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Title: Biochemical and behavioural effects of parathion on *Aporrectodea caliginosa* under laboratory conditions

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Abstract:

Ethyl parathion is a widely used organophosphate pesticide in Mexico. The sublethal effects of this pesticide were studied using *A. caliginosa* as a model earthworm since it is very common in agricultural soils in France but also in Mexico. In a first experiment, classical endpoints (i.e. mortality, weight loss and cholinesterase activity) were measured in earthworms exposed to parathion sprayed on four different soils, three Mexican soils (two vertisols and one andosol differing in their organic matter content) and one French soil (eutric cambisol). All earthworms were collected in France in an abandoned orchard close to Avignon. The Predictive Environmental Concentration (PEC) for parathion is approximately 0.625 mg/kg of dry soil (or ppm). Earthworm mortality was between 80 and 100% for concentrations in parathion of 100 ppm for the three Mexican soils but was only 50% in the French soil. Weight loss was significantly different from the control for concentrations in parathion of 10 ppm and no difference was observed between the four soils. Significant cholinesterase inhibitions were observed in the four soils for concentration in parathion of 1 ppm. No important differences in effects were observed between soils suggesting that exposition was not directly related to sorption coefficients of the active ingredient but to available concentrations after soil ingestion. Another experiment was carried out with the French soil to evaluate behavioural effect (avoidance and burrowing capacity) of parathion. *A. caliginosa* did not avoid any of the tested concentrations (10, 1 and 0.1 ppm) of parathion. The burrowing behaviour of *A. caliginosa* was significantly affected in 2D terrarium for concentrations as low as 1 ppm showing that behaviour is a sensitive biomarker.

(poster)
