Trichinella in wolverines of northwestern Canada, Sentinel Species and One Health

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ABSTRACT:
Trichinellosis, an important parasitic zoonosis is caused by nematodes of Trichinella spp. Wolverines (Gulo gulo) are an economically important species across much of its Holarctic range because of their valuable fur. Due to their position in northern food webs as a high-level predator and scavenger, wolverines could play role as “bioaccumulators” and indicators of foodborne parasites such as Trichinella spp. Our study was designed to explore the utility of apex carnivores as sentinels for occurrence and circulation of Trichinella spp. in northwestern Canada. Muscle samples (tongue and diaphragms) were collected from 465 wolverine carcasses submitted by licensed fur
trappers. Muscles were artificially digested using pepsin-HCl digestion method to detect and recover *Trichinella* spp. larvae. Larvae were identified to species level using Multiplex Polymerase Chain Reaction (PCR). Overall, 340 wolverines were found positive for *Trichinella* spp. larva indicating a prevalence of 73%. *Trichinella* T6 was the predominant genotype followed by: *T. nativa* (T2); a previously undescribed species of *Trichinella*; *T. pseudospiralis*; and *T. spiralis*. This is the first recorded occurrence of *T. spiralis* and *T. pseudospiralis* in the Canadian sub-arctic region. Mixed infections (both T6 and *T. nativa*) were also detected. Our findings suggest a wider diversity of species of *Trichinella* in wolverines in northwestern Canada as compared to previous reports. We validate molecular methodologies for broad scale survey of zoonotic parasites and concurrently reveal the power of wolverines as sentinels in building a One-Health infrastructure to explore the pathways and circulation of parasitic diseases in northwestern Canada because samples are readily available, protocols are well-tested, and prevalence, intensity, and genetic diversity are relatively high compared to other wildlife.