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Diversity of helminths in reindeer (*Rangifer tarandus*) in Russia

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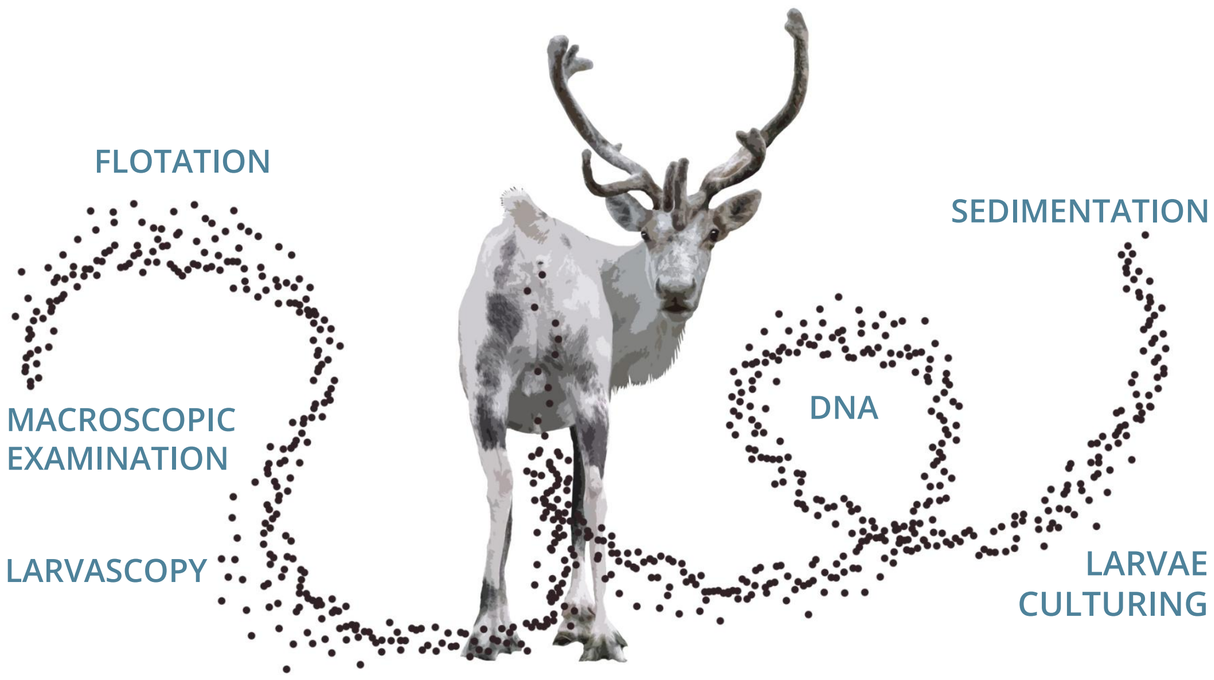
INTRODUCTION & AIM

A large-scale survey of helminths in reindeer (*Rangifer tarandus*) in Russia was initiated by the author in 2018. A previous similar study was conducted in 1930-60 by K. I. Skrjabin, V. Yu. Mizkewich, and other Soviet scientists. Climate change, human expansion in the Arctic region, and animal introductions and translocations might have intensified the presence of helminth fauna in reindeer.

The aim of this study was to revise helminth fauna of reindeer in Russia.

MATERIALS & METHODS

More than 500 fecal samples of wild and semi-wild reindeer were collected throughout Russia from Murmansk Oblast in the West to Chukotka in the East and from Franz Josef Land in the North to Buryatia and Altai in the South. This research covered nature reserves, agricultural units, and all the zoos in Russia. When possible, autopsy was also performed. In total, about 200 reindeer were examined post mortem. Fecal samples were processed via larvoscopic and ovoscopic (flotation and sedimentation) techniques, along with fecal examination (in order to find macrohelminths). DNA analyses were made of adult worms and larvae primarily by targeting the internal transcribed spacer region.



RESULTS

The diversity of helminths found via fecal examination is represented by *Fasciola hepatica*; *Paramphistomum* spp.; *Dicrocoelium* spp.; *Moniezia expansa*; *Moniezia* spp.; small strongylids, including *Ostertagia gruehneri* (major morph) and *O. arctica* (minor morph), *O. leptospicularis*, and *O. ostertagi*; *Nematodirus* spp.; *Nematodirella longissimespiculata*; *Dictyocaulus* spp.; *Elaphostrongylus rangiferi*; *Orthostrongylus* sp.; *Varestrongylus eleguneniensis*; *Trichuris* spp.; *Capillaria* spp.; *Ascaris mosgovoyi*; and *Skrjabinema tarandi* (Fig. 1).

The helminths recovered via autopsy were *Paramphistomum* spp.; *Dicrocoelium chinensis*; *Oesophagostomum* sp.; *Dictyocaulus* spp.; *E. rangiferi*; *Trichuris discolor*; *Setaria* spp.; *Onchocerca flexuosa*; *Onchocerca* sp.; *Echinococcus* spp.; and *Taenia* spp.

CONCLUSION

The following helminths were reported for reindeer in Russia for the first time: *Orthostrongylus* sp., *Varestrongylus eleguneniensis*, *Oesophagostomum* spp., and *T. discolor*.

The *Orthostrongylus* sp. and *T. discolor* nematodes were reported for the first time for reindeer at the world scale.

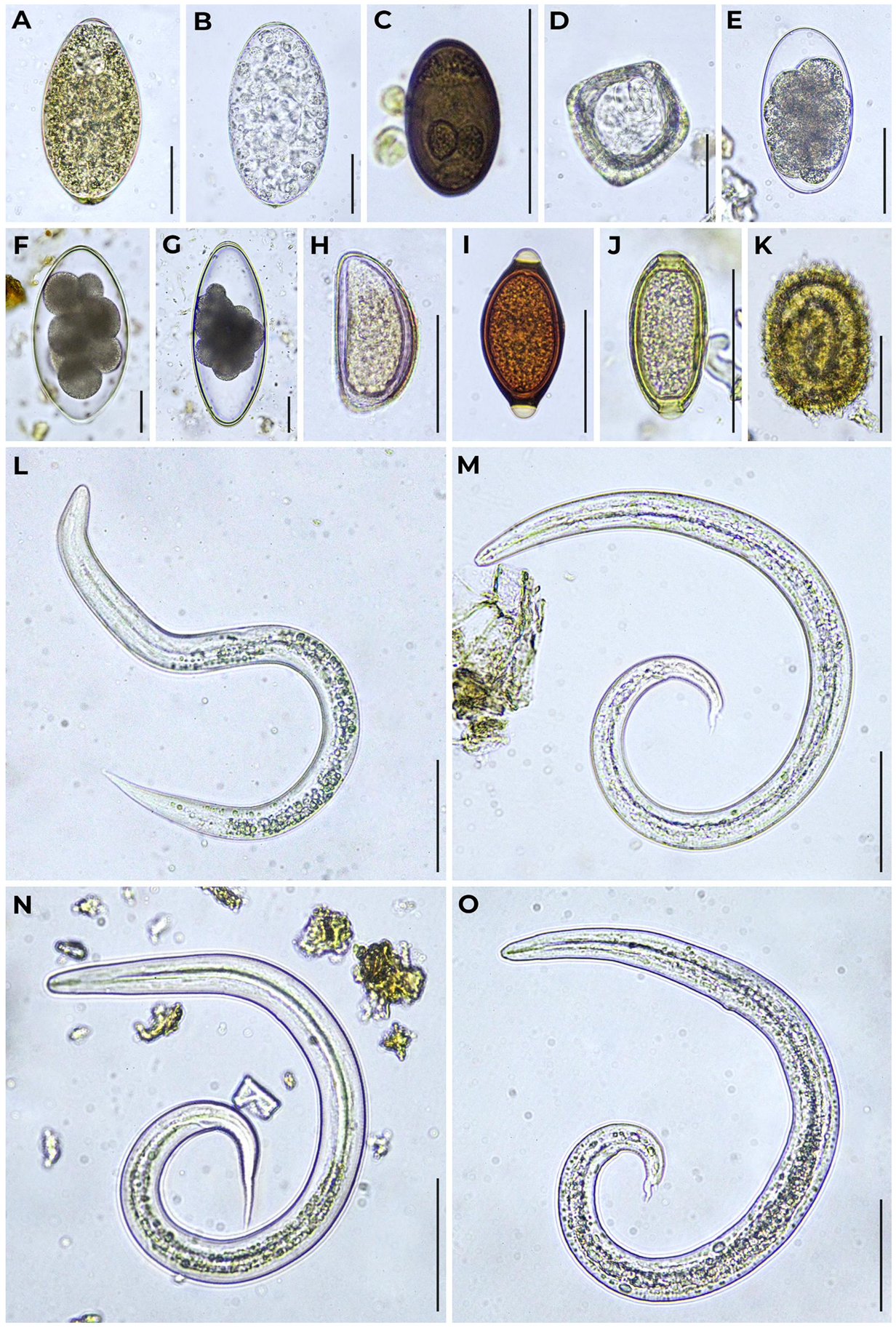


Figure 1. Diagnostic stages of helminths obtained from feces of reindeer. **A** *Fasciola hepatica* egg; **B** *Paramphistomum* sp. egg; **C** *Dicrocoelium* sp. egg; **D** *Moniezia* sp. egg; **E** Strongyle-type egg; **F** *Nematodirus* sp. egg; **G** *Nematodirella longissimespiculata* egg; **H** *Skrjabinema tarandi* egg; **I** *Trichuris* sp. egg; **J** *Capillaria* sp. egg; **K** supposedly *Ascaris mosgovoyi* egg; **L** *Dictyocaulus* sp. first stage larva (L1); **M** *Elaphostrongylus rangiferi* L1; **N** *Orthostrongylus* sp. L1; **O** *Varestrongylus eleguneniensis* L1. Bright field microscopy, 400x magnification. Scale bar = 50 µm.

FUTURE WORK / REFERENCES

This poster highlights a big research, some parts of which are available:

1. Loginova, O. et al. (2023) First report of *Orthostrongylus* sp. (Nematoda: Protostrongylidae) in wild reindeer (*Rangifer tarandus*) from the Taimyr, Russia: Nearctic parasites in a Palearctic host. *Parasitol Res* 122, 685-689. **DOI: 10.1007/s00436-022-07754-7**

2. Loginova, O. et al. (2023) Diversity and Distribution of Helminths in Wild Ruminants of the Russian Arctic: Reindeer (*Rangifer tarandus*), Muskoxen (*Ovibos moschatus*), and Snow Sheep (*Ovis nivicola*). *Diversity*15, 672. **DOI: 10.3390/d15050672**

3. Loginova, O. (2024) Coprological Survey of Helminths in Reindeer (*Rangifer tarandus*) in 50 Selected Zoos and Menageries in Russia. *JZBG* 5(3), 492-506. **DOI:10.3390/jzbg5030033**

4. Loginova, O. (2024) Double trouble: ‘two-headed’ *Nematodirus* sp. juvenile ex *Rangifer tarandus*. *RJN* 32(2), 115-120. **DOI: 10.24412/0869-6918-2024-2-115-120**

5. Loginova, O. et al. (2024) *Fasciola hepatica*: Updates on egg morphology, host range, and distribution, *Food and Waterborne Parasitology* 36, e00237. **DOI: 10.1016/j.fawpar.2024.e00237**

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