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The cost of being a caring mother: the ignored factor in the reproduction of marine invertebrates

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Abstract:

Investment in reproduction ranges from gamete production to active parental care, and marine invertebrates span this range. However, the cost of parental care has not yet been systematically quantified, nor incorporated into life history studies of marine invertebrates, in contrast to most other animal taxa. Since oxygen is a limiting factor in egg masses of marine invertebrates, we studied patterns of oxygen partial pressure over time in embryo masses of Brachyuran crabs, and correlated these results with the cost of providing oxygen to the embryos. We found that: (1) oxygen is limiting in the embryo masses, (2) female crabs show an active brooding behaviour that we think helps to provide oxygen to the embryo mass, and (3) there is a substantial parental investment associated with brooding behaviours. Oxygen limitation and parental investment seem to be associated with brooding behaviours. Oxygen limitation and parental investment seem to be associated in many taxa of marine invertebrates, and we suggest that oxygen provision to the embryos may be a critical factor determining parental investment in this group.

Key-words: Brachyuran crab, brooding, marine invertebrates, oxygen, parental investment