

Vector-Borne Diseases: Impact of Climate Change on Vectors and Rodent Reservoirs
Berlin, 27 & 28 September 2007

Influence of meteorological conditions on the occurrence of ticks and TBD in the Czech Republic.

B.Kriz, V. Danielova, M.Daniel., National Institute of Public Health, Praha, Czech Republic

Background:

In the second half of the twentieth century there have been two markedly warm periods in the Czech Republic. There was a smaller one in the years 1948-55 and a longer one since 1990 lasting up to now. It certainly was not just by chance that the tick-borne encephalitis (TBE) virus had been discovered in Europe in that first warmer period and Lyme borreliosis (LB) agents become a significant threat during the second period.

In the year 1993, there was a great increase of TBE and LB cases in the Czech Republic and this high level (with certain fluctuations) persists.

Material and methods:

The influence of weather condition on day-to-day changes of *I. ricinus* host-seeking activity was studied in 2001-2006. *I. ricinus* activity was investigated by flagging method on 3 plots (200 m² each) in weekly intervals (March-November). The instruments for micrometeorological observations were installed between the experimental plots. Macrometeorological data were used from the nearby Czech Hydrometeorological Institute meteorological observatory. Simple and multiple linear regression and quadratic regression were used to test the relation between the weather modification and *I. ricinus* host-seeking activity.

Presence of TBD infectious agents in ticks were investigated by PCR and cultivation methods.

Data of human TBE and LB cases were obtained from the National mandatory ID reporting system EPIDAT and analyzed by conventional statistical methods.

Results:

Since 1990, increasing Tick-borne encephalitis (TBE) occurrence trends in the Czech Republic were associated with higher numbers of cases in areas well-known for TBE occurrence in humans; re-emergence in areas where TBE cases were not observed, or only sporadically, for a long time; emergence of TBE in sites previously unknown as TBE foci (including mountainous areas newly colonized by ticks e.g. the Šumava and Krkonoše Mts.) and a significant shift of TBE incidence towards spring and autumn months (together with an analogous shift of *I. ricinus* activities). Both TBE and LB trends were significantly associated during this period.

Discussion:

Human Tick-borne diseases (TBD) incidence is largely influenced by temperature as a leading climatological factor with at least a triple effect

1. upon tick *I. ricinus* biology and distribution,
2. upon TBD infectious agents replication in ticks (demonstrated in laboratory experiments),
3. upon human behaviour. TBD are exclusively recreational diseases in the Czech Republic and these outdoor activities are also influenced by climate factors.

B.Kriz, V. Danielova, M.Daniel

National Institute of Public Health, Praha

Srobarova 48

100 42 Praha 10