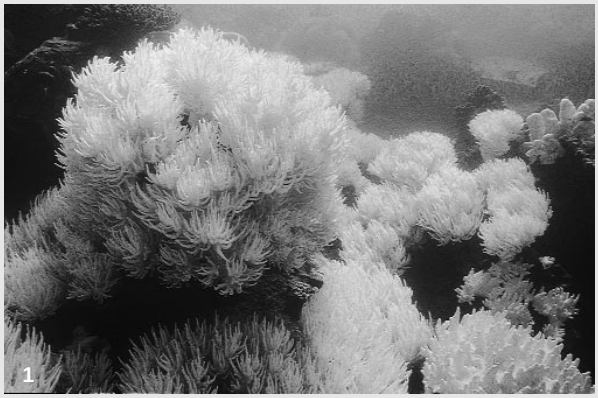

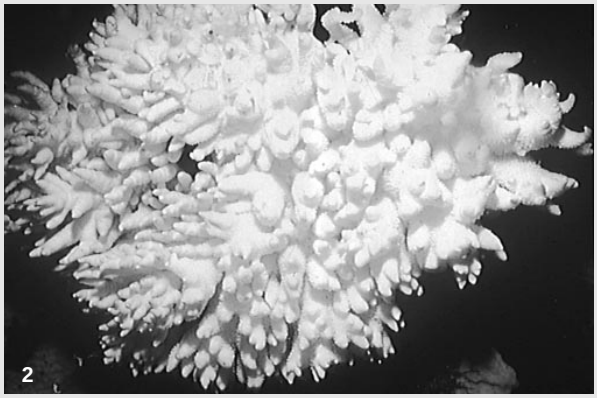

Tissue loss and mortality in soft corals following mass-bleaching

Alcyoniid soft corals sustained extensive and rapid tissue wastage during a mass bleaching event on the Great Barrier Reef in early 1998. Bleaching set in after exposure to unusually high water temperatures, combined with freshwater intrusion onto near-shore reefs during a flood event. Soon after the onset of bleaching (Fig. 1), totally bleached colonies ceased expanding during the day, except in flow-exposed habitats. At 2 months, very few of the bleached colonies expanded at night (Fig. 2); the time of greatest feeding activity in soft corals on the Great Barrier Reef. Within 2 to 3 months, many of the fully-bleached *Sinularia*, *Lobophytum* and *Sarcophyton* colonies had shrunk by 60–80 % in volume (Fig. 3), before fouling by algae and subsequent death set in. The corals appeared to have starved to death. The starvation was not only a consequence of failing phototrophy due to the loss of zooxanthellae, but also of severely reduced heterotrophy, due to extended periods of full colony contraction and thus lack of heterotrophic food intake. This observation agrees with previous findings which suggest a strong contribution by hetertrophy to the carbon budget of soft corals (Fabricius et al. 1995, Fabricius and Dommisse, in prep.), and a relatively inefficient phototrophy, probably due to their low surface area/volume ratio (Fabricius and Klumpp 1995).

Soft corals bleached at similar rate to hard corals: in the upper 8 m of five near-shore reefs of the Central GBR 71 % ± 8 (SE) of soft corals and 81 % ± 4 of hard corals were totally or partially bleached five weeks after the onset of bleaching. Of the three dominant soft coral families, members of the family Alcyoniidae (eg., *Sarcophyton*, *Sinularia* and *Lobophyton*) were most commonly recorded as partially or totally bleached, while the Xeniidae had the lowest proportion of bleached colonies. However, re-surveys indicated the opposite trend in mortality rates. Within days of loosing their zooxanthellae, many xeniid colonies died and disintegrated without leaving any remains, and thus counts of bleached colonies were lower than for the Alcyoniidae. In contrast, dying alcyoniid colonies (Fig. 4) were initially rare, but mortality rate rose to 30 % ± 6 in the upper 8 m on near-shore reefs after ~ 3 months. The high rate of mortality in this longlived group (Fabricius 1995) is indicative of the severity of the 1998 bleaching event.

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Reef sites