

Relationship Between Seagrass Standing Crop and the Spatial Distribution and Abundance of the Natantian Fauna at Green Island, Northern Queensland

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Abstract

The natantian fauna of the seagrass bed at Green Island (16°46'S, 145°58'E) was sampled monthly at night by using a small beam trawl along three transects. Most of the catch consisted of members of the caridean families Processidae, Palaemonidae and Hippolytidae (in order of numerical abundance). The remainder consisted of members of the penaeidean families Sergestidae and Penaeidae. Seagrass standing crop and a living-space index correlated significantly with the abundances of carids but not those of penaeids. The most appropriate regression models explaining the variation in processid and palaemonid densities included only the living-space index and explained between 25 and 38% of the variance. The most appropriate model for the abundance of the hippolytid family was a combination of living-space index and standing crop, which explained 21% of the variance.

Introduction

Many laboratory, field and review studies have explored the effects of habitat complexity on the abundance and/or diversity of seagrass-associated macrofauna (e.g. Heck and Wetstone 1977; Virnstein 1977; Nelson 1979; Peterson 1979; Heck and Orth 1980; Stoner 1980a, 1982; Gore *et al.* 1981; Lewis and Stoner 1983; Lewis 1987; Staples and Poiner 1987). Macrophyte complexity, as measured by plant biomass or plant surface area, is generally considered a predictor of the abundance of motile epifauna in seagrass systems (Heck and Wetstone 1977; Orth 1977; Heck and Orth 1980; Stoner 1980a). Although the biotic parameters of seagrass (i.e. biomass, leaf height and width, and species composition) may be important in structuring the seagrass community, it is the abiotic parameters (i.e. temperature and light) that influence the life histories, population dynamics and productivity cycles of the fauna (Livingston 1984), particularly those animals that have a meroplanktonic stage (Anger 1983). It is likely that a combination of abiotic and biotic factors influences fluctuations in the abundance and distribution of animals within a seagrass bed. Abiotic factors determine the number of animals that settle into the bed, whereas biotic factors determine the distribution of the settled animals within the bed.

This study documents the relationship, over the course of a year, between changes in habitat complexity and the effect of these changes on the spatial distribution and abundance of the natantian crustaceans in a tropical seagrass bed at Green Island, northern Queensland, and evaluates the relative importance of seagrass standing crop (Mellors *et al.* 1993) and leaf area in determining the spatial distribution and abundance of this fauna.