Living with parasites: exploring tolerance of infection to reduce the impact of gastrointestinal nematodes on sheep

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Productivity loss caused by gastrointestinal nematode infection is a major problem in the livestock industry. Resistance to anthelmintic drugs is rampant, therefore, new, sustainable methods of control are needed. There are two strategies an individual can use to manage infection - resistance, and tolerance. Resistance reduces the parasite burden with more resistant individuals having lower nematode burdens, but this is often at the cost of productivity. Tolerance is the maintenance of health, or productivity, despite increasing parasite burden. Tolerance has been researched in plant science for over a century, with many plants bred for their ability to be tolerant to a range of adverse conditions, such as disease, salinity, and drought. However, whilst breeding for resistance is common practice in livestock, tolerance has been neglected in livestock research. In my PhD, I will be looking at tolerance of nematode infections in domestic sheep, including its genetic basis, the role of the immune system, and the effect of nutrition. Over my first year, I have been and will continue to analyse data from two sources. Preliminary results show individual and sire variation in performance traits, measured as body weight and average daily gain. Going forward, we will be investigating the involvement of various antibodies, such as IgA and IgG, and cytokines, such as IL-4 and IL-17, in tolerance to gastrointestinal nematodes. In the future, we will be looking at whether nutrition can promote tolerance through a rotational grazing trial.