

## Interrelation with food and habitat preference of *Littorina* in upper intertidal tide pools

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### Introduction

Seaweeds often provide both habitat and food for several groups of animals (Brawley, 1992). Tide pools constitute a remarkable feature that community structures of seaweeds and animals are different from those of intertidal zone. *Neorhodomela aculeata* (Perestenko) Masuda and *Ceramium kondoi* Yendo grow in tide pools where *Littorina* sp. is abundant (Lee et al., 2000). Interestingly, *Littorina* sp. inhabits on *N. aculeata* but not on *C. kondoi*.

Thus, the aim of the present study was to test the hypothesis, whether *Littorina* only grazes the fronds of *N. aculeata* and inhabits on it.

### Materials and Methods

*Neorhodomela aculeata* and *C. kondoi* and *Littorina* sp. were collected from two tide pools at Padori, west coast of Korea. The two species and associated animals were collected with care at four sites in each tide pool and preserved in 5-10% of formalin-seawater in the field. Additional collections were made for laboratory experiments, and samples were put in plastic bottles with seawater and transported to the laboratory.

*Littorina* densities on *N. aculeata* and *C. kondoi* were examined quantitatively. To test the hypothesis, food preference and attractiveness experiments were conducted in the laboratory. Feeding preference of snails was tested with with no choice and choice experiments. Snails were starved for 3 days before the experiments. In no choice experiment, vegetative thalli (500mg) of each species, 8 snails, and 200ml of seawater were put in a beaker, kept it for 3 days, and measured the amount of consumed algae by snails. In choice experiment, the protocol was repeated as in no choice experiment, but vegetative thalli (250mg) of each species were placed together in a beaker. Both experiments were replicated five times.

To investigate the attractiveness of the two test algae, a series of experiments were conducted similar to those of Watson and Norton (1985). A total of 16 snails, 300ml of seawater and 4 pieces [*Neorhodomela* (2) + *Ceramium* (2)] of both species were placed in a Petridish (diameter 18 cm) and the number of snails on each alga was recorded after 15 minutes. This experiment was replicated 32 times.

## Results and Summaries

Densities of *Littorina* snails ranged between 1.79 - 2.65 (individuals g<sup>-1</sup>) on the fronds of *Neorhodomela aculeata* and between 0.23 - 0.34 on *Ceramium kondoi* in two tide pools. Snail densities (Log<sub>10</sub> +1 transformed) were significantly greater on *N. aculeata* than on *C. kondoi* in both tide pools (Two-way ANOVA;  $F_{1,12} = 16.13$ ,  $p < 0.01$ ). However, no significant differences in density of snails were found between the two tide pools (Two-way ANOVA;  $F_{1,12} = 0.20$ ,  $p = 0.66$ ).

In no choice experiment, snails ate  $96 \pm 13.27$ mg (mean  $\pm$  SE,  $n=5$ ) of *N. aculeata* and  $156 \pm 13.27$ mg of *C. kondoi*. Snails significantly preferred *C. kondoi* to *N. aculeata* (ANOVA;  $F_{1,8} = 6.98$ ,  $p < 0.05$ ). In choice experiment, snails preferentially grazed *C. kondoi* rather than *N. aculeata* (ANOVA;  $F_{1,8} = 5.48$ ,  $p < 0.05$ ).

The results of attractiveness experiments revealed that there was a significant difference in attractiveness between *N. aculeata* and *C. kondoi* ( $p < 0.05$ , chi-squared test). Snails were attracted to *N. aculeata*.

*Littorina* snails mainly found on *N. aculeata* in two tide pools and were attracted to *N. aculeata* in attractiveness trials. In laboratory food choice experiments, however, feeding rate of snails was much higher for *C. kondoi* than *N. aculeata*. Present results indicate that habitat and food preference of *Littorina* are different. However, future works are needed to understand the ecology of the snails. Why do snails inhabit on *N. aculeata* for sheltering or for grazing epiphytes on it? Are snails attracted to *N. aculeata* by chemicals?

## References

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