
Interplay between physical and social phenomena may explain the behavioral plasticity of tuna (*Thunnus albacares*) associated with an array of floating objects

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Résumé

In marine pelagic habitats, floating structures are known to affect the spatial behavior of tuna and are extensively used by fishers. However, our understanding of the associative behavior of fish with FADs is still incomplete, which prevents the scientific community from providing managers with science-based recommendations on the impacts of FADs on ecosystems. The durations of the associated (on-FAD) and unassociated (off-FAD) behavioral phases of 69 acoustically tagged yellowfin tuna (*Thunnus albacares*) captured in an array of FADs around Oahu, Hawaii were studied over a period of three years. These data were analyzed using survival curves with the objective of determining the rules governing the decisions made by fish to leave or join a FAD. Short and long durations were observed for both associated and unassociated phases and these patterns were characterized by memoryless phenomena that occurred at a constant average rate. Our results strongly suggest that factors involved in decisions to leave or join FADs are independent. The duration of the on-FAD period depends on local conditions existing around a FAD in a given period whereas the durations of off-FAD periods were not dependent on the period. Individuals switched between short and long modes for both on- or off-FAD phases, suggesting that distinct behavioral patterns coexist in the behavioral repertoire of each individual. Although spatio-temporal distributions of populations in heterogeneous environments are often interpreted as individual responses to physical characteristics of patches, they may also be influenced by social interactions.

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