



Identification of metal-responsive oribatid mites in a comparative survey of polluted soils

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Summary

Responses of oribatid mites to anthropogenic soil pollution vary greatly according to the species. In this study we aimed to identify sensitive and resistant species with a consistent relationship to soil metal concentrations. A regional survey of nine woodlands polluted to various degrees, was conducted in The Netherlands, Belgium, France and Germany. Oribatids were Tullgren extracted from soil cores and identified to species level, representing altogether 75 oribatid species. No relationship could be found between metal pollution and total density of oribatids, species rank abundance slope or Bray–Curtis similarity of species composition. The Shannon diversity index was lowest in the most polluted sites, but it was not significantly correlated with metal concentrations. A principal component analysis of the log-transformed species abundance data and the concentrations of zinc, cadmium, lead and copper revealed a separation between clean sites, moderately polluted sites and highly polluted sites. A redundancy analysis revealed that only the cadmium concentration in litter had a significant effect on community structure. Abundance of *Tectocepheus velatus* and *Metabelba* sp. was positively correlated with cadmium in litter, while *Platynothrus peltifer* and *Hypochothonius rufulus* were negatively correlated. For *Galumna lanceolata*, *Suctobelbella subtrigona* and *Oppiella nova* abundance was not associated with metals. Our survey confirms that oribatid mite communities display a great variety of responses to heavy metals. Our field data also corroborate earlier laboratory experiments, showing that *P. peltifer* is a cadmium-sensitive species.

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