

Sofonia, J. J. and K. R. N. Anthony. 2008. High-sediment tolerance in the reef coral *Turbinaria mesenterina* from the inner Great Barrier Reef lagoon (Australia). *Estuarine, Coastal and Shelf Science* 78(4):748-752.

Abstract:

Sedimentation is an important stressor on coral reefs subjected to run-off, dredging and resuspension events. Reefs with a history of high-sediment loads tend to be dominated by a few tolerant coral species. A key question is whether such species live close to their tolerance thresholds or near their niche optima. Here, we analyse experimentally the sediment tolerance of a spatially dominant coral, *Turbinaria mesenterina* (Dendrophylliidae), at nearshore reefs in the central Great Barrier Reef lagoon. Testing was conducted in a 5-week tank experiment under manipulated sediment loading and flow conditions. Physiological stress was assessed based on the behaviour of three key response variables: skeletal growth rate, energy reserves (lipid content) and photosynthetic performance. Because sediment effects are likely to vary between flow regimes, sediment and flow responses were tested using a full factorial design. Sediment loads greater than 110 mg cm^{-2} had no effect on any of the physiological variables, regardless of flow ($0.7\text{--}24 \text{ cm s}^{-1}$). *Turbinaria mesenterina* is thus tolerant to sediment loads an order of magnitude higher than most severe sediment conditions in situ. Likely mechanisms for such tolerance are that: (1) colonies covered in sediment ($60\text{--}120 \text{ }\mu\text{m}$) in low-flow were able to clear themselves rapidly (within 4–5 h); and (2) sediment provides a source of food. These results suggest that intensified sediment regimes on coastal reefs may shift coral communities towards dominance by a few well-adapted species.