Who wins in the weaning process? Juvenile feeding morphology of two freshwater mussel species

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The global decline of freshwater mussels can be partially attributed to their complex life cycle. Their survival from glochidium to adulthood is like a long obstacle race, with juvenile mortality as a key critical point. Mass mortality shortly after entering into a juvenile state has been reported in both wild and captive populations, thus weakening the effective bivalve population. A similar phenomenon occurs during metamorphosis in natural and hatchery populations of juvenile marine bivalves. Based on a morphological analysis of newly formed juveniles of the freshwater species *Margaritifera margaritifera* (Margaritiferidae) and *Unio mancus* (Unionidae), we show that a second metamorphosis, consisting of

drastic morphological changes, occurs that leads to suspension feeding in place of deposit feeding by the ciliated foot. We hypothesise that suspension feeding in these two species develops and improves gradually due to several morphological features including the contact between cilia of the inner gill posterior filaments, the inner gill reflection, the appearance of the ctenidial ventral groove and the formation of the pedal palps. Regardless of the presence of available food, a suspension feeding mode replaces deposit feeding, and juveniles unable to successfully transition morphologically or adapt to the feeding changes perish.