

## ***The tree that hides the forest: not only West Nile virus, but also Toscana virus and Usutu virus***

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To the editor-in-chief,

I thank the authors for the excellent review entitled "West Nile disease in Tunisia: an overview over 60 years" (Hammami *et al.* 2017). I would like to add the following comments.

First, as raised by the authors, epidemic clusters of West Nile virus (WNV) infection in humans as well as sporadic human cases are frequently undetected in Tunisia and more widely in North Africa. The reasons for such a situation are multiple and complex. However, simple approaches that can be rapidly and efficiently built-up should be considered to improve the early detection of WNV circulation in a cost-effective manner. The process for establishing an Early Warning System for WNV circulation in Tunisia would benefit from the implementation of molecular and serological diagnostic tools in clinical, microbiology laboratories collaborating with the Public Hospital system throughout the whole country. As clearly stated, in Tunisia most geographic areas are suitable for an active circulation of WNV during the warm season. Accordingly, cerebrospinal fluid (CSF) specimens that are routinely collected in patients presenting with meningitis and meningo-encephalitis could be tested for the direct detection of the RNA of WNV using real-time reverse-transcription polymerase chain reaction (RT-PCR) assays.

Second, extending the spectrum of pathogens to be tested using systematic syndromic screening would allow for gaining knowledge about the circulation and medical importance of several microorganisms, such as Usutu virus, Toscana virus, among others. Usutu virus, also transmitted by *Culex* mosquitoes, is described in several European countries, but there are few data in Tunisia. Hence, the current knowledge would be improved by systematic molecular detection of Usutu virus in samples already tested for West Nile virus. Toscana virus is another arbovirus, transmitted by phlebotomine sandflies, for which intense circulation is proven in Tunisia (Bichaud *et al.* 2013, Fezaa *et al.* 2014, Sghaier *et al.* 2012). Specifically, seroprevalence studies based on neutralization assays demonstrate human exposure that is approximately 10 times higher

than the one observed in Southern Europe (Portugal, Spain, France, Italy) (Sakhria *et al.* 2013). Such clinical-based surveillance possesses the advantage to explore emerging and neglected viruses of medical importance.

Third, the «oasis effect» should be further studied, since the current limited data gathered in Tunisia suggest that viral circulation is massive, as described by Wasfi and colleagues (Wasfi *et al.* 2016) whose study reported at least 7 out of 21 pools of 5 *Culex pipiens* mosquitoes carrying West Nile virus RNA; this is one of the highest rate of infection reported in the literature. If this confirmed, we might consider oases as "*in natura* laboratories", i.e. the perfect environment for studying the mechanisms of emergence and to operate longitudinal surveillance for selected arboviruses combined with ecological inventories, such as those performed from 1950 to 1970 by the Rockefeller foundation (Calisher 2005, Downs 1982).

Would an emergence with novel virus occur, then such a Early Warning System combined with diagnostic laboratories of the Public Hospital system could provide timely diagnosis of almost any emerging pathogen.

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