

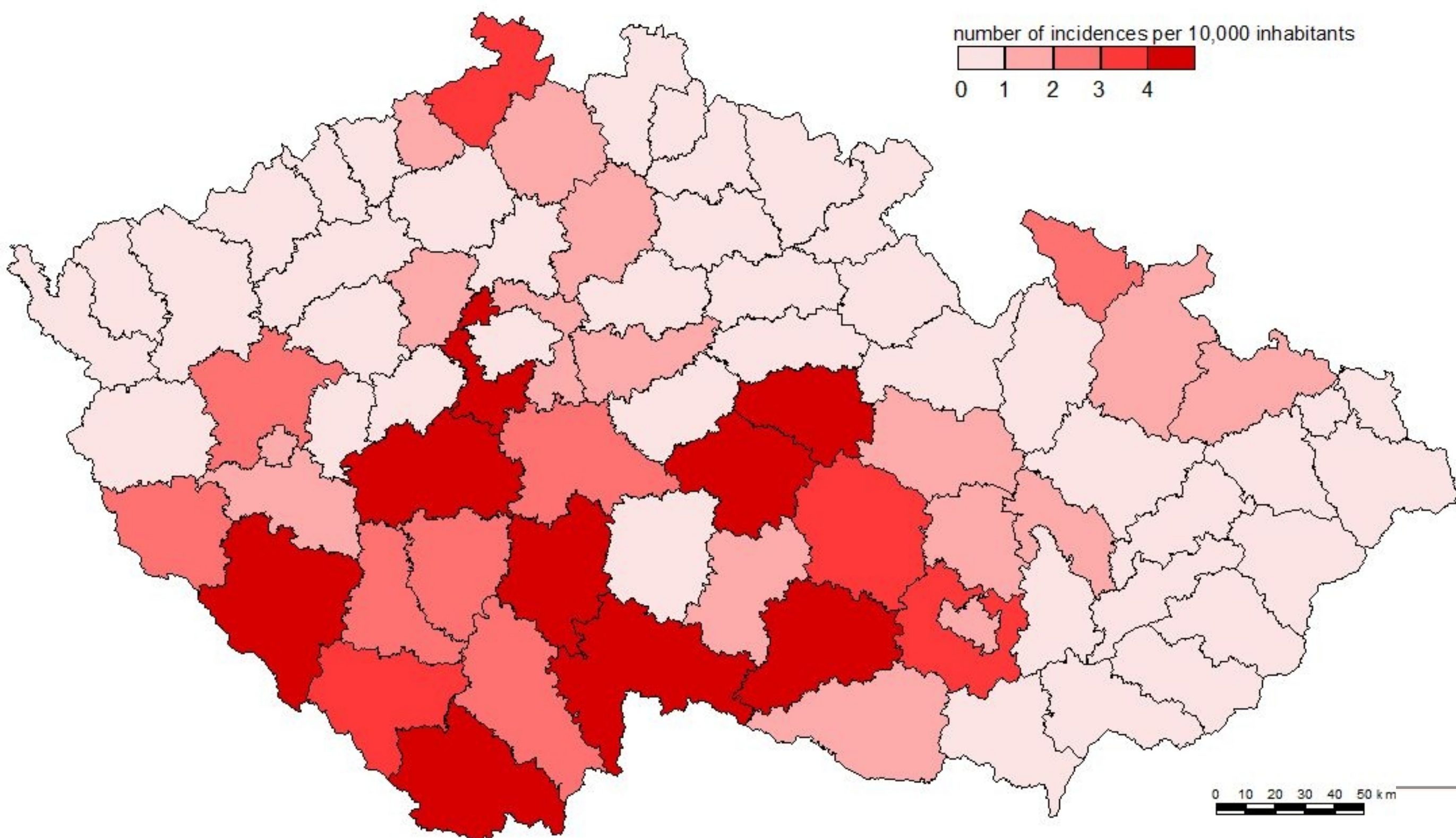
IMPACT OF CLIMATE CHANGE ON THE INCIDENCE OF TICK-BORNE ENCEPHALITIS AND LYME DISEASE IN THE CZECH REPUBLIC

There is long-term research on distribution of the incidence of tick-borne encephalitis (TBE) throughout the past two decades. A sharp rise was recorded in the last decade: while 2596 TBE cases reported during 1983-1992, 5892 TBE cases in the decade 1993-2002, with high rates persisting also in the following years (606 TBE cases reported in 2003). Research continues in present decade and is processed as geoinformatic project.

Tick-borne meningoencephalitis or Tick-borne encephalitis is a tick-borne viral infection of the central nervous system affecting humans as well as most other mammals. The virus can infect the brain (encephalitis), the membrane that surrounds the brain and spinal cord (meningitis) or both (meningoencephalitis). It is transmitted by the bite of infected deer- or sheep ticks or (rarely) through the non-pasteurized milk of infected cows. Sexual transmission has been documented in mice with vertical transmission to progeny. Sexual transmission with humans has never been documented.

Lyme disease, or borreliosis, is an emerging infectious disease caused by at least three species of bacteria belonging to the genus *Borrelia*. *Borrelia burgdorferi* is the predominant cause of Lyme disease in the United States, whereas *Borrelia afzelii* and *Borrelia garinii* are implicated in most European cases. *Borrelia* is transmitted to humans by the bite of infected hard ticks belonging to several species of the genus *Ixodes*. Early manifestations of infection may include fever, headache, fatigue, depression, and a characteristic skin rash called erythema migrans.

INCIDENCE OF TICK-BORNE ENCEPHALITIS
Czech Republic, 2006



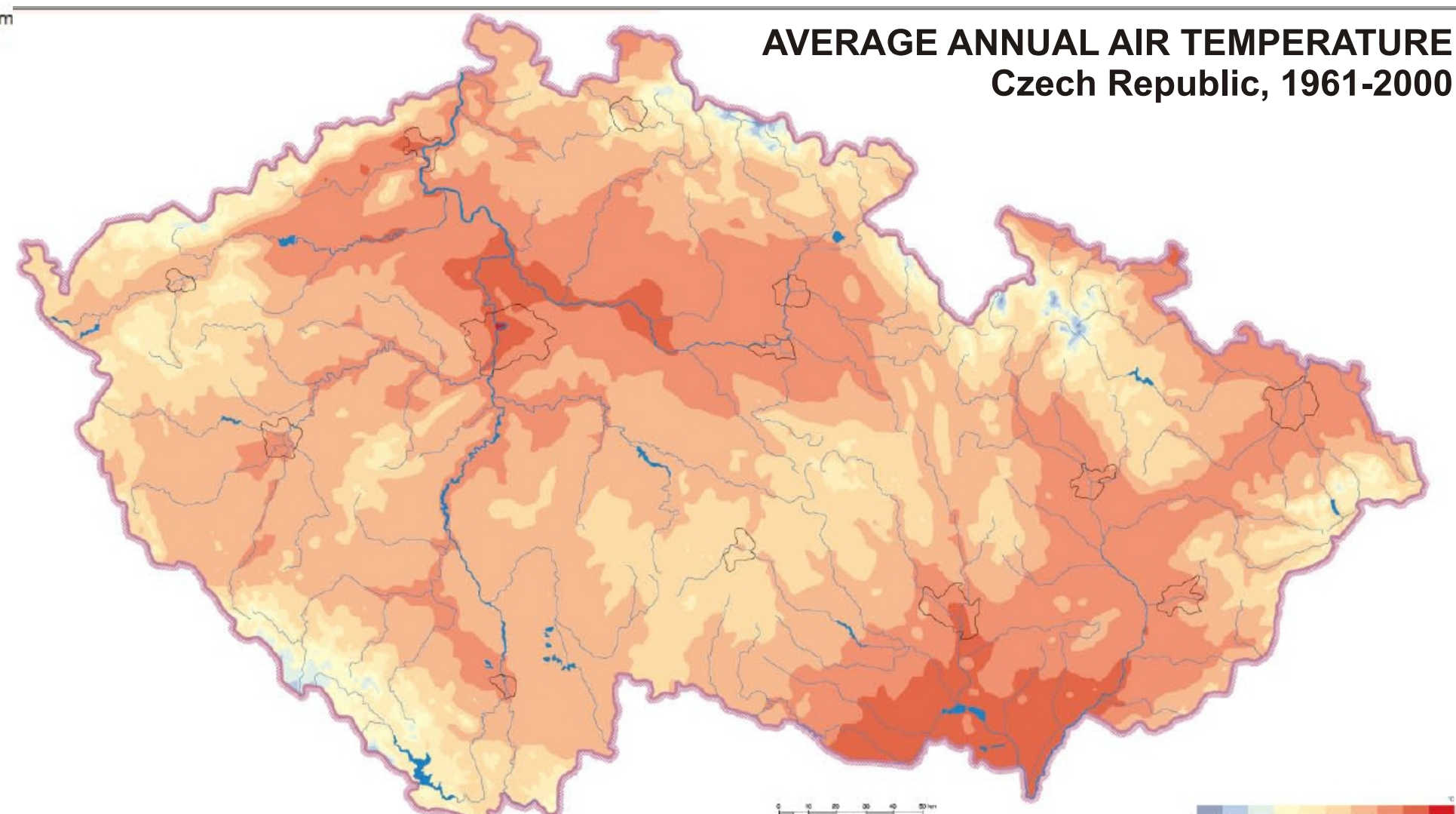
At the same time shifts in TBE seasonal trends (i.e. to March and October/November) associated with a TBE incidence peak was observed in autumn. Field research revealed that the major factors are the climate-related changes in ecology of the TBE vector *Ixodes ricinus* and resulting variation in its population density.

TBE emergence in new areas is linked to the occurrence of ticks *Ixodes ricinus* at higher altitudes (previously found at 700 m and currently spreading to 1200 m) as well as to a coming warm climate era.

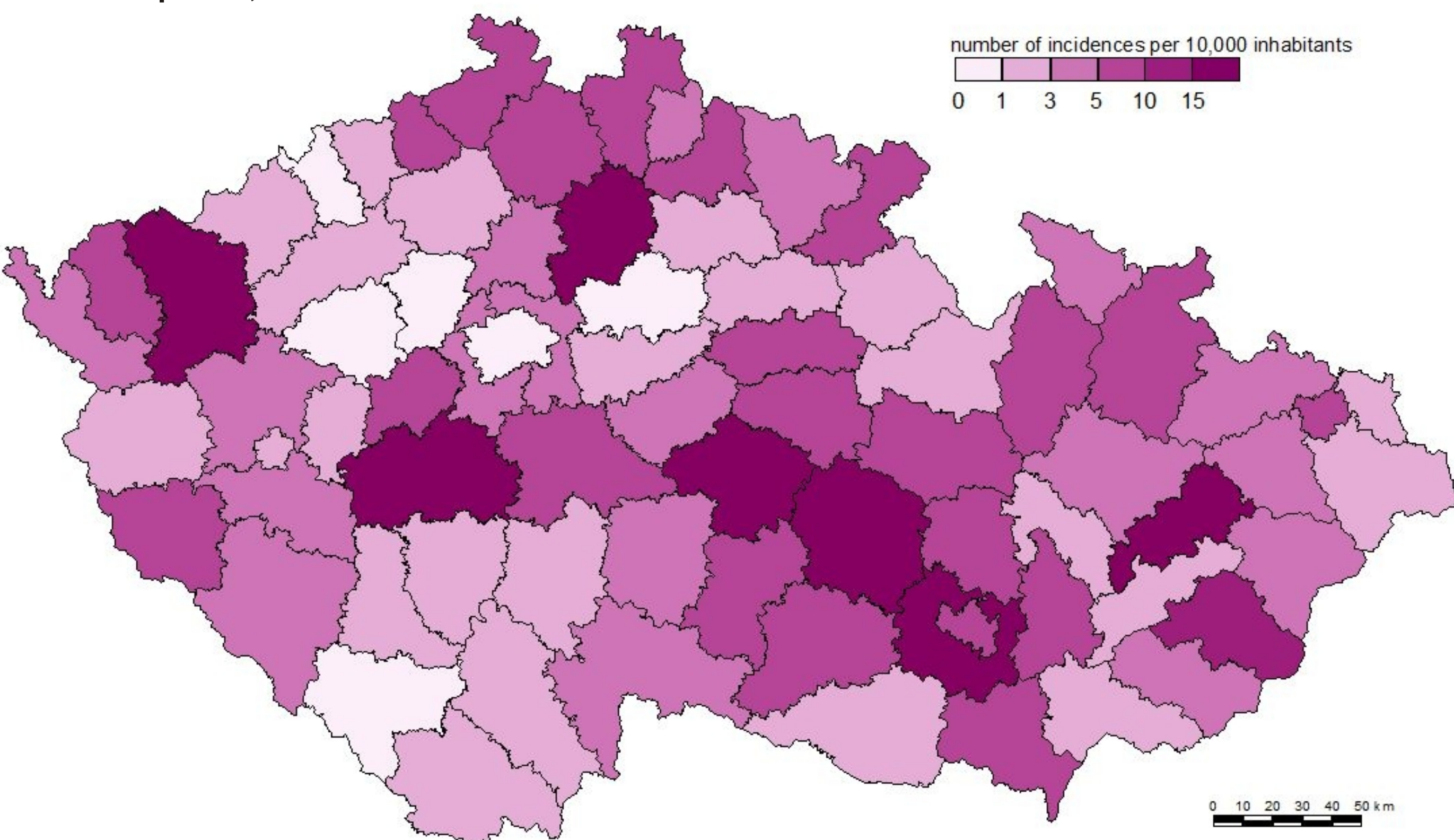
Data from the database TBE EPIDAT of the National Institute of Public Health in Prague, and that of the Communicable Diseases Information System in Ostrava were used for analysis within GIS. Meteorological data were taken from the database of the Czech Institute of Hydrometeorology in Prague.



AVERAGE ANNUAL AIR TEMPERATURE
Czech Republic, 1961-2000



INCIDENCE OF LYME DISEASE
Czech Republic, 2006



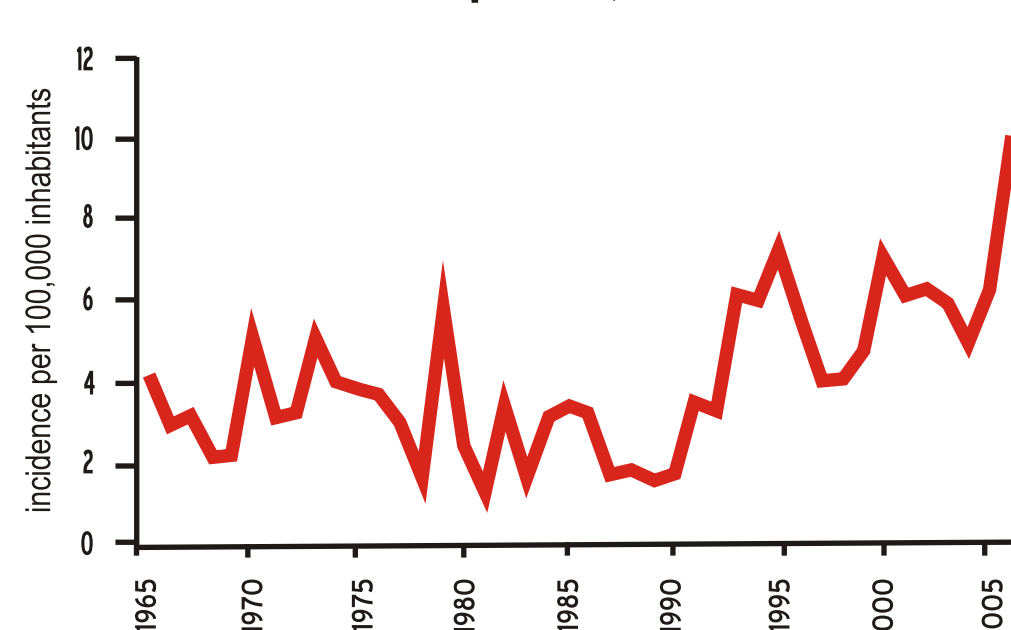
Specialists have revealed that there was a sharp rise in the incidence in tick-borne encephalitis, or TBE, in the Czech Republic last year. Some 1000 people contracted the potentially deadly disease which is transmitted by deer ticks: 60 percent more than in 2005.

Year 2006 the situation in the Czech Republic was quite unique: a relatively wet April and May leading to ticks increasing. Also unique was a very dry and warm autumn with many people active in the woods and I think that too led to more people getting more exposed to ticks. The result is the very high incidence of TBE in our country.

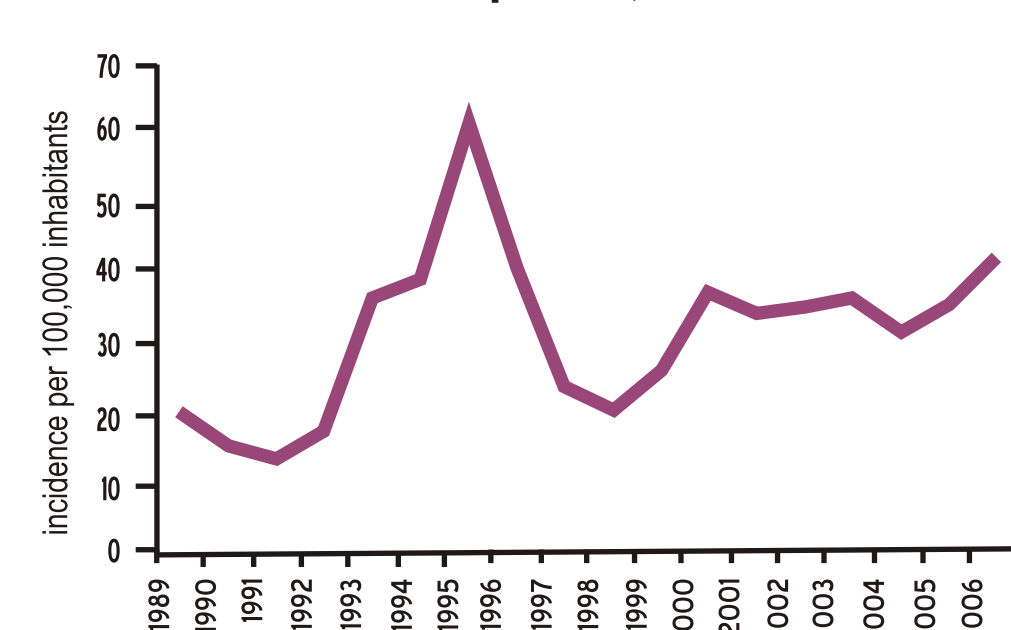
Ticks usually prefer forested areas, especially with heavy undergrowth and until recently, they were only common in low-lying areas. Nowadays, however, you can find them almost everywhere in the Czech Republic.

A Moravian company Bioveta in cooperation with Palacký University in Olomouc has just completed the development of a vaccine against Lyme disease.

INCIDENCE OF TICK-BORNE ENCEPHALITIS
Czech Republic, 1965-2006



INCIDENCE OF LYME DISEASE
Czech Republic, 1989-2006



In 1971 to 2003, 13 231 laboratory confirmed TBE cases were reported in the Czech Republic. Irregular distribution of these TBE cases in time is consistent with the observations of climate variation made between 1931 and 2000. The increase in the TBE incidence in the Czech Republic in the last decades can be characterized as follow:

- 1) higher rates of TBE cases manifested in regular TBE natural focuses,
- 2) reemergence of TBE in the same localities after 20 and more year intervals and
- 3) emergence of TBE in localities where it was not reported before.

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Source:
National Institute of Public Health
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