
Growth and biochemical composition of a microphytobenthic diatom (*Entomoneis paludosa*) exposed to shorebird (*Calidris alpina*) droppings

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Résumé

Intertidal mudflats are important feeding areas for migrating and wintering shorebird species. The objective of the present work was to experimentally evaluate the effect of Dunlin droppings on the growth and biochemical composition of the microphytobenthic diatom, *Entomoneis paludosa*. Various culture media were used going from plain artificial seawater to F/2 culture media containing variable nitrate concentrations (0; 50 or 882 $\mu\text{M-NO}_3$) to which bird dropping extract was added or not. The faeces extracts contained inorganic nitrogen (9.1 $\mu\text{M-NH}_4$), inorganic phosphorus (8.2 $\mu\text{M-PO}_4$), traces of silicate (0.2 $\mu\text{M-Si}$), organic nitrogen in the form of urea (16 $\mu\text{M-N}$) and other dissolved organic nitrogen (120 μMN). Faeces extract in artificial seawater was sufficient to sustain *E. paludosa* growth (up to 6.8 cell divisions in 9 days). A significant growth rate increase (+20%) and higher biomasses were observed when faeces extract was added to inorganic media enriched with 50 $\mu\text{M-NO}_3$. Bird droppings had a significant effect in *E. paludosa* final biochemical composition with the addition of faeces extract to a culture medium containing 50 $\mu\text{M-NO}_3$ increasing *E. paludosa* protein content and decreasing carbohydrate content. Pigment content per cell increased with the addition of bird dropping extract but ratios of light-harvesting and photo-protective pigments to chlorophyll a were unaffected. *E. paludosa* grown with faeces extract showed high cellular nitrogen and carbon contents, close to those obtained when cells were grown in F/2 medium. This study showed that shorebird droppings, through the addition of dissolved material, can significantly affect microphytobenthic diatom growth and biochemical composition.

Mots-Clés: Dunlin, microphytobenthos, mudflat, guano, carbon, nitrogen

*Intervenant