Climate change increasing the prevalence of harmful parasite, warn scientists

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A rise in a parasite called liver fluke, which can significantly impact livestock production in farms in the UK and across the world, could now be helped by a new predictive model of the disease aimed at farmers.

The tool, developed by University of Bristol scientists, aims to help reduce prevalence of the disease.

Cattle or sheep grazing on pastures where the parasite is present can become infected with liver fluke, which develops in the liver of infected animals, leading to a disease called fascioliasis. Current estimates suggest liver fluke contributes to around £300 million annually in lost productivity across UK farms and $3 billion globally.

Until now, risk predictions have been based on rainfall estimates and temperature, without considering the life-cycle of the parasite and how it is controlled by levels of soil moisture. This, combined with shifts in disease timing and distribution attributed to climate change, has made liver fluke control increasingly challenging.

A new tool for farmers has now been developed by the Bristol team to help them mitigate the risk to their livestock. The model, which works by explicitly linking liver fluke prevalence with key environmental drivers, especially soil moisture, will help farmers decide whether they avoid grazing livestock on certain pastures where liver fluke is more prevalent, or treat animals based on when risk of infection will be at its peak. Importantly, the model can be used to assess the impact of potential future climate conditions on infection levels and guide interventions to reduce future disease risk.

Ludovica Beltrame, one of the study's researchers from Bristol's School of Civil, Aerospace and Mechanical Engineering, said: "In recent decades, the prevalence of liver fluke has increased from 48 to 72 per cent in UK dairy herds. This new tool will help farmers in managing the risk associated with liver fluke and offers a more robust approach to modelling future climate change impacts."

Professor Thorsten Wagener from Bristol's Cabot Institute added:

"Water-related diseases can be difficult to eradicate using medicine alone, as resistance to available drugs is increasing. We need predictive models of disease risk that quantify how strongly infection risk is controlled by our rapidly changing environment to develop alternative intervention strategies."

More information: Ludovica Beltrame et al. A mechanistic hydro-epidemiological model of liver fluke risk, *Journal of The Royal Society Interface* (2018). DOI: 10.1098/rsif.2018.0072

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