

## ABSTRACT

### The importance of blood-sucking arthropods in military environment

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**Background:** Mosquito-borne diseases still compromise military operations. A better insight on the presence of vectors in the field and their pathogen load is critical to install a performant Force Health Protection preventive system.

Monitoring the presence of exotic mosquitoes linked to transport from military missions abroad is a key element in prevention of the import of those mosquitoes.

The study presented here has three goals; to create an overview of the arthropods actually present in current operational theatres; to investigate the presence of mosquito-borne viruses in those arthropods; and to explore the risk of import of exotic arthropods into Belgium linked to military operations.

**Research strategy:** Mosquitoes were collected over a period of 3 years (2017-2019) at different locations using different kinds of traps: in several operational theatres, in the cargo of C-130 aircrafts returning from operational theatres, in the military airport and harbor, on the bridge and in the tonnage of ships, and in the military distribution center of Berlaar.

After identification, female mosquitoes were pooled according to their genera and screened for pathogens using Real-Time Reverse Transcription-PCR (qRT-PCR) assays.

**Results:** A total of 3895 mosquitoes were collected; 3191 in operational theatres and 713 on Belgian military sites. The BG-Sentinel traps are efficient and productive means to collect mosquitoes, both in consideration of the numbers of individuals captured and the diversity of species represented (*Anophelinae* and *Culicinae*). *Culex quinquefasciatus* is widely distributed in Mali. Unexpectedly few *Anopheles* mosquitoes were caught in the military basis in Mali. An attempt to develop a SYBR Green-I based one-step real-time RT-PCR assay was made for flaviviruses.

**Conclusion:** Many morphological characteristics are lost during the transport of mosquitoes. This makes the morphological identification of mosquitoes difficult. Genetic techniques (DNA barcoding) were used to identify some specimens. Ideally, identification should be done in theatre. Developing a qRT-PCR for flaviviruses seems to be a great challenge. Well-developed and continuous surveillance programs in the operating theatres are essential for early detection of (invasive) species with public health importance and for prevention and control of emerging pathogens. Shaping the environment to prevent breeding spots is the key element of prevention.