



Functional xanthophyll cycle and pigment content of a kleptoplastic benthic foraminifer: *Haynesina germanica*

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Some shallow water benthic foraminifera are able to retain functional chloroplasts (kleptoplasts) from their food source, i.e. diatoms. Here we assessed the functionality of the kleptoplast xanthophyll cycle (XC, i.e. the main diatom short-term photo-regulation mechanism) and we surveyed *Haynesina germanica* kleptoplast pigment composition over time and at different light regimes. Six common diatom lipophilic pigments were detected, two chlorophylls (Chl a, Chl c) and four carotenoids (fucoxanthin and by-products, diadinoxanthin, diatoxanthin and β -carotene), the same pigment profile as the diatom species frequently isolated at the sampling site. The xanthophyll cycle (XC) was functional with kleptoplast diatoxanthin (DT) content increase with concomitant diadinoxanthin (DD) decrease after short term light exposure. DT/(DT+DD) and DT/DD ratios increased significantly in specimens exposed to low light and high light in comparison to specimens maintained in the dark. Specimens placed in very low light after the light treatments reverted to values close to the initial ones, suggesting that *H. germanica* XC is functional. A functional XC is an indication of *H. germanica* kleptoplasts capacity for short-term photo-protection from photo-oxidative damages caused by excess of light. Furthermore, the pigment survey suggests that *H. germanica* preserved some chloroplasts over a longer time than others and that pigment content is influenced by previous light history. Finally, the current study highlighted seasonal differences, with higher pigment contents in winter specimens (27.35 ± 1.30 ng cell⁻¹) and lower in summer specimens (6.08 ± 1.21 ng cell⁻¹), a quantitative and qualitative composition suggesting light acclimation to low or high light availability, according to the season.

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