



**Fig. 1** Sponge orange band (SOB) on *Xestospongia muta*, Conch Reef, Florida. **a** SOB advancing across a large sponge. Right edge of slate = 14 cm. **b** SOB advancing from below. **c** Same sponge as in **b**, different angle, 16 days later

## Sponge orange band (SOB): a pathogenic-like condition of the giant barrel sponge, *Xestospongia muta*

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The distinct reddish-brown coloration of the giant barrel sponge *Xestospongia muta* is due to photosynthetic cyanobacteria in the surface tissue (Steindler et al. 2005). In recent years, bleaching (loss of pigmentation) of *X. muta* has been reported (Vincente 1990). We have been monitoring the populations of *X. muta* in the Florida Keys National Marine Sanctuary on Conch Reef since 1997, and have recorded the annual cycles of bleaching and recovery (~25% of population). At much lower frequency (<1%), however, we have observed a process of fatal bleaching, which results in the complete loss of color, tissue disintegration and sponge mortality. Fatally bleached sponges are vigorously consumed by both spongivorous and generalist predatory fishes (Dunlap and Pawlik 1998).

During a field season in 2005, several large (~2 m in height) *X. muta* became fatally bleached and died (Fig. 1). A distinct orange band developed along the zone of healthy and dead tissue (Fig. 1a, b), a phenomenon that we refer to as sponge orange band (SOB). SOB had been first observed on 2 June 2005, and within 6 weeks SOB migrated across two of the largest sponges and both died. The band did not spread across two other sponges where there was some tissue loss (<5% of volume) but not mortality.

The cause of SOB is unclear, but it resembles an infection. A general environmental trigger is not indicated, as the adjacent sponges were not affected. The orange coloration of SOB may be an epiphenomenon of dying tissue, with possible pathogenesis occurring in advance of the orange band. In retrospect, it is possible that we have encountered the final result of SOB as fatal bleaching for at least a decade in the Florida Keys and the Bahamas, but because of the rapid pace of SOB, only the bleached tissue or a pile of white spicules marking a dead sponge was observed (Fig. 1c), and not SOB itself.

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