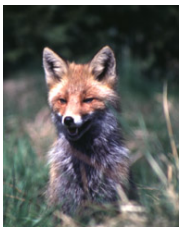
Description of geo-ecological factors of TBE epidemiology through geographic information system: analysis of TBEV infections in humans and foxes in southern Germany



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Introduction

Geographic Information Systems (GIS) and models for spatial data are used in epidemiology for mapping small area data or in ecological regression studies for investigating the association between disease occurrence and area-specific covariates. Analysis on the background of GIS should be performed in data of anti-TBEV seroprevalence among red foxes (*Vulpes vulpes*) already published in 1999 (Rieger et al., 1999 [Zentr.bl. Bakteriol. 289, 610]) and showing the suitability of this species to serve as indicators for TBE endemic regions.

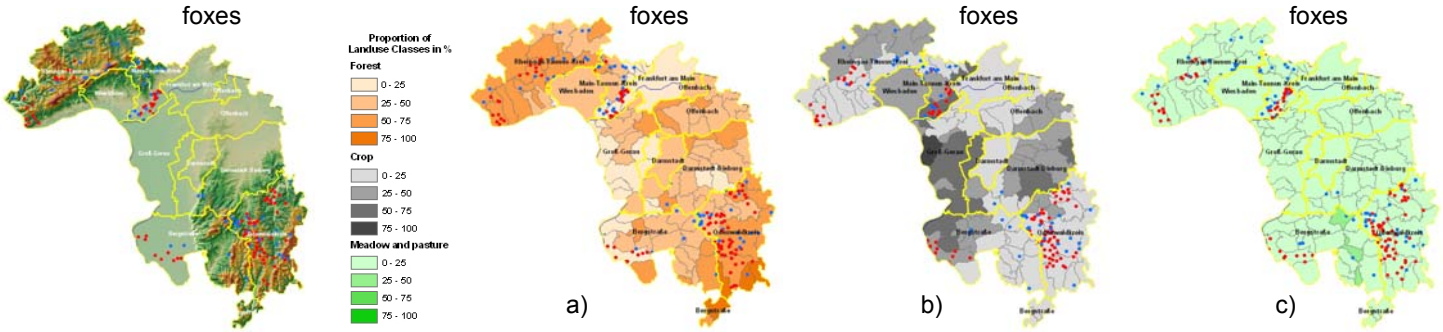
Methods and Material

- GIS data from CORINE land cover data (European Union)
  ➔ geo-ecological data
- n=635 human TBE cases in southern Germany (1994-1998)
  ➔ place of infection and/or place of residence
- n=329 fox sera dating from 1993-1997
  ➔ serological testing of TBEV-specific antibodies

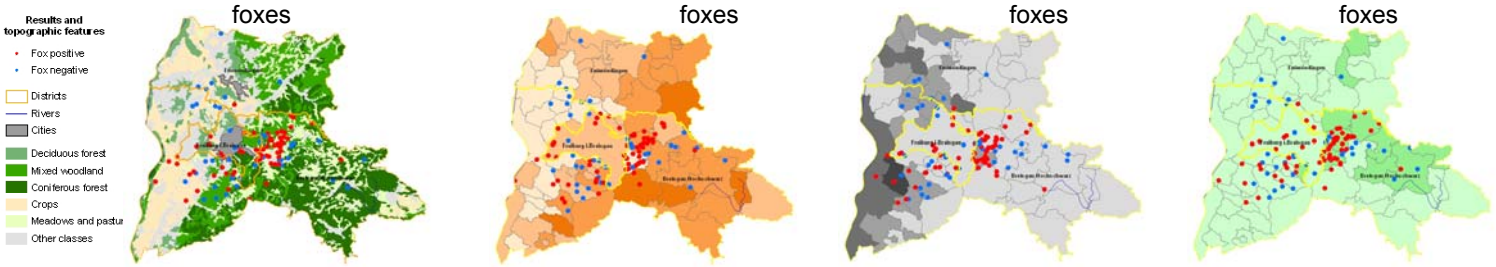
Results

1 high seroprevalence among foxes indicates possible future risk for humans

2 seropositive foxes are found in forests (a), in rural landscape with crop production (b) and in meadows and pastures (c)
➔ human TBEV exposure due to occupation in agriculture and forestry and / or due to leisure time activities is possible



3 seropositive foxes are found near the city of Freiburg (southwestern Germany)
➔ exposure to TBEV may happen in parks and gardens, during agricultural work and due to leisure time activities



As the extension and the spread of TBE endemic regions is changing, surveillance of TBE epidemiology is necessary.
The use of GIS may be useful for predicting possible endemic regions and assessing the impact of changes in geo-ecological conditions on TBE epidemiology (e.g. clearing of forests, extensive cultivation of agricultural areas or forest).