FROM RILEY TO MICROBIAL LOOP: NEED PLANKTONIC FOOD WEB MODELS BE COMPLEX?

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Riley's model (1946) gave good predictions of the seasonal cycle of phytoplankton on Georges Bank, despite containing no pathways for resupply of nutrient. Subsequent models of planktonic food webs form a series which tends towards increasing complexity, with the aim of representing an increasing body of knowledge about relationships amongst, in particular, pelagic micro-organisms. But has this trend resulted in better predictions? In this paper we compare the ability of three biological models to predict the seasonal cycle of phytoplankton in waters of the North-Eastern Atlantic Ocean, using a simple physical framework similar to that of Riley's surface mixed layer, but allowing for supply of new nutrients by mixing from below. The biological models are (a) Riley's phytoplankton model modified to cause nutrient depletion; (b) the microplankton-detritus model of Tett (1990); and (c) a microbial loop model developed from the accounts of Azam *et al* (1983) and Thingstad and Pengerud (1985).

ON THE PRODUCTION, ELEMENTAL COMPOSITION (C,N,P) AND DISTRIBUTION OF PHOTOSYTHETIC ORGANIC MATTER IN THE SOUTHERN BLACK SEA

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Until recently, data on the optical transparency, phytoplankton biomass (in terms of chlorophyll and particulate organic carbon) and primary production (by C-14) is very limited for the southern Black Sea. Coastal waters of the region is principally fed by the inputs of rivers whereas the cyclonically dominated open ecosystem is mainly controlled by the influx from the oxygenated lower layers by vertical mixing that is much effective in winter. However, the input from the anoxic layer is limited due to the presence of a permanent suboxic zone between the oxic and anoxic waters, where intense denitrification and redox-dependent proceses limit nitrogen and phosphorus input to the productive layer. Thus, surface waters become poor in inorganic ,nutrients during the stratied seasons due to biological activity. Light penetration is generally limited to upper 20-50m, with a downward attenuation coefficient in the range of 0.1-0.3 m-1. The layer-averaged chlorophyll concentrations for the euphotic zone are in the range of 0.1-5 mg/m^3 and 10-250 mg/m^2. A subsurface Chl-a maximum is establihed within the seasonal thermocline where the biomass is also dominant. Particulate organic matter (POC,PON,PP) concentrations are relatively high in the lighted surface waters and show a dcreasing trend with depth depending on the source and sink terms. C/N, C/P and N/P ratios in particulate organic matter range in between 10-20, 100-175 and 5-15 in productive layer respectively. Below the euphotic zone all ratios tend to increase with depth. The photosynthetic carbon production rate (Pp) was determined as 250 and 400 $mgC/m^2/d$ for the late spring and autumn periods respectively and the depth profiles of Pp show the same trends with those of chlorophyll and POC.

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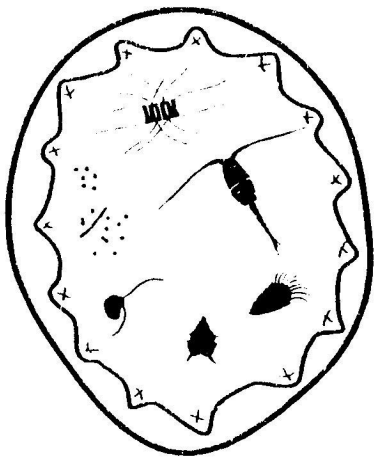

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