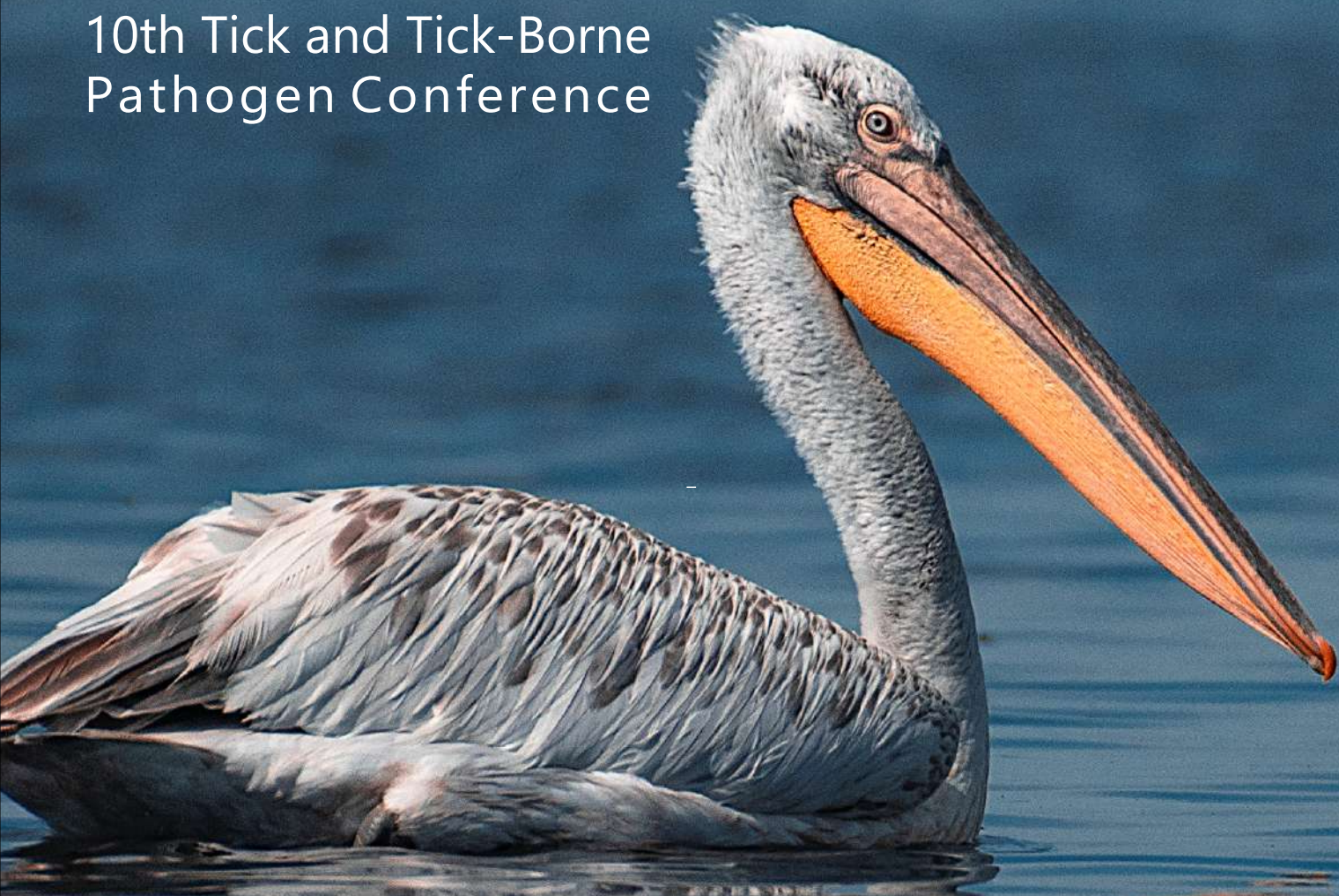


TTP.10

10th Tick and Tick-Borne
Pathogen Conference



29 August–2 September 2022
Murighiol, Danube Delta, Romania



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Platinum



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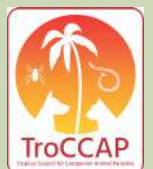
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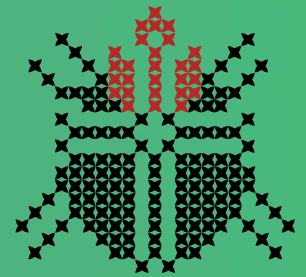


Partner



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SY1.2 *Rickettsia lusitaniae*, a widespread maternally inherited symbiont of *Ornithodoros* soft ticks

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Rickettsia are obligate intracellular bacteria best known as pathogens of vertebrates and transmitted by blood-feeding arthropods, mainly ticks. However, new *Rickettsia* species and strains with no apparent pathogenicity are continually uncovering from a variety of arthropod groups as ladybirds, spiders, wasps, book lice and even ticks. These *Rickettsia* are endosymbionts which live exclusively within arthropod cells and typically undergo high efficiency maternal (transovarial) transmission to offspring. In this context, the recent discovery of *R. lusitaniae* in several soft tick species belonging to the genus *Ornithodoros* is worthy of interest. *R. lusitaniae* is closely related to the causative agent of flea-borne spotted fever, *R. felis*. It can successfully infect cell lines in lab conditions but was only reported once in organs of a bat in China. In our study, we have investigated on the mechanisms used by *R. lusitaniae* to spread and persist in *Ornithodoros* species. We have first characterized important variations of prevalence (from 0 to 100%) between natural populations and laboratory colonies for six *Ornithodoros* species: *O. maritimus*, *O. sonrai*, *O. capensis*, *O. costalis*, *O. moubata* and *O. erraticus*. Multilocus genetic typing and complete genome sequencing further revealed a low level of genetic differentiation between multiple strains of *R. lusitaniae* across the Old and New Worlds: all *R. lusitaniae* strains cluster in a robust phylogenetic clade well distinct to other species (including *R. felis*, *R. asembonensis* and *R. hoogstraalii*) of the *Rickettsia* transitional phylogenetic group. We further examined the tissue tropism of *R. lusitaniae* using real-time quantitative PCR and Fluorescence in situ Hybridization (FISH): we found this bacterium highly abundant in Malpighian tubules and ovaries, and less abundant in salivary glands and gut. Subsequent surveys of tick progeny revealed a high level of maternal transmission in several *Ornithodoros* species: from 83 to 100% of larvae from an infected mother are themselves infected. Experimental investigations lastly showed that *O. erraticus* does not transmit *R. lusitaniae* to mice on which they have feed. Examination of several mice's organs (skin, heart, spleen and blood) through real-time quantitative PCR assays revealed absence infection. While current view in rickettsiology has a strong anthropocentric bias and tends to describe novel *Rickettsia* species as pathogenic forms, our observations rather establish that *R. lusitaniae* is a common endosymbiont of *Ornithodoros* ticks that largely relies on maternal inheritance to spread and persist in tick populations.