

Sodium Fluoride Effects on Honeybees



High amounts of fluoride are lethal to bees, and negatively impacts the bee's ability to learn.



INTRO

- Fluoride is a naturally occurring mineral chemically related to fluorine
- Fluoride enters water through water fluoridation, pesticides, and chemical waste
- Normal amount in water is ~0.7ppm
- This experiment is a more extreme version than what is seen in nature
- Understand environmental components to help pollinators
- If high concentrations of fluoride are added to sucrose, then the bee's cognitive abilities and lifespan will be impaired

METHODS

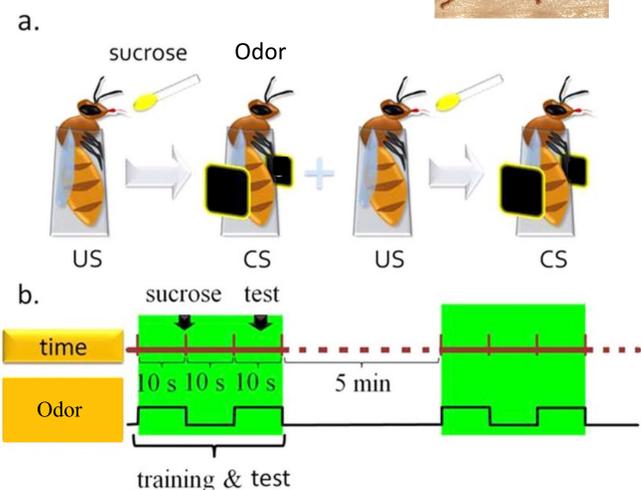
Deadly Concentration (LD50)
(Mishra et al. 2020) (Costa et al. 2015, 50)

Collected 20 bees. Fed sucrose or sucrose + fluoride

1. Observed 24 hours for survival

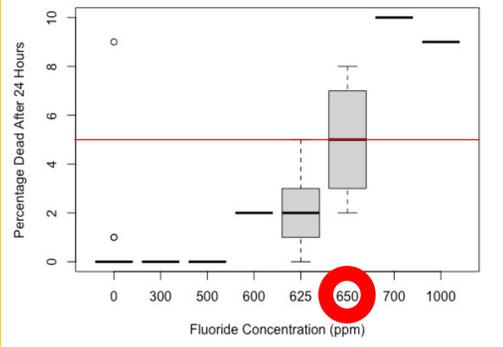
Learning Experiment

Proboscis Extension Reflex (PER)



RESULTS

% Bees Dead After 24hrs for Varying Fluoride Concentrations



DISCUSSION

-LD50 was 650ppm (around 6500x bigger than in nature)

-Amount that effects bees in PER is 500 (around 5000x bigger than in nature)

Future directions:

- acute fluoride effects testing
- continuing to test water samples

SOURCES

Costa, LM, TC Grella, RA Barbosa, O Malaspina, and RCF Nocelli. 2015. "Determination of Acute Lethal Doses (LD50 and LC50) of Imidacloprid for the Native Bee *Melipona Scutellaris* Latreille, 1811 (Hymenoptera: Apidae)." 5.

Mishra, Diksha, Rishu Kumari, Smita Ranjan, and Shahla Yasmin. 2020. "Effect of Fluoride on the Learning and Memory Ability of Larvae of *Zaprionus indianus*." *The Journal of Basic and Applied Zoology* 81 (1): 27. <https://doi.org/10.1186/s41936-020-00166-y>.

