Seasonal development of Zn, Pb, As and Cd contents in the biomass of selected grass species growing on contaminated soils: Implications for phytostabilization

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Rhizospheric soil of three plant communities (*Agrostis capillaris, Calamagrostis epigeios* and *Arrhenaterus elatius*) was investigated. Samples were taken at four different times within one year, in blocks of 30cm^3, from a site contaminated by Pb, Zn, Cd and As due to mine and smelting activities (Přibram, Czech Republic). The parameters measured include: concentration of elements in plant (digestion in HNO_3), pseudo-total concentration of elements in soil (aqua-regia extraction), available concentration of metals in soils ($CaCl_2$ extraction), sequential extraction of Pb, Zn, As and Cd, and arbuscular mycorrhizal fungi (AMF) colonization. The data was processed by analysis of variance (anova) and principal components analysis (PCA). Below-ground biomass of *A. capillaris* accumulated the highest concentrations of Pb, Zn and As, while its rhizosphere showed the highest concentrations of Pb and Cu. *C. epigeios* shows the lowest concentrations of Zn and Pb in shoot, as well as in its rhizosphere (pseudo-total and $CaCl_2$-extractable). The rhizospheric soil of *A. elatius* presented the highest pH, lowest concentration of K, highest of P and Cl and the lowest $CaCl_2$-extractable Pb. Colonization of the roots by AMF was the lowest for *C. epigeios*, while no statistical differences were found among the other two species. The PCA positions *A. capillaris* separated from the other species, with positive correlation with the concentration of elements in below-ground biomass, and negative correlation with the concentration in above-ground biomass. The results point at *A. capillaris* as the best candidate for phytostabilization purposes.