



Costs and Benefits to Male Pipefish Caring for Broods of Different Sizes

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Abstracts: Trade-offs between brood size and offspring size, offspring survival, parental condition or parental survival are classic assumptions in life history biology. A reduction in brood size may lessen these costs of care, but offspring mortality can also result in an energetic gain, if parents are able to utilize the nutrients from the demised young. Males of the broad-nosed pipefish (*Syngnathus typhle*) care for the offspring by brooding embryos in a brood pouch. Brooding males can absorb nutrients that emanate from embryos, and there is often a reduction in offspring number over the brooding period. In this study, using two experimentally determined brood sizes (partially and fully filled brood pouches), we found that full broods resulted in larger number of developing offspring, despite significantly higher absolute and relative embryo mortality, compared to partial broods. Male survival was also affected by brood size, with males caring for full broods having poorer survival, an effect that together with the reduced embryo survival was found to negate the benefit of large broods. We found that embryo mortality was lower when the brooding males were in good initial condition, that embryos in broods with low embryo mortality weighed more, and surprisingly, that males in higher initial condition had embryos of lower weight. Brood size, however, did not affect embryo weight. Male final condition, but not initial condition, correlated with higher male survival. Taken together, our results show costs and benefits of caring for large brood sizes, where the numerical benefits come with costs in terms of both embryo survival and survival of the brooding father, effects that are often mediated via male condition.

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