

THE ROLE OF DIATOM COMMUNITIES IN THE QUALITY EVALUATION AND ECOLOGICAL CHARACTERIZATION OF A REGULATED MEDITERRANEAN STREAM

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In 2005, a study was conducted on the diatom communities of the R.Mucone, a regulated Mediterranean stream in a mountainous part of Calabria (S.Italy). Diatoms were sampled in 4 locations situated at increasing distances from the dam which forms Lake Cecita and in other 3 locations along unregulated tributaries. Three sampling campaigns were undertaken, in the course of which aquatic chemical-physical factors and stream morphometric characteristics. Physical substrate was characterized, and several water chemistry variables were analyzed in all stations.

A total of 97 taxa were identified. The most abundant were *Achnanthes minutissimum* (23.5% of identified individuals), *Cocconeis euglypta* (9.6%), *Cocconeis pseudolineata* (7.2%), *A.pyrenaicum* (6.9%), *Fragilaria crotonensis* (3.9%), *Navicula gregaria* (3.8%) and a less well known species, *Adlafia suchlandtii* (3.6%).

A Detrended Correspondence Analysis (DCA) on the taxonomic data of the 15 most abundant taxa preliminarily allowed to distinguish different groups of samples: a first group, with a certain degree of internal differentiation, which included the first 3 stations along the R.Mucone downstream of the dam and a group including the samples taken in the final station along the R.Mucone and in three reference sites situated along the tributaries. A Cluster Analysis (CA) and a Multi-Response Permutation Procedure (MRPP) also confirmed the segregation of these groups of samples (and sites). Several diatom-based water quality indices were calculated.

The mentioned groups of stations showed differences in community structure. In particular, in those downstream of the dam the most abundant species was *A.minutissimum* (33.9% of individuals identified), *C.euglypta* (15.5%) and *F.crotonensis* (8.6%), while in the group of reference sites including the most downstream station of the R.Mucone the 3 most abundant species were *A.minutissimum* (15.3% of individuals identified in this group), *C.pseudolineata* (12.6%) and *A.pyrenaicum*. (12.3%). *A.suchlandtii* was found only in the group of reference stations. Several species showed strong differences in average abundance between segregated groups of samples.

The differences between the groups of samples can be explained primarily by the presence of the dam and its influence on the hydrology downstream. The final station along the R.Mucone appeared to be more similar to the reference sites, indicating a significant degree of recovery, thanks to the increasing distance from the dam and to the effect of the tributaries.

The results proved the existence of differences among sites ascribable to the effects of the dam. Diatoms, with other ecological and environmental variables, proved to be a useful tool in the evaluation of the effects of stream regulation.