

**EFFECT OF HYDROSTATIC PRESSURE ON THE REDISTRIBUTION
OF CELL ORGANELLES IN *BRYOPSIS PLUMOSA* (HUDS.) C. AG.***

MUSTAFA SHAMEEL

Institute of Marine Biology, University of Karachi, Karachi-32.

Bryopsis plumosa (Huds.) C. Ag. when centrifuged at 1000 r.p.m. showed a concentration of cell organelles at the tip of the ramuli, thus rendering it dark green. When left undisturbed, the organelles were found to return to their normal position after a few hours. *B. plumosa* is an extreme barophobe (Shameel, 1973d). It showed cell morphological abnormalities after treatment to 250 atm and a considerable weight loss after subjection to 500 atm (Shameel & Ohno, 1972) with no induction of reproduction even after an exposure of 800 atm (Shameel, 1973b). The effect of pressures below 250 atm on the redistribution capability of the cellular organelles in this alga was therefore examined.

Materials and Methods

B. plumosa was collected from Kiel Bight (Baltic Sea) and was cultured as mentioned previously (Shameel, 1973b). Healthy specimens were kept under 20—200 atm hydrostatic pressures as described earlier (Shameel, 1973a) and immediately after pressure release were centrifuged at 1000 r.p.m. for 10 min. They were constantly examined under microscope mounted in culture medium and the time required for the complete redistribution of the cell organelles was noted. The controls were similarly treated without being subjected to pressure. All the experiment was performed at 15°C.

Results and Discussion

Results obtained are expressed as the proportion of control (Table 1). The increasing hydrostatic pressure as well as the increasing duration of its action caused a successive increase in the time required for the redistribution of cell organelles. This strengthens the previous suggestion that pressure intensity and the duration of pressure action must be considered together since both of them collectively constitute the quantity of stimulus (Shameel, 1973c). The pressures upto 80 atm subjected for 5 hours, doubled the time required for the return of chloroplasts and nuclei as compared with the controls; whereas higher pressures appeared to be lethal. Above 80 atm *B. plumosa* was found to lose its ability to redistribute cellular organelles and died within 5 days.

A gradual diminishing of protoplasmic streaming in the cells of *Elodea canadensis* under increasing hydrostatic pressures and a complete inhibition of cyclosis under pressure was observed by Marsland (1939). After pressure exposure a solational weak-

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TABLE 1. Relative time required for the redistribution of cell organelles after centrifugation of previously pressure treated *Bryopsis plumosa* at 15°C (time value of control in each case = 1.00)

Hydrostatic pressure (atm)	Duration of pressure action (hours)				
	1	2	3	4	5
20	1.00*	1.00	1.00	1.09	1.28
40	1.00	1.00	1.16	1.29	1.47
60	1.00	1.25	1.39	1.73	1.96
80	1.19	1.47	1.71	1.93	2.31
100	1.38	1.73	2.17	2.24	**
150	1.61	2.21	**	**	**
200	2.08	**	**	**	**

*mean of 8 values each. **no return of cellular organelles.

ening has been reported in the protoplasmic gel of *Euglena gracilis* with increasing pressure (Byrne & Marsland, 1965). These results may probably be explained on the basis of pressure influences on protoplasmic sol-gel reactions and the volume changes in macromolecules (Zimmerman, 1970; Shameel, 1974), which needs a detailed investigation.

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