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PROGRAM AND ABSTRACTS

Modelling temporal dynamics of *Culicoides* populations on Reunion Island (Indian Ocean) vectors of viruses of veterinary importance

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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 According to a recent viral screening of local *Culicoides* populations (unpublished data), at least four species are involved in the transmission of each virus.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.