

## Relationship between bank vole abundance, seroprevalence and human hantavirus infections

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In temperate zones, bank vole (*Myodes glareolus*) population dynamics show seasonal variations and multi-annual fluctuations (3-4 years) as a function of food conditions. In turn, food quality and quantity - here mast of forest trees, mainly beech (*Fagus sylvatica*) - are dependent on climatic conditions. Furthermore, the bank vole is the reservoir species for Puumala viruses in Germany, a hantavirus species that can cause haemorrhagic fever with renal syndrome (HFRS) in humans. Years with bank vole peak abundance can oscillate with a large number of human Puumala virus infections. Therefore, the aim of our study is to investigate the potential correlations between climate, beech mast, bank vole abundance and Puumala virus infections within the host species as well as in humans.

Population density and dynamics of bank voles are estimated in climatically different regions of Germany (North Rhine-Westphalia - NRW, Baden-Wuerttemberg - BW, Thuringia - THR and Mecklenburg-Western Pomerania - MVP) using live trapping (capture-mark-recapture). Trapping sites are three woodland areas per state which are sampled three times a year - April, July and October. Blood samples of captured individuals are collected for serological detection of Puumala virus infection and to determine the seroprevalence in the rodent host populations.

In 2010, bank vole abundances were high in NRW (60-100 individuals per hectare (ind/ha)), BW (70-110 ind/ha) and THR (50-100 ind/ha), but low in MVP (<20 ind/ha). Population densities in each state increased from spring to summer and decreased from summer to fall. Estimated Puumala virus seroprevalences in bank voles also fluctuated between trapping seasons (NRW 23-67%, BW 22-49%, MVP 0-5%, THR 0-2%), but unlike population densities, seroprevalences were highest in April 2010 and lowest in October 2010. Results of trapping sessions within year in 2010 show no positive correlation of bank vole abundances and Puumala virus seroprevalences in bank voles. On the contrary, human Puumala virus infections are positively correlated with estimated bank vole abundances in 2010 ( $R^2=0.37$ ).

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