



Sheep tick (*Ixodus ricinus*). ♦ Photo Hans Smid

Encephalitis and meningitis via ticks

Ticks can cause not only Lyme disease but also meningitis and encephalitis. That is possible if the tick is infected with the tick-borne encephalitis virus. On 17 May, Julian Bakker received a PhD for his research on ticks and this virus in the Laboratory of Entomology. ‘This is tricky research.’

‘Far fewer ticks are infected with the tick-borne encephalitis virus, but it only takes 15 minutes for the virus to be transmitted after a bite compared with 24 hours in the case of the Lyme bacterium *Borrelia*,’ says Bakker. The research was difficult. ‘We have breeding lines in our lab for mosquito studies but not for ticks. Ticks live for four years and need different hosts for the larva, nymph and adult stages of the life cycle.’ Strict safety precautions also apply for the virus. ‘I always had to wear a special suit and I wasn’t allowed to just open a tube.’

Artificial skin

Bakker caught ticks in the woods of the Salland ridge and around Wageningen. They were fed cows’ blood via an artificial skin. That blood contained the virus to make sure the ticks became infected. Bakker saw differences between the tick populations and viral strains in the proportion of infected ticks. ‘Some of the microorganisms in a tick affect what the tick does. For example, infection with the *Borrelia* bacterium makes the tick more active, so it finds a host more quickly. Other microorganisms cause it to suck more blood and grow bigger. I also found some ticks were smaller than normal, probably due to yet other microorganisms.’ Bakker caught wild wood mice and infected them with the tick-borne encephalitis virus. ‘Lab mice can’t cope with the infection.’ He discovered the wood mice had virus particles in their blood for up to three weeks after being infected, rather than just two to four days. ‘That means horizontal contamination — from tick to tick via a mouse — is more likely than we thought.’ ^{RL}