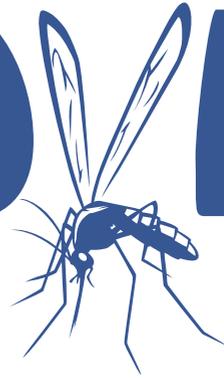


# E-SOVE

the 21<sup>st</sup> conference

2018



**Arthropod Vector Science  
for the benefit of society:  
Educate, Empathize, Engage**

22<sup>nd</sup> - 26<sup>th</sup> October 2018  
Palermo, Italy



**PROGRAM AND ABSTRACTS**

**Modelling temporal dynamics of *Culicoides* populations on Reunion Island (Indian Ocean) vectors of viruses of veterinary importance****Y. Grimaud<sup>1,2,3</sup>, H. Guis<sup>4,5,6</sup>, F. Boucher<sup>3,4</sup>, F. Chiroleu<sup>7</sup>, A. Tran<sup>3,4,8</sup>, I. Rakotoarivony<sup>4,9</sup>, M. Duhayon<sup>4,9</sup>, C. Cêtre-Sossah<sup>3,4</sup>, O. Esnault<sup>2,7</sup>, E. Cardinale<sup>3,4</sup> and C. Garros<sup>3,4</sup>**<sup>1</sup>GDS Réunion, 1 rue du Père Hauck, 97418 La Plaine des Cafres, La Réunion, France<sup>2</sup>University of Reunion Island, 15 avenue René Cassin, 97715 sainte Clotilde, La Réunion, France<sup>3</sup>CIRAD, UMR ASTRE, F-97490 Sainte Clotilde, La Réunion, France<sup>4</sup>ASTRE, Univ Montpellier, CIRAD, INRA, Montpellier, France<sup>5</sup>CIRAD, UMR ASTRE, 101 Antananarivo, Madagascar<sup>6</sup>Institut Pasteur of Madagascar, Epidemiology and clinical research unit, 101 Antananarivo, Madagascar<sup>7</sup>CIRAD, UMR PBVMT, F-97410 Saint Pierre, La Réunion, France<sup>8</sup>CIRAD, UMR TETIS, F-97490 Sainte Clotilde, La Réunion, France<sup>9</sup>CIRAD, UMR ASTRE, F-34398 Montpellier, France

Reunion Island regularly faces outbreaks of epizootic haemorrhagic disease (EHD) and bluetongue (BT), two viral diseases transmitted by haematophagous midges of the genus *Culicoides* (Diptera: Ceratopogonidae) to animals of economic importance such as cattle, sheep and goats. To date, five species of *Culicoides* are recorded in Reunion Island: *Culicoides bolitinos*, *C. enderleini*, *C. grahamii*, *C. imicola*, and *C. kibatiensis*. Although epizootics and *Culicoides* diversity are already well documented, abundance and seasonality of the five species are not. According to a recent viral screening of local *Culicoides* populations (unpublished data), at least four species are involved in the transmission of each virus. Therefore, characterizing the risk period by modelling the temporal dynamics of the five *Culicoides* species is a key step to better understand BT and EHD epidemiology and improve their control.

Between 2016 and 2018, 55 biweekly *Culicoides* catches using OVI traps were set up in 11 sites. A hurdle model (i.e. a presence/absence model combined with an abundance model) was developed for each species in order to determine climatic and environmental drivers of presence and abundance of *Culicoides*.

Regarding abundance, average *Culicoides* catch per site ranges from 4 to 45,875 individuals. Also, diversity differ between sites with *C. imicola* being dominant at low altitude and *C. kibatiensis* at high altitude. A marked seasonality is observed for the 3 other species. Eleven meteorological and environmental determinants were used to model presence and abundance of each species: temperature, humidity, rain, wind, global radiation, vegetation index, eco-climatic area, land use, farm density, animal density and length of nearby watercourse. The association of these determinants to explain presence and/or abundance depends on the species, but each plays a role in at least one species. This is the first study to model *Culicoides* population dynamics in Reunion Island. In the absence of vaccination and vector control strategies, determining periods of high abundance of *Culicoides* is a crucial first step towards identifying periods at high risk of transmission for both viruses.