What drives ontogenetic niche shifts in reef fishes?

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Abstract

Ontogenetic niche shifts are taxonomically and ecologically widespread across the globe. Consequently, identifying the ecological mechanics that promote these shifts at diverse scales is central to an improved understanding of ecosystems generally. We evaluated multiple potential drivers of ontogenetic niche shifts (predation, growth, maturation, diet shifts, and food availability) for three fish species between connected coral reef and nearshore habitats. In all cases, neither diet compositional change nor sexual maturity functioned as apparent triggers for emigration from juvenile to adult habitats. Rather, the fitness advantages conferred on reef inhabitants (that is, enhanced growth rates) were primarily related to high prey availability on reefs. However, there exists a clear trade-off to this benefit as survival rates for small fishes were significantly reduced on reefs, thereby revealing the potential value of (and rationale behind high juvenile abundances in) nearshore habitat as predation refugia. We ultimately conclude that predation risk functions as the primary early life stage inhibitor of ontogenetic niche shifts towards more profitable adult habitats in these systems. Furthermore, this study provides a case study for how complex, meta-dynamic populations and ecosystems might be better understood through the elucidation of simple ecological trade-offs. © 2013 The Author(s).

Key Word coral reef ,Food abundance,Growth,mangrove,seagrass,Survival, trade-offs