

The role of tannins within the mangrove sponge association

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Introduction

Sponges are major epibionts of submerged *Rhizophora mangle* L. roots in Caribbean mangrove systems. Sponge communities in mangroves are structurally heterogeneous, i.e. neighboring roots can vary greatly in sponge coverage and composition. However, knowledge of underlying mechanisms in spatial variations remains fragmented.

A positive correlation between sponge coverage and tannin concentrations in roots of was recently reported¹. This study evaluates plant responses to sponge coverage and involvement of tannins in substrate selection of sponge larvae.



Material and methods

Recruitment

30 mimicry gels comprising 3 different treatments (0, 0.3 or 1.8 nM tannic acid) were haphazardly installed throughout Curaçao mangrove fringes (± 0.8 m depth). Sponge recruits were collected after 7 weeks.

Transplantation

Concentrations of tannin and polyphenolics were determined in roots that were **1.** naturally covered, **2.** bare **3.** covered with transplanted *T. ignis*, **4.** roots wrapped in plankton net (500 μ m). Roots were collected after 8 weeks.

Results

Recruitment

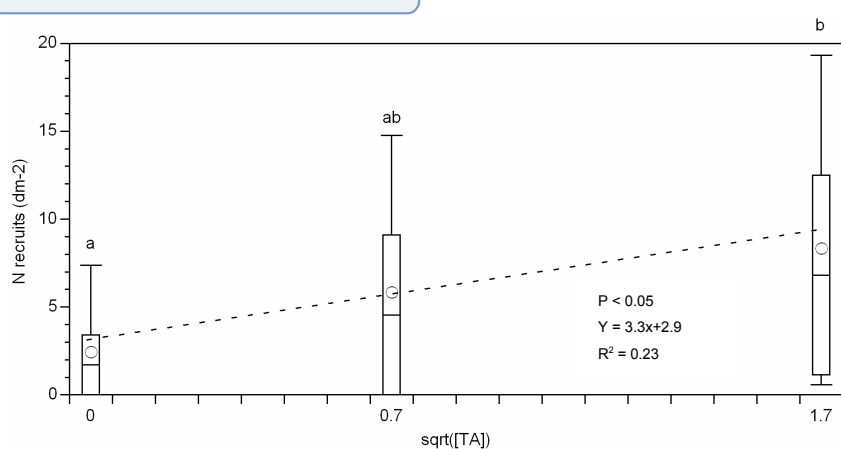


Fig. 1. Number of recruits on mimicry gels with different tannin concentrations. Box plot indicates median, the 25th and 75th percentile, whiskers are 10th and 90th percentile. Open circles indicate mean. Corresponding letters indicate statistical similarity ($\alpha < 0.05$; $n = 10$ per treatment).

- Recruitment is positively related to tannin concentration in mimicry gels (Fig. 1). Over 90 % of the recruits were *Tedania ignis* and the remaining species were *Desmapsamma anchorata*, *Dysidea janiae* and *Ircinia felix*. This resembles adult abundance levels of the majority of Caribbean mangrove habitats
- Roots significantly enhance tannin and polyphenolic content in response to both natural and experimental sponge fouling (Fig. 2).

Transplantation

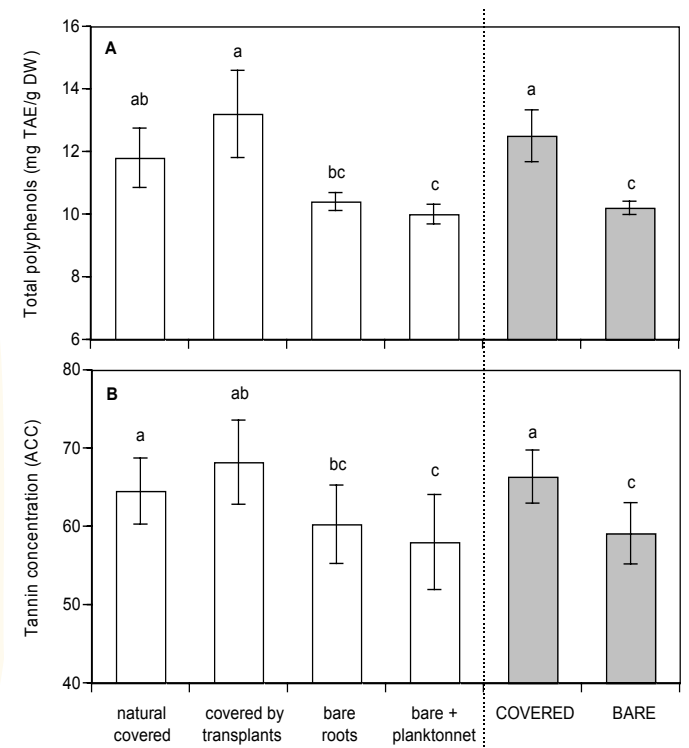


Fig. 2. Concentrations of (A) total phenolic compounds and (B) protein precipitating tannins. Bars indicate mean (\pm s.e.) and corresponding letters indicate statistical similarity ($\alpha < 0.05$; $n = 10$ per treatment).

Discussion

Results indicate that tannins are directly or indirectly involved in substrate selection of larvae of *T. ignis*

- Differential settlement may be the result of a behavioral response (chemotaxis) of sponge larvae to tannins
- Alternatively, larvae may respond to differences in chemical, textural or structural aspects of the microbial biofilm

Positive feedback mechanism

