Seascape effects on the nursery function of macroalgal habitats

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Abstract

Understanding how seascape configuration influences nursery function is important for spatial management and conservation of essential habitats. Here, we examine how local habitat, seascape, and environmental factors influence demographic metrics of juvenile *Lethrinus punctulatus* and assess spatial variation in macroalgae nursery function. We quantified abundance, biomass, and productivity of juvenile *L. punctulatus* over three years and estimated size-at-age and condition from collected fish. Abundance, biomass, productivity, and size-at-age exhibited significant spatial variation, although each pattern was best explained by different factors. *Lethrinus punctulatus* were most abundant in macroalgae-rich seascapes, whereas biomass and productivity peaked where macroalgal cover and water temperatures were high. Conversely, fish exhibited the greatest average daily growth at sites near coral reefs. Processes contributing to spatial variation in size-at-age occur prior to fish reaching ~ 5 cm in length and may be due to differences in resource availability, size at settlement or size-selective mortality. Our findings suggest habitat and resource availability constrain *L. punctulatus* abundance and productivity, while size-at-age is influenced by size-selective mortality and prey quality. Thus, while seascape configuration can affect nursery function, the degree of influence will depend on the processes involved, emphasising the value of considering multiple metrics when identifying nurseries.