

Micromorphological leaf characteristics of *Fontinalis antipyretica* Hedw. as biomarkers of water pollution

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METHODS

The current study is a part of complex research for establishing new fast and reliable methods for water pollution control. The subject of the study is three anthropogenically affected reservoirs (Kardzhali, Studen Kladenets, and Zhrebchevo), compared with the control - non-polluted one (Vacha Reservoir). *Fontinalis antipyretica* Hedw. was used as a biomonitor and mossbags stayed for 30 days in the dams. The micromorphological characteristics of cells in the stem and twig leaves of the gametophyte of *F. antipyretica* were studied by using a light microscope (CETI, Magnum T Trinocular, magnification 400x)

AIM

The aim of the present study was to determine the effect of water pollution on the structure of the photosynthetic cells of the stem and twig leaves of the gametophyte of *F. antipyretica*.

RESULTS

A proven increase in the number of cells was registered (significance level between 99% - 99.9% according to Student t-test), both on the branch leaves (for all three affected reservoirs) and the stem leaves (for Zhrebchevo Reservoir). In parallel, a reduction was recorded in the size of cells, mainly in terms of their width, as a result of the anthropogenic pressure. The twig leaves showed higher sensitivity to water pollution than the stem leaves. Based on Hierarchical cluster analysis, the indicators were compared by using the square Euclidean distance method. The analysis confirmed the differences between the stem and twig leaves and that placed the Zhrebchevo Reservoir in a separate cluster.

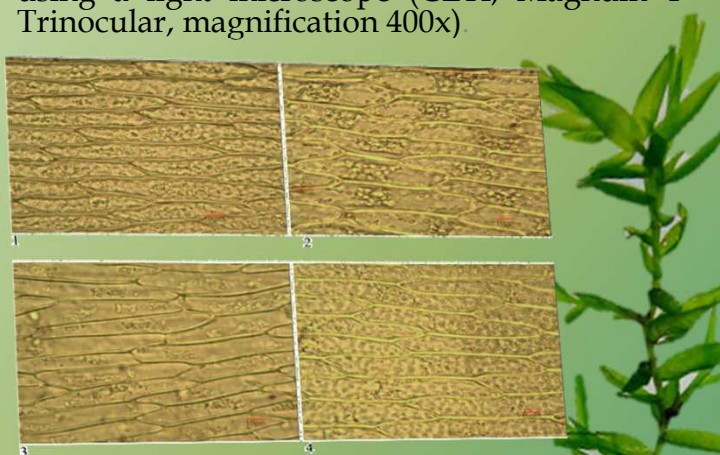


Figure 1. Photomicrographs of the leaf cells from *Fontinalis antipyretica*: **1,2** Background (Control); **3,4**—Zhrebchevo Reservoir; **1,3**—twig leaves; **2,4**—stem leaves.

CONCLUSIONS

In conclusion, *Fontinalis antipyretica*, in particular the number of twig leaf cells and their width, can be used as suitable micromorphological markers in biomonitoring studies of water basins.

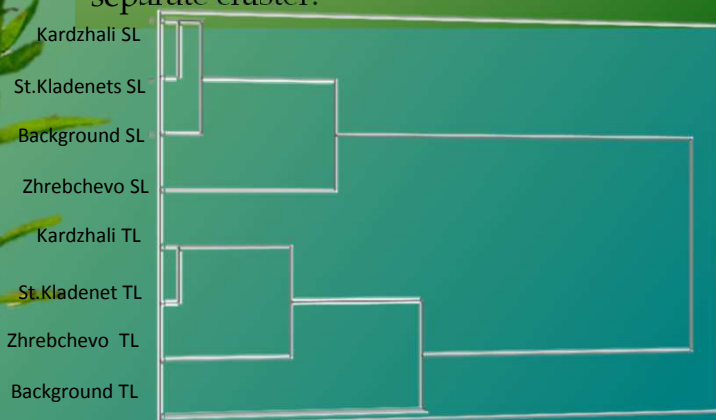


Figure 2. Cluster analysis in terms of the number and size of cells in the stem and twig leaves of the four studied habitats. TL – twig leaves; SL – stem leaves.

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