Providing Food for Zooplankton in the Laboratory

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We are currently working in the laboratory with a species of zooplankton named Euphausiacea, *but more commonly known as krill. This form of animal life is found abundantly in sea-water all over the world and serves as ideal food for numerous species of fish and cetaceans. Krill live in aggregates, often consisting of several thousand individuals, and migrate vertically each day; during the migration they feed, inter alia, on smaller crustaceans such as* Copepoda. *It is therefore highly instructive to study the part played by this form of animal life in the concentration and transport of radioactive substances in the sea.*

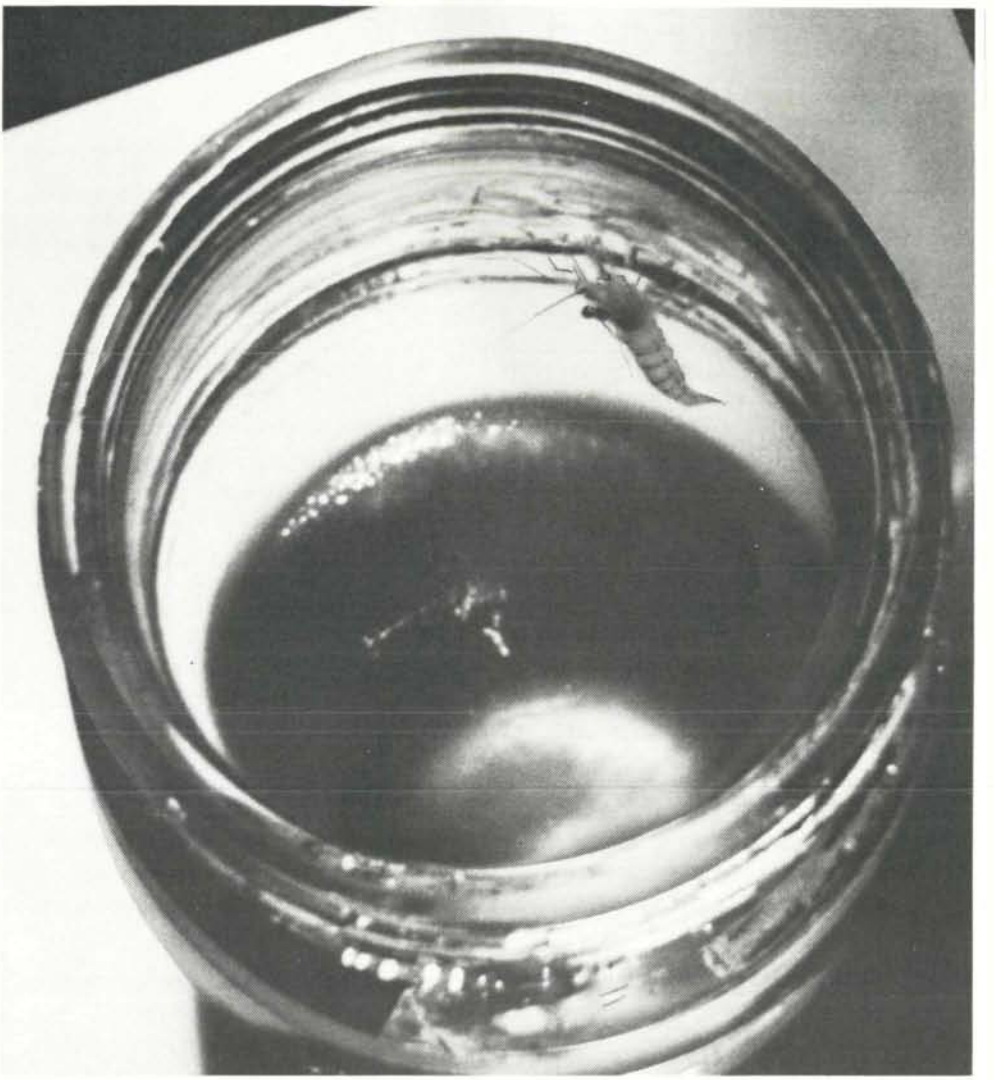
To make this possible, we have had to acclimatize the krill to laboratory conditions. In doing so many problems have been encountered, since it is a delicate creature and often difficult to keep alive. More specifically, one of our main worries has been to find food approximating as closely as possible the natural sustenance of Euphausiacea, *food that is readily assimilable and relatively simple to procure.* Artemia salina *appeared to meet our requirements and we have begun rearing it on a mass scale.*

Artemia salina *is a tiny crustacean that lives in discontinuous populations in the highly saline waters found only in the brines of salt-works and in salt lakes. The process of rearing* Artemia *as applied in our laboratory covers several stages. The first of these is the hatching of the eggs (which are supplied to us by specialist retailers).*

Across a small plastic tank, which should preferably be wide and shallow (about 5 cm), we place a transverse partition (an ordinary strip of wood 3 cm high). Provided the two ends of the partition fit tightly, a gap of 2 cm is then left above the bottom of the tank, through which the Artemia *can pass (when hatched) in response to attraction by light. The tank is placed beneath fluorescent lighting and filled in equal proportions with ordinary sea-water and sea-water in which brewer's yeast has been pre-dissolved.*

One of the compartments of the tank is then sprinkled with Artemia *eggs and covered with aluminium foil. At approximately 24° C hatching takes place after 24 to 48 hours. This simple and ingenious method makes it possible to separate the* Artemia *from the egg shells and thereby prevent them getting mixed together. The yeast cells decompose, supplying the ingredients essential for the growth of both the young* Artemia *and the algae which breed in the tank and serve, in turn, as food for the* Artemia.

After living for about a week under these conditions, the young Artemia *are strong enough to stand transfer to a tank of much larger size. This tank, which contains roughly 30 litres of continuously aerated sea-water, is placed under a bright light at an ambient temperature of 24° C, and to it is added 30-35 g of pre-dissolved brewer's yeast. Two or three days later the milky white colour of the water turns green; in this way we*



A small oceanic crustacean — euphausiid — which has just shed its shell.

obtain a culture of mixed flagellates within a few days. When the colour reaches dark green, we dilute this highly concentrated culture in a second tank (with the same contents as the first one) in the proportion of 5 litres of culture to 20-30 litres of sea-water. This second tank is used to accommodate the young Artemia. *We watch their growth and from time to time add a small amount of concentrated algae culture to replace what has been eaten. When they reach a length of 2-4 mm, the* Artemia *are fed to the krill in the proportion of 10-15* Artemia *per head. In this manner we can keep* Euphausiacea *alive for weeks, if not months, and the conditions in which the animals live are very satisfactory.*

As a result, we can use the zooplankton in our studies of the transfer of pollutants via marine food chains, and more specifically the part played by zooplankton in the radionuclide cycle in the sea.