

Ticks and *B. burgdorferi* s. l. infection of urban hedgehogs in a Central European city park

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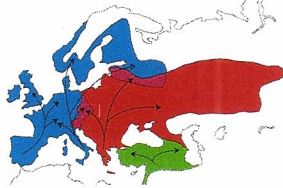
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1. BACKGROUND

- Hedgehogs are frequent hosts of ticks and tick-borne pathogens.



- Three species in Europe: *Erinaceus europaeus* (blue), *E. roumanicus* (red) and *E. concolor* (green). The sympatry zones are violet. (Bolfikova and Hulva, 2011).
- Most information on ticks and *Borrelia* infection is from *E. europaeus* and little is known about Northern white-breasted hedgehogs (*E. roumanicus*) common in Hungary.

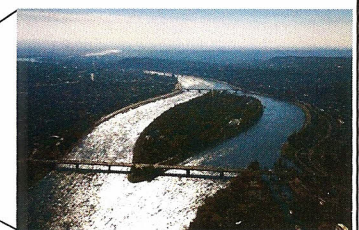


2. QUESTIONS

- Is *E. roumanicus* also a preferred host for ticks?
- Does *E. roumanicus* maintain *Borrelia burgdorferi* s.l.?



- Can this hedgehog species pose a human health risk in an urban park as Lyme spirochete reservoir?



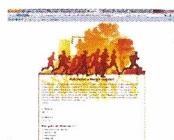
Margaret Island, a popular urban park in central Budapest

3. METHODS

- Hedgehog capture every month (2009-2010)
- Anesthesia and ear tissue samples (from 2010), measurements, marking, removing and identification of ticks



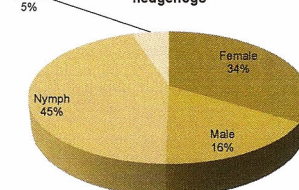
- DNA extraction and PCR amplification of the partial ospA gene from tick and ear samples, sequencing
- Online questionnaire on tick encounter and habits of island visitors



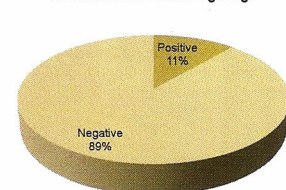
4. FINDINGS

- 247 hedgehogs examined (including 46 re-captures)
- 5063 ticks removed: 99% *Ixodes ricinus*, 1% *I. hexagonus*, 1 *I. acuminatus* and 1 *Hyalomma marginatum* (new for Hungary, vector of Crimean–Congo hemorrhagic fever virus)
- Tick prevalence: 77.3% ; mean intensity: 26.5 ticks/animal

Tick stages and sexes removed from hedgehogs



Borrelia PCR results of pools of 1612 ticks removed from hedgehogs



- B. burgdorferi* s.l. in engorged ticks: a minimum prevalence of 11%. Species: *B. afzelii* & *B. garinii*
- 173/177 (98%) of ear samples were positive for the Lyme disease spirochete. Species: *B. afzelii* & *B. spielmanii*
- From the 241 questionnaire respondents, no one has been infected with *B. burgdorferi* and few people were bitten by ticks on the island

4. ANSWERS (AND FURTHER QUESTIONS)

- ✓ The Northern white-breasted hedgehog is a key host species which feeds every developmental stage of *I. ricinus* thus maintains tick populations without other hosts.
- ✓ *E. roumanicus* probably serves as reservoir for *B. burgdorferi* s.l. in urban environments, however, our preliminary data suggest that they do not pose a direct infection risk of Lyme borreliosis to people visiting the park.
- ✓ We plan to assess the risk of human infection with the PCR analysis of monthly, field-collected ticks from the island.