Dragonfly Larvae as Bioindicators of Mercury in Texas Waters

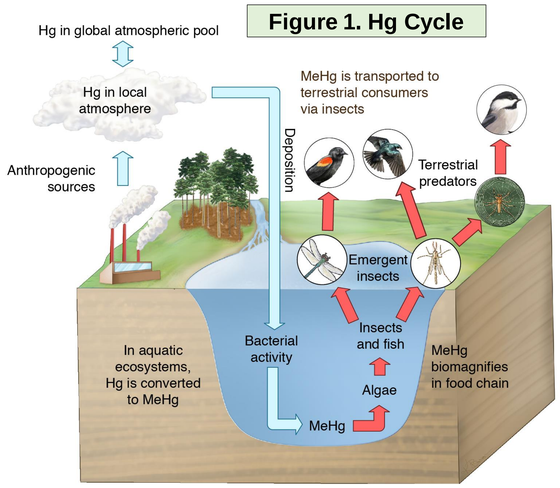
Ely Raphael[1], Andrew Brinker[1] , and Matthew Chumchal[2]

1. Texas Academy of Biomedical Sciences
2. Texas Christian University

Introduction

Mercury (Hg) is a neurotoxin that biomagnifies through aquatic food chains. Hg is released into the environment by Coal-fired power plants, artisanal gold mines, and other human activities (Fig 1.). Aquatic bacteria then convert inorganic forms of Hg into highly toxic methyl Hg. Dragonflies bioaccumulate Hg during their aquatic larval stage, due to their carnivorous diet. The larvae are being used as bioindicators of Hg contamination through the USGS Citizen Science Project – The Dragonfly Mercury Project.

Figure 1. Hg Cycle



Objectives

- Involve secondary students in research project.
- Provide USGS Dragon Fly Project with North Texas samples.
- Determine Hg concentrations in Fort Worth.

Figure 2. TABS Teachers and Students

Methods

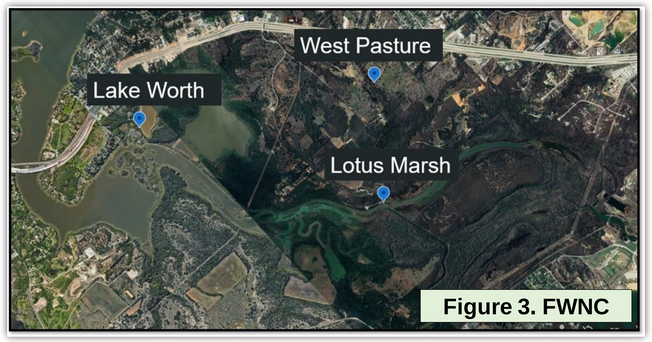


Figure 3. FWNC

- Three locations at the Fort Worth Nature Center and Refuge (Fig 3.)
- TABS and TCU students used dipnets in shallow water near edge to collect larvae (Fig 4)
- Larvae length measured, identified to family and placed in Ziploc bag with label (Fig 5 &6)
- Students use gloves and follow protocol to avoid contamination.
- Samples shipped to USGS with dry ice.

Figure 4. Students with dip netting

Figure 5. Students identifying family

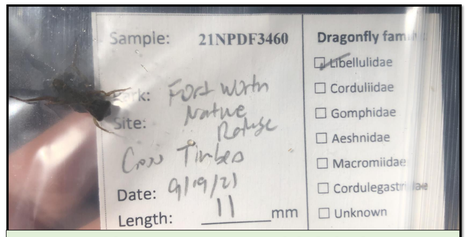


Figure 6. Larva with label

Figure 7. West Pasture

Results and Discussion

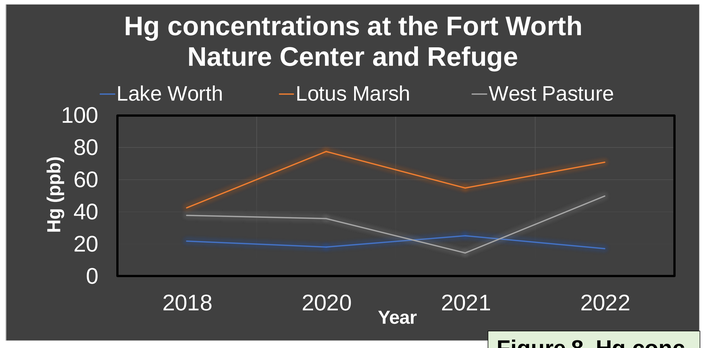


Figure 8. Hg conc.

- Lotus Marsh larvae had the highest Hg (Fig 8)
- Lake Worth mean 20.5ppb, Lotus Marsh mean 61.4ppb and West Pasture mean 34.2ppb (Table 1)

Table 1. FWNC Hg data

	Lake Worth (Hg in ppb)	Lotus Marsh (Hg in ppb)	West Pasture (Hg in ppb)
2018	21.7	52.5	37.8
2020	18.1	77.5	35.7
2021	25.2	54.7	14.4
2022	17.1	70.9	49.8
N	62	62	66
$\overline{X}$	20.5	61.4	34.2

- Concentrations generally low
- Lotus Marsh concentrations likely tied to differences in biogeochemistry
- The highest concentrations in Texas are from the Big Thicket in East Texas (228.4ppb)

Acknowledgements

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