Mercury contamination of a High Arctic invertebrate food web and potential risk to arachnivorous birds

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Introduction

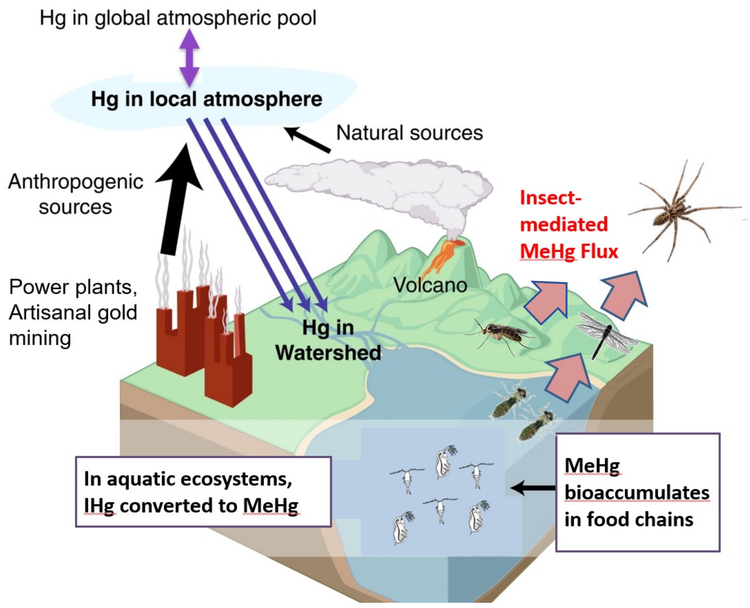

Figure 1: Global mercury cycle

- Aquatic ecosystems in the Arctic are contaminated with toxic mercury (Hg) originating from anthropogenic emissions. Following deposition, IHg can be converted to MeHg and bioaccumulate in food webs.
- Identifying levels of contamination in the base of Arctic aquatic food webs and sentinel species can help determine risk posed by Hg to wildlife.

Objectives

The objectives of this study were to determine:

1) **If shoreline spiders are sentinels of aquatic Hg in the high Arctic.**
2) **Baseline Hg contamination of lentic systems in Northwest Greenland**
3) **If terrestrial prey Hg could contribute to the Arctic invertebrate mercury cycle**

Methods

Figure 2: 1) Study site in NW Greenland 2) Pitfall trap for spider and terrestrial insect collection 3) Emergence trap for aquatic insect collection

Results

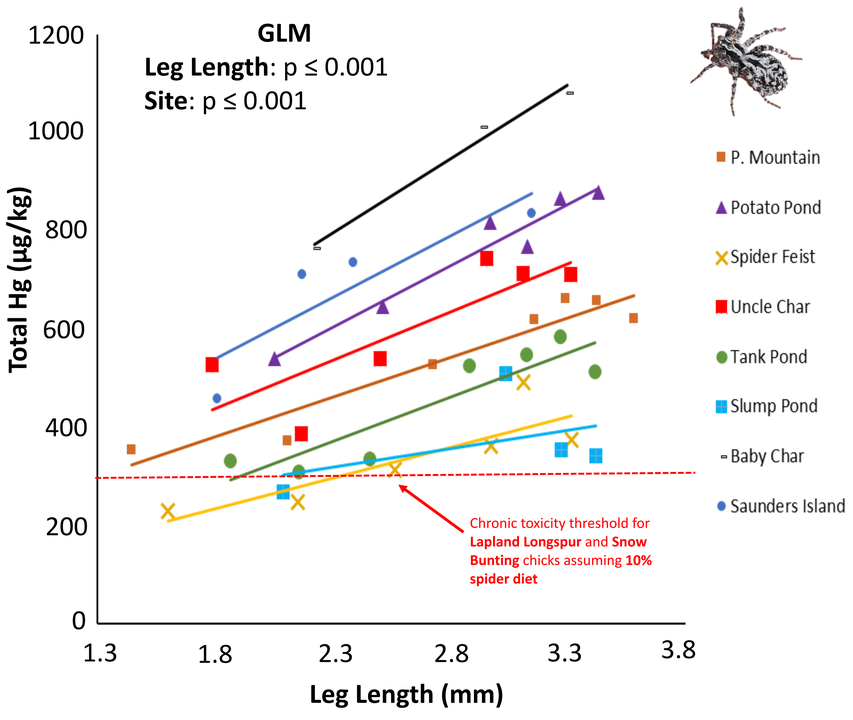

Figure 3: Total Hg in shoreline spiders as a function of leg length (tibia + patella) from eight sites in Northwest Greenland

Results (continued)

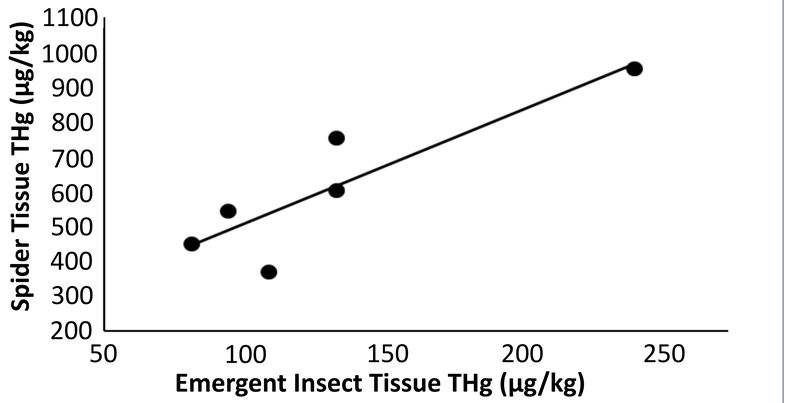

Figure 4: Total Hg in shoreline spider and emergent insect tissues from six ponds in Northwest Greenland

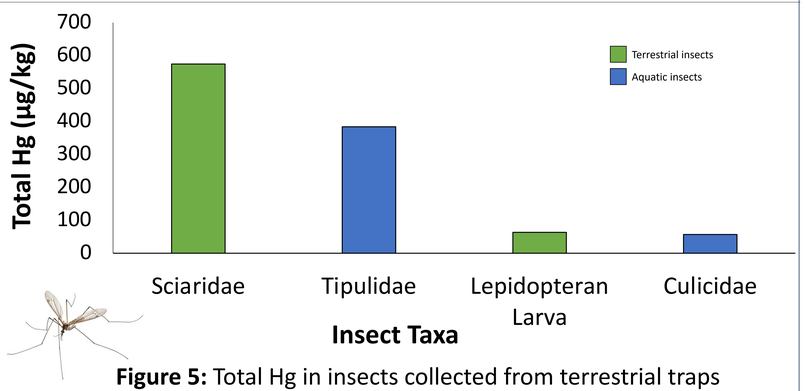

Figure 5: Total Hg in insects collected from terrestrial traps

Discussion

- Lentic systems in Northwest Greenland are contaminated with high levels of bioavailable Hg, but Hg varies across landscape.
- Using **SBAWVs** (spider-based avian wildlife values) from Beaubien et. al (2020), Lapland Longspur and Snow Bunting chicks may be at risk of chronic toxic effects of Hg from consuming spiders.
- Spiders are sentinels of Hg contamination in the High Arctic
- Terrestrial insects are a potential source of Hg to spiders

References: Angot et. al 2016, Beeby & Alan 2001, Beaubien et. al 2020, Chumchal et. al 2022, Dastoor et. al 2022, Hannappel et. al 2021, Ortega-Rodriguez et al. 2019, Walters et. al 2008.