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Studies on the co-localization of TBE-Virus and Borrelia species at selected TBEV-foci in Baden-Wuerttemberg

Inhalt

Ixodes ricinus is the main vector of several zoonotic pathogens in Central Europe, including Tick-Borne Encephalitis Virus (TBEV) and *Borrelia burgdorferi* sensu lato. Both are of major public health concern and call for integrated One Health surveillance. While co-circulation is known, co-localization in individual ticks remains largely unexplored.

In this study, 4587 ticks were collected in 2023–2024 from three confirmed TBEV microfoci and two TBEV-free sites in Baden-Wuerttemberg, Germany, and screened for both pathogens using molecular methods. TBEV-RNA was detected in 15 ticks and six of them (40%) were co-infected with different *Borrelia* species, mainly *B. afzelii*. Co-infections occurred in both nymphs and adult females.

Borrelia spp. prevalence across all sample sites ranged from 22% to 29%. The species detected were *B. afzelii*, *B. garinii*, *B. valaisiana*, *B. burgdorferi* s.s., *B. lusitaniae* and *B. miyamotoi*. Species composition was analyzed and compared between TBEV-endemic and TBEV-free sites.

These findings provide new evidence for the co-localization of human-pathogenic organisms in individual ticks. Co-infections may be more common than previously assumed and should therefore be considered both in diagnosis and in risk assessment.

Keywords

Ixodes ricinus, Borrelia burgdorferi sensu lato, TBE-Virus, Co-infection

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