

2 YEARS-LONG MONITORING OF *CODIUM ELISABETHAE* POPULATION DYNAMICS IN THE AZORIAN REEF ECOSYSTEM (FAIAL ISLAND) WITH SEABED IMAGERY

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In the Site of Community Interest (Natura, 2000) of Monte-da-Guia (Faial, Azores), two sites were delimited in order to investigate particularly the links between habitat characteristics, population structure, distribution and dynamics of the green alga *Codium elisabethae*. The first site is a large protected rocky seafloor of an ancient volcano crater (20m deep) and classified as no-go reserve. It shows very high density stands of *Codium elisabethae* (up to 105 ind.m⁻²), representing the main vegetal biomass. At similar depth but distant of about two kilometers, the second site is in a more exposed area, where a sparse population (about 13 ind.m⁻²) occupies rocky tables and boulders emerging from shallow sandy deposits. These contrasting densities reflect different population dynamic equilibrium resulting from the particular environmental pressures of each site. A two year population survey started in August 2003, aiming principally at building submarine image mosaics of each site on a seasonal basis. Further, a computer assisted detection is run on the images to derive valuable information about the studied macroalgae. This technique allows to study a comparatively large zone regarding to the diving time invested so as to integrate spatial patchiness and to focus on the temporal evolution of well identified individuals. The imagery methodology was validated with *in situ* measurements, confirming the adequacy of the 1cm precision size histograms produced, when considering individuals larger than 5cm diameter. Seasonal fluctuations of growth rate (from 0.5 to 3cm.month⁻¹) and primary production (from 1 to 15kg.m⁻².month⁻¹) could be described. For both sites studied, density, biomass and cover rate seemed affected by a seasonal variation with reduction starting in end summer early autumn. In both sites, the reduction was sharp in the fall 2003 and population density didn't recover completely in spring and summer 2004. During the following year, population of the protected site could maintain density and biomass, while population of the exposed site dropped continuously all year. Last processing step will search to relate statistically these different population evolutions to the benthic environmental constraints measured in both sites during the year 2004-2005 (temperature, currents, turbidity, photosynthetic active radiation, nutrients). Differences in hydrodynamic exposure of both sites could be part of the answer, but observed differences in the reproduction intensity of these two populations is an important factor, and remains unexplained.