Short Communication

Detection of Amblyomma mixtum (Acari: Ixodidae) in Germany on a Human Traveler Returning From Cuba

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Abstract

The importation of exotic ticks to Germany on infested humans is rarely reported. Here we describe the detection of an Amblyomma mixtum nymph harboring Rickettsia amblyommatis by a tourist returning from a holiday trip to Cuba. Tick infestation may be neglected by tourists. Therefore, careful anamnesis and diagnosis should be carried out when tourists return from tropical and subtropical countries suffering from nonspecific symptoms, such as fever and malaise.

Key words: Amblyomma mixtum, Rickettsia spp., Cuba, Germany

In the New World, the Amblyomma cajennense complex comprises A. cajennense sensu stricto (Fabricius, 1787); Amblyomma interrandinum Beati, Nava and Cáceres, 2014; Amblyomma mixtum Koch, 1844; Amblyomma patinoi Labruna, Nava and Beati, 2014; Amblyomma sculptum Berlese, 1888; and Amblyomma tonelliae Nava, Beati and Labruna, 2014 (Beati et al. 2013, Nava et al. 2014). These species are among the most important human-biting ticks in South America (Nava et al. 2017, Guglielmone and Robbins 2018). The A. cajennense complex includes potential vectors of Rickettsia rickettsii Ricketts, 1907, the agent of Rocky Mountain spotted fever (Krawczak et al. 2014, 2015, Tarragona et al. 2016). The members of this complex are very similar morphologically; thus, a combination of morphological, molecular, and distributional data may be necessary to ensure correct species determinations (Nava et al. 2014). Here, we report the detection of one member of the A. cajennense complex—A. mixtum—in Germany while attached to a human traveler and its infection with Rickettsia.

Material and Methods

On 5 March 2019, an adult male resident of Kassel (State of Hesse, Germany) returned from a holiday trip to Cuba, having visited Playa Jibacoa and Havanna, where he is presumed to have been parasitized by a nymphal tick. The day after his return, he recognized the tick on his shoulder, removed it, and sent it to the Museum of Natural History at Kassel, where it was forwarded to the Bundeswehr Institute of Microbiology for identification and screening for rickettsiae in early May. The tick was identified on the basis of morphological descriptions of nymphs of the A. cajennense complex provided in Keirans and Durden (1998), Martins et al. (2016), and Nava et al. (2017). The nymph described as A. cajennense in Keirans and Durden (1998) corresponds to A. mixtum, according to the known geographical distribution of this species (see Beati et al. 2013, Nava et al. 2014). Additionally, the 16S rDNA sequence was amplified according to Mangold et al. (1998). DNA analysis using pan-Rickettsia real-time PCR to amplify part of the gltA gene (Wolfel et al. 2008), followed by a 23S-5S intergenic spacer region PCR (Chitimia-Dobler et al. 2018), served to identify the Rickettsia species, and ompA PCR (Fournier et al. 1998) and ompB PCR (Roux and Raoult 2000) provided further molecular characterization. Obtained sequences were edited using BioEdit Sequence Alignment Editor (Hall 1999) prior and then compared with those available in GenBank using BLAST (http://www.ncbi.nlm.nih.gov).

Results and Discussion

The tick was morphologically determined to be an A. mixtum nymph (Fig. 1a and b), and the 16S rDNA sequence subsequently obtained from this specimen (GenBank MN106364) showed high similarity (98–100% identity) to sequences available in GenBank from A. mixtum ticks collected at different localities (MG930061; MG930058; KM519935). Amblyomma mixtum is currently known to have a range extending from Texas to Colombia and Ecuador.
The A. mixtum nymph tested positive for Rickettsia sp. by panRick PCR. Furthermore, 23S-5S intergenic spacer region (GenBank MN447533), ompA (GenBank MN447533) and ompB (GenBank MN447534), sequences of the Rickettsia detected in the nymph were highly similar (98.9 to 100%) to sequences of Rickettsia amblyommatis available in GenBank (23S-5S intergenic spacer region: CP015012, KJ796425; ompA: CP012420; ompB: CP015012). Rickettsia amblyommatis (also referred to as Rickettsia amblyommii and ‘Candidatus Rickettsia amblyommii’) is the most commonly detected Rickettsia in Central America and has been reported in 10 species of ticks and one flea species in six of the seven countries in that region (Bermúdez and Troyo 2018, Noda et al. 2016a). Commonly more than 25% of A. cajennense populations are infected with R. amblyommatis. (Bermúdez et al. 2009). The medical importance and pathogenicity for humans of R. amblyommatis have not yet been fully elucidated. Moreover, some cases of Rocky Mountain spotted fever (RMSF) diagnosed in the United States may be due to R. amblyommatis rather than R. rickettsii (Apperson et al. 2008). It is also possible that previous infection with R. amblyommatis (R. amblyommii) may prevent severe disease during subsequent infection by the more highly pathogenic R. rickettsii (Blanton et al. 2014, Rivas et al. 2015).

To the best of our knowledge, this is the first record of A. mixtum having been detected in Germany; however, the unintentional importation of an exotic tick was only detected because of the individual’s background in science, causing him to be aware that such events occasionally occur and promptly delivered the specimen to the Kassel museum. Some tick species are regularly introduced from other countries or continents, on avian hosts (Petney et al. 2012, Chitimia-Dobler et al. 2019) or domestic animals traveling with tourists (Petney et al. 2012). Amblyomma mixtum is the only member of the A. cajennense complex known from Cuba (Estrada-Peña et al. 2014, Nava et al. 2014). Physicians should be aware of the potential for exotic diseases in patients who report fever and other nonspecific symptoms, especially if they have recently returned from tropical or subtropical countries.

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Conflict of Interest
The authors declare no competing personal or financial interests. M.B. had consultancy agreements with Pfizer and GlaxoSmithKline.

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