

Does moonlight affect newborn reef sharks in a tide-free environment?

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Synchronised behaviours of animals with the monthly phases of the moon have been demonstrated in a wide range of taxa, and the effects of the lunar cycle appear to be particularly important in the marine environment. In coastal ecosystems, the two main processes through which the lunar cycle can influence the movements and behaviour of marine animals are tidal variation and moonlight availability. The island of Moorea, however, is located within the South Pacific amphidromic system and only experiences a very narrow tidal range (ca. 0.2 m). Effects of lunar-induced tidal variation are therefore largely absent from the shallow reef flats fringing Moorea, and changes in moonlight availability can be expected to be the major factor in the entrainment of behavioural rhythms to the lunar cycle. Moorea therefore provides for a unique location to tease the effects of moonlight availability on the activity and foraging behaviour of newborn tropical reef sharks unconfounded by a tidal effect. Newborn sharks can often be considered as mesopredators in their ecosystem, but whether moonlight availability affects these sharks – through variation in foraging success, variation in predation risk, or a combination of both – is unclear.

In the present study, we used capture data and stomach content data from a long-term fisheries-independent survey of blacktip reef (*Carcharhinus melanopterus*) and sicklefin lemon (*Negaprion acutidens*) shark neonates at Moorea, French Polynesia to assess whether the foraging activity and predation success of the newborn sharks is affected by moonlight availability. Our results reveal no influence of the lunar cycle on the foraging activity or predation success of the studied shark neonates, suggesting that moonlight availability does not appear to affect the behaviour of these sharks off Moorea. As present-day shark neonates represent adult populations of the future, a sound understanding of the effects that environmental conditions may or may not have on the early life of these fishes may prove crucial for the conservation of future shark populations.

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