

Comparison of Intestinal Parasite Diversity between Urban and Peri-Urban Coyotes (*Canis latrans*)

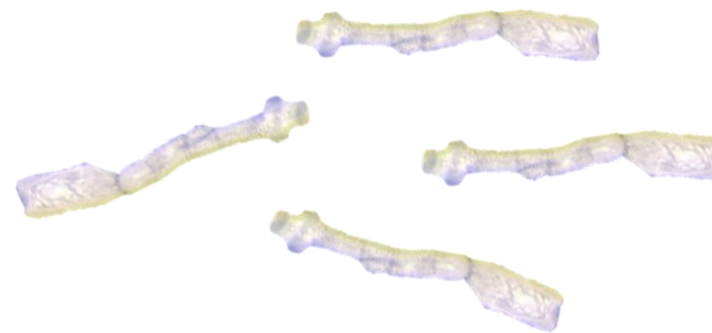
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BACKGROUND

- Animals occur in higher densities in cities, which increases parasitic transmission opportunities¹
- Coyotes are host to many zoonotic parasites, including *Echinococcus multilocularis*
- E. multilocularis* causes fatal alveolar echinococcosis in humans²
- 65% prevalence of *E. multilocularis* in Edmonton³
- The prevalence of other parasites may also differ along an urban gradient

STUDY QUESTION

Is there a difference between urban and peri-urban coyotes in prevalence, diversity and intensity of parasitic infections?



METHODS

- Compared 30 urban coyotes from City of Edmonton and 30 peri-urban coyotes from Leduc County
- Polymerase chain reaction to confirm the presence / absence of *E. multilocularis*, which cannot be distinguished morphologically from *E. canadensis*
- Scraped, filtered, and counted intestinal samples to determine presence and abundance of all parasites⁴
- Calculated species richness and Shannon-Weiner diversity index and compared values for urban and peri-urban coyotes with Hutchinson's t-test

KEY RESULTS

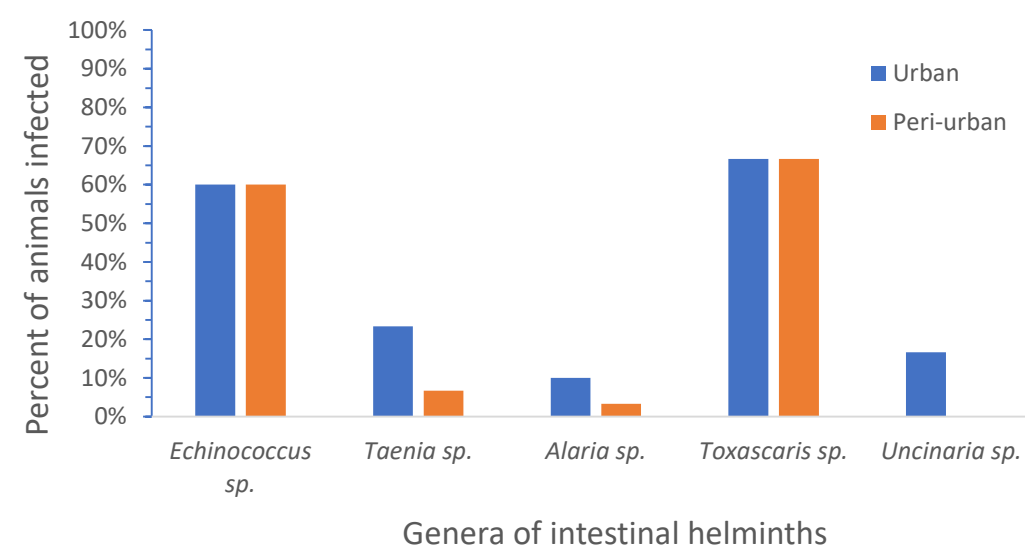


Figure 1. Prevalence (% occurrence) of each of five genera of intestinal parasites for 30 urban and 30 peri-urban coyotes in the Edmonton area.

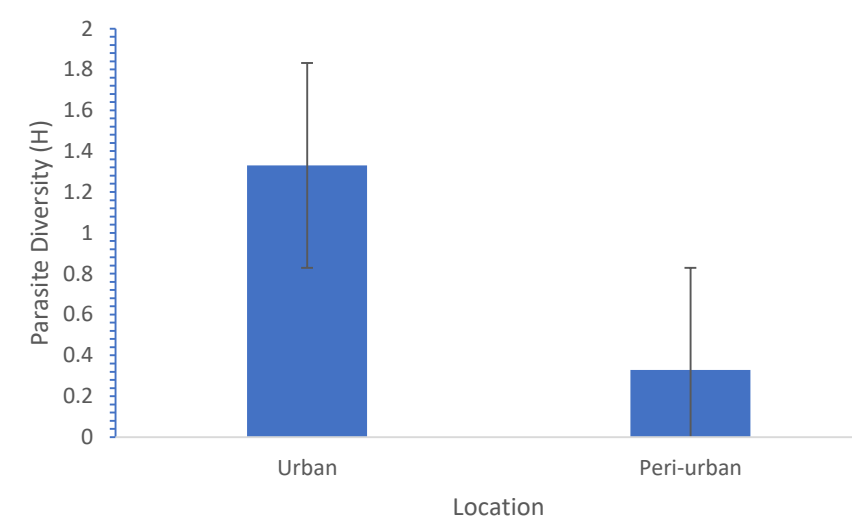


Figure 2. Shannon-Weiner diversity in the intestinal parasites of 30 urban and 30 peri-urban coyotes. Error bars represent standard error.

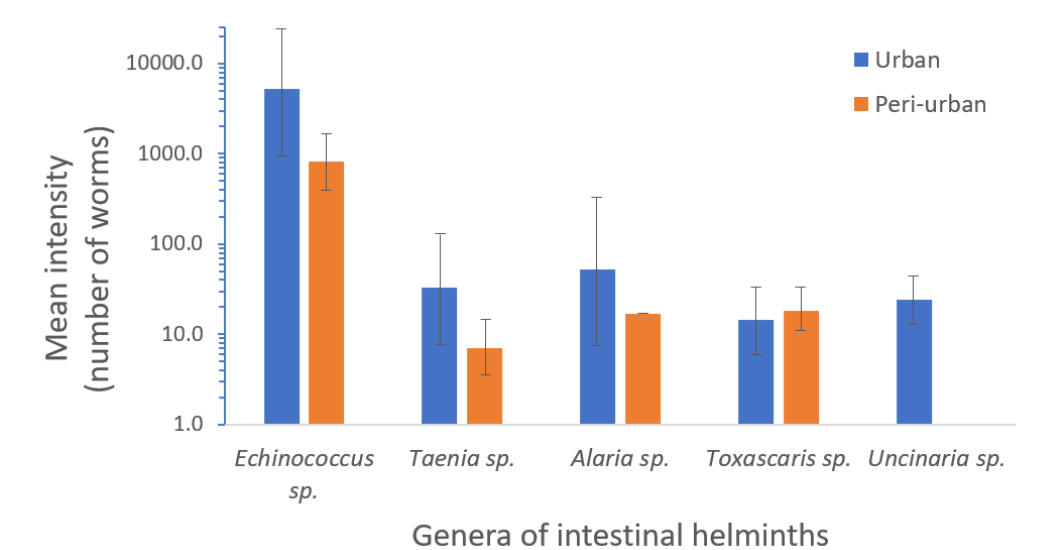


Figure 3. Mean intensity (# worms) of each of five genera of intestinal parasites for 30 urban and 30 peri-urban coyotes in the Edmonton area. Error bars represent standard deviation.

- Taenia sp.*, *Alaria sp.* and *Uncinaria sp.* were more prevalent in urban coyotes (Figure 1)
- Echinococcus sp.* and *Toxascaris sp.* were equally prevalent in urban and peri-urban coyotes (Figure 1)
- Urban coyotes had a higher parasite diversity than peri-urban coyotes (Figure 2; $p < 0.001$)
- Parasite intensity was greater in urban coyotes for all parasites except *Toxascaris sp.* (Figure 3)

CONCLUSIONS

Urban coyotes in Edmonton hosted more species, with higher prevalence and intensity of infections than a peri-urban population from the Leduc area. Given several recent cases of human alveolar echinococcosis in Alberta⁵, urban coyotes may present an infection risk to dogs and people.

References

- Bradley CA, Altizer S. 2007. Urbanization and the ecology of wildlife diseases. *Trends Ecol Evol.* 22(2):95-102.
- Eckert J, Gemmill MA, Meslin FX, Pawlowski ZS. 2001. WHO/OIE manual on *Echinococcus* in humans and animals: a public health problem of global concern. Paris: World Organisation for Animal Health. 286 p.
- Luong LT, Chambers JL, Moizis A, Stock TM, St Clair CC. 2018. Helminth parasites and zoonotic risk associated with urban coyotes (*Canis latrans*) in Alberta, Canada. *J Helminthol.* 94:e25.
- Gesy K, Pawlik M, Kapronczai L, Wagner B, Elkin B, Schwantje H, Jenkins E. 2013. An improved method for the extraction and quantification of adult *Echinococcus* from wildlife definitive hosts. *Parasit Res.* 112(5):2075-2078.
- Massolo A, Klein C, Kowalewska-Grochowska K, Belga S, Macdonald C, Vaughan S, Girgis S, Giunchi D, Bramer SA, Santa MA et al. 2019. European *Echinococcus multilocularis* identified in patients in Canada. *New England Journal of Medicine.* 381(4):384-385.
- Coyote photo source: Yathin S. Krishnappa, WikiCommons



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