

Mercury in a Common Riparian Forest Salamander

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Introduction

Terrestrial salamanders are some of the most abundant vertebrates of deciduous forests. Acting as both predator and prey, salamanders are an important link in the trophic web. Because of their importance, we studied the amount of total mercury (THg) found in Redback salamanders, *Plethodon cinereus*, to see if they were concentrating mercury in their bodies and subsequently passing the mercury through the food chain in a riparian forest.

Objective

Our specific objectives were to a) determine if THg was accumulating within *P. cinereus* of a riparian forest, and b) delineate any differences in mercury accumulation between the Redback and Leadback phases of this salamander (Figure 1).

Methods

- Salamanders were collected from beneath artificial cover objects in a riparian forest along the Susquehanna River near Berwick, Pennsylvania (41.0845°N, -76.1317°W).
- Salamanders were identified, weighed to the nearest gram, and then measurements were made of their total lengths (TL) and snout-to-vent lengths (SVL) to the nearest mm.
- Tail fragments were detached from each specimen and subsequently frozen in 1.5 mL Eppendorf vials.
- The mass of each tail fragment was measured to the nearest 0.0001g and analyzed for total mercury using a direct mercury analyzer (DMA-80 Milestone, Inc). The DMA has a manufacturer's calculated detection limit of 0.005 ng.
- Data were analyzed by a Mann-Whitney test of the ranks. Alpha was set at P=0.05.



Figure 1. Lead-back phase of the Redback salamander *Plethodon cinereus*.

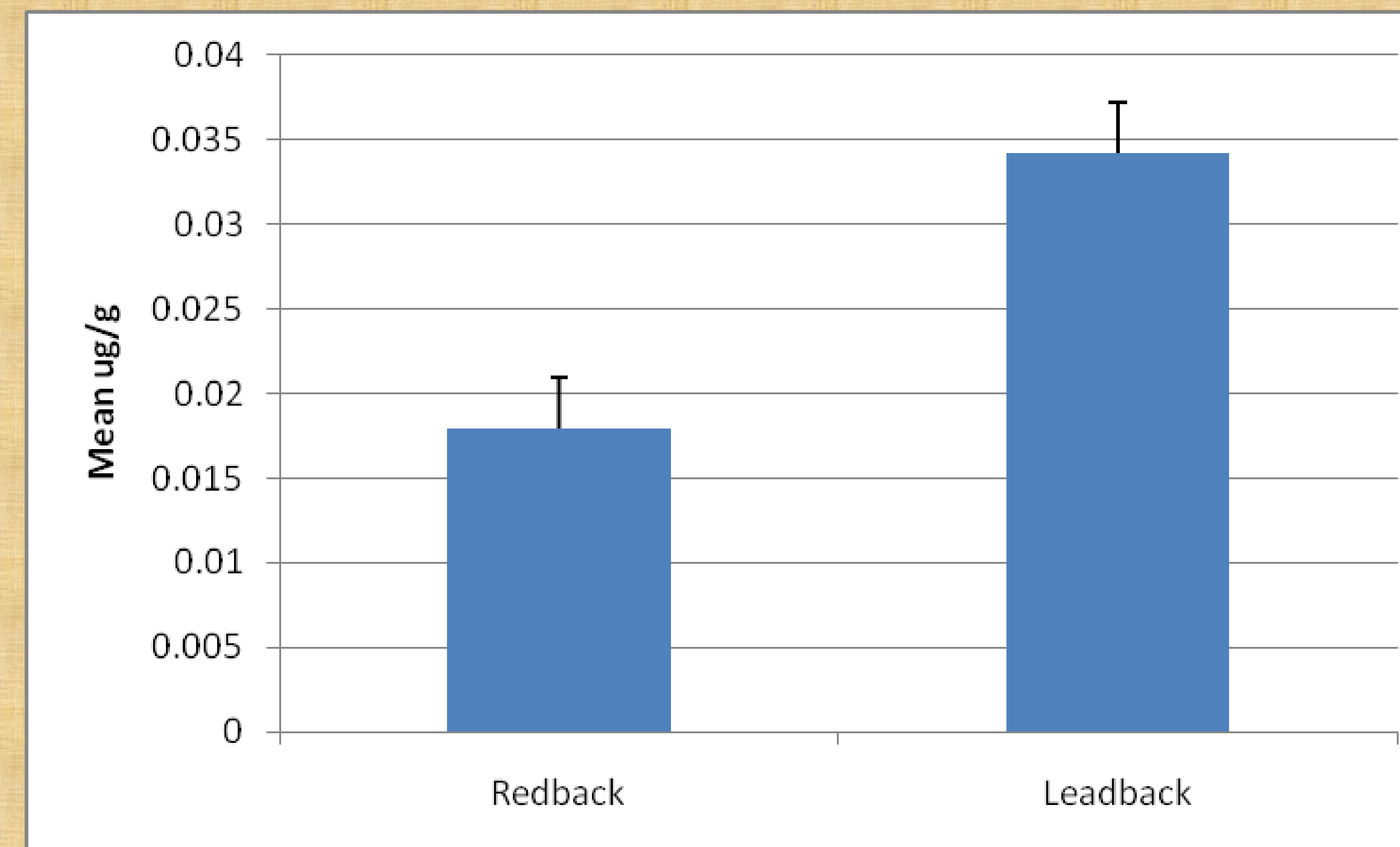


Figure 2. The median level of THg in *P. cinereus* collected from a riparian forest. Error bars indicate one standard error.

Results

- P. cinereus* accumulated mercury in riparian forest habitats.
- The average concentration of THg in the Leadback salamanders was almost twice that of the Redback phase (Figure 2).
- However, there was no statistically significant difference in THg between the two forms (P=0.154).

Conclusions

- In general, the Redback salamanders were more abundant beneath the artificial cover objects than the Leadback salamanders.
- Our data suggest that differences in mercury concentration could be related to dietary differences.
- Other researchers have reported a difference in mobility between the forms, therefore the more mobile Leadbacks could be encountering more prey and thereby having greater opportunity to concentrate mercury.
- Additionally, these same researchers also report a higher predation rate among Redbacks, which could translate into longer lifespans for Leadbacks and more opportunity to concentrate mercury..

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