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Hatching mechanism and accelerated hatching of the eggs of sac-spawning euphasiid *Nematoscelis difficilis*

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Observation of the sac-spawning euphausiid Nematoscelis difficilis Hansen during shipboard laboratory incubations showed that its embryos usually hatch as pseudometanauplius (PMN) or metanauplius (MN). The eggs which have ready to hatch, the PMN or MN embryos extend and contract their first and second antennae in a swimming movement, breaking the chorion into almost equal halves joined by one small section in the anterior part of the dorsum. The first and second antennae project from the chorion. This is the newborn ‘push-off’ hatching. The embryos always hatch progressively from the distal end towards the proximal end of the ovigerous sac. The time between hatching of the first and last embryo may reflect the time the females require to lay a clutch of eggs (<2.1 h). Development time to the PMN stage at 10°C was 55–60 h and to MN stage 84 h. Eggs of one brood of N. difficilis hatched backwards at 47 h as nauplius 2 (N2) rather than as PMN or MN. This is the second observation of early hatching by any sac-spawning euphausiid species. Therefore, a morphological description is provided of the free-swimming N. difficilis N2. It is expected that N. difficilis N2 could