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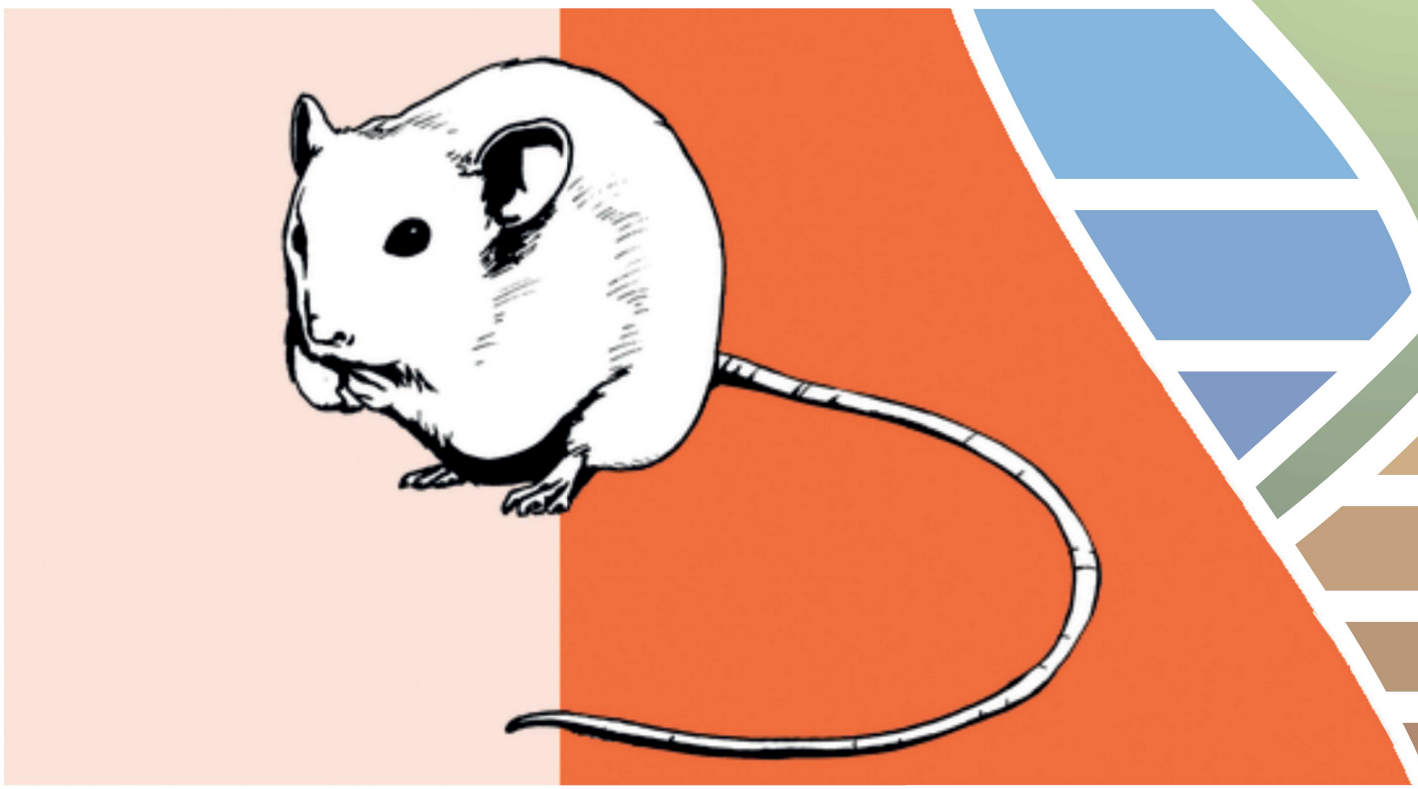
Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6th International Conference of Rodent Biology and Management and 16th Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



Julius Kühn-Institut
Bundesforschungsinstitut für Kulturpflanzen

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Workshop Rodent-Borne Diseases

Temporal changes in rodent density and climatic factors as ecological drivers of tick-borne encephalitis (TBE) within a natural endemic foci

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Tick-borne encephalitis (TBE) is a severe neurological disease caused by the TBE virus (TBEV), a flavivirus transmitted mainly by the tick *Ixodes ricinus*. TBE has a patchy distribution in natural endemic hotspots. TBEV circulation in the natural environment occurs via three different modes of transmission: vertical transmission (from the infected female to the succeeding offspring), viraemic transmission (infectious animals are the source of the virus when ticks feed on them and vice versa) and non-viraemic transmission or co-feeding (NVT or COF, when ticks get infected while simultaneously feeding on susceptible or not susceptible/immune animals). NVT has been recognized as the most efficient so far. The rodent *Apodemus flavicollis* is the most important host in terms of supporting transmission of TBEV between feeding ticks. The co-occurrence of larvae and nymphs on rodent hosts is therefore essential for the NVT and is favoured by the seasonal synchronicity of their activity. We used a long term dataset from 2000 to 2014 on yellow-necked mouse (*Apodemus flavicollis*) population, feeding *Ixodes ricinus*, rodent TBE seroprevalence and climatic data to investigate the principal drivers of co-feeding ticks on rodents. In particular, climatic conditions (i.e. autumnal cooling) during the previous year of sampling affected COF occurrence in terms of ticks synchronicity. Larvae intensity, but not nymphs, was associated with rodent density only until a certain threshold, above which ticks bites on rodent hosts are wasted. Also individual features of rodents affected COF occurrence, i.e. heaviest males carried more COF groups and the overall number of COF groups positively affected TBEV infection prevalence in rodents the following year. In conclusion, climatic variables and rodent density could be used as early warning tools to determine the persistence of a TBE foci.