. racemosa*. The number of tannin cells (supposed to produce the phenolic compounds) largely increased in the adult and intermediate leaves when the degree of interaction with *C. taxifolia* increased: 90 mm above the base of the sheath (in adult leaves),  $16.7 \pm 10.6$  tannin cells  $\text{cm}^{-2}$  were found without interaction (0Ct), and  $57.8 \pm 21.2$  tannin cells  $\text{cm}^{-2}$  with high interaction (2Ct). No significant difference was found for *C. racemosa* interaction. It thus appears that when the seagrass *P. oceanica* is in interaction with *C. taxifolia*, it accelerates its production of secondary metabolites so as to limit invasion of the beds.

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