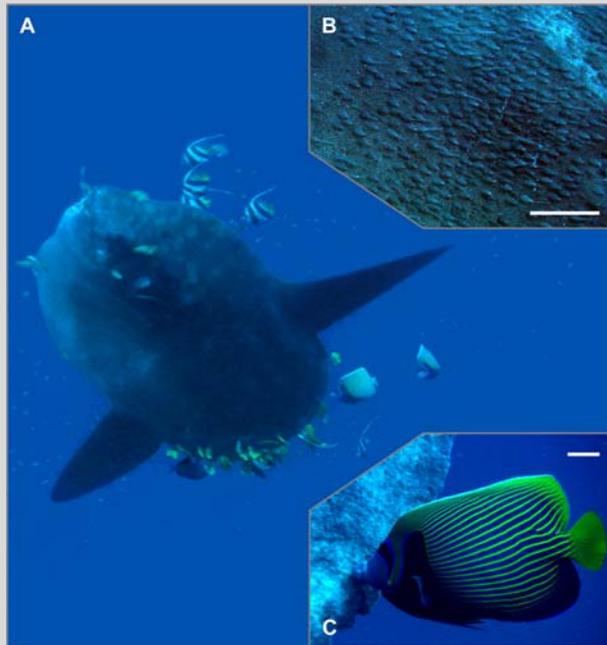


# Adult Emperor angelfish (*Pomacanthus imperator*) clean Giant sunfishes (*Mola mola*) at Nusa Lembongan, Indonesia

Received: 15 November 2005 / Accepted: 28 November 2005 / Published online: 16 March 2006  
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**Fig. 1a** Five reef fish taxa cleaning separate *Mola* body-regions, **b** heavy ectoparasite-loads on *Mola*, **c** *P. imperator* cleaning *Mola* fin trailing edge. Scale bars 50 mm

to *Holacanthus*, it may be an aberrant behaviour in the ‘Lembongan angelfishes’—a product of predictable, albeit transient aggregations of megafauna carrying sufficient ectoparasite loads to warrant such behavioural divergence.

**Acknowledgements** We thank www.scubali.com. J. R. Smith optimised HD video images from a Sony HDWF900/R3 camera.

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Over 4 days in October 2004, up to 16 ectoparasite-laden Giant Sunfishes (*Mola mola*) were observed off Nusa Lembongan, Indonesia, confirming indigenous reports of annual *Mola* aggregations at a short stretch of coral reef slope. An ‘assembly line’ of five coral reef species cleaning separate *Mola* body regions was documented (Fig. 1a). Butterflyfish species (*Chaetodon kleinii* and *Hentiochus diphleutes*) cleaned the ventral and head areas respectively, while wrasses (*Labroides dimidiatus* and *Thalassoma lunare*) covered flank regions. Surprisingly, of 37 observed cleaning events, ~40% were dominated by large Emperor angelfishes, *Pomacanthus imperator* ( $n \leq 12$ ; total length < 55 cm) (Fig. 1c).

A previously un-documented *Mola* breaching behaviour and the intense cleaning efforts markedly reduced the initially severe parasite loads (Fig. 1b). The angelfish removed particularly firmly attached copepod and trematode ectoparasites (Logan and Odense 1974), similar to the seagulls cleaning surfacing *Mola* in Monterey Bay, California. During cleaning, ulcerations appeared along the *Mola* fin trailing edges. Angelfish have an extra lower jaw joint which results in an unusual grab-and-tearing capability (Konow and Bellwood 2005), and it may be that the cleaning rips the *Mola* skin rather than the sturdy parasite-attachment, which seemed otherwise unaffected by the breaching and less tenaciously biting cleaners.

Adult angelfish cleaning behaviour is a rare juvenile trait retention otherwise only seen in the East-Pacific genus *Holacanthus* (Bellwood et al. 2004). In *Pomacanthus*, similar biogeographical trends exist with juveniles commonly cleaning in the Caribbean, while only juveniles of the Emperor angelfish do so in the Indo-West Pacific (Sazima et al. 1999). Whilst adult cleaning behaviour may not be unique