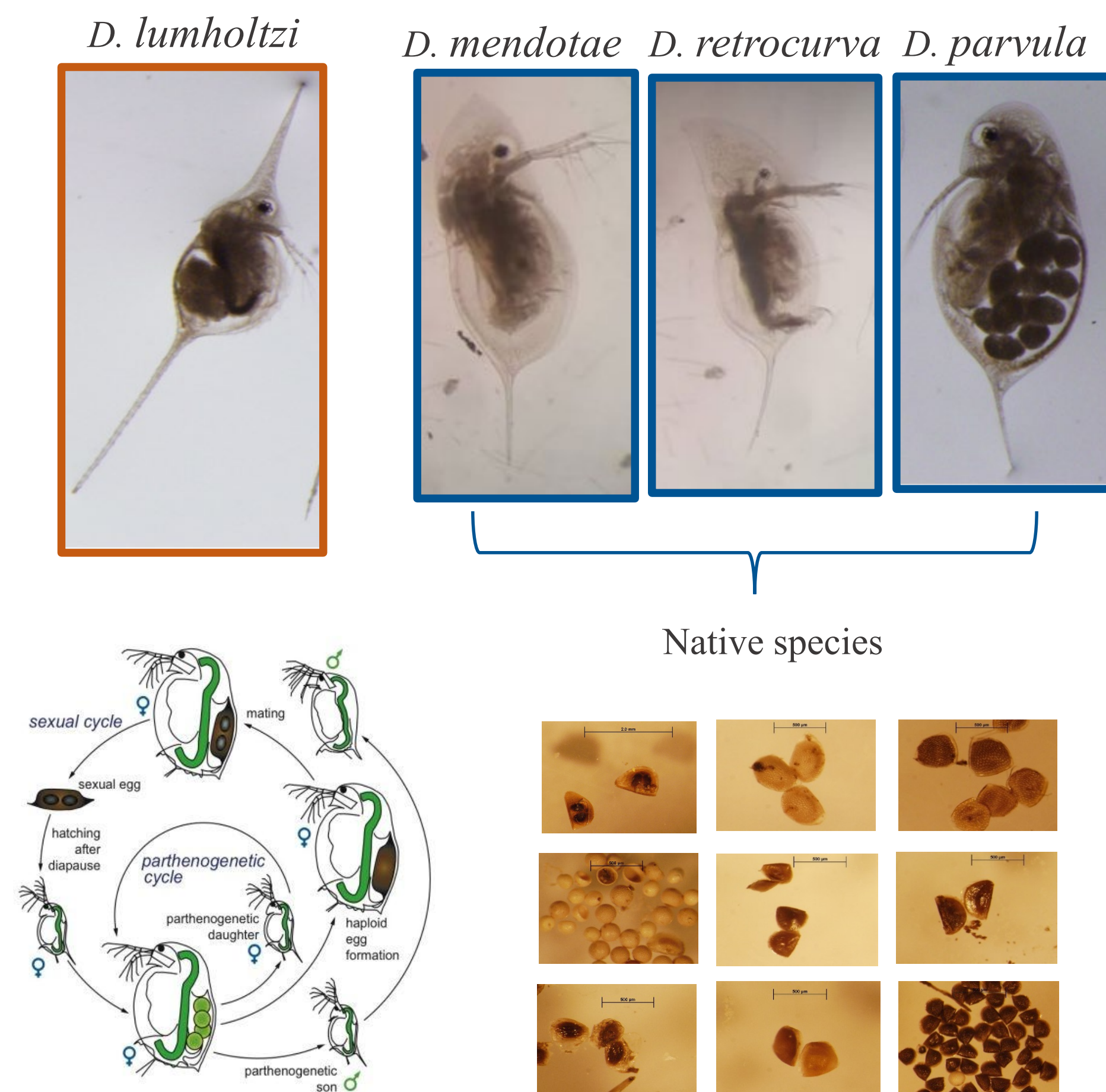


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## Background

- Aquatic ecosystems are vulnerable to invasion by non-native species
- *Daphnia lumholtzi*, commonly known as the water flea, invaded the United States in the 1990's from tropical regions of Asia and Africa
- *D. lumholtzi* has the potential to outcompete native *Daphnia* species, because their long spines protect them from fish predation, and their large body sizes allow them to consume small and large algae
- *Daphnia* can produce resting eggs called ephippia that can remain dormant in lake sediments for decades, which are useful for inferring historical population dynamics of *Daphnia* spp.



## Results

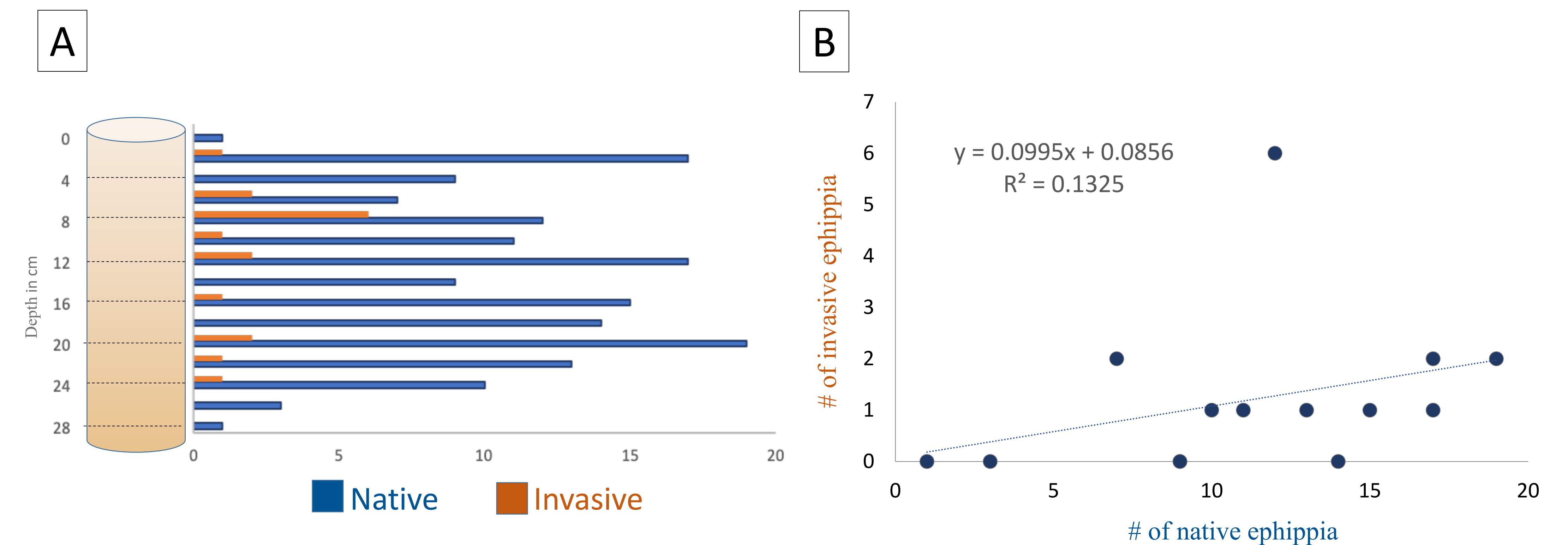


Figure 1. A) Number of ephippia in relation to depth of core. B) Relationship between native ephippia compared to invasive ephippia at varying depths. Average number of ephippia for 2 cm interval was 10.53 native ( $\pm 5.68$ ) and 1.13 invasive ( $\pm 1.55$ ).

## Objective

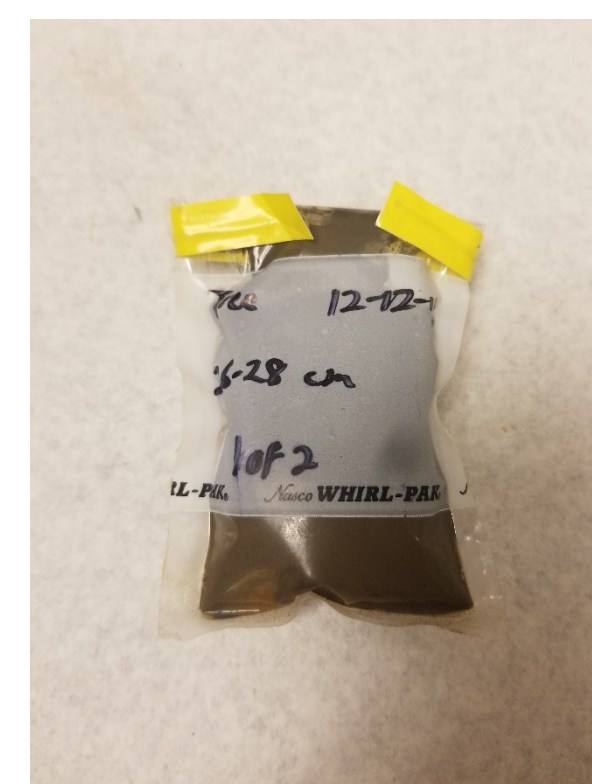
We wanted to see how *D. lumholtzi* and native *Daphnia* spp. ephippia abundances differed over time in lake sediments, using sediment cores collected from Grand Lake, Oklahoma.

## Methods

1) We collected cores in December 2018 with a gravity corer at Grand Lake, OK.



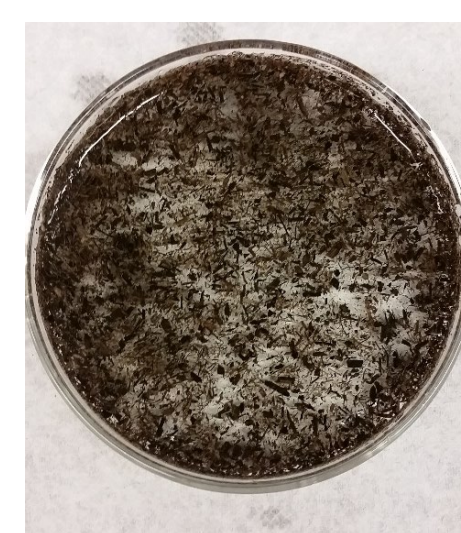
2) We sliced the cores into 2 cm intervals



3) We used a sieve (250 $\mu$ m) to separate the ephippia from the sediment.



4) We examined the sample in a petri dish under a dissecting microscope to locate *Daphnia* ephippia.



5) We counted and recorded the number of native and invasive *Daphnia* ephippia.



## Discussion

- *Daphnia lumholtzi* ephippia were relatively uncommon throughout the sediment core compared to those of the native *Daphnia* spp.
- There was no clear relationship between the ephippia densities of *D. lumholtzi* and the native *Daphnia* spp.
- *D. lumholtzi* is known to occur in higher densities in turbid, riverine zones of reservoirs, so they may be naturally uncommon in this portion of the reservoir.
- Southern reservoirs do not experience extreme seasonal changes in temperature, so *D. lumholtzi* may rely less on resting eggs for maintaining their populations, because they can survive through most of the year compared to *D. lumholtzi* populations in northern reservoirs
- Future efforts should focus on spatial dynamics within reservoirs to determine how egg bank composition differs spatially, as well as, methods for identifying native *Daphnia* ephippia to the species level.

## Acknowledgements

We would like to thank Rachel Hartnett for helping develop the project and collecting and processing the sediment cores. We would also like to thank the staff at the Grand River Dam Authority (GRDA) for taking us out to collect sediment cores and allowing us to use their corer.