

Toscana virus – finding the new vectors

Nikola Polanska¹, Adrien Thiesson², Frederick Arnaud², Marketa Stejskalova¹, Marketa Rehbergerova¹, Alain Kohl³, Petr Volf¹, Maxime Ratinier², Magdalena Jancarova¹

¹ Laboratory of Vector Biology, Dpt. of Parasitology, Faculty of Science, Charles University, Vinicna 7, 128 00 Prague, Czech Republic

² IVPC UMR754, INRAE, Universite Claude Bernard Lyon 1, EPHE, PSL Research University, F-69007 Lyon, France

³ MRC-University of Glasgow Centre for Virus Research, Glasgow, UK; Department of Vector Biology and Tropical Disease Biology, Liverpool School of Tropical Medicine, Liverpool, UK.

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Arbovirus *Phlebotomus toscanaense* (TOSV) is an emerging but still neglected human pathogen that circulates in countries around the Mediterranean Sea. The manifestation of the disease varies from non-symptomatic forms through febrile illness to central nervous system disease. Although, it is one of the leading causes of meningitis and encephalitis, information about TOSV biology and epidemiology is limited. Based on the nucleotide sequences, TOSV is currently divided into 3 genetic lineages A, B and C; but the latter was only described based on partial sequences and virus isolate has never been obtained. Currently, there are only two species of sand flies (Diptera: Phlebotominae), *Phlebotomus perniciosus* and *P. perfiliewi*, considered as a proven TOSV vectors. However, the spread of TOSV to the new areas as well as the TOSV detection in several sand fly species suggested that the vector spectrum could be much broader. Here we aim to study in detail the vector competence of four sand fly species (*P. tobbi*, *P. sergenti*, *P. papatasi*, and *Sergentomyia schwetzi*) to two TOSV strains: 1500590 (TOSV A) and MRS20104319501 (TOSV B). Sand flies were infected by artificial feeding system with blood containing virus and fed females were collected and dissected at days 4, 8 and 14 after infection for virus quantification by infectious viral particles titration and RT-qPCR assay. First, we show that TOSV-B appears to be more successful in development in sand flies than TOSV A. Moreover, *P. tobbi* with an infection rate of 66% and 53% at D4 and D8, respectively, seems to be the most susceptible species with a weak gut barrier to infection. In contrary, *P. sergenti* seems to be less susceptible to TOSV B with an infection rate of 5.5%, even though the virus disseminated in the head of all infected females. Additionally, *P. papatasi* and *S. schwetzi* appear to be refractory to TOSV B strain infection. In conclusion, our data suggest that two more sand fly species (*P. tobbi* and *P. sergenti*) are potential vectors of TOSV. In the context of climate changes and human activities, this information is crucial as sand flies are expected to expand to new areas, together with pathogens they carry.

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