Estimating the effects of climate change on rodent dynamics and associated parasites

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Rodents serve as main food source for a variety of arthropods like fleas, mites and ticks. These arthropods maintain diverse zoonotic pathogens within the rodent population and may transmit them from the rodent reservoir to larger mammals including humans. Well known zoonotic diseases include Lyme borrelioses and FSME. Climatic variation can affect both the population dynamics of rodents and the host-seeking behavior of arthropod vectors. Predicting possible future effects of climate change on rodents, arthropods and vector-borne pathogens is of great public health interest.

This project aims to examine the effect of climate change on the system of common voles (*Microtus arvalis*), ectoparasites and pathogens regarding relevant zoonotic pathogens like *Borrelia* spp. and *Rickettsia* spp.

A large-scale field study will be conducted at the "Global Change Experimental Facility" of the "Helmholtz-Zentrum für Umweltforschung Halle/Leipzig". In half of 50 plots of 400 m^2 climate conditions are manipulated to reflect future temperature and precipitation. The other half of plots are un-manipulated experimental controls. Over three years, during the rodent reproductive period, rodents will be live trapped and uniquely marked with a RFID transponder. Blood samples, tissue samples and ectoparasites will be collected, body measurements taken and reproductive activity assessed.

Data will be used to identify potential changes regarding vole breeding and population dynamics, ectoparasite composition/density and pathogen composition/load. This should reveal potential differences between varying temperature and precipitation regimes.

Such empiric systematic assessments of climate change impact on biological systems in the relevant habitat are essential to judge potential consequences for the protection of plants and human health. The findings will be utilized for the development of effective adaptation strategies.