

PRELIMINARY INVESTIGATIONS OF THE IMPORTANCE OF OLIGOTRICH  
CILIATES OTHER THAN TINTINNIDS IN THE NORTHERN ADRIATIC SEA

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ABSTRACT

*The distribution of oligotrich ciliates (other than Tintinnids) in the Northern Adriatic are reported. The group (20-50  $\mu\text{m}$ ) represented 60 to 80 % of the microzooplankton population. The highest densities occurred off the Po delta, but their relative contribution to the population was highest at less productive eastern stations. Other regional differences were discussed.*

RESUME

*Nous fournissons ici un rapport sur la distribution des ciliés oligotriches "non Tintinnides" en Adriatique septentrionale. Ce groupe (20-50  $\mu\text{m}$ ) représente 60 à 80 % de la population du microzooplancton. Les plus fortes densités ont été observées au large du delta du Pô, mais leur contribution relative à la population était la plus forte dans des stations moins productives, du côté est. D'autres différences par rapport aux régions sont également étudiées.*

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Ciliates represent a relatively unstudied fraction of the zooplankton population mostly because of inadequate sampling techniques (nets). The inaccurate distribution patterns consequently reported inadequately portray their importance in the marine food webs. Only recently has appreciable attention been given to this fraction of the microzooplankton population (Beers and Stewart, 1967; Margalef, 1973) and data indicate they can make up a significant portion of the total zooplankton assemblages. Their high metabolic and growth rates and ability to utilize small size particles (e.g. nanoplankton) largely unavailable to larger crustacean grazers, may represent a quantitatively important grazing process in the trophic dynamics of the total planktonic community.

The Northern Adriatic is characterized by high nanoplankton densities with almost complete dominance (> 90%) by this group in the summer months. As a result, this fraction of the microzooplankton may play a particularly important role as grazers.

Microzooplankton are defined as planktonic animals smaller than 200  $\mu\text{m}$ . The enumerations reported herewith are based on an inverted microscope (Utermöhl, 1958) analysis using 100-200 ml aliquots preserved with Lugol's solution. In addition, about 5 liters of seawater was taken and preserved with neutralized formaldehyde for the enumeration of organisms larger than 50  $\mu\text{m}$ , mostly larval and juvenile stages. The period of observation included summer and winter periods in 1978 and 1979. The population was identified as to: ciliates (oligotrichs, other than tintinnids; holotrichs; and tintinnids), nauplii larvae, postnauplii larvae; eggs; and other metazoa. The dominant microzooplankton fraction in the Northern Adriatic were ciliate protozoans, oligotrichs other than tintinnids, in the size range 20-50  $\mu\text{m}$ , Strombidium spp., Didinium sp., Mesodinium sp. They accounted, on average, for more than 60% of the total microzooplankton population density. There was a tendency for a higher relative contribution of this fraction to the total population to occur at eastern Northern Adriatic stations (even though the population density was much lower here) than at western stations influenced by the Po River discharge. There seemed to be a relative increase of tintinnids in the ciliate group at the western stations. The highest densities occurred in the summer months (June-September) when a definite west to east surface gradient in densities was present. The highest densities occurred at the Po-influenced western stations during the summer stratified period with density ranges of  $0.6 - 58.7 \times 10^6 \text{ m}^{-3}$ , while eastern stations had a range of  $0.4 - 3.1 \times 10^6 \text{ m}^{-3}$ . During the winter mixed period (October-December), the densities were generally lower with no pronounced surface gradient and densities ranging from  $0.6 - 1.5 \times 10^6 \text{ m}^{-3}$  at western stations and  $0.2 - 1.4 \times 10^6 \text{ m}^{-3}$  at eastern stations. The high relative contribution of smaller-sized oligotrichs to the total microzooplankton population in the northern Adriatic may provide a class of grazers which, by their size, represent a food web link to the extensive nanoplankton blooms developing during summer stratified periods. It is recommended that this food web link be further investigated.

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