Hydraenidae and Elmidae assemblages (Coleoptera) from a Spanish river basin: good indicators of coal mining pollution?

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With 3 figures and 4 tables

Abstract: Coal mining is an economically important activity in northwestern Spain often causing severe ecological damage in river systems. However, very little is known about its biological effects. In this paper, its influence on two Coleoptera families, Hydraenidae and Elmidae, is assessed at the assemblage level by basic community parameters (richness, abundance, Shannon-Wiener index) and multivariate analysis (CCA). A two-year survey in several streams in the Sil River basin (province of León, Spain) was undertaken. 34 species were collected from stony bottoms and a large set of environmental variables was measured. The negative effect of mining on these families was first revealed by a decrease in richness and abundance, even at moderately polluted stretches. No specimen was collected at the most heavily contaminated sites. The Shannon-Wiener index failed to discern the impact. CCA identified mining pollution, indicated by the sulfate concentration, as a major factor determining beetle distribution. A difference in the tolerance of different species to the impact became evident. Hydraena sharpi, Hydraena emarginata, Hydraena hispanica, Hydraena iberica, Hydraena barrosi, Hydraena stussineri, Elmis perezi, Esolus angustatus and Limnius perissi seem sensitive to mine-derived pollution, while Hydraena cordata, Hydraena corrugis, Elmis maugetii, Esolus parallelepipedus and Oulimnius troglodytes might be considered as relatively tolerant taxa. However, these families are not specific indicators of coal mining since their response to other types of pollution (e.g. eutrophication) is very similar. Besides, sensitive species have a reduced longitudinal distribution along the rivers and are restricted to upper reaches. This limits the potential of Hydraenidae and Elmidae as indicators in lower stretches.

Key words: River system, biomonitoring, metal concentrations in rivers.

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