

# Corals on the move: morphological and reproductive strategies of reef flat coralliths

Received: 1 November 2007 / Accepted: 26 November 2007 / Published online: 25 December 2007  
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Coralliths are free-living scleractinian corals of subspheroidal growth form that exist on the shallow inter reef and reef flat environments (Glynn 1974; Pichon 1974). Such mobile corals are abundant (often  $>10 \text{ m}^{-2}$ ) on the depositional reef flats at Heron Reef (Capricorn Bunker, southern Great Barrier Reef), where strong currents and periodic resuspension result in a circumrotatory action, enabling live tissue to cover the entire surface area of fragments.

Reef flat corallith assemblages are dominated by subspheroidal branching (Fig. 1a, b, c), and submassive morphologies (Fig. 1d, e) formed exclusively through asexual fragmentation of parent colonies. Although smaller branching coralliths are prone to mortality through burial and abrasion (Smith and Hughes 1999), high rates of clonal dispersal through corallith formation may represent a key reproductive strategy for branching reef flat corals, allowing redistribution of colonies to adjacent regions where sandy substrates are often unsuitable for larval recruitment.

In contrast, free-living submassive spheroidal forms of *Porites lutea* (Fig. 1f) are formed exclusively by sexual reproduction through recruitment on dead coral rubble encrusted with coralline algae. Whilst *P. lutea* coralliths show greater preservation potential due to their spheroidal morphology, they are more mobile and less dominant in reef flat assemblages. X-radiographs of density banding in sections of *P. lutea* coralliths support the longevity of these coralliths, indicating between 1 and 6 years of continuous growth following settlement (Fig. 1g), whilst asexual fragments are of indeterminate age due to their clonal life histories.

As rates of sexual reproduction in reef flat corals become increasingly compromised through successive coral bleaching events (Ward et al. 2000) such mechanisms of clonal dispersal through asexual fragmentation are likely to play an increasingly important role in the reproductive strategies of reef flat corals.

**Acknowledgments** P. Colls for assistance with sectioning and L. Lawrance for assistance with X-radiograph sections.

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Coral Reefs (2008) 27:343–344  
DOI 10.1007/s00338-007-0344-5

**Fig. 1** Examples of subspheroidal forms of reef flat branching coralloliths: **a** *Acropora formosa*, **b** *Montipora digitata*, **c** *Pocillopora damicornis*, submassive coralloliths: **d** *Goniastrea aspera*, **e** *Platygyria lamellina*, **f** *Porites lutea*, and **g** thin section and X-radiograph of *P. lutea* showing gradual circumfusion of live tissue following recruitment to dead coral rubble

