

Heterogeneity of zooxanthellae density in the coral *Acropora globiceps* around Moorea (French Polynesia)



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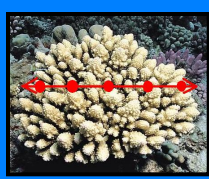
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Introduction

Understanding the actual heterogeneity of coral zooxanthellae density appears as very important to understand variations in coral survival due to bleaching (the loss of these micro-algal symbionts). Heterogeneity of coral bleaching at different observation scales remains largely misunderstood. A baseline is therefore needed to detect thresholds where unusual perturbations take place. This study was led in a very perturbed region where strong environmental gradients appears at small scale. *Acropora spp* are known to be the corals most sensitive to bleaching and are therefore good witnesses indicating perturbations.

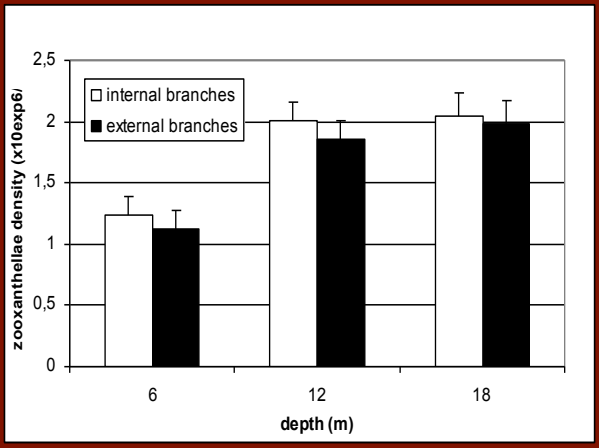
Materials and methods

The present work explores intracolony, intercolony, spatial and temporal variations of zooxanthellae density in the coral *Acropora globiceps* Dana 1846, over a period of three months on the foreereef of Moorea, French Polynesia.



Results

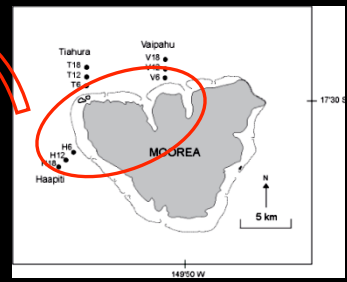
Intracolony zooxanthellae densities did not vary significantly : differences in zooxanthellae densities between inner and outer branches do not significantly differ at 6, 12 and 18 meters depth. Furthermore, there is no difference between colonies of the same site. This is useful as baseline to monitor bleaching.



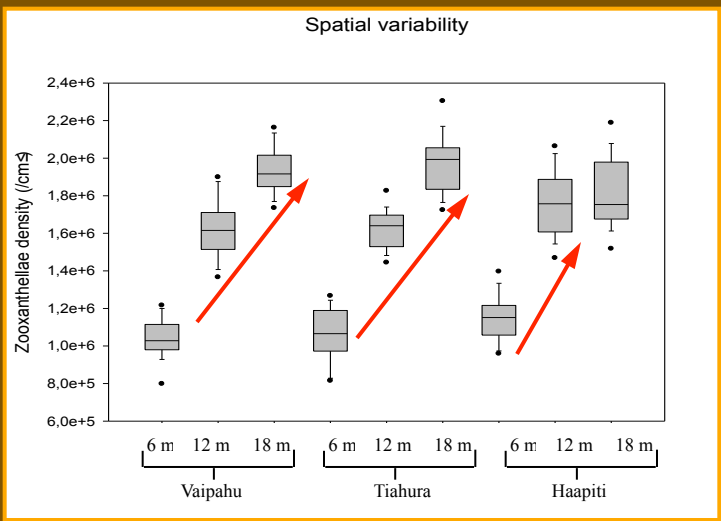
The temporal variation of zooxanthellae densities did not show significant variations over the study period.



<http://www.internet-general.info/IMG2/Polynesie/Francaise/Moorea-1.jpg>



On a wider scale, intercolony zooxanthellae densities vary spatially : a positive correlation was observed between depth and symbiont density (density increases when light intensity decreases, so according to depth). Moreover, the location of colonies exposed to different hydrodynamic conditions was not a parameter controlling the concentration of zooxanthellae.



Conclusion

Considering the importance of taking into account the variations within and among colonies to determine zooxanthellae densities and to assess the evolution of zooxanthellae populations, the present results of this study showed the only strong effect of depth (factor regrouping light, sedimentation, hydrodynamic and perhaps temperature). We have therefore the baseline of the natural heterogeneity of zooxanthellae density of a bleaching-sensitive coral species, in a often perturbed region, with environmental gradients at a small scale. This should allow a better interpretation of bleaching heterogeneity.