Gender-related differences in the apparent timing of skeletal density bands in the reef-building coral *Siderastrea siderea*

J.P. Carricart-Ganivet • L.F. Vásquez-Bedoya •N. Cabanillas-Terán • P. Blanchon

Unidad Académica de Sistemas Arrecifales, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México; Grupo de Investigación en Gestión y Modelación Ambiental, GAIA–SIU, Universidad de Antioquia, El Colegio de la Frontera Sur

Abstract Density banding in skeletons of reef-building corals is a valuable source of proxy environmental data. However, skeletal growth strategy has a significant impact on the apparent timing of density-band formation. Some corals employ a strategy where the tissue occupies previously formed skeleton during as the new band forms, which leads to differences between the actual and apparent band timing. To investigate this effect, we collected cores from female and male colonies of *Siderastrea siderea* and report tissue thicknesses and density-related growth parameters over a 17-yr interval. Correlating these results with monthly sea surface temperature (SST) shows that maximum skeletal density in the female coincides with low winter SSTs, whereas in the male, it coincides with high summer SSTs. Furthermore, maximum skeletal densities in the female coincide with peak Sr/Ca values, whereas in the male, they coincide with low Sr/Ca values. Both results indicate a 6-month difference in the apparent timing of density-band formation between genders. Examination of skeletal extension rates also show that the male has thicker tissue and extends faster, whereas the female has thinner tissue and a denser skeleton—but both calcify at the same rate. The correlation between extension and calcification, combined with the fact that density banding arises from thickening of the skeleton throughout the depth reached by the tissue layer, implies that *S. siderea* has the same growth strategy as massive Porites, investing its calcification resources into linear extension. In addition, differences in tissue thicknesses suggest that females offset the greater energy requirements of gamete production by generating less tissue, resulting in differences in the apparent timing of density-band formation. Such gender-related offsets may be common in other corals and require that environmental reconstructions be made from sexed colonies and that, in fossil corals where sex cannot be determined, reconstructions must be duplicated in different colonies.

Carricart-Ganivet JP, Vásquez-Bedoya, LF, Cabanillas-Terán N, Blanchon P (2013) Gender-related differences in the apparent timing of skeletal density bands in the reef-building coral *Siderastrea siderea*. Coral Reefs. doi: 10.1007/s00338-013-1028-y