

LONG TERM TRENDS IN THE DISTRIBUTION OF SOFT-BOTTOM POLYCHATES IN THE  
SABAUDIA LAGOON (LATINA, ITALY)

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Resumé

*On analyse la distribution des Annélides Polychètes dans les fonds meubles du lac saumâtre de Sabaudia (Latina, Italie) relativement à six ans de prélèvements et en différentes saisons. Dans la zone près du canal principal de communication avec la mer, les variations saisonnières sont moins importantes que dans la zone centrale du lac où l'on observe quelques variations de dominance. La zone la plus confinée du lac, près la ville de Sabaudia, est la plus variable et instable. Malgré les fluctuations observées, la communauté à Polychètes est assez stable; en effet, après la crise dystrophique observée en 1979, les espèces qui ont recolonisé le lac sont les mêmes qu'auparavant.*

The Sabaudia lake is a polyhaline lagoon with salinity ranging between 25‰ and 33‰. Its medium depth is about 5m and vertical stratification occurs seasonally. The lagoon has two channels connecting the sea, but only the southern one is well working. Benthic fauna is absent under 3m depth where anoxia conditions occur. The Sabaudia lagoon is well known as far as its qualitative and quantitative productivity is concerned (FERRERO, 1961). Recently, some anoxia phenomena occurred with changeable frequency; the last one, in August 1979, causing the total mortality of fish.

During a period of six years from 1977 to 1984, five samples of soft-bottom benthos were carried out every two years, each time seasonally. The samples were collected using a Van Veen grab. In the present paper the distribution of Polychaetes was analyzed. The lagoon was divided in three zones: a northern area near Sabaudia town (A = st 1,2), a middle area (B = st 3) and a southern area close to the main outlet (C = st 4,5). (Fig 1).

A total of 3,895 individuals belonging to 20 species were collected during the whole study period. Remarkable was the finding of *Gyptis capensis* Day, species new for the Mediterranean Polychaete fauna. *Pomatoceros lamarckii*, *Tharyx marioni*, *Serpula concharum* and *Nereis succinea* were found only once with few individuals. Most of the taxa found are characteristic of brackish waters (*Ficopomatus enigmaticus*, *Nereis succinea*) or of polluted environments (*Nereis caudata*, *Schistomeringos rudolphi*, *Malacoceros*

*fuliginosa*, *Polydora ciliata*, *Capitella capitata*, *Podarke pallida*) and are considered "opportunistic species", occurring in unpredictable biotopes (COGNETTI, 1972, 1974; GRASSLE & GRASSLE, 1974). Some of the other species are often found on muddy sediments in sheltered zones (*Prionospio cirrifera*, *Polydora antennata*, *Nainereis laevigata*, *Syllis gracilis*) (GIANGRANDE et al., in press).

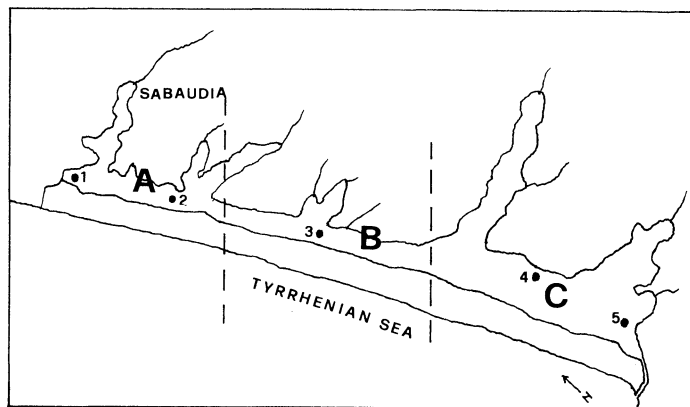


Fig. 1: Map of the Sabaudia lagoon with the sampling sites and the A, B and C zones

Fig 2 shows the trends of abundances of the species during the whole study period. In the C zone the least fluctuations were observed with *N. laevigata*, *P. ciliata* and *Hydroides elegans* as dominant species. This was probably due to the closeness to the outlet, which, permitting exchange with the sea, supplied more favourable conditions. In the B zone some variations in abundance were observed, but without changes in species composition: *S. gracilis* and *H. elegans* dominated in 1981/82, *P. cirrifera* was more abundant in 1977/78, while *P. ciliata* and *C. capitata* were always abundant. Lastly, the A zone showed the biggest fluctuations among the different sampling periods, in fact, only 6 species were collected in 1977, while in the following years 13 species were present, some of which very abundant: *Spio filicornis*, *P. ciliata*, *C. capitata*. This strong variability was probably due to the high trophic level of this zone caused by its closeness to the Sabaudia town and its high "confinement" (GUELORGET & PERTHUISOT, 1983).

As for as the seasonal trends were concerned, the minima of abundances and species richness were observed, every year, during the summer when the worst environmental conditions occurred. Only in 1977/78 the minima of the above parameters occurred in October. Fig. 3 shows the trend of Diversity index (Shannon-weaver,  $H'$ ): the A zone showed an irregular trend with lower values in 1977/78; the B and C zones showed a similar trend with maxima in October and minima in July.

In 1977/78 an environmental gradient, related to the high trophic level, occurred proceeding from C zone to the A zone (PERDICARO et al., 1981); after the anoxy crisis in 1979, only 5 species survived in the whole lagoon: *S. rudolphi*, *M. fuliginosa*, *P. ciliata*, *P. cirrifera*, *C. capitata*. In 1980

the domestic waste of Sabaudia town stopped and in 1981/82 the lake was recolonized by the same species found before the crisis (except for *G. capensis*). In 1983/84 the situation was quite similar to that of 1981/82.

After the 1979 crisis, therefore, the global conditions of the lagoon improved, thus leading to a closer similarity among A, B and C zones.

- 1 *Phyllodoce rubiginosa*
- 2 *Gyptis capensis*
- 3 *Podarke pallida*
- 4 *Syllis gracilis*
- 5 *Nereis caudata*
- 6 *Schistomeringos rudolphi*
- 7 *Nainereis laevigata*
- 8 *Malacoceros fuliginosa*
- 9 *Spio filicornis*
- 10 *Polydora ciliata*
- 11 *Polydora antennata*
- 12 *Prionospio cirrifera*
- 13 *Capitella capitata*
- 14 *Terebella lapidaria*
- 15 *Ficopomatus enigmaticus*
- 16 *Hydroides elegans*

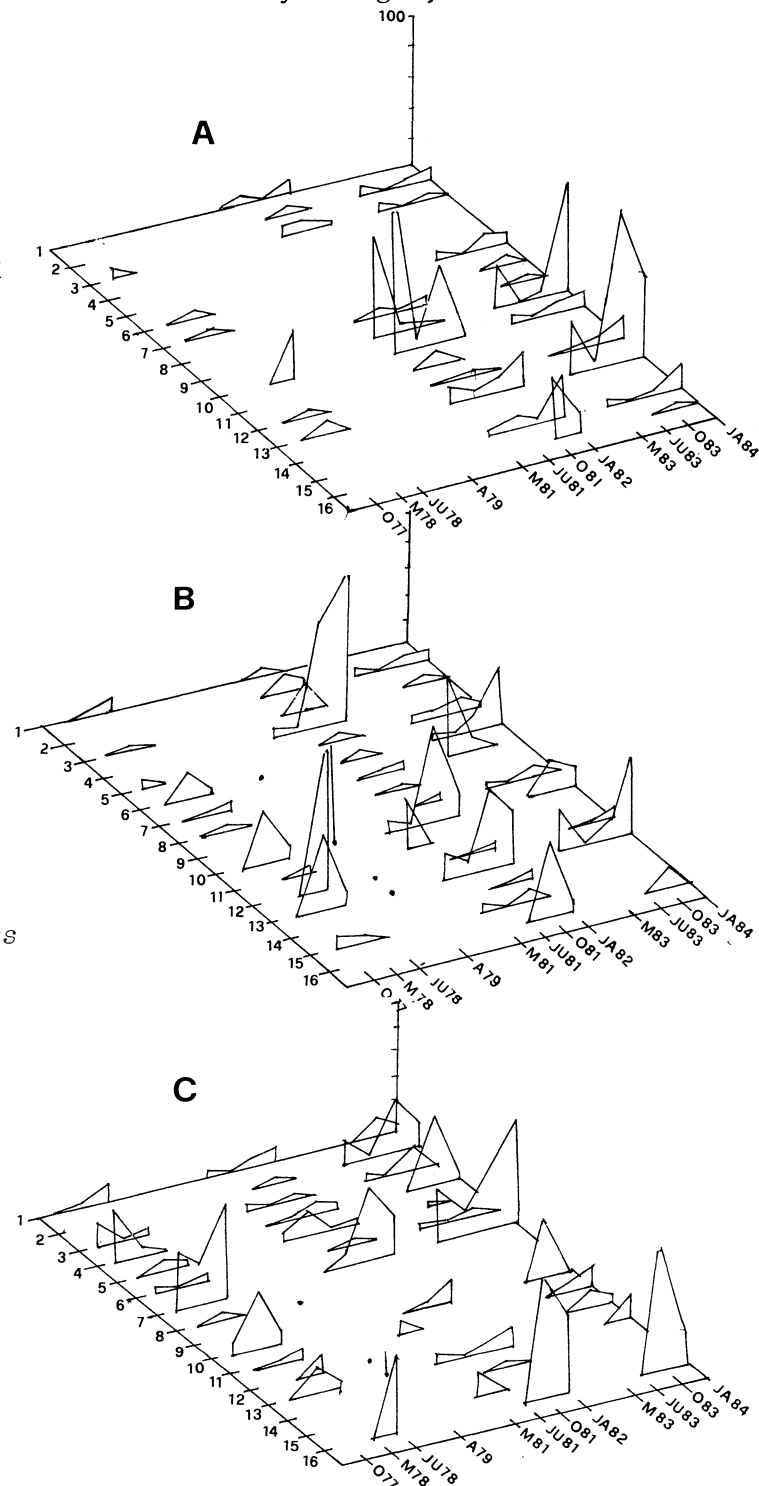
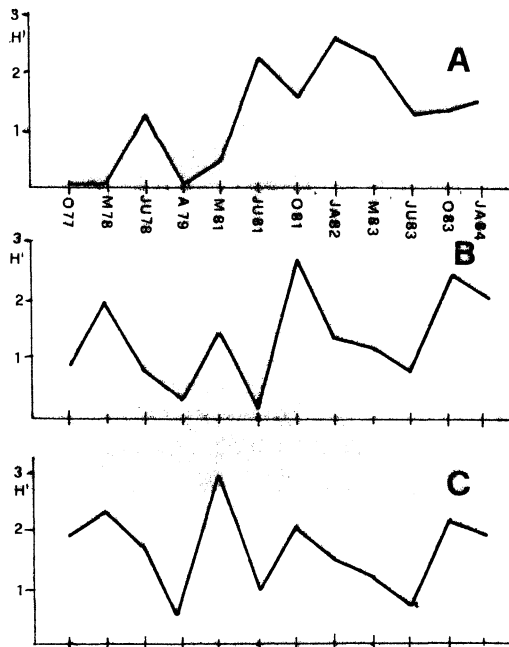


Fig. 2: Trends of abundances of the species during the whole study period (species found only once were not considered)



In conclusion, notwithstanding the fluctuations above reported and discussed, the Polychaete community of Sabaudia lake seems to possess some "recurrent patterns".

If heavy alterations of the biotope do not occur, these patterns are maintained during the time. Therefore, the Sabaudia lake, although an unpredictable environment as any lagoon is, seems to be at least predictable as far as biological conditions are concerned.

Fig. 3: Trends of Diversity index (Shannon-weaver,  $H'$ ) .

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