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Ontogenetic influence on *Mytilus edulis* growth rates and calcite Mg/Ca ratio

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The trace element chemistry of bivalve shells as basis for proxies is a field of research showing much promise. There are however difficulties in the use of bivalve shell carbonate for environmental proxies. The calcification kinetics varies from species to species, and even within a single species calcification is dependant on internal as well as external conditions. Thus species specificity is not the only hurdle to be overcome for the application of the bivalve shell trace element thermometer. Ontogeny also plays a role in the uptake of trace elements into the shell; this, along with other physiological factors, is often referred to as “vital effects”. An investigation into the influence of ontogeny on the magnesium uptake in young shells of the common blue mussel *Mytilus edulis* has been carried out. Data from LA-ICP-MS analyses of shell material from a field-based aquaculture experiment carried out in the Dutch Wadden Sea in 2005 and 2006 show that there is a marked difference between the Mg/Ca ratios of shell material deposited right after settlement of the young individuals, and shell deposited after the first few months of life. But while there is a clear difference in shell chemistry between early juvenile shell and later juvenile shell no obvious differences between the chemistry of the later juvenile shell and adult shell have been observed.

By measuring the shell lengths of the samples on several dates during the experiment, linear extension growth rates could be calculated. A striking feature of the earliest

deposited shell is the fast growth, where an individual may extend its shell length by 0,3mm/day in the first month after settlement. The relationship between growth rate and size of a specimen is in no way straightforward, but two groups occur. Individuals that have just settled have very high growth rates, while adults display growth rates ranging from no growth to 0,2mm/day. The large spread in the growth rates of adults is caused by a seasonal aspect in growth rates; individuals grow faster in late spring and early summer, when food is plentiful and temperatures are increasing. The growth of adults peaks in May and June. The growth rates of the just settled juveniles are consistently higher than the rates of the adults, and the fastest juvenile growth occurs in June and July.

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