

# MOODY MOBULIDS: Rapid Colour Change in

# MANTAS

"The secret lives of manta rays are relatively unknown to us, but recent research has revealed some fascinating discoveries about rapid colour change in these animals and what it might mean."

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Report by **Alex Rose** 



ravs are considered elasmobranchs along with other rays and sharks, and are only eleven species in the Mobulidae family including manta and mobula rays. They are currently divided into two recognized species, Manta birostris, which are the larger oceanic mantas, and M. alfredi, which are the smaller, but still impressively large, reef mantas. While both species are considered pelagic, M. birostris is more migratory and seems to have a wider geographic range, having been seen in waters ranging from the east coast of the United States to northern New Zealand. M. alfredi has a smaller home range that is typically restricted to tropical waters, and is more commonly spotted near coral reefs and tropical island chains.

It is not particularly easy to tell the difference between oceanic and reef mantas, but one of the ways species and individuals have been classified is by their colouration, a factor that was assumed to be permanent but was recently discovered to be dynamic. Dr. Csilla Ari, Director of the Manta Pacific Research Foundation, has dedicated her life to learning about these mysterious mobulids, and published a paper in the Biological Journal of the Linnean Society this year documenting the ability of manta rays to rapidly change colour. We now know that mantas are capable of reversibly and repeatedly changing their colour within a matter of minutes for a variety of potential reasons: "indication of excitement, aggression, and courting, or perhaps stress related to hormonal changes". According to Dr. Ari, "It could be speculated that these coloration changes might give adaptive advantages for prey capture, be used as a communication signal between individuals or help to avoid potential predators."

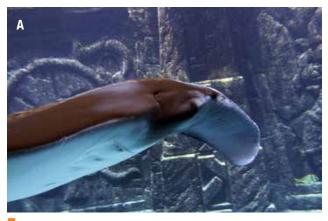
change involves rapid development of intense coloration with regard to their lighter-hued markings, particularly during times of feeding,

intense social interaction, and courtship behaviour. The most prominent areas where this vivid whitening occurred include the shoulder bars, the chevron shaped marking on their backs, fin tips, the circular area around the eyes, the mouth, and inner side of the cephalic fins (the pair of flaps surrounding their mouth). This study hypothesizes that "the white markings most likely intensify as a response to excitement-related stimuli, as triggered by food, mate, competition or danger." Until now, rapid colour change in mantas has never been definitively documented before. This study is of particular importance for classification and conservation efforts because these changes must be taken into account when coloration of these changing areas is intended to be used for identification purposes. Dr. Ari has also conducted research on the behaviour and cognition of manta rays as well as the brain structure of various elasmobranch species, determining that mantas have the largest brain of any fish species yet studied.

#### Until now, rapid

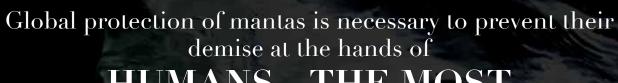
## **COLOUR CHANGE IN MANTAS**

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Rapid colour change is illustrated in these images of the same manta ray before (A) and after (B) intense social interactions. Photos by Dr. Csilla Ari



## HUMANS – THE MOST DANGEROUS SPECIES ON EARTH.

Mantas are categorized as "Vulnerable" according to the IUCN Red List and have also recently been listed on Appendix I and II under the Convention on Migratory Species (CMS), a measure that aims to "conserve terrestrial, aquatic and avian migratory species throughout their range". In addition to natural predators such as sharks, orcas, and false killer whales, humans have become the main reason for declining numbers of manta rays in our world's waters. Mantas are frequently entangled in fishing nets and are caught as bycatch, while still more of them are viciously hunted for their gill plates, a highly sought after remedy for "blood purification" in Traditional Chinese Medicine (TCM).

Global protection of these majestic animals is necessary to prevent their demise at the hands of humans - the most dangerous species on earth. Protecting mantas is integrally linked not just to legislation and education, but to empowering the people who depend on hunting them for survival. In response to this need for change, Dr. Ari established the Manta Memories Project in 2013, a venture that aims to provide alternative income options to manta ray fishing communities by distributing mantathemed merchandise worldwide, with the profit from sales benefiting them. Some of the items sold will be souvenirs and handicrafts made by the people in these communities, so the project will serve

as a way to facilitate the development of sustainable local economies independent of the manta fishing industry......To learn more about this initiative, see *mantamemories.org*. •

