
A pot experiment was conducted for three vegetation periods on a sandy soil (pH 7.5) to study the uptake of cadmium and the distribution of Cd in plant tissues of *Calamagrostis epigejos* (L.) Roth. Cadmium was applied as CdCl$_2$ (a total of 1 l solution of 0, 20, 100, 200 mg Cd l$^{-1}$). HNO$_3$- and water-extractable concentrations of Cd in 2 cm and in 20 cm soil depths were correlated with the applied Cd showing that Cd was very mobile in the soil. There was also a clear linear relationship between water-extractable and total Cd in the soil. The uptake of Cd from soil by *Calamagrostis epigejos* was directly related to the total soil Cd content and to its water-soluble pool of Cd. The concentrations of Cd in plant tissues (roots, rhizomes, leaves) and litter increased with increased Cd applied. Most of the Cd taken up was accumulated in roots (range from 1.88±0.42 to 40.96±16.71 mg kg$^{-1}$ dry mass), followed by rhizomes (0.52±0.13 to 25.70±6.35 mg kg$^{-1}$) and leaves (0.30±0.06 to 9.20±1.93 mg kg$^{-1}$). Cd concentrations of the litter were about twofold the concentrations of leaves (0.67±0.07 to 18.98±7.00 mg kg$^{-1}$). The bioaccumulation factor (leaf/soil concentration ratio) increased significantly from 0.70±0.10 (control) to 1.13±0.17 (100 mg Cd l$^{-1}$), but decreased again at the highest Cd level (200 mg Cd l$^{-1}$) towards 0.74±0.34, which was not significantly different from the control. The low transfer of Cd from soil to aboveground organs at higher soil Cd concentrations indicates an excluder mechanism. The leaf/root Cd concentration ratio (translocation factor) shows no significant relationship to increasing soil contamination. Only 4 – 7 % of the total plant Cd was accumulated in the aboveground tissues. The phytoextraction potential (total Cd removed from soil) within three growing seasons ranged from 0.11 to 0.25 % of the total soil Cd. Despite its low phytoextraction potential, *C. epigejos* can be suitable for phytostabilisation of the soil by uptake of the available Cd pool and accumulation in belowground biomass.

*Key words*: bioaccumulation factor, bioremediation, phytoextraction potential, phytostabilisation.