Functional morphology, biology and sexual strategy of the circumboreal, adventitious crypt-building, Crenella decussata (Bivalvia: Mytiloidea: Crenellidae)

The anatomy of Crenella decussata (Mytiloidea) is described. Individuals of this circumboreal species occupy granular crypts composed of sand grains held in place by mucus. The swollen basal region of the tubule is occupied by an individual, which connects to the sediment surface by two posterior tubes accommodating the inhalant and exhalant streams. There is reduction in musculature and, most importantly, anterior foreshortening of the outer ctenidial demibranchs and loss of the labial palp. This creates an anterior space in the mantle for the initial brooding of fertilized ova by females to the prodissoconch stage. Subsequently, these larvae are transferred to the exhalant tube of the crypt wherein they attach by a single fine byssal thread and are further brooded until the crawl-away juvenile stage is attained. Experimental studies of larval behaviour suggest that parental pheromones sustain the female/offspring bond. Newly hatched individuals responded to parental exhalant water by actively attaching themselves using a byssal thread. This response persisted for 28 days, but not after 55 days when, we suggest, the pheromonal response ceases and offspring are developed sufficiently to take up life in their own nests. Offspring retrieved from parental crypts and fed continuously reached an average shell length of 500 mm after 7.5 months. Brooded offspring thus appear to rely on embryonal energy resources until post-metamorphosis, after which suspension feeding becomes essential for further growth and development before the parental crypt is vacated.