

Journal Publications

Jenkins. E. J., A. M. Veitch, S.J. Kutz, E.P. Hoberg, and L. Polley 2006 **Climate change and the epidemiology of protostrongylid nematodes in northern ecosystems: Parelaphostrongylus odocoilei and Protostrongylus stilesi in Dall's sheep (Ovis d. dalli)**. *Parasitology* (2006), 132, 387–401.

SUMMARY

We describe the epidemiology of the protostrongylid parasites *Parelaphostrongylus odocoilei* and *Protostrongylus stilesi* in Dall's sheep (*Ovis dalli dalli*) from the Mackenzie Mountains, Northwest Territories, Canada (65°N; 128°W). Peak numbers of 1st-stage larvae of both parasites were shed by Dall's sheep on their winter range from March until May. In larval development experiments in the Mackenzie Mountains, peak numbers of infective 3rd-stage larvae of *P. odocoilei* were available in gastropod intermediate hosts in August–September. For both protostrongylids, the majority of transmission likely occurs on the winter range, with infection of gastropods when they emerge from hibernation in spring, and infection of Dall's sheep upon their return in fall. We validated a degree-day model for temperature-dependent development of larval *P. odocoilei* in gastropods, and applied degree-day models to describe and predict spatial and temporal patterns in development of *P. odocoilei* and *P. stilesi* in northern North America. Temperature-dependent larval development may currently limit northward range expansion of *P. odocoilei* into naïve populations of Dall's sheep in the Arctic, but climate warming may soon eliminate such constraints. In Subarctic regions where both *P. odocoilei* and *P. stilesi* are endemic, the length of the parasite 'growing season' (when temperatures were above the threshold for larval development) and amount of warming available for parasite development has increased over the last 50 years. Further climate warming and extension of the seasonal window for transmission may lead to amplification of parasite populations and disease outbreaks in host populations.