

ACTIVE CELL HYPOTHESIS

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In some waters (water masses, in general) and in the sea, phytoplankton cell count is more but primary production is less. It is the opposite in some other water masses where grazing by zooplankton and fish is attributed for the less count. More count and less production result in poor quality of water.

The "active cell" hypothesis looks internally at the nature of the cells themselves. It states that in a given volume of sea water, some of the cells are only active and mature enough to participate in the process of primary production. The plankton cells manufacture carbohydrate (primary food) by tanking carbon from carbondioxide dissolved in sea water and also hydrogen from the water and solar energy (light absorbed in water). Thus what the phytoplankton cell does is synthesis of mass and energy together in their body and the production is high when there are more of active cells. Thus primary production depends on the number of active cells and not upon the total number of cells. Primary production per unit number of active cells depend on the quality of water since all live cells require nutrients like phosphates, nitrates, silicates etc. for their growth. Therefore, the gradient G of the linear relation

of production against active cells is a characteristic biological parameter. The greater the value of G , the greater will be primary production per unit number of active cells.

Different water masses will have different G values quantifying the productive efficiency of the waters. Therefore, by surveying the seas and oceans in the light of G , the regional character of seas can be identified. G quantifies the biological production of the waters. In physical oceanography, temperature and salinity diagram (T-S diagram) differentiates water masses. A water mass will have a specific type of T-S diagram which indicates the water mass character from physical oceanography point of view. As T-S diagram is to physical oceanography for characterizing the water masses, so is the G to biological oceanography for characterising the waters from the point of productivity value. G finds its usefulness in mariculture and molecular and cellular biology. It may be possible to identify active cells among live cells through further studies on the physiology, cytogenetics and biochemistry of phytoplankters.