Study of feeding of the pink whiprays, *Himantura fai* in French Polynesia

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In this first study of a stingray species, *Himantura fai*, in French Polynesia we evaluated the social, cultural and economic impacts of ray feeding as a tourist attraction on the island of Moorea. From its inception in 1994, this activity grew rapidly and by 2003 there were 14 operators employing 40 people. Two different feeding sites were developed and in 2005 they shared over 60,000 tourists and generated over 500,000 Euros in direct revenue. In addition to this economic impact, we investigated social and cultural consequences of this new activity including its impact on lagoon management and customs. We also studied the behavioral ecology of this species, particularly the movement patterns of rays in the Tiahura area on the north-west side of Moorea. Fifty-eight individuals were identified by color tagging (30 males, 28 females) and 13 of them (6 males, 7 females) were studied by acoustic telemetry (up to 340 days) to quantify their behavior in the feeding zones. Acoustic results show strong correlation between individual movements and feeding times with 11 of 13 individuals returning to the same feeding site. Rays were attracted to feeding activity from more than 2000 meters away, but no correlation was found with environmental parameters (tides, current, seasons, temperature, rain, lunar cycles). In addition, a tracking survey of 3 fed rays and 3 unfed rays for over 100 hours showed limited effects on home range (below 0.7 km²) and animal speed; only the amount of time stationary (global and daily) was significantly greater in the fed rays. The third component of this study addressed the genetic structure of the *H. fai* population amongst 10 different islands in French Polynesia, based on 156 individuals sampled. It demonstrated limited gene flow between archipelagos with three main groups: Society-Gambier, Tuamotu, and Marquesas. In conclusion, *H. fai* has high added value for tourism and is important for the local economy. Our study serves as a tool for the implementation of “ray-feeding guidelines” in Moorea’s Marine Management Area plan (adopted by the local government in 2004). Future research will build on the data presented here to better understand *H. fai*’s ecology, its reproductive biology, and its ability to adapt to a changing ecosystem.