

Global distribution and climate adaptation of *Ixodes trianguliceps*

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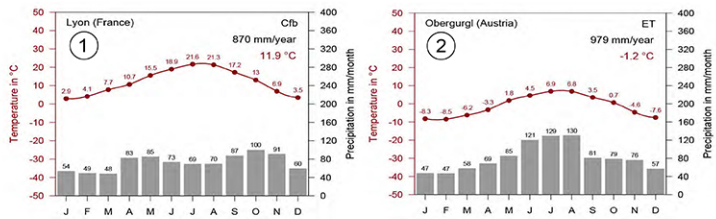
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Motivation

The Palaearctic tick *Ixodes trianguliceps* Birula lives in the nests and burrows of its small mammal hosts (mainly *Myodes glareolus*, *Arvicola* spp., *Microtus* spp., *Apodemus* spp., *Sorex* spp.) and is – along with larvae and nymphs of *Ixodes ricinus* or *Ixodes persulcatus* – the most commonly collected tick species from these hosts in its Eurasian range.

Data and methods

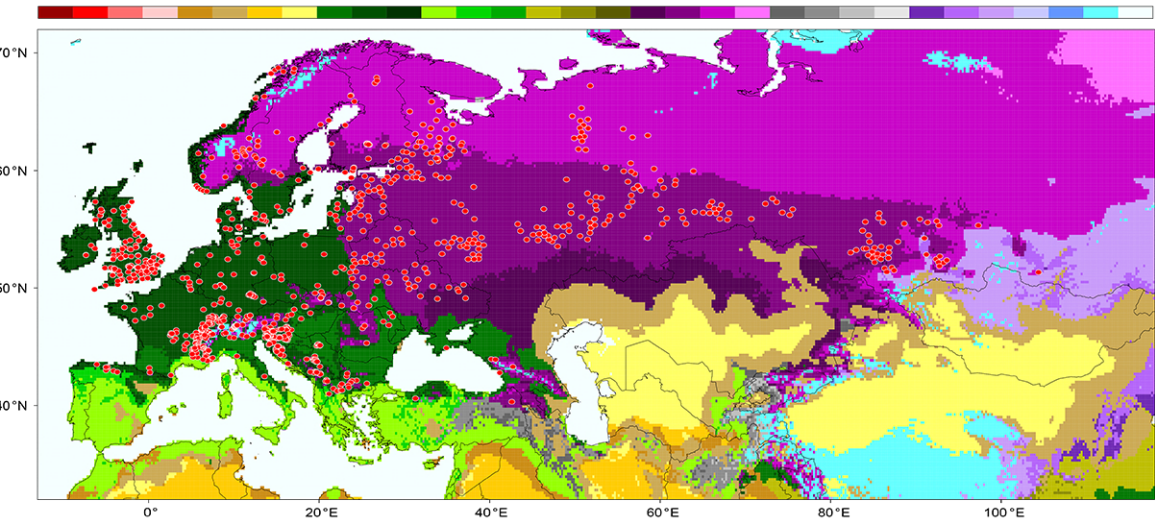
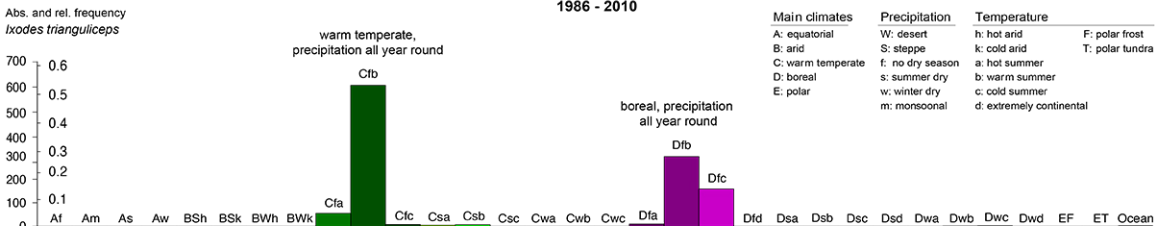
A dataset was compiled, resulting in more than 1,000 georeferenced tick locations. This data set covers the entire range for the first time. To investigate its climate adaptation, the tick locations were superimposed on a high resolution map of the Köppen-Geiger climate classification and the frequency distribution of the corresponding climate classes was plotted.



Rubel, F., and O. Kahl, 2023: The Eurasian shrew and vole tick *Ixodes trianguliceps*: Geographical distribution, climate adaptation, and pathogens detected. Exp. Appl. Acarol., submitted.

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Köppen-Geiger Climate Classification 1986 - 2010



Results

The distribution area between 8°W–105°E and 40°N–69°N extends from Northern Spain to Western Siberia. It needs mentioning that endophilic ticks as soil organisms in contrast to non-endophilic ticks such as *Ixodes ricinus* spend all off-host phases in a climatically rather protected micro-environment and are much less exposed to extreme weather conditions than the latter, especially when questing. The frequency distribution of the tick occurrence under different climates shows two peaks related to the following climates: warm temperate with precipitation all year round (Cfb), and boreal with warm or cold summers and precipitation all year round (Dfb, Dfc). Almost 97% of all considered *I. trianguliceps* locations are related to these climates. Thus, *I. trianguliceps* prefers climates with a warm or cold summer without dry periods. Cold winters apparently do not limit the distribution of this tick species, which has been recorded in the European Alps up to altitudes of 2,400 m. A new detailed distribution map of *I. trianguliceps* in the greater area of the European Alps with two typical climate diagrams is shown. *Ixodes trianguliceps* does not occur in the Mediterranean area with its hot and dry summers.