

A Short Guide to Writing about Biology

Third Edition

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Kinehcép, N. A. 1982. Ability of some gastropod egg capsules to protect against low-salinity stress. J. Exp. Marine Biol. Ecol. 63: 195-208.

The fertilized eggs of marine snails are often enclosed in complex, leathery egg capsules with 30 or more embryos being confined within each capsule. The embryos develop for one or more weeks before leaving the capsules. The egg capsules of intertidal species potentially expose the developing embryos to thermal stress, osmotic stress, and desiccation stress. This paper describes the ability of such egg capsules to protect developing embryos from low-salinity stress, such as might be experienced at low tide during a rainstorm.

Two snail species were studied: Nucella lamellosa and N. lima. Embryos were exposed, at 10-12°C, either to full-strength seawater (control conditions) or to 10-12% seawater solutions (seawater diluted with distilled water). The ability of egg capsules to protect the enclosed embryos from low-salinity stress was assessed by placing intact egg capsules into the test solutions for up to 9 h, returning the capsules to full-strength seawater, and comparing subsequent embryonic mortality with that shown by embryos removed from capsules and exposed to the low-salinity stress directly.

Encapsulated embryos exposed to the low salinities suffered less than 2% mortality, even after low-salinity exposures of 9 h duration. In contrast, embryos exposed directly to the same test conditions for as little as 5 h suffered 100% mortality. All embryos survived exposure to control conditions for the full 9 h, showing that removal from the capsules was not the stress killing the embryos in the other treatments. Sampling capsular fluid at various times after capsules were transferred to the diluted seawater, Kinehcép found that the concentration of solutes within capsules fell to near that of the surrounding water within about one h after transfer.

This study clearly demonstrates the protective value of the egg capsules of two snail species faced with low-salinity stress. However, Kinehcép was unable to explain how egg capsules of these two species protect the enclosed embryos, since the capsules did not prevent decreases in the

solute concentration of the capsular fluid. Although Kinehcép plotted the rate at which the solute concentration falls within the capsules (his Fig. 1), he sampled only at 0, 60, and 90 minutes after the capsules were transferred to water of reduced salinity. I think he should have sampled at frequent intervals during the first 60 min to discover how rapidly the solute concentration of the capsule fluid falls. As Kinehcép himself suggests, perhaps the embryos are less stressed if the concentration inside the capsule falls slowly. These experiments were all performed at a single temperature even though encapsulated embryos are likely to experience fluctuation in both temperature and salinity as the tide rises and falls during the day; the study should be repeated using a range of temperatures likely to be experienced in the field. In addition, I suggest repeating these experiments using deep-water species whose egg capsules are never exposed to salinity fluctuations of the magnitude used in this study.