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REVIEW

Epidemiology of Reindeer Parasites

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Every Christmas we sing about Rudolph the red-nosed Reindeer, but do we give much thought to why his nose is red? The general consensus is that Rudolph has caught a cold, but as far as I know no proper diagnosis has been made of his abnormal condition. I think that, rather than having a cold, Rudolph is suffering from a parasitic infection of his respiratory system. To some this may seem a bit far-fetched as one would not expect an animal living with Santa Claus at the North Pole to be plagued by parasites, but I shall show otherwise.

Although the Hollywood Santa Claus/reindeer image is full of fantasy, reindeer (or caribou), *Rangifer tarandus*, is the ruminant which lives closest to the North Pole. In Europe, reindeer are found as far north as the Svalbard archipelago at about 80°N, and

in America, caribou are found as far north as Ellesmere Land at about 84°N (Ref. 1). For convenience I will use the vernacular 'reindeer' in the following.

The distribution of reindeer is not, however, limited to the arctic. It covers most of Norway south to about 59°N, and in Eurasia the species reach as far south as about 46°N (Ref. 1). But it is in the arctic and subarctic that the reindeer's ecology is unique and interesting, including the epidemiology of its parasites.

Parasites of Reindeer

In much of its distribution, reindeer overlaps with other ruminants. A list of parasites recorded in reindeer is therefore longer than the arctic image of the host might suggest and includes some 25 species of gastrointestinal nematodes². Reindeer do have parasites that are either species specific or at least primarily associated with this host. These include protozoa, helminths and arthropods (Table 1).

In general, parasites of reindeer belong to groups commonly found in ruminants. One exception is the pentastomid *Linguatula arctica*. The final hosts of linguatulids are normally carnivores, but *L. arctica* reaches maturity in reindeer and thus represents an unique adaptation³.

Way up North

An examination of the Svalbard reindeer will reveal the extent to which parasites of ruminants are able to become established in arctic localities. The Svalbard reindeer live on Spitsbergen and the other larger islands of the Svalbard archipelago at about 80°N, and form an endemic subspecies *R. t. platyrhynchus*⁴. Despite the double difficulty faced by parasites immigrating to oceanic islands in the Arctic, the reindeer on Spitsbergen are parasitized by both protozoa and helminths (Table 2).

Table 1. A list of parasites specific to or primarily associated with reindeer, *Rangifer tarandus*. Only species referred to by authors after 1970 are included. See Ref. 43 for other species and Ref. 44 for a different opinion on the identity of *E. rangiferi*

Parasite	Ref.
Protozoa	
<i>Sarcocystis gruhneri</i>	37
<i>Sarcocystis rangi</i>	37
<i>Sarcocystis tarandivulpes</i>	37
<i>Sarcocystis hardangeri</i>	37
<i>Sarcocystis tarandi</i>	37
<i>Sarcocystis rangiferi</i>	37
Cestoda	
<i>Taenia ovis krabbei</i>	38
Nematoda	
<i>Lappinema auris</i>	39
<i>Ostertagia gruhneri</i>	6,23
<i>Skrjabinagia arctica</i>	6
<i>Nematodirus tarandi</i>	2,6
<i>Nematodirella longispiculata</i>	2
<i>Elaphostrongylus rangiferi</i>	7,8,40
Pentastomida	
<i>Linguatula arctica</i>	3
Insecta	
<i>Solenopotes tarandi</i>	41
<i>Cephenemyia trompe</i>	28
<i>Oedemagena tarandi</i>	26,27,28