WATER TEMPERATURE, THE FACTOR CONTROLLING THE ZOOPLANKTON BIOMASS GROWTH IN EUTROPHICATED MARINE ECOSYSTEMS.

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RESUME

De 1973 à 1976, dix-neuf campagnes océanographiques ont été effectuées dans le golfe de Saronikos, mer Egée. Dans ce golfe, on a pu distinguer au moins cinq écosystèmes marins indépendants. L'écosystème marin de la zone "7.0-9.9", qui n'est d'ailleurs pas défini du point de vue géographique, dépend d'un enrichissement continu, principalement influencé par les rejets urbains de la ville d'Athènes. Parmi les paramètres mesurés, seuls la température (en °C) et le zooplancton (en mg de poids sec/m^3) ont montré une correlation significative ($r = -0.75$, $P < 0.001$). L'équation $Zb = \frac{1}{0.02329.T - 0.21162}$ *exprime cette relation.*

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Nineteen oceanographic cruises were performed in the Saronikos Gulf, Aegean Sea, during the years 1973 till 1976. At least five and rather independent marine ecosystems can be distinguished in the Saronikos Gulf water body. The marine ecosystem of the "7.0-9.9" boundary, not defined geographically is subject to continuous nutrient enrichment mainly effected by the urban wastes of the city of Athens. Among the parameters measured, only temperature, in ^{o}C, and zooplankton, in mg of dry weight /m^3, showed a highly significant correlation ($r=-0.75$, $P<0.001$) and the following equation was derived $Zb=\frac{1}{0.02329.T - 0.21162}$.

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The temperature-zooplankton relationship has not been modelled in a satisfactory way so far. The significance of temperature as the factor controlling the zooplankton growth, has been pointed out by several authors (McLaren 1963, Heinle 1969) who stated that when food available to zooplankton is not limited, then its growth will depend on temperature only. The present paper introduces a new model obtained at the

"7.0-9.9" artificially eutrophicated region of the Saronikos Gulf, where the zooplankton growth seems rather uninhibited due to food abundance. The model shows that the zooplankton biomass is an hyberbolic function of the sea water temperature.

A station grid consisted of 38 fixed points, had been established. Based on individual measurements, at standard depths, the mean values of all parameters have been calculated at each station. Monthly means were obtained from the mean values of the different stations. Figure 1, shows the annual variation of temperature (dashed line) and zooplankton (solid line), as it has been concluded from the application of the "T" test and their monthly means with the positive standard deviations.

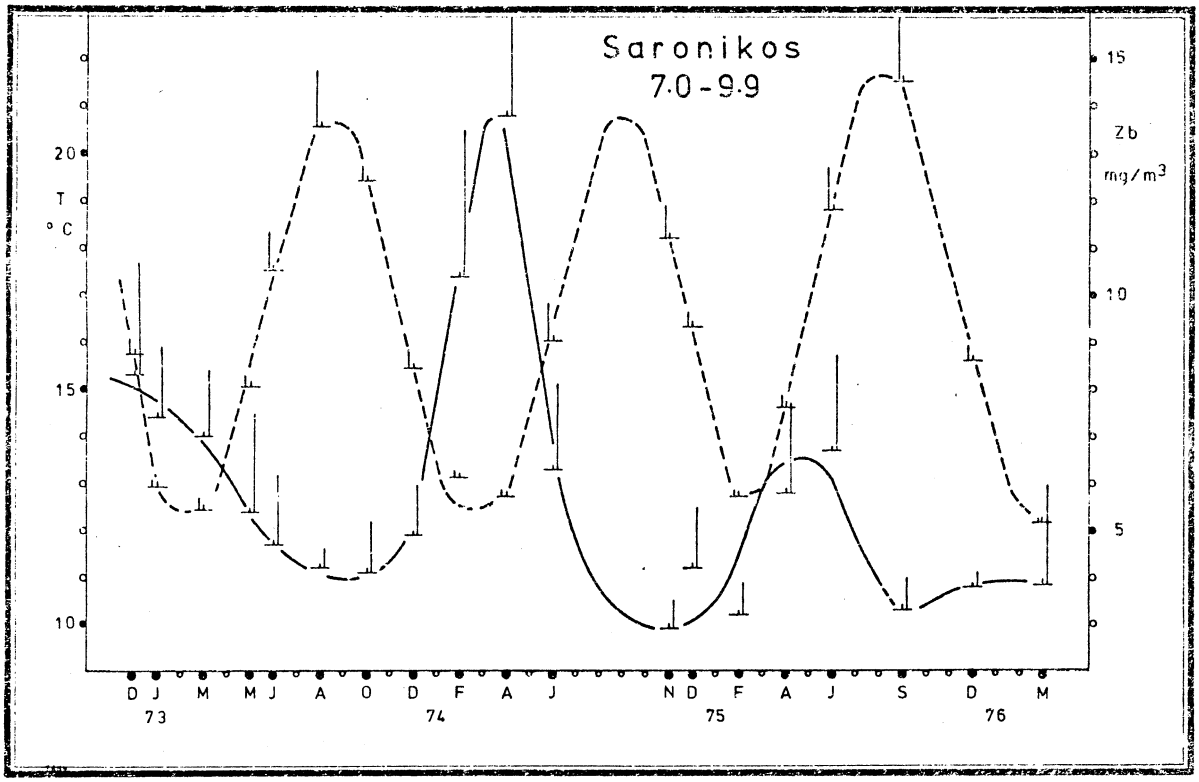

Table I shows the data from several regions of the Saronikos Gulf. The two parameters from the poor waters of the Outer and the Epidavros basin

Saronikos Gulf regions	*T °C*	*Zb mg/m³*	r_{T-Zb}	*P<*	*N*
"7.0-9.9"	*16.82 ± 2.87*	*5.82 ± 2.75*	*-0.46*	*0.02*	*19*
"Outer region"	*16.18 ± 1.93*	*2.40 ± 1.42*	*-0.25*	*NS*	*17*
Epidavros basin	*15.75 ± 1.97*	*3.22 ± 4.76*	*-0.31*	*NS*	*18*
"7.0-9.9"	*17.61 ± 2.68*	*6.02 ± 3.10*	*-0.75*	*0.001*	*13*

regions showed no significant (NS) correlation. The most important coefficient of correlation has been obtained when only 13 pairs of data, from the "7.0-9.9" region were inserted to computation. The equation fitted to this set of data may be expressed as $Zb = \frac{1}{0.02329 \cdot T - 0.21162}$.

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