

Cestode Parasites are Depleted in ^{15}N Relative to their Fish Hosts

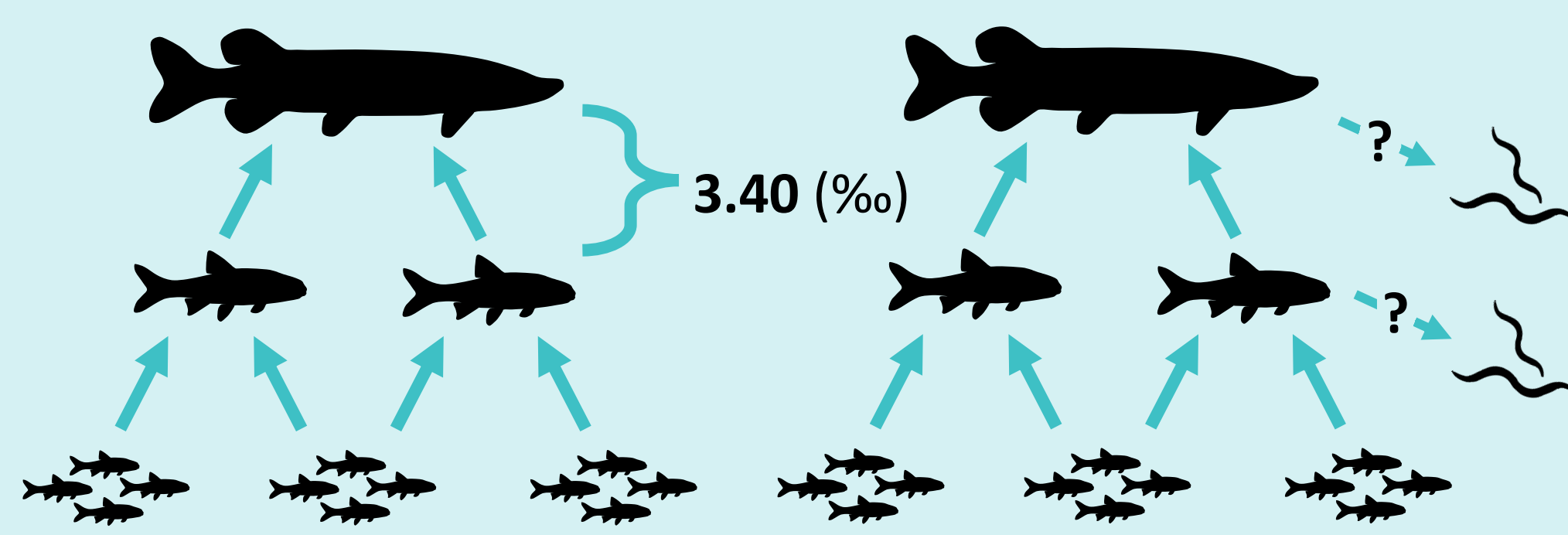
Kaegan Finn*, Karling Roberts, & Mark Poesch

University of Alberta Department of Renewable Resources, *Presenting author



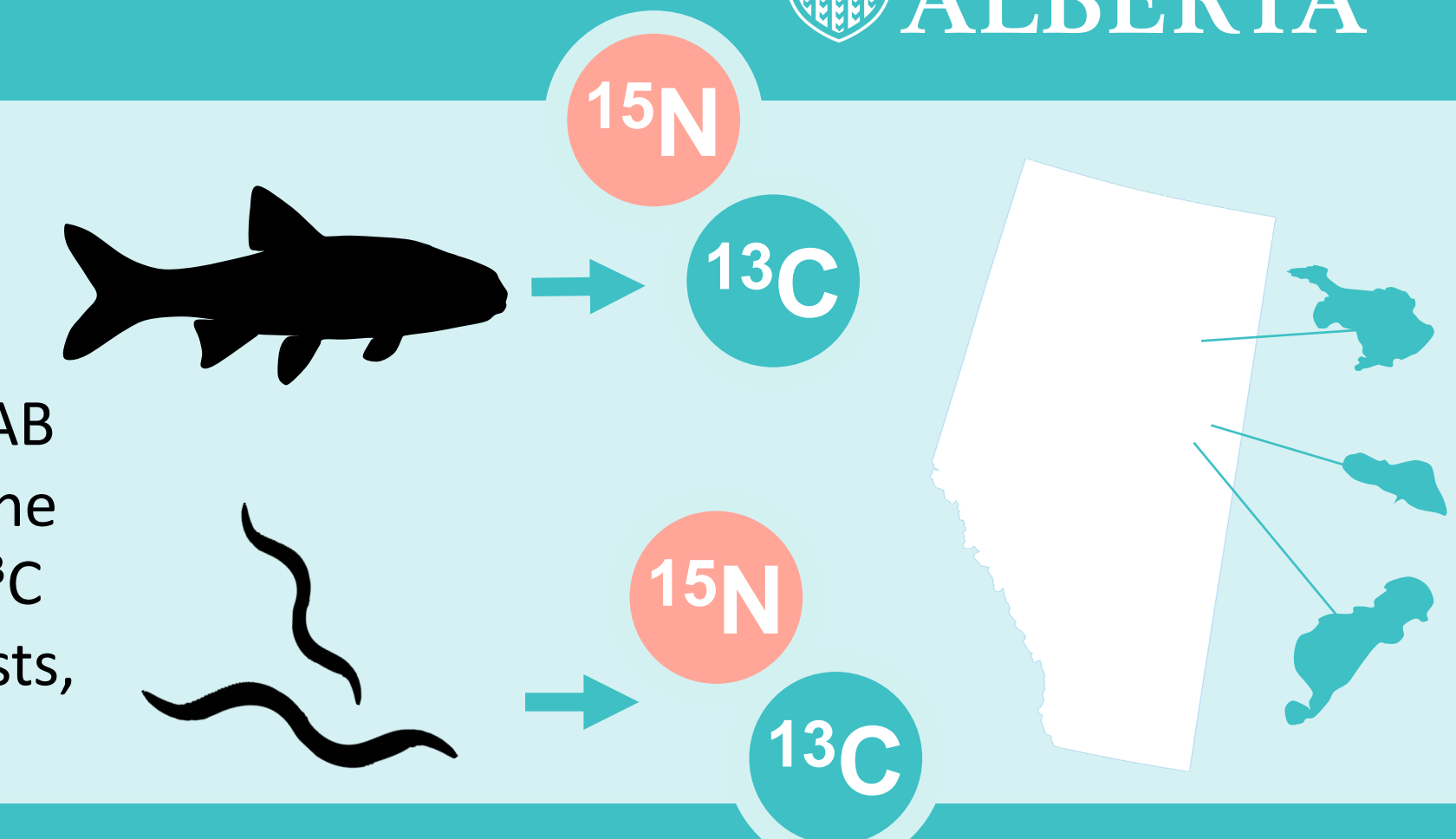
Introduction

- The stable isotopes ^{15}N and ^{13}C are often used to understand food-webs^{1,2}
- $^{15}\text{N} \approx$ trophic position
- $^{13}\text{C} \approx$ carbon source
- Inclusion of parasites remains unclear²
- **We ask:** how do ^{15}N and ^{13}C differ between parasites and their hosts?



Methods

- We collected **92** host-parasite pairs across **7** species and **3** lakes in AB
- Linear models tested the difference in ^{15}N and ^{13}C between parasites, hosts, and host species



Results

- ^{15}N was significantly depleted in parasites with a discrimination factor of -2.01 (‰) (Fig 1)
- ^{15}N differed between hosts and parasites, and between host species ($p < 0.001$) (Fig 2)
- ^{13}C did not differ between hosts and parasites, but did between host species ($p < 0.001$) (Fig 3)

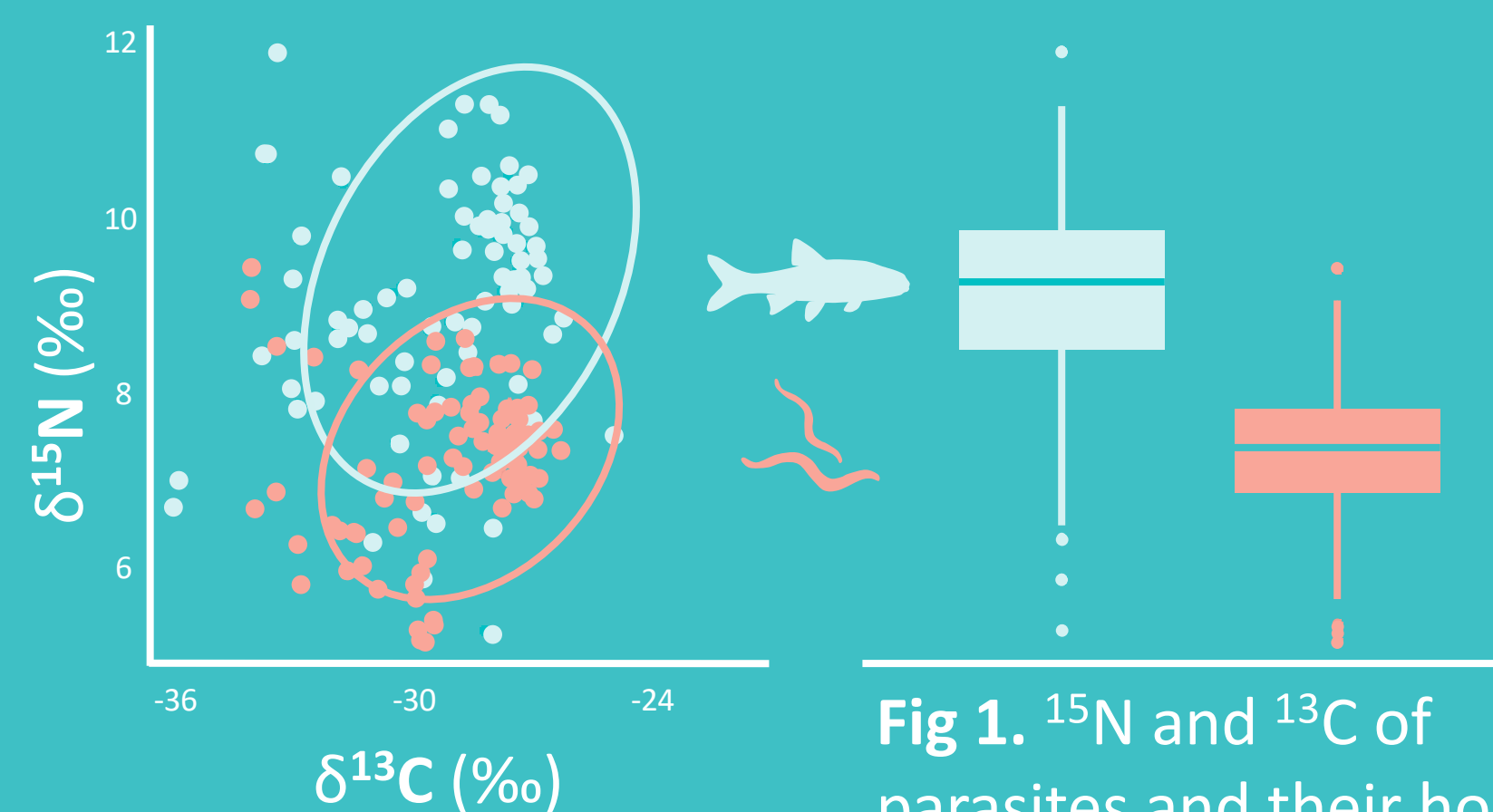


Fig 1. ^{15}N and ^{13}C of parasites and their hosts

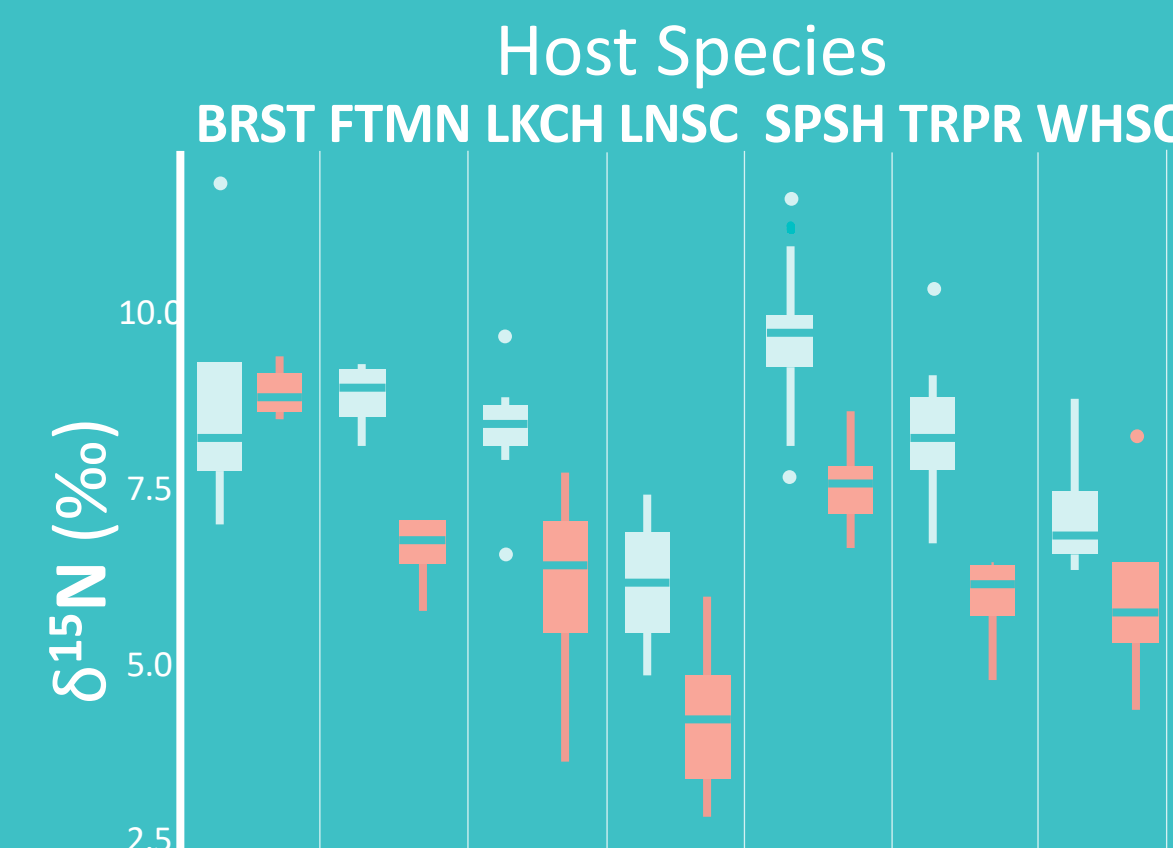


Fig 2. ^{15}N of parasites and their hosts by species

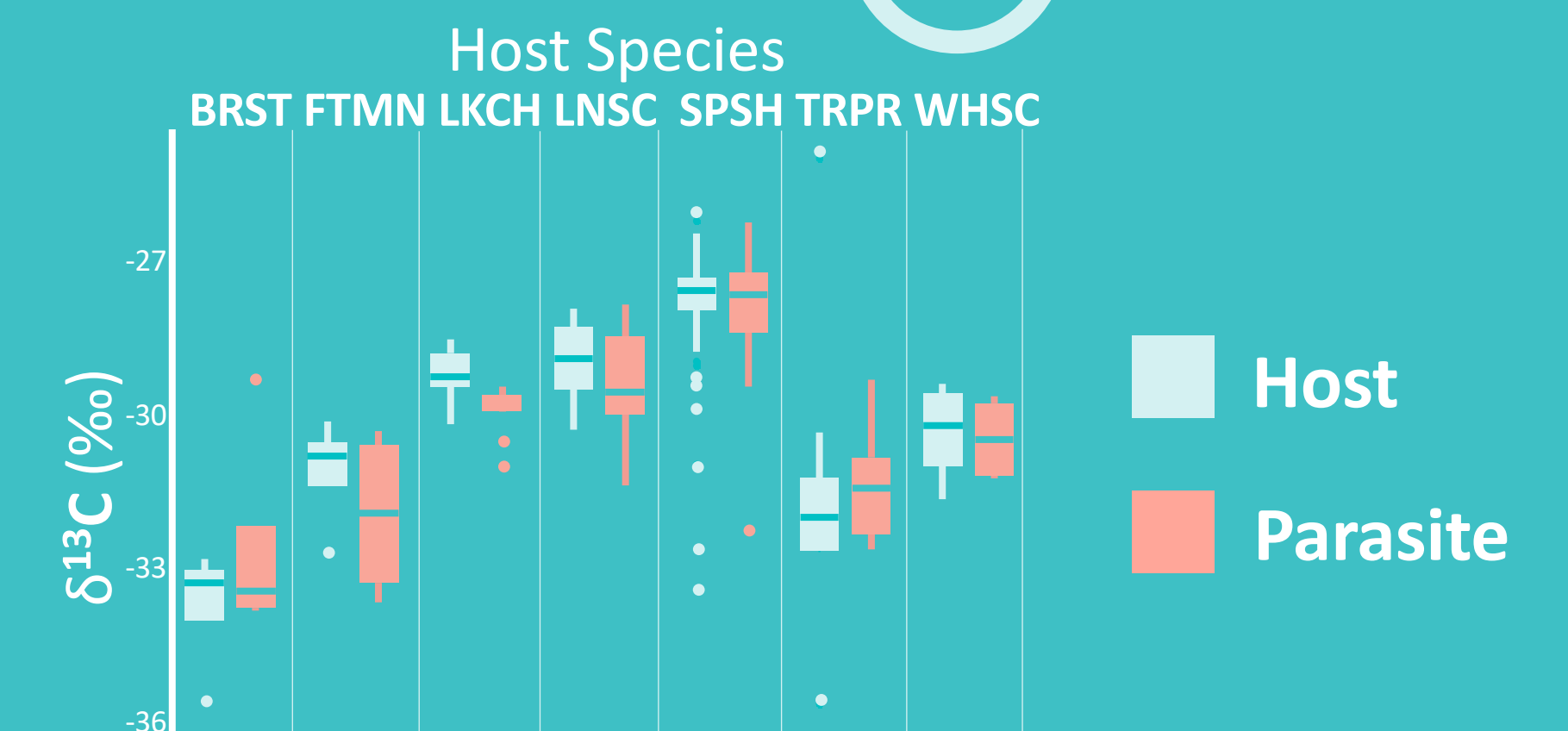
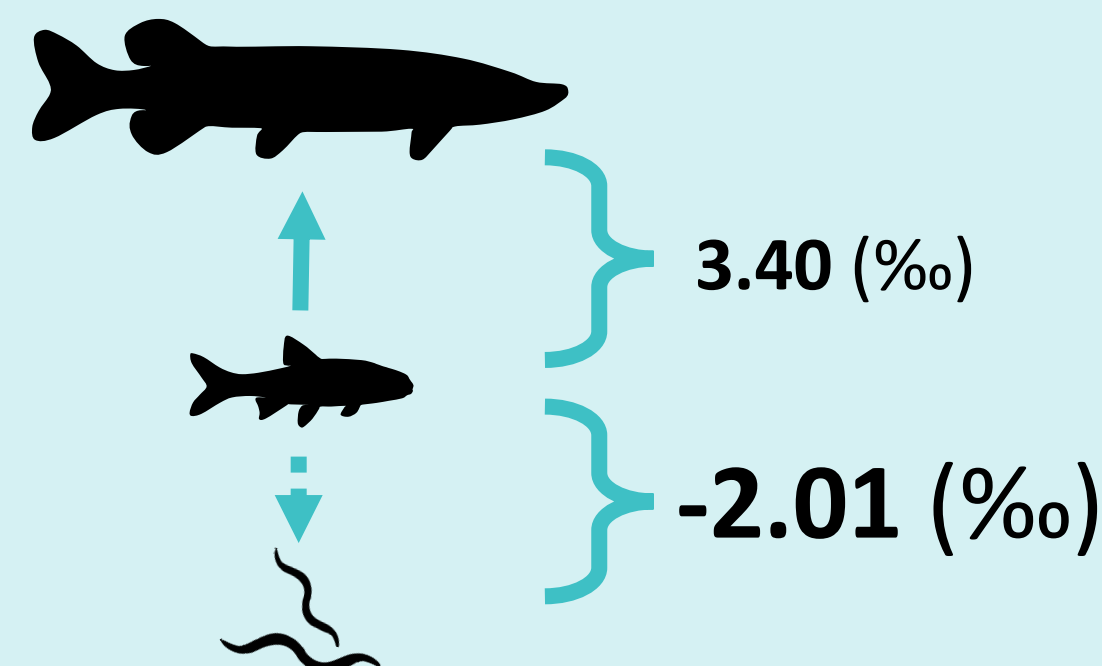


Fig 3. ^{13}C of parasites and their hosts by species

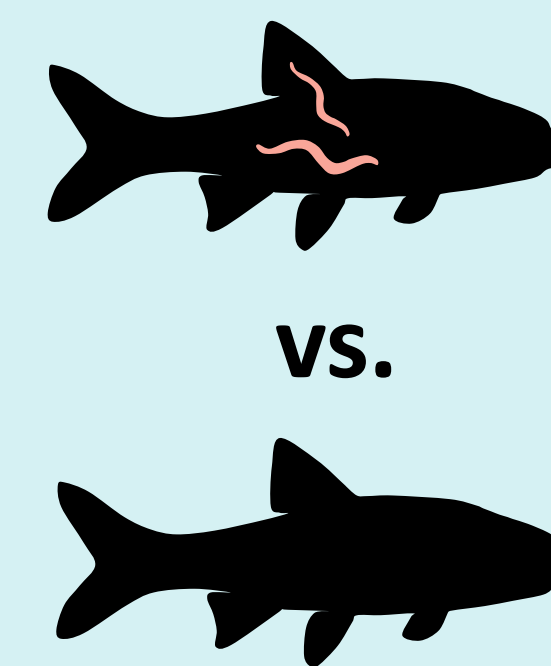
Discussion

- Including parasites in food webs is necessary to accurately represent ecosystem complexity^{1,2,3}
- Our negative ^{15}N discrimination factor is similar to the findings of other studies³
- A new “rule of thumb” discrimination factor for parasites may allow for easy inclusion in future food-web studies



Next steps

- Body condition of hosts and uninfected fish
- Gut contents of hosts and uninfected fish
- This will provide a clearer picture of how parasites influence food-webs²



Acknowledgments

Clement Lagrue, Matthew Cunningham, Cordelius Hultberg, Jessica Newman, Mike Barbeau, Catelyn Vanveen, Cait Donadt, Rebecca Huang, Angela Ten, and Aidan Sheppard.

References

1. Dunne, J. A., Lafferty, K. D., Dobson, A. P., Hechinger, R. F., Kuris, A. M., Martinez, N. D., ... Zander, C. D. (2013). Parasites Affect Food Web Structure Primarily through Increased Diversity and Complexity. *PLoS Biology*, *11*, e1001579.
2. Lafferty, K. D., Allesina, S., Arim, M., Briggs, C. J., De Leo, G., Dobson, A. P., ... Thielges, D. W. (2008). Parasites in Food Webs: The Ultimate Missing Links: Parasites in Food Webs. *Ecology Letters*, *11*, 533–546.
3. Thielges, D. W., Goedknegt, M. A., O'Dwyer, K., Senior, A. M., & Kamiya, T. (2019). Parasites and Stable Isotopes: A Comparative Analysis of Isotopic Discrimination in Parasitic Trophic Interactions. *Oikos*, *128*, 1329–1339.