

Epi- and endophytic diatoms associated with two South African kelp species: Ecklonia maxima (Osbeck) Papenfuss and Laminaria pallida **Greville ex. J. Agardh**

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Introduction

- Kelps host a variety of associated biota, including diatoms.
- Marine epiphytic diatoms are poorly investigated in Southern Africa, except some pioneering floristic surveys dating back in the 1970s.
- This study aims to provide an overview and the baseline descriptions of the epiphytic diatom assemblages associated with Ecklonia maxima and Laminaria pallida, at different growth stages.

Materials and methods







• 4 juvenile and 4 adult thalli of both kelp species were collected, each in 6 separate subsamples.



Sample processing included dehydration in ethanol solutions at increasing grades, criticalpoint drying and sputter coating with gold palladium.

In situ diatom observations was done using AURIGA Field **Emission SEM and LEO** 1450 SEM (Zeiss, Germany).



with Laminaria pallida (A-D) and Ecklonia maxima (E-H). A, B. Gomphoseptatum sp. on the surface of an adult thallus of *L*. pallida. C. Diatoms growing on juvenile L. pallida. D. Gomphoseptatum sp. growing on juvenile L. pallida. E, F. Diatoms growing on adult *E. maxima*. G, H. Diatoms dwelling in juvenile *E. maxima* tissue. Scale bars = 10 μ m (H); 20 μ m (B, D, F); 40 μm (E); 50 μm (A, C); 100 μm (G).



1. A colony of *Grammatophora marina* . Scale bar = $40 \mu m$





Results

- Average diatom densities: 7 ± 5 cells mm⁻² (A. Lp), 38 ± 77 cells mm⁻² (J. Lp), 21 \pm 15 cells mm⁻² (A. Em) and 43 \pm 66 cells mm⁻² (J. Em).
- The most influential diatom taxa included Gomphoseptatum spp., Cocconeis spp., Navicula spp., Nagumoea spp., Tabularia sp., Rhoicosphenia sp., Amphora spp. and Cylindrotheca sp. (SIMPER results).
- Constrained coordination analysis (CCA) showed that 20.7% of the variation in the diatom abundance data is explained by the constraining variables (Host_spp and Host_size).

Figure 6: Non-metric multidimensional scaling (nMDS) graph based on diatom taxa abundances showing the relationship between the diatom communities growing on both, host species: Lp = Laminaria pallida, Em = Ecklonia maxima and host age: A = Adult, J = Juvenile

Discussion

- The low number of diatom taxa may be partly justified by the homogenous surface and uniform morphology of the kelps.
- Kelp defence mechanisms, e.g. secretion of chemically active metabolites and/or sloughing off their outer layer, could be another factor that influences epiphytic diatom communities development.
- On such unstable substrate some diatoms seemed to prefer endobiotic life dwelling in what appeared to be a damaged or growing tissue.



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