

Reef sites

Manta alfredi target multispecies surgeonfish spawning aggregations

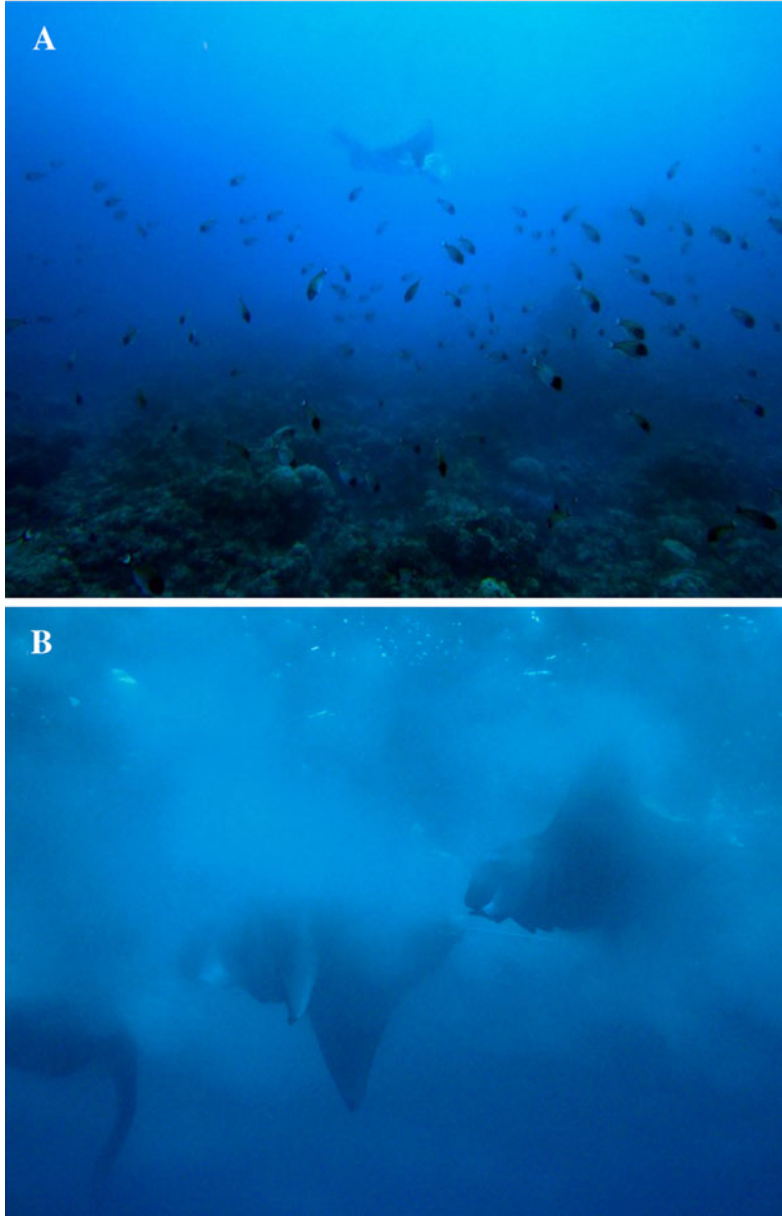


Fig. 1 **a** *Manta alfredi* near an aggregation of *Acanthurus lineatus*; **b** *M. alfredi* feeding in spawn clouds (photo credit Jan-Willem Staman)

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Received: 14 February 2013 / Accepted: 19 February 2013 / Published online: 20 March 2013
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We document, for the first time, that reef-associated manta rays (*Manta alfredi*) target and feed on fish gamete clouds produced at multiple spawning aggregations (SPAGs) of three surgeonfish species: *Acanthurus triostegus*, *A. guttatus*, and *A. lineatus*. Our observations additionally first document SPAGs on Guam. *M. alfredi* are ram-filter feeders that feed on rich sources of zooplankton influencing their distribution and site fidelity (Anderson et al. 2011). Similarly, the whale shark (*Rhincodon typus*), also an Elasmobranchii ram-filter feeder, has been well documented feeding upon fish spawn (Heyman et al. 2001). Spawning events occurred adjacent to a channel, at a depth of 5–13 m on the reef slope of Tumon Bay Marine Preserve, Guam. Events that occurred early in the year were largest in size, with fish numbers subsequently decreasing. Spawning generally lasted approximately 20 min, during an outgoing tide. *A. triostegus* and *A. guttatus* spawned at sunset, preceding the first quarter and new moon (four SPAGs per species observed during January–April 2012). Eight *A. lineatus* SPAGs were observed at sunrise around the full and new moon from March to June 2012. Spawning events were predicted from previous observations in 2010. During 10 of the 12 observed SPAGs, up to 12 *M. alfredi* fed on the gamete clouds. The number of manta rays present was positively correlated with the size of surgeonfish aggregations. *M. alfredi* were present before spawning (Fig. 1a), swimming with their cephalic fins furled, while fish commenced courtship behavior, including color changes, and made quick, vertical rushes to the surface. As gamete clouds were released into the water column, the manta rays immediately extended their cephalic fins, opened their mouths, expanded their buccal cavity, and began to feed (Fig. 1b). Once spawning was complete, both surgeonfish and manta rays departed (videos available as Electronic Supplemental Material and at www.youtube.com/MantaCoralReefsSites).

Observations document for the first time: (1) groups of *M. alfredi* target SPAGs as a food source and (2) predictable SPAG patterns for 3 species of surgeonfish on Guam.

Acknowledgments Dr. Jennifer McIlwain and Dr. Mark Deakos for assisting with the manuscript and improvements made by the reviewers.

References

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Electronic supplementary material The online version of this article (doi:10.1007/s00338-013-1022-4) contains supplementary material, which is available to authorized users.

Coral Reefs (2013) 32:367
DOI 10.1007/s00338-013-1022-4