Identification of disease vectors from foreign deployment sites of the Belgian armed forces using DNA-based technologies

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Mosquito-borne diseases impact humans in almost every part of the world. Besides arboviruses, mosquitoes are also vectors of other pathogens of significant public health concern. Mosquito prevention/control measures help reduce

during deployments. Indeed, besides potentially affecting the soldiers' health, diseases can compromise the mission. Medical advisors are assessing the risks and supporting the commander by providing technical advice and training with regard to the



the impact and spread of these diseases. In this framework, the Medical Component of the Belgian Armed Forces has launched a pilot project to investigate the Culicidae biodiversity at foreign sites where the Belgian Army is deployed, in order to minimize mosquito-borne disease threats

prevention and control of mosquito-borne diseases. As support, provides DNA-based species identifications of BopCo mosquitoes to the Laboratory for Vector-Borne Diseases of the Queen Astrid Military Hospital, collected during the on-site surveillance phase.

Deployment Vector Management Strategy

- Identify vectors and evaluate potential impact
- Formulate recommendations
- Distribution of personal protective equipment (e.g. repellents, treated nets and uniforms, vaccines)
- Provide guidance and training on personal protection; provide equipment for surveillance and control measures
- Trapping mosquito species on-site
- Sampling shipment to the medical advisors
- ✓ Identification of mosquito species (morphologyand DNA-based): during and/or after deployment (depending on the deployment's duration)



- ✓ Annotate significant differences between expected and observed risks
- \checkmark Assess the operational risk in retrospect (in comparison to pre-deployment risk assessment)
- ✓ Formulate new or adapt recommendations for potential future deployments at same site
- Report zoonotic experience to appropriate organizations (international)

Surveillance of vectors is the basis for determining what, when, and if prevention/control measures should

INTRO

ODUCTION

Estimate the general vector population levels

be implemented on-site.

METHODS AND RESULTS



Some of the identified mosquito species, and diseases they can transmit



Known vector of the chikungunya, dengue and West Nile viruses, and of dirofilariasis parasites

Primary vector of malaria

Anopheles gambiae s.l. Known vector of the West Nile virus and of filariasis parasites

Known vector of the dengue, yellow fever, chikungunya, West Nile and Zika viruses Aedes aegypt



Known vector of the West Nile virus

Known vector of the West Nile virus and of filariasis parasites



Besides providing essential information to set up mosquito \rightarrow prevention and/or control measures at deployment sites, the present results also support the importance of treating army equipment appropriately when returning to Belgium in order to avoid unintentional introductions of exotic mosquito disease vectors.





Map extracted from Leta et al. (2018): Global country-level occurrences of five selected arboviral diseases.

Picture credit: La défence; Belga; vop.cz; Muhammad Mahdi Karim, Jim Gathany; Verdict Media Limited; Yvonne U Ajamma; Josef Dvorak; Salvador Vitanza; US Army









