

Autoecology of epilithic diatoms in the Duero rivers Basin

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Diatoms are known to be an effective tool for water ecosystem health diagnosis. Two major arguments in favour of using diatoms in water-quality assessment are their cosmopolite distribution and their well-known ecological requirements. This features let, therefore, that diatom indices developed in a geographic region can be used in other parts of the world. However, there is a strong evidence that diatom metrics are less useful when applied in a geographic area other than that where species-environment relationships were originally assessed. This is due to the fact that species have different autoecological requirements in different geographic areas.

In this study, we define the ecological optimum and tolerance ranges for selected environmental variables (pH, conductivity, BOD₅, [NH₄⁺-N], [NO₃⁻-N], [PO₄³⁻-P]), in three common epilithic diatom species in the Duero Basin (NW Spain): *Achnanidium pyrenaicum* (Hustedt) Kobayasi, *Navicula tripunctata* (O.F. Müller) Bory and *Eolimna minima* (Grunow) Lange-Bertalot; comparing our results with the data gathered from different geographic regions. Furthermore, we compare the autoecological parameters obtained from the northern and southern subbasins, and from different years, in order to observe if significant small-scale spatio-temporal changes exist.

Our results show that there are variations in species' autoecological parameters between different regions. Furthermore, there are significant changes comparing northern and southern Duero subbasins for some species and physiochemical variables, although all studied taxa exhibited highly significant differences regarding conductivity optima and tolerance ranges comparing both zones. Additionally, different autoecologies have been observed for certain diatoms and environmental factors comparing two different years.

It can be concluded that freshwater diatom autoecologies can vary between different geographic areas. This implies that, in order to improve water-quality bioassessments, autoecology-based diatom metrics should be developed by quantifying species distributions along environmental gradients, using datasets representative of the areas or river types where the metrics will be applied.