Some Preliminary Observations on the Autecology of the Ciliate Conchophthirus mytili, an Ectocommensal of the Foot of Mytilus edulis

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It is known that the rate of water propulsion through the mantle cavity of Mytilus corresponds to the tidal levels where the mussel occurs. Since the incurrent stream supplies the food of both Mytilus and Conchophthirus, the question arises whether any of the activities of the ciliate are correlated with the cycles of water propulsion. This question was studied, using division rate as the criterion of activity.

In July and August, 1958, 150 mussels were collected on the Laboratory shore between the tide lines at low water (mussels thus exposed and not feeding when collected) and examined immediately for Conchophthirus; 120 mussels were taken from the same sites at high water (thus well submerged and presumably feeding when collected) and likewise examined. The mussels taken at low water had 3558 ciliates, of which 187 or 5.3 per cent were in division; those taken at high water had 2870 ciliates, of which 138 or 4.8 per cent were dividing. Examination of these percentages shows that division was not correlated with rate of water propulsion.

Although approximately 5 per cent of the ciliates were regularly found in division, the average number per mussel was only 22. This low figure suggests that ciliate losses in the excurrent stream are numerous, and that Conchophthirus, in order to infect new hosts where tidal extremes are great, must have considerable tolerance for sea water. Reports in the literature indicate, on the contrary, that it can live only an hour or two in sea water away from its host. A reinvestigation of this point showed conclusively that Conchophthirus when removed from its host can live in sea water at least 72 hours, provided the normal temperature of the water (about 14° C. in Frenchman Bay) is not exceeded. Its ultimate death under these conditions results from starvation, though higher temperatures are lethal.

The Effect of Tetracycline on Skeletal Development of *E. parma*

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The addition of tetracycline to the sea water in which fertilized eggs of *E. parma* were reared produced a marked effect upon subsequent development. At 75 mg/100cc, development is completely arrested; at 50

mg/100cc early development is retarded and does not continue beyond the blastula stage; 20 - 30 mg/100cc produces a slight retardation of skeletal formation. Addition of 25 mg of tetracycline to 100cc of sea water lowers the pH to approximately 7.5. A similar reduction of the pH of sea water by addition of appropriate amounts of HCl does not affect the skeletal development. Lower concentrations permit gastrulation and skeletal formation to occur at a somewhat reduced rate. Examination of the skeletons of embryos grown in mixtures of 15 mg/100cc show a yellow fluoresence when examined with ultra violet light which indicates the incorporation of tetracycline or a derivative into the growing skeleton.

In view of the marked avidity which tetracyclines have for heavy metals, calcium and magnesium were added to the tetracycline-sea water mixtures. Magnesium had no effect; adition of calcium resulted in a slight improvement in development.

The Development of the Skeleton of E. parma

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Normal skeletal development in *E. parma* consists of the intra cellular formation of a large crystal, the triradiate spicule. Subsequent development occurs extra cellularly and is brought about by the incorporation of mineral salts into a protein matrix. The primary mesenchyme cells elaborate the matrix and also concentrate and transfer the mineral salts in the region of the growing skeleton.

The accumulation and subsequent transfer of calcium carbonate is correlated with vacuole formation, crystal formation, and other cytological events in the mesenchymal cells. These phenomena are moreover dependent upon the osmotic conditions of the coelomic fluid.

The Bromination of Phenol Red by the Dogfish, Squalus acanthias

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Introduction of phenol red, determined as homogeneous by paper chromatography, into the uterus of the spiny dogfish in the later stages of pregnancy results within twenty-four hours in a visible different dye. Chromatographic comparison between the new dye and bromphenol blue in four solvent systems showed no significant differences, nor did a comparison of the light absorption characteristics. The quantity of purified dye did not permit complete chemical analysis, but it was determined that bromine not iodine was present. The evidence rather clearly indicates that the uterus of the dogfish can turn phenol red into bromphenol blue. The