

Assessing diversity and abundance of vector populations at a national scale: Example of *Culicoides* surveillance in France after Bluetongue Virus emergence

> **R. Venail**¹, T. Balenghien², H. Guis², A. Tran², M.L. Setier-Rio¹, J.C. Delécolle³, B. Mathieu^{1,3}, C. Cêtre-Sossah², D. Martinez², J. Languille⁴, T. Baldet², C. Garros²

¹ EID Méditerranée, Montpellier, France

² Cirad, UMR Contrôle des maladies animales exotiques et émergentes (Cirad-Inra), Montpellier, France

³ IPPTS, Université de Strasbourg, Strasbourg, France

⁴ DGAl, Direction générale de l'alimentation, Paris, France

Biting midges of the genus *Culicoides* (Diptera: Ceratopogonidae) are small hematophagous dipterans responsible for transmitting major viruses to livestock such as African horse sickness virus in equids, and zoonotic haemorrhagic disease and bluetongue viruses (BTV) in ruminants. Between 1998 and 2005, BTV outbreaks occurred into many countries around the Mediterranean basin associated with the northward extension of *C. imicola*, which colonized new Mediterranean territories in the past decades due to the global increase of temperatures. In August 2006, BTV serotype 8 (BTV-8) was unexpectedly introduced in the Netherlands and was intensively transmitted by autochthonous Palaearctic *Culicoides* species, leading in 2007 and 2008 to a major sanitary crisis in whole continental Europe with huge economic losses due to animal movement restrictions. This chapter presents a synthesis of the data gathered through the different entomological surveillance networks implemented in France since 2000 when *C. imicola* was recorded for the first time in France. These networks aimed at first to monitor the spread and establishment of the invasive *C. imicola* and then from 2006 onwards, to study the diversity and dynamics of autochthonous *Culicoides* species. The data collected enable to describe for the first time the spread of *C. imicola* into French mainland, propose an updated list of *Culicoides* species for France, describe the *Culicoides* species distribution and seasonal dynamics, and report assays to identify BTV in field-collected *Culicoides* during outbreaks.