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Quantitative modelling of the response of earthworms to metals

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Propositions

For the doctoral thesis “Quantitative modeling of the response of earthworms to metals” by Hao Qiu, Leiden University, June 2014

1. The multicomponent Freundlich model, complying with the basic assumptions of BLM but requiring fewer parameters than the BLM, is a feasible framework for linking soil porewater chemistry to metal toxicity in soils (this thesis).
2. Metal toxicity to earthworms needs to be evaluated on a metal-specific basis (this thesis).
3. The commonly measureable traits assist in explaining differences in metal accumulation and toxicity in earthworms (this thesis).
4. Interactions of Cd and Zn at the organism level influence their toxicity to earthworms (this thesis).
5. Identifying interaction of mixture components at relevant levels and incorporating bioavailability effects in mixture toxicity modeling are helpful to explain differences in interaction patterns that occur between different soil types (this thesis).
6. The effectiveness, success, and regulatory relevance of BLM benefit from its mechanistic basis, which will suffer if BLM development becomes too much a data-fitting exercises based on faith that simple implementations of the approach are sufficient (Russell J. Erickson, 2013).
7. Since there is no "most sensitive species" a battery of toxicity tests is needed to obtain proper insight into the potential hazard of a chemical for the ecosystem (Cornelis A. M. van Gestel, 2012)
8. The lack of a specific type of toxicity for a single compound, does not per se imply a lack of toxicity when part of a mixture (Kilian E. C. Smith et al., 2013).
9. Improving risk assessment and remediation rests on better understanding bioavailability (Laura J. Ehlers and Richard G. Luthy, 2003).
10. The ultimate goal for modellers should be to meet the law of parsimony, to look for a simple explanation of the observed phenomena rather than postulating complex processes without empirical evidence (William of Occam, 1341).
11. A dwarf standing on the shoulders of a giant may see farther than a giant himself (Didacus Stella, 1621).
12. We are what we repeatedly do. Excellence, then, is not an act but a habit. (Aristotle)