

Spidey Senses: Using wolf spiders as a sentinel species for Pb soil amendment effectiveness

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One of EPA's more novel approaches to characterizing remediation effectiveness is through the collection of spiders. The spider taxa used are broadly distributed, have small home ranges, and integrate targeted and local persistent organic pollutants (e.g., polychlorinated biphenyls), organometals (e.g., methyl-mercury), and heavy metals (e.g., lead [Pb]). However, this approach to characterizing remediation effectiveness assumes there are no significant adverse effects to the spider's behavior or morphology and research regarding the correspondence of heavy metal concentrations, like that of Pb, in spiders and environmental media (e.g., soil, sediment, and water) are still lacking. To fill in this missing piece, healthy wolf spiders (*S. ocreata*) were collected from a nature preserve and exposed to Pb contaminated soils after their penultimate instar. Following maturation, the spiders were run through a battery of behavioral tests before the total body Pb concentration was determined on the spiders.

The preliminary data found that spiders not only demonstrated differences in concentrations among control spiders (n = 39; mean ± standard error = 0.36 ± 0.08 mg_{Pb}/kg dw), Pb-females (n = 16; 18.04 ± 3.26 mg_{Pb}/kg dw), and Pb-males (n = 23; 118.4 ± 31.74 mg_{Pb}/kg dw), but also the effect of Pb on behavior. During the mating trials, control spiders (n = 5 trials) successfully mated 100% of the time. However, Pb-female trials (n = 9), Pb-male trials (n = 12), and Pb-Pb trials (n = 9) were only successful 78%, 75%, and 56% of the time, respectively. A more robust study with a greater number of spiders and more levels of lead contamination was completed in the fall and the total body metal analysis is underway.

