Worldwide distribution of Candidatus Borrelia capensii in ticks associated with seabirds

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Résumé

Introduction and objectives. Relapsing fever spirochetes (RF, *Borrelia*) are known pathogens for humans, often transmitted by soft ticks. Compared to their sister group, the Lyme disease spirochetes (*Borreliella*), our understanding of their transmission cycle, natural reservoirs, spatial scale of circulation, wildlife role and impact, and vectors is less comprehensive. Our work focuses on the circulation of *Borrelia* in seabirds and their associated ticks. Sporadic studies have reported phylogenetically similar isolates in seabird species from South Africa and Eastern Asia, in association with an ill bird, and present in a soft tick. Its association with a human clinical case (then named *Borrelia* sp. K64) and the ecological proximity between seabirds and humans raise particular interest in the context of zoonotic disease emergence.
Material and methods. We investigated the distribution of *Borrelia* in ticks associated with seabirds. We screened 1,944 individual tick samples of the *Ornithodoros capensis* species complex, collected globally from nests of 22 seabird species, using PCR and qPCR assays. Additionally, we examined *Borrelia* circulation by testing avian blood samples in a colony where tick infestation is high.
Results, discussion, and conclusion. Our findings confirmed the presence of *Borrelia* in 19 locations, spanning diverse geographic areas up to 7,600 km apart, with 62 positive samples (3.19%). No blood samples were positive. Further characterization was performed using a multi-locus typing approach. Most samples, associated with 5 seabird genera, clustered with the *Borrelia* sp. K64 isolate. Genetic distance analysis with known RF bacteria revealed that these isolates represented a distinct species, leading us to propose the species *Candidatus* Borrelia capensii. Studies are now needed to validate tick vector competence and to examine the impact of this Borrelia species on seabirds. Additional colony-level surveys are also called for to evaluate the risk of exposure for human populations that live near to nesting seabirds.

Mots-Clés: Ticks, vectors, seabirds, Borrelia, Ornithodoros, survey

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