Geophysical Research Abstracts
Vol. 18, EGU2016-12690, 2016
EGU General Assembly 2016

Simulating the Risk of Liver Fluke Infection using a Mechanistic Hydro-epidemiological Model

Ludovica Beltrame (1), Toby Dunne (1), Hannah Rose (1), Josephine Walker (1), Eric Morgan (1), Peter Vickerman (1), Thorsten Wagener (1,2)

(1) University of Bristol, Bristol, United Kingdom , (2) Cabot Institute, University of Bristol, Bristol, United Kingdom

Liver Fluke (Fasciola hepatica) is a common parasite found in livestock and responsible for considerable economic losses throughout the world. Risk of infection is strongly influenced by climatic and hydrological conditions, which characterise the host environment for parasite development and transmission. Despite on-going control efforts, increases in fluke outbreaks have been reported in recent years in the UK, and have been often attributed to climate change. Currently used fluke risk models are based on empirical relationships derived between historical climate and incidence data. However, hydro-climate conditions are becoming increasingly non-stationary due to climate change and direct anthropogenic impacts such as land use change, making empirical models unsuitable for simulating future risk.

In this study we introduce a mechanistic hydro-epidemiological model for Liver Fluke, which explicitly simulates habitat suitability for disease development in space and time, representing the parasite life cycle in connection with key environmental conditions. The model is used to assess patterns of Liver Fluke risk for two catchments in the UK under current and potential future climate conditions. Comparisons are made with a widely used empirical model employing different datasets, including data from regional veterinary laboratories. Results suggest that mechanistic models can achieve adequate predictive ability and support adaptive fluke control strategies under climate change scenarios.