Environmental control on biometry and demography of solitary corals in the Mediterranean Sea

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Abstract:
The relationship between environmental factors and biometric and demographic characteristics was assessed in the Mediterranean Balanophyllia europaea, a zooxanthellate coral, and Leptopsammia pruvoti, an azooxanthellate coral. Oral disc allometric growth was opposite in the two species. With increasing polyp size, the oral disc of B. europaea assumed an oval shape, while that of L. pruvoti tended to assume a circular shape. The different shapes might represent an adaptation to different sedimentation stress in the habitats of the two species. In both species, temperature had a greater effect on biometry in comparison with solar radiation. In the zooxanthellate species, temperature explained a higher percentage of the biometric parameter variance in comparison with the azooxanthellate species. The effect of temperature on growth might be amplified by the photosynthesis of zooxanthellae, which can influence calcification. While environmental factors did not influence demographic characteristics of L. pruvoti, temperature had a negative effect on population density of B. europaea. This might be the consequence of a decline in fecundity, due to less availability of resources supporting gametogenesis with inhibition of photosynthesis at high temperatures. We conclude that the strong effect of temperature on biometry and demography of B. europaea depends on photosynthesis of symbiotic zooxanthellae.