

Meningeal Worms in Sheep, Goats, and Llamas

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Over the last 2 decades there have been several reports of neurologic impairment or death in sheep and other small domestic ruminants attributed to the meningeal worm (*Parelaphostrongylus tenuis*) of white-tailed deer. Published reports exist for sheep from Connecticut, Minnesota, New Hampshire, New York, and West Virginia; for goats from Michigan, New York, and Texas; and for llamas from Minnesota, Ohio, Texas, and Virginia. Morbidity in affected herds has usually ranged from 2 to 13%. While cases of meningeal worm-induced disease in domestic stock are sporadic and isolated, they are important to the individual owner. Thus, various state wildlife agencies have consulted SCWDS on possible methods of prevention of the disease in domestic or exotic stock.

The meningeal worm is common in white-tailed deer throughout much of eastern North America. The prevalence of infection in white-tailed deer herds varies widely but can be over 90% in some locales. The parasite is rare or absent in the lower Coastal Plain of the Southeast and in arid regions of Oklahoma and Texas. The life cycle requires terrestrial snails or slugs as intermediate hosts. Deer and other ruminant hosts are infected when they ingest gastropods containing infective meningeal worm larvae. White-tailed deer normally tolerate infection without illness; however, the meningeal worm readily causes severe neurologic disease and mortality in other native North American cervids and many exotic ruminants, as well as the domestic ruminants mentioned above. Cattle are refractory to infection.

Various livestock dewormers, such as ivermectin, diethylcarbamazine, fenbendazol, levamisol, and thiabendazole, have been used to combat the infection, but the efficacy of these drugs for the meningeal worm has not been established. Chemical control of snails with compounds such as copper sulfate can have serious ecological drawbacks and generally is not an effective long-term solution. Maintaining clean pastures without decaying wood or forest litter to protect gastropods from climatic extremes would be more beneficial. Deer population reduction is generally ineffective to control meningeal worms due to the high rates of infection often found in deer. A single infected deer can shed several thousand larvae per gram of feces, and these larvae are highly resistant to environmental forces. Control of meningeal worm infection in domestic stock is probably best achieved by restricting small ruminants from areas receiving high deer utilization and/or making pastures less attractive to both deer and gastropods.