Reappearance of *Taenia ovis krabbei* muscle cysts in a roe deer (*Capreolus capreolus*) in Denmark after 60+ years, with a possible role of a grey wolf (*Canis lupus*) as definitive host

Al-Sabi, Mohammad Nafi Solaiman; Chriél, Mariann; Holm, Elisabeth; Jensen, Tim Kåre; Ståhl, Marie; Enemark, Heidi L.

Published in: The nature of parasitism

Publication date: 2013

Document Version
Publisher's PDF, also known as Version of record

Citation (APA):
Al-Sabi, M. N. S., Chriél, M., Holm, E., Jensen, T. K., Ståhl, M., & Enemark, H. L. (2013). Reappearance of *Taenia ovis krabbei* muscle cysts in a roe deer (*Capreolus capreolus*) in Denmark after 60+ years, with a possible role of a grey wolf (*Canis lupus*) as definitive host. In *The nature of parasitism: Joint Spring Symposium 2013, Danish Society for Parasitology and Danish Society for Tropical Medicine & International Health* (pp. 22)
Reappearance of *Taenia ovis krabbei* muscle cysts in a roe deer (*Capreolus capreolus*) in Denmark after 60+ years, with a possible role of a grey wolf (*Canis lupus*) as definitive host

Mohammad NS Al-Sabi, Mariann Chrièl, Elisabeth Holm, Tim K Jensen, Marie Ståhl, Heidi Enemark

Technical University of Denmark (DTU-VET).

Background:
*Taenia ovis krabbei* is a parasite of carnivore definitive hosts and cervid intermediate hosts (1). Accidental ingestion of eggs of *T. ovis krabbei* is the primary cause of infection in intermediate hosts, in which larvae develop in heart and skeletal muscles and may cause severe illness (2). The life cycle is completed when definitive hosts ingest infected meat (3), which is, for aesthetic reasons, not regarded of high quality and discarded upon meat inspection in abattoirs (4). This report describes infections with *T. ovis krabbei* in a roe deer and a grey wolf in Denmark.

Methods:
In May 2012, a male roe deer was hunted in Pajheden forest, in northern Jutland, Denmark. White spots in the thigh muscle were analyzed by microscopy (5) and histology (Fig. 1).

Few months later, a grey wolf found dead in Hansthholm wildlife reserve in northern Jutland, around 66 km away from Pajheden forest where the deer was shot. Taenid worms were recovered from the intestine and examined microscopically (5) (Fig. 2). Molecular analysis was performed on cysts and worms and phylogenetic relationships were inferred employing distance-based Neighbor-Joining analysis of the *cox1* gene (6).

Conclusions:
*Taenia ovis krabbei* was detected in a roe deer and a grey wolf in northern Jutland, Denmark, for the first time. The source of the infection was unknown but could have been introduced to the area following the invasion of the grey wolf. Invading wolves can support its establishment in new areas by carrying worms of *T. ovis krabbei* that cause severe illness to native deer, which later become prey to the wolves.

Results:
The characteristic shape and size of the recovered rostellar hooks (Fig. 1 & 2) are typical for either *T. ovis krabbei* or *T. ovis ovis*, but not for any other *Taenia* spp. By phylogenetic analysis, the roe deer and the wolf isolates were clearly grouped together with other isolates of *T. ovis krabbei* from Finnoscandia (Fig. 3). Therefore, the isolated cysts and worms were identified as *T. ovis krabbei*.

Discussion:
This is the first report of *T. ovis krabbei* in Jutland, Denmark, and a reappearance of the parasite in roe deer in Denmark after more than 60 years (2). This finding is of particular interest to game meat retailers since infected meat is usually not considered fit for human consumption.

Deer infections with *T. ovis krabbei* have been reported in the German county that borders Denmark (4). It is possible that similar deer infections were already present but unnoticed in other areas in Denmark. Introducing the infection via deer transport is unexpected, and the suggested method of introducing *T. ovis krabbei* to the area is via a definitive host.

In mainland Europe, *T. ovis krabbei* is considered a parasite of wolves (7 & 8). The unexpected reappearance of a wolf in Denmark after almost two decades could be a mere coincidence, but can also explain, and/or support, the introduction of this parasite during wolf introduction. Domestic dogs, on the other hand, could play a role in transmission of *T. ovis krabbei* in that area, but this has yet to be tested.

Invading hosts usually experience a reduction in parasite diversity during invasion (9). However, it would be advantageous for invading wolves to sustain infections with *T. ovis krabbei* as long as possible, in order to infect native deer. Infected deer will eventually suffer from severe illness and become exposed to predation by carnivores, for example the wolf. Using this strategy of transmitting *T. ovis krabbei* infection to deer, wolves can increase their chance of establishment in a new area.