INTRODUCTION

- *Echinococcus* species are parasitic cestodes (tapeworms) that infect humans, wildlife, livestock, and domesticated dogs and cats.
- Definitive hosts are primarily canids, especially coyotes and foxes.
- Reports of infection in non-endemic regions are increasing.
- As urbanization increases worldwide, humans and domesticated animals are at greater risk of being infected through more frequent interactions with wild canid hosts.
- Given the increased risk of transmission, there is a need to identify the most effective and sensitive fecal flotation methods to detect *Echinococcus* eggs.

RESEARCH OBJECTIVE & HYPOTHESIS

- Different fecal flotation methods are employed by researchers and veterinary clinics, yet a gold standard test has not yet been widely adopted.
- The objective of this project was to compare the sensitivity & detection limit of three methods:
  1. Centrifugal
  2. Passive
  3. Mini-FLOTAC

Hypothesis: Of the three methods, the centrifugal fecal float will be most sensitive for the detection of *Echinococcus* spp. eggs.

MATERIALS & METHODS

- Isolated eggs from *Echinococcus* spp. proglottids
- Spiked negative fecal samples with known concentrations of *Echinococcus* spp. eggs: 25, 40, and 60 eggs per gram of feces.
- Performed 6 replicates of each method using zinc sulfate flotation solution (1.18 SG):
  - Centrifugal fecal float
    - Homogenized 10mL flotation solution with 1g feces.
    - Centrifuged for 10 minutes at 500 rpm then read.
  - Passive fecal float
    - Homogenized 1g of feces with 10mL flotation solution.
    - Let sit in conical tube for 20 minutes then read.
  - Mini-FLOTAC
    - Homogenized 18mL flotation solution with 2g feces.
    - Filled chambers, let sit 10 minutes, then read.

RESULTS

- Figure 4. Percentage of replicates that were positive across three methods and concentrations. Asterisks denote statistically significant differences at a significance level of 0.05. EPG = eggs per gram.
- Figure 5. Percent recovery of eggs across three different methods at differing concentrations. Asterisk denotes a statistically significant difference at a significance level of 0.05. EPG = eggs per gram.

LIMITATIONS

- Eggs adhering to tools during sample preparation could result in lower concentrations.
- Human error in collecting and counting eggs.
- Centrifugal fecal floats are prone to loss of coversips during centrifugation.

CONCLUSIONS & SIGNIFICANCE

- Centrifugal flotation and the Mini-FLOTAC had more positive results than passive flotation.
- The Mini-FLOTAC tended to detect more *Echinococcus* spp. eggs than the other methods.
- FLOTAC appears to be the best fecal flotation method to detect *Echinococcus* spp. eggs.
- Veterinarians in previously unaffected regions may not screen for *Echinococcus* spp.
- Public & veterinary health concern:
  - Alveolar echinococcosis (AE) is particularly harmful to humans.
  - Cystic hydatid disease (CE) is less pathogenic.
  - Cystic hydatid disease (CE) is less pathogenic.
  - *Echinococcus* spp. currently infect 2-3 million people worldwide, costing $200-800 million annually.
  - Infected livestock produce less meat, milk, and wool, resulting in an estimated $1-5 billion USD loss annually.
  - Reliable detection methods are needed to address increasing *Echinococcus* spp. infections.

FUTURE DIRECTIONS

- Continue data collection using larger sample sizes and different egg concentrations.
- Co-author a manuscript detailing fecal flotation methods best suited for detection of *Echinococcus* spp. eggs.

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Figure 1. Life cycles of (A) *E. multilocularis* and (B) *E. granulosus*. Diagrams courtesy of Henry Adams.