Geophysical Research Abstracts
Vol. 13, EGU2011-2311, 2011
EGU General Assembly 2011

Accumulation of heavy metals in plants growing around an abandoned mine in Poblet, Tarragona (NE Spain)

Jaume Bech (1), Paola Duran (1), Nuria Roca (1), Juan Barceló (2), Rafael Boluda (4), Luis Roca-Perez (4), and Charlotte Poschenrieder (2)

(1) University of Barcelona, Chair of Soil Science (Plant Biology), Barcelona, Spain (jbech@ub.edu), (2) Universitat Autònoma de Barcelona, Bioscience Faculty, Plant Physiology Laboratory, 08193, Bellaterra (Spain); , (3) Faculty of Agronomy. Universidad Nacional del Centro de la Provincia de Buenos Aires, CC 47, 7300, Azul (Argentina), (4) Universidad de Valencia, Plant Biology Department, Valencia (Spain).

In mediterranean region, many of the metal rich soils are located in small, heavily disturbed areas and show a typical pseudometallophyte vegetation. These plants have attracted less attention than metallophytes. However, according to previous studies the pseudometallophytes are species that are able to adapt to a wide range of adverse soil conditions. We studied top soil and spontaneous plants collected around the old abandonated mine located in Poblet, Tarragona (Catalonia-Spain). Plants and soils were sampled and analyzed for concentrations of Al, Cr, Cu, Fe, Ni, Pb, V and Zn. The translocation factors (TF) and the bioaccumulation factors (BF) were determined and used to measure each plant's effectiveness for concentrating metals into its biomass.

The top soil had acid pH (5.8$\pm$0.4) with a relatively high content of organic carbon (7.26$\pm$3.82) and a sandy texture i.e., silts (27.9$\pm$2.47) and clay (11.16$\pm$2.07). High Al (5.0 to 6.2%), Cu (157 to 518 mg.kg^{-1}), Pb (97 to 224 mg.kg^{-1}) and Zn (195 to 704 mg.kg^{-1}) concentractions were detected. Concentrations of Cr, Cu, Ni, Pb, V, and Zn found in soils around the Poblet mine were clearly higher than background levels reported for the Tarragona area. Among the plants, only *Cistus salvifolius* was able to accumulate higher metal concentrations in shoots than in roots. In the rest of species preferent accumulation in roots was observed. High concentration of Al were found in the rhyzome of *Polypodium vulgare* (2000 mg.kg^{-1}). *Rubia peregrine* was able to accumulate the highest metal concentration of Cu in its roots (45 mg.kg^{-1}) while *Viburnum tinus* was able to accumulate the highest metal concentration of Zn (210 mg.kg^{-1}). *Dactylis glomerata* despite growing in soils with high Cu burdens ($>$ 500 mg.kg^{-1}) was able to efficiently exclude Cu from its tissues. *Cistus salvifolis* accumulated high Al concentrations in shoots (around 3000 mg.kg^{-1}), similar concentrations have been reported for Al-hyperaccumulator species. The low TFs indicate that plants accumulated metals mainly in roots, except in *C. salvifolius*, which showed TF values $>$1. BFs values were $<$1 in all species.

We suggest *C. salvifolius* as a good candidate for phytoremediation purpose. The species is able to grow in soils with polymetallic pollution, is well adapted to mediterranean climate (summer drought and heat) and has relatively high biomass production even when growing on metal contaminated soils.