

An overview of echinococcosis in Canada and the potential implications for BC

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Provincial Health
Services Authority

We gratefully acknowledge that we are gathered on the unceded, traditional, and ancestral lands of First Nations in this place currently known as British Columbia where we work, play and live.

First Nations have been responsible for stewarding this land for all time and we give thanks as uninvited guests on these lands.

We recognize the historic and ongoing colonial impacts on all First Nations, Métis Peoples and Inuit that call this land home.



Disclosures

- None

Echinococcus spp.

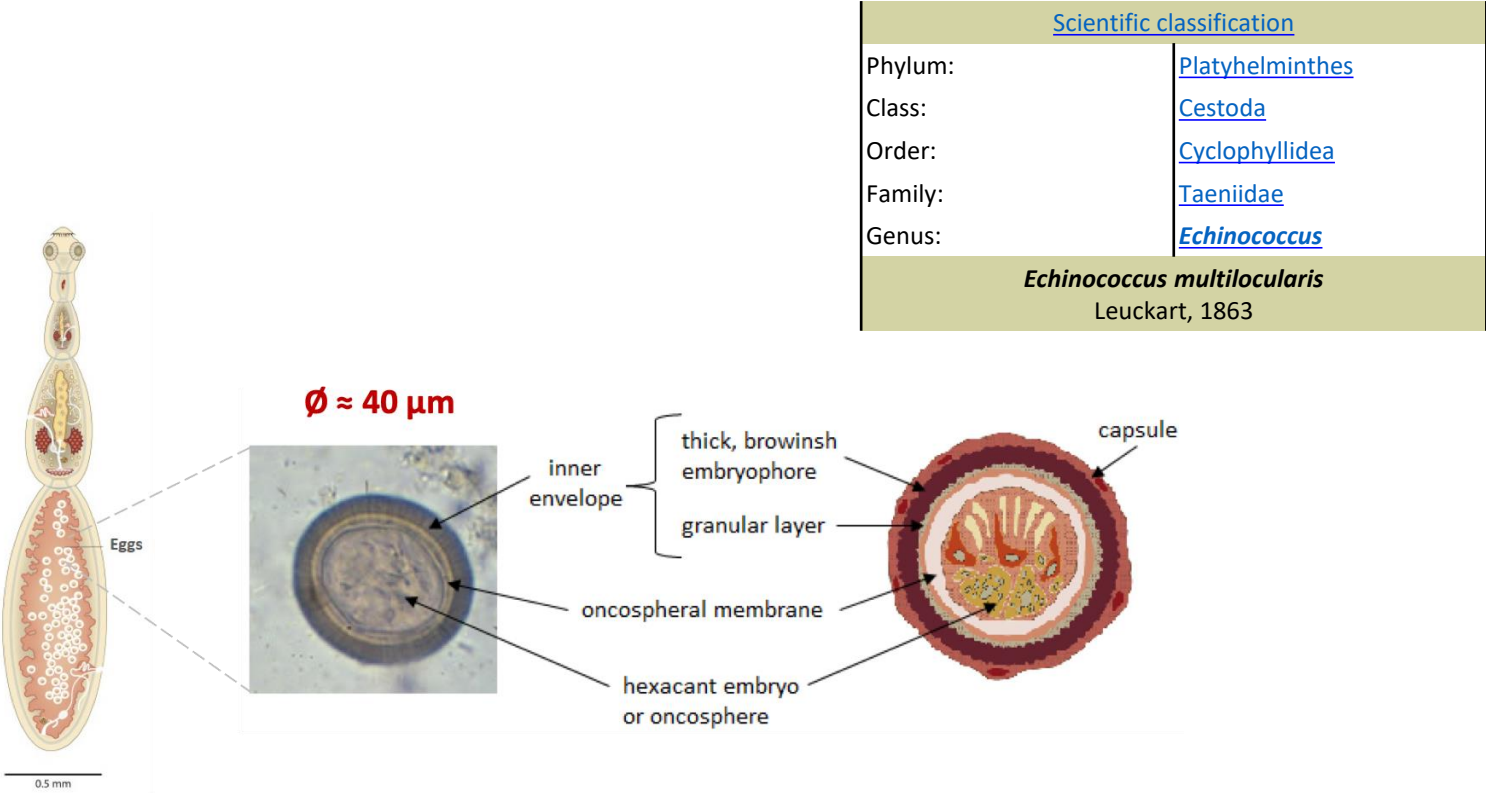
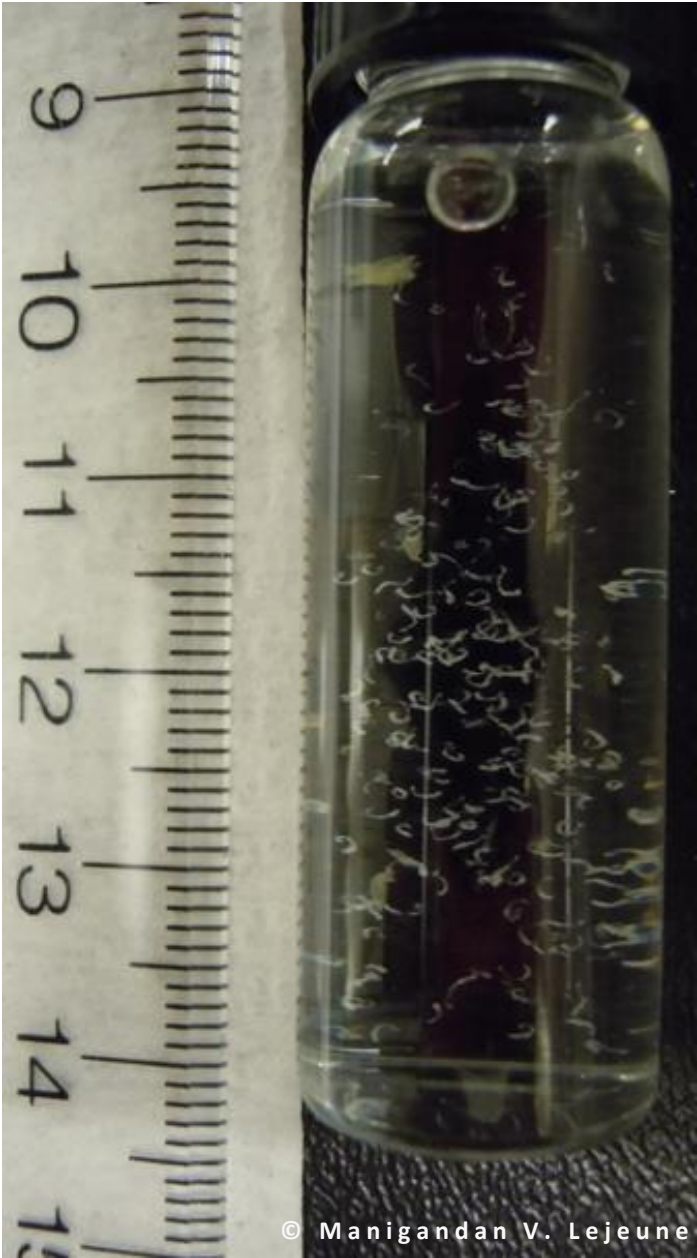


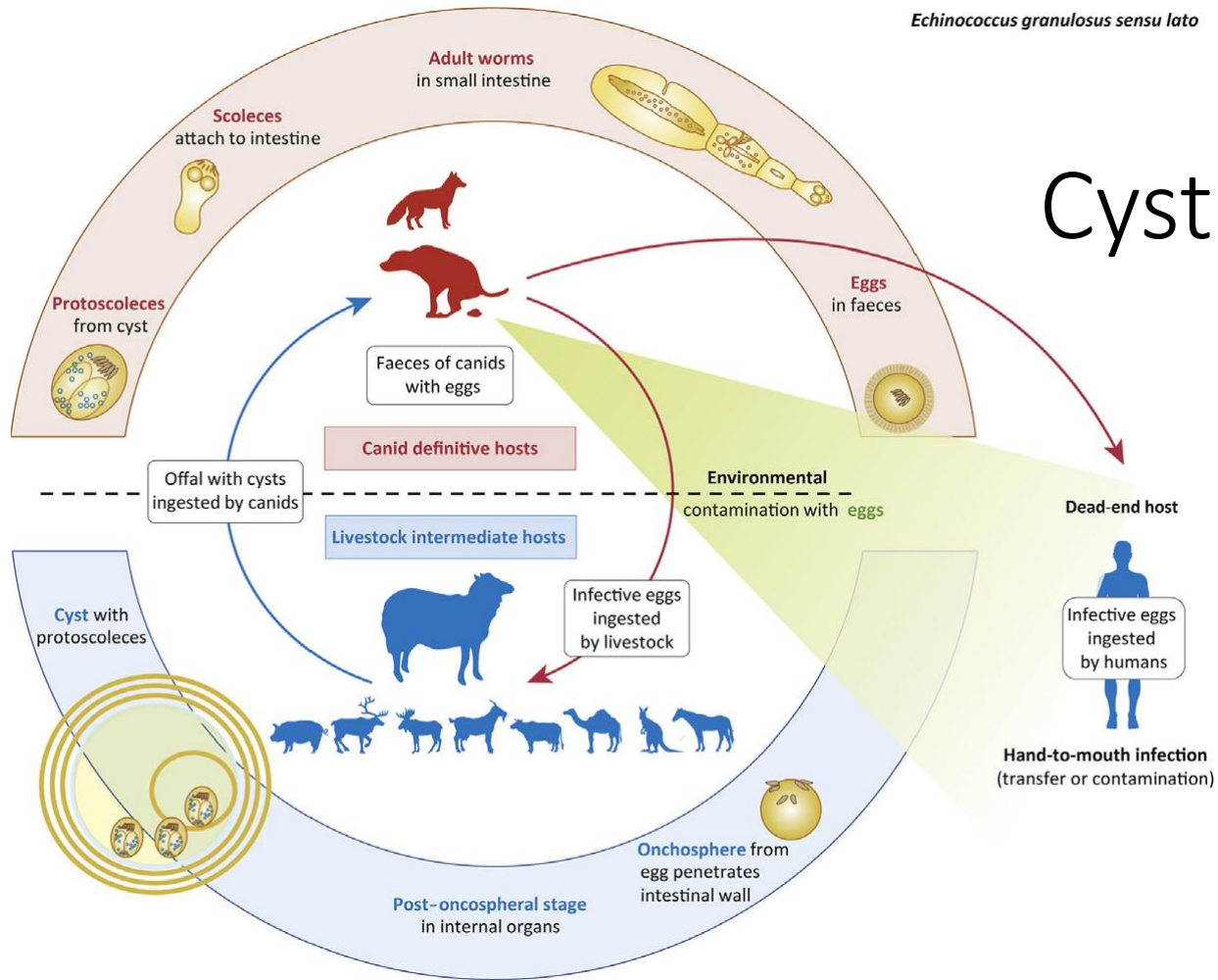
Figure modified from R.C.A. Thompson, 2017



Echinococcus granulosus

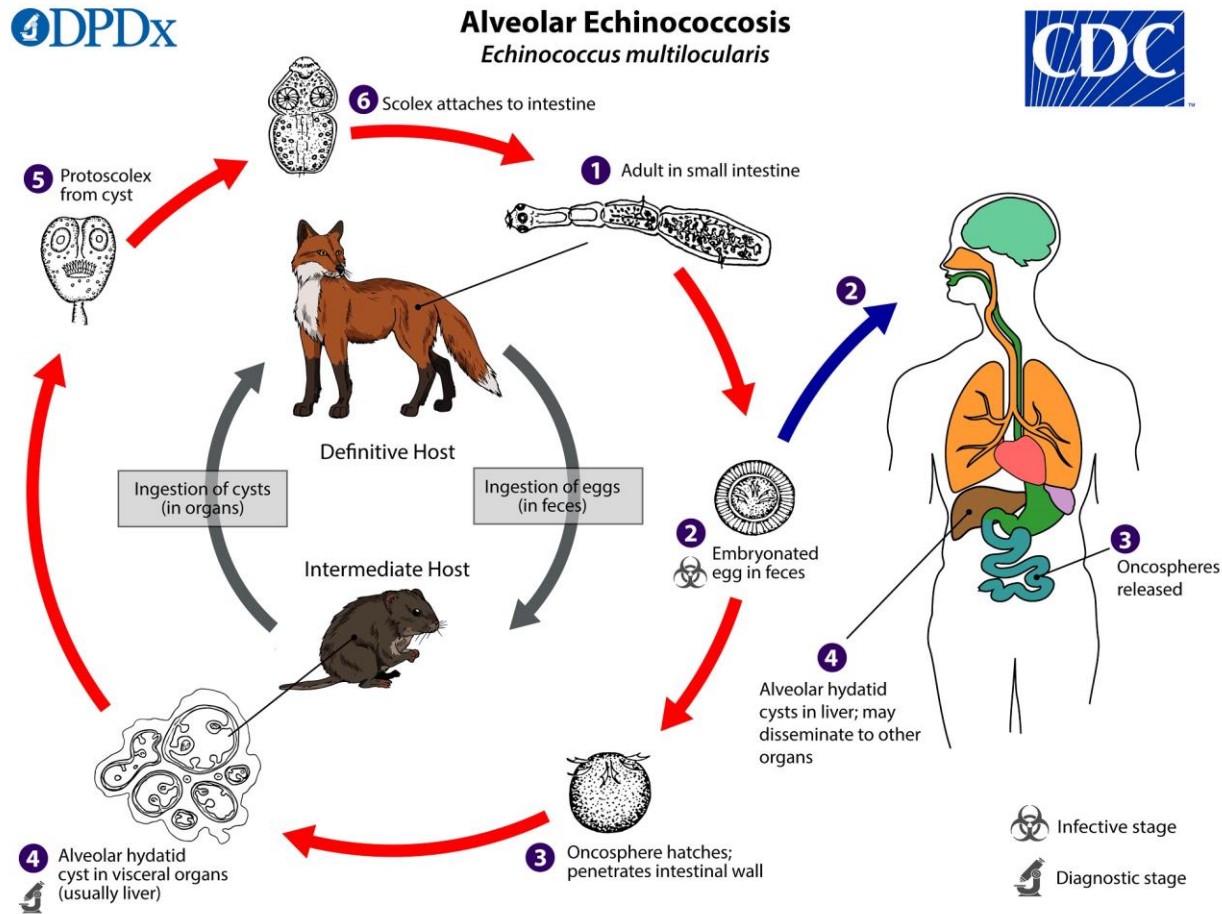
Echinococcus granulosus sensu lato

Cystic Echinococcosis

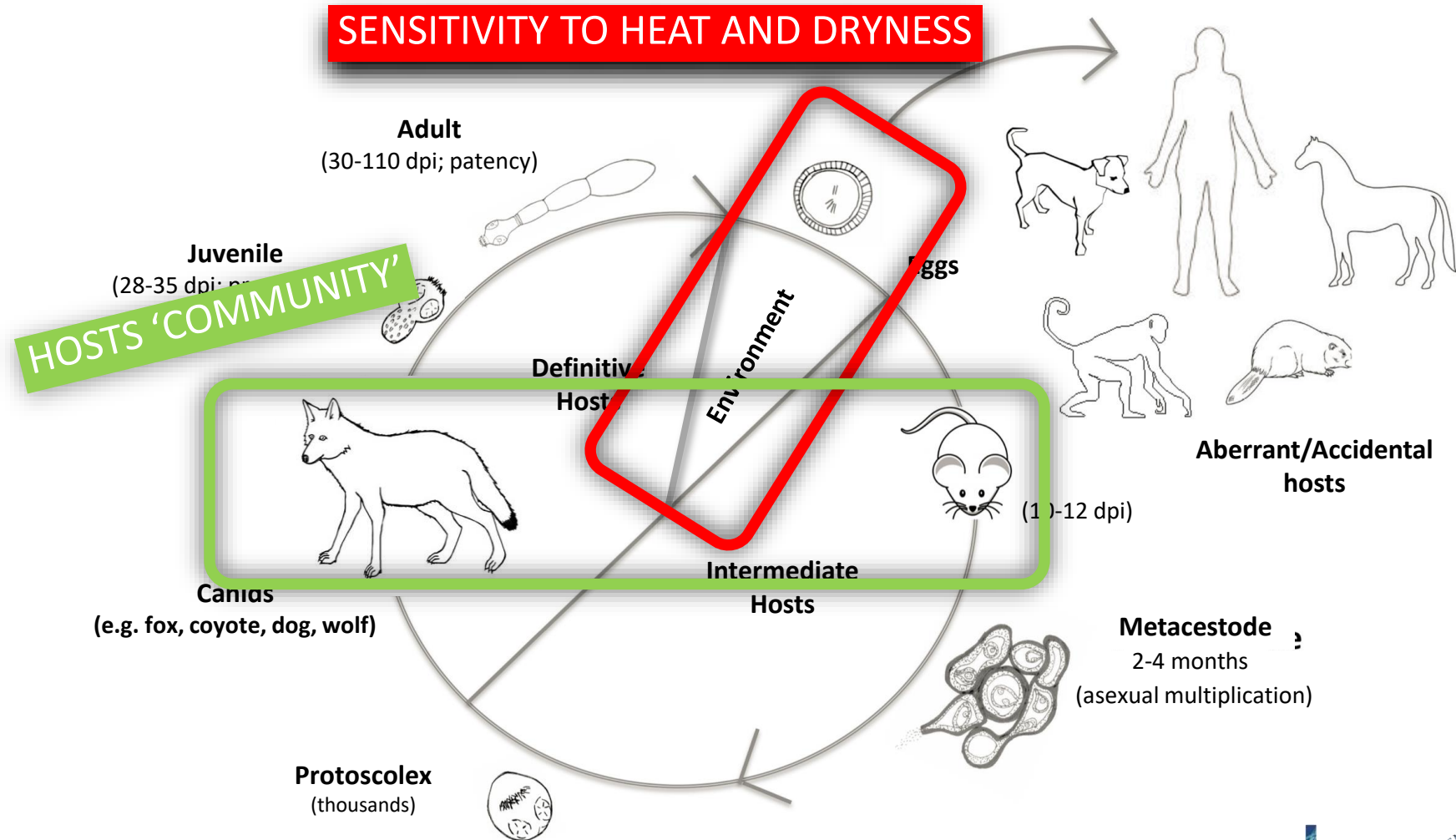


Echinococcus multilocularis

Alveolar Echinococcosis



The ecology of *Echinococcus* spp.



AE: diagnostics and health outcomes in humans

- Incubation period is 5-15 years
- Asexual replication of metacestodes produces slow-growing tumour most commonly in liver, can metastasize
- Non-specific symptoms in advanced cases (malaise, abdominal pain, weight loss)
- Asymptomatic early stages of the disease diagnosed after incidental finding on abdominal imaging
- Abnormal liver imaging followed by histopathology, and confirmed through serology, and PCR
- Can be left untreated for long periods, fatal

Em distribution and strains

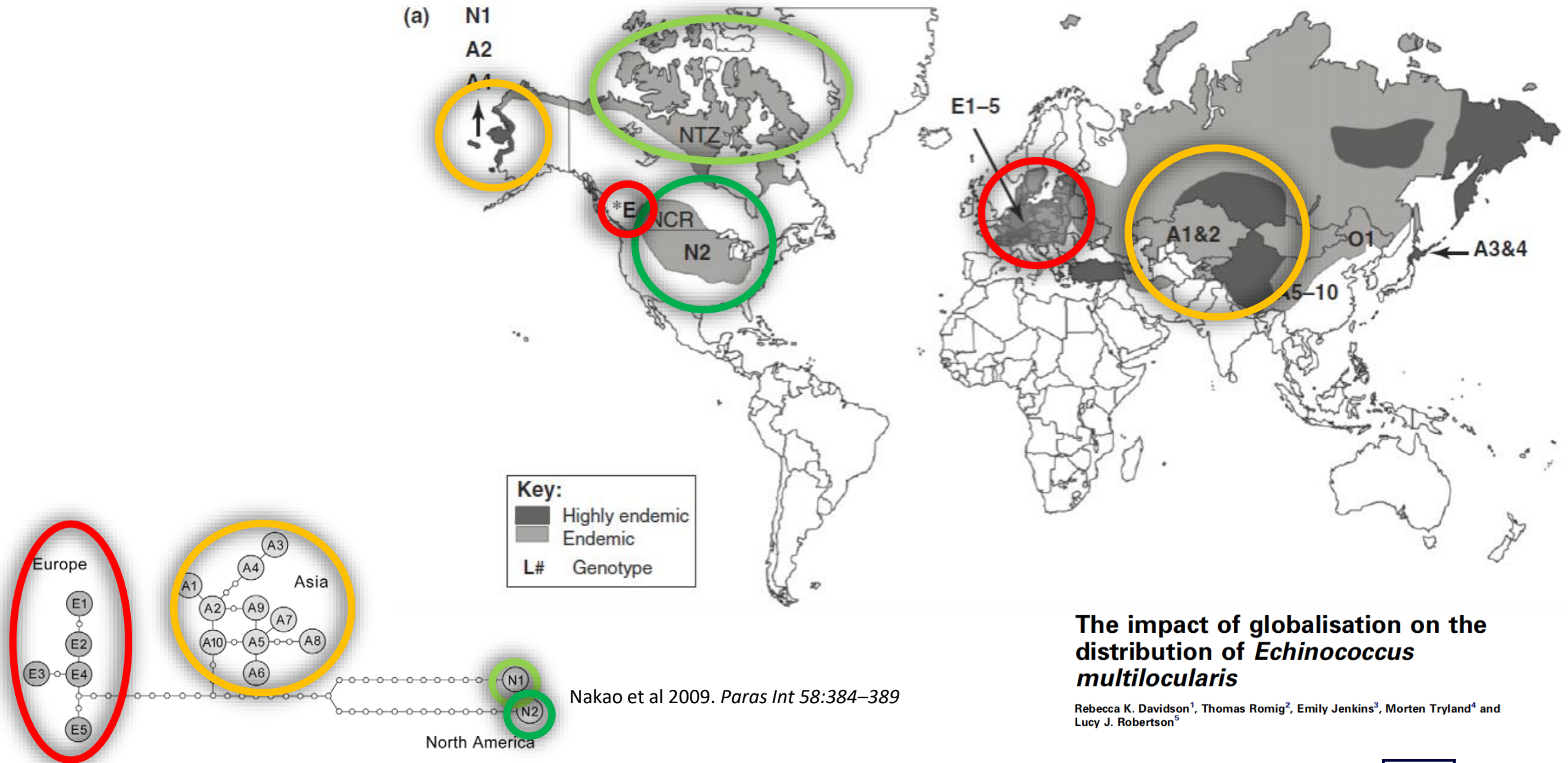


Fig. 4. Mitochondrial haplotype network of *E. multilocularis* based on statistical parsimony. Large circles denote haplotypes found in this study, whereas small circles show hypothetical haplotypes. The haplotype O1 from Inner Mongolia was disconnected with the network.

The impact of globalisation on the distribution of *Echinococcus multilocularis*

Rebecca K. Davidson¹, Thomas Romig², Emily Jenkins³, Morten Tryland⁴ and Lucy J. Robertson⁵

Other relevant and recent Canadian studies

Research articles

It's a small world for parasites: evidence supporting the North American invasion of European *Echinococcus multilocularis*

Maria A. Santa, Gerald Umhang, Claudia Klein, Danielle M. Grant, Kathreen E. Ruckstuhl, Marco Musiani, John S. Gilleard and Alessandro Massolo ✉

Published: 08 March 2023 | <https://doi.org/10.1098/rspb.2023.0128>



SURVEILLANCE

Human echinococcosis incidence in Canada: A retrospective descriptive study using administrative hospital and ambulatory visit data, 2000–2020

Ayisha Khalid^{1,2*}, Pia K Muchaal¹, Danielle A Julien¹



BC Centre for Disease Control
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Em in Alberta

2012

First description of Em in urban coyotes

Catalano et al 2012 EID

***Echinococcus multilocularis* in Urban Coyotes, Alberta, Canada**

Stefano Catalano,¹ Manigandan Lejeune,¹
Stefano Liccioli, Guilherme G. Verocai,
Karen M. Gesy, Emily J. Jenkins, Susan J. Kutz,
Carmen Fuentealba, Padraig J. Duignan,
and Alessandro Massolo

Echinococcus multilocularis is a zoonotic parasite in wild canids. We determined its frequency in urban coyotes (*Canis latrans*) in Alberta, Canada. We detected *E. multilocularis* in 23 of 91 coyotes in this region. This parasite is a public health concern throughout the Northern Hemisphere, partly because of increased urbanization of wild canids.

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 18, No. 10, October 2012

scientific reports

OPEN

Risk factors for *Echinococcus multilocularis* intestinal infections in owned domestic dogs in a North American metropolis (Calgary, Alberta)

Emilie Toews^{1,2}, Marco Musiani^{1,3}, Anya Smith^{4,5,11}, Sylvia Checkley⁴, Darcy Visscher^{6,7,8} & Alessandro Massolo^{4,9,10} 

 Check for updates

2013

First documented human case in Alberta, CA

22 cases!

(AB, 2013-2022)

0.053-0.058 cases per 100,000 inhabitants/year



Em in BC

Case Report Rapport de cas

Alveolar hydatid disease (*Echinococcus multilocularis*) in the liver of a Canadian dog in British Columbia, a newly endemic region

Andrew S. Peregrine, Emily J. Jenkins, Brian Barnes, Shannon Johnson, Lydden Polley, Ian K. Barker, Bradley De Wolf, Bruno Gottstein

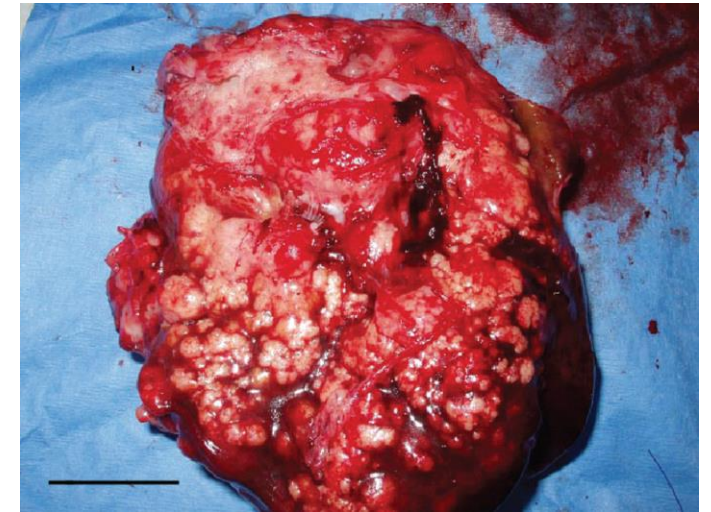


Figure 2. Photograph of the resected hepatic mass. Notice the multiple generalized coalescing white nodules that appear to infiltrate hepatic tissue. Bar = 3 cm.

LETTER ▶ Emerg Infect Dis. 2012 Jun;18(6):1010–1012. doi: [10.3201/eid1806.111420](https://doi.org/10.3201/eid1806.111420)

Detection of European Strain of *Echinococcus multilocularis* in North America

[Emily J Jenkins](#)^{1,2,3,4,5,✉}, [Andrew S Peregrine](#)^{1,2,3,4,5}, [Janet E Hill](#)^{1,2,3,4,5}, [Christopher Somers](#)^{1,2,3,4,5}, [Karen Gesy](#)^{1,2,3,4,5}, [Brian Barnes](#)^{1,2,3,4,5}, [Bruno Gottstein](#)^{1,2,3,4,5}, [Lydden Polley](#)^{1,2,3,4,5}

Establishment of a European-type strain of *Echinococcus multilocularis* in Canadian wildlife

K. GESY^{1*}, J. E. HILL¹, H. SCHWANTJE², S. LICCIOLI³ and E. J. JENKINS¹

¹Department of Veterinary Microbiology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

²Ministry of Forests, Lands and Natural Resource Operations, Victoria, British Columbia, Canada

³Department of Ecosystem and Public Health, Faculty of Veterinary Medicine, University of Calgary, Calgary, Alberta, Canada

JAVMA



Novel molecular diagnostic (PCR) diagnosis and outcome of intestinal *Echinococcus multilocularis* in a dog from western Canada

Michelle D. Evason, DVM, BSc, DACVIM¹; Emily J. Jenkins, PhD, DVM, BScHon²; Temitope U. Kolapo, PhD, MSc, DVM²; Kelly D. Mitchell, DVM, DVSc, DACVIM¹; Christian M. Leutenegger, DrMedVet, BSc, PhD, FVH¹; Andrew S. Peregrine, BVMS, PhD, DVM, DEVPC, DACVM³



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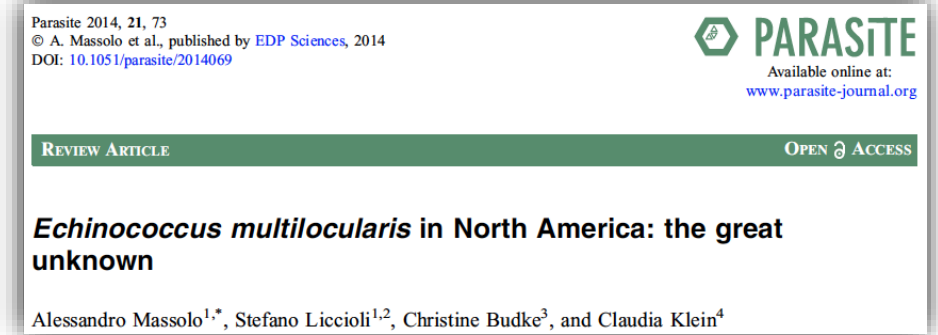
Em in BC

- 3 known human cases, first case over 10 years ago
- Epidemiological picture incomplete
- Genotyping unknown, to-date



What's Next for BC?

- Not reportable human disease in BC
- Organize surveillance efforts provincially and nationally
- Investigate epidemiology and Em genotypes of existing human AE cases...
- ...combined with conducting more studies, e.g. strains circulating in coyotes and dogs, rodents, laboratory methods



Questions?