THE ICHTHYOLOGICAL SYMPHONY OF MESOPHOTIC CORAL REEFS: HOW LIGHT REDUCTION SHAPES FISH ACOUSTIC COMMUNICATION

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According to the Acoustic Niche Hypothesis, the sound spectrum is a limited resource that species or communities share to minimize acoustic competition. This theory has been proven in birds, frogs, arthropods and has recently begun to be shown in fishes. However, the partitioning of acoustic activity in ichthyological communities of Mesophotic Coral Ecosystems (MCEs) and how abiotic factors shape this partitioning is poorly known. This research focuses on studying the ecological role of light reduction on the acoustic behavior of fish in mesophotic coral reefs. The study specifically investigates the lower and upper mesophotic coral reefs from the Tuamotu Archipelago (French Polynesia). Three key complementary objectives are pursued: investigating how fish share the acoustic soundscape, how depth shapes the diel cycles of fish sounds with GAM models and analyzing their 'realized acoustic niches' (i.e., the range of acoustic resources). The study showed that the MCEs acoustic community exhibited temporal and frequential partitioning. Moreover, depth exerts a significant impact on the community dynamics of fish sounds. As depth increases, the nocturnal character of frequency modulated sounds is more pronounced while the contrary is observed for pulse series sounds. Depth also affects realized acoustic niches. At the community level, acoustic activity becomes more focused during specific time periods at greater depths, particularly during the night. There is a broader exploitation of the frequency spectrum. On the contrary, for certain sound types, acoustic niches become narrower for frequency resources at deeper depths. Overall, this study showed that light reduction, both with depth and diel cycle, has a significant influence on the acoustic characteristics and community dynamics of fish sounds in MCEs, deepening our understanding of the ecology of MCEs' communities.