An unusual cyanobacterial bloom in Hawai‘i

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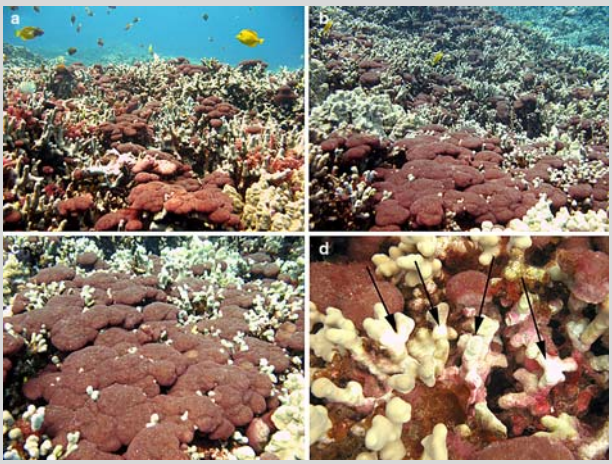

Fig. 1 (**a**, **b**) Landscape views of *Leptolyngbya* growing over the coral *Porites compressa* at 12–15 m depth, (**c**) close-up of *Leptolyngbya* growing in dense mats at 15 m, and (**d**) dead and dying coral (black arrows) under colonies of *Leptolyngbya* suggesting that overgrowth is causing coral mortality

Surveys conducted by the University of Hawai‘i (UH) in May 2008 documented an unusual bloom of the cyanobacterium *Leptolyngbya crosbyana* on the reefs directly adjacent to the National Park Pu‘uhonua o Hōnaunau (Fig. 1a). UH has been conducting annual surveys on Hōnaunau’s reefs since 2006 and we have documented consistently high coral cover (>40%) and low cover of cyanobacteria (<5%). However, these surveys documented an unusually high abundance of *L. crosbyana* where it was most abundant (~40% cover) at 10–15 m along the edge of a prevalent drop off (Fig. 1b). *Leptolyngbya* is commonly found on subtidal reefs in Hawai‘i; however, most colonies rarely exceed 5 cm in diameter. Our surveys consistently found colonies in excess of 50 cm. More importantly, these colonies were very dense, exceeded 10 cm in thickness, coalesced and fused and were clearly smothering and overtopping corals (Fig. 1c). After removing large colonies of *Leptolynbya*, dead and dying branches of the coral *Porites compressa* were evident under the mats (Fig. 1d).

Cyanobacterial blooms have been reported from other coral reefs around the world and have been shown to have deleterious effects on corals where they can inhibit larval settlement and cause adult tissue mortality through direct contact or allelopathy (Kuffner et al. 2006). Nutrient pollution of groundwater has been correlated with similar blooms (Littler et al. 2006), but the causes of this bloom remain unclear. High nutrient input has been reported in groundwater seeps at Hōnaunau, but other interacting factors may also be involved. Finally, our observations show that *Leptolyngbya* is causing coral mortality and is thus having negative effects on the reef community, suggesting that management action may be needed to prevent further damage to Hōnaunau’s unique reefs.

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Reef sites

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