



The role of lipids during embryonic development of the euphausiids *Euphausia pacifica* and *Thysanoessa spinifera*

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ABSTRACT: To understand the role of lipids during early embryogenesis, major lipid classes together with individual fatty acid and sterol composition were determined in embryos from multiple developmental stages of the euphausiids *Euphausia pacifica* and *Thysanoessa spinifera*. Average lipid content in embryos of *E. pacifica* and *T. spinifera* from the earliest stage (multicell) were 4.45 and 3.69 $\mu\text{g embryo}^{-1}$, respectively. During development, the lipid content decreased at similar rates in the embryos of both species. In contrast to many crustacean eggs, phospholipids were the dominant lipid class in all embryonic stages, with decreasing concentrations seen during development. Individual fatty acids and sterols showed selective utilization during early developmental stages. The dominant fatty acids were 16:0 and 16:1 ω 7 and 20:5 ω 3, with most polyunsaturated fatty acids preferentially metabolized throughout early stages. An exception was 22:6 ω 3, which remained near constant through all stages. Cholesterol was the dominant sterol (>82% of total sterols) in embryos, with only minor changes during development. The appearance of algal sterols and fatty alcohols, including phytol, in *T. spinifera* embryos suggests that considerable amounts of algal lipids are directly allocated to eggs during vitellogenesis. Despite the substantial changes in lipid amount and composition during embryo development, the presence of phospholipids as the dominant lipid store acts to moderate changes in egg-sinking rate for both species until the late (early and late limb-bud) stages of development.

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