Title	**Monitoring of heavy metal concentrations in home outdoor air using moss bags**
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Journal	Environmental Pollution, Vol. 159(4)
Abstract	"One monitoring station is insufficient to characterize the high spatial variation of traffic-related heavy metals within cities. We tested moss bags (*Hylocomium splendens*), deployed in a dense network, for the monitoring of metals in outdoor air and characterized metals ' long-term spatial distribution and its determinants in Girona, Spain. Mosses were exposed outside 23 homes for two months; NO_2 was monitored for comparison. Metals were not highly correlated with NO_2 and showed higher spatial variation than NO_2. Regression models explained 61–85% of Cu, Cr, Mo, Pb, Sb, Sn, and Zn and 72% of NO_2 variability. Metals were strongly associated with the number of bus lines in the nearest street. Heavy metals are an alternative traffic-marker to NO_2 given their toxicological relevance, stronger association with local traffic and higher spatial variability. Monitoring heavy metals with mosses is appealing, particularly for long-term exposure assessment, as mosses can remain on site many months without maintenance. **Research highlights** Moss bags can be used to measure the metal's long-term spatial distribution within cities. Heavy metals in mosses are not highly correlated with ambient NO_2 concentrations. Heavy metals show higher spatial variation and association with traffic than NO_2 Bus lines in the nearest street explain 75–85% of Mo, Cr, Sb, Sn and Cu variability. Moss bags are useful for long-term at home exposure assessment in epidemiological studies. The long-term spatial distribution of heavy metals, measured with moss bags, is mainly determined by proximity to bus lines. "
Year	2011
Pages	954- 962
keywords	Traffic-related air pollution, Outdoor exposure, Spatial distribution, Determinants, Particulate matter, Nitrogen dioxide

Title	**Comparison of Epigeic Moss (*Hypnum cupressiforme*) and Lichen (*Cladonia rangiformis*) as Biomonitor Species of Atmospheric Metal Deposition**
Author	Mahmut Coskun, Eiliv Steinnes, Munevver Coskun and Akin Cayir
Journal	Bulletin of Environmental Contamination and Toxicology, Volume 82(1)
Abstract	In the present work epigeic moss (*Hypnum cupressiform*e Hedw.) and epigeic lichen (*Cladonia rangiformis* Hoffm.) samples were collected simultaneously in the Thrace region, Turkey according to a regular sampling grid. Whereas the moss was found at all 68 sampling sites, the lichen could be collected only at 25 of the sites, presumably because lichens are more sensitive than mosses with respect to air pollution and climatic variations. All elements showed higher accumulation in the moss than in the lichen whereas element inter-correlations were generally higher in the lichen. All considered the moss was judged to be a better choice than the lichen for biomonitoring of atmospheric deposition of metals in this case, and it is argued that mosses may be generally more suited than lichens for this purpose.
Year	2009
Pages	1-5
keywords	*Hypnum cupressiform*e Hedw, *Cladonia rangiformis* Hoffm, heavy metals