



*Ph.D. Thesis Defense*

# *Student Presentation*

Friday, 08 October 2021 at 12:00

**This seminar is open to the public via Zoom at the following link:**

<https://ucy.zoom.us/j/95070819134?pwd=U1FteGVhbGNOMkdSbEhZbTBt0pHdz09>

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### **“Investigating the epidemiology of West Nile virus in its primary hosts and potential vectors in Cyprus”**

West Nile virus (WNV) is a mosquito-borne pathogen causing infections in humans, horses, and birds. In nature, WNV is maintained in an enzootic cycle between birds and ornithophilic mosquitoes, with birds being the main reservoir amplifying hosts, and mosquitoes being the principal vectors for WNV transmission. It is a neurotropic human pathogen as it may lead to a serious neuroinvasive disease, such as WNV encephalitis, meningitis, meningo-encephalitis, or acute flaccid paralysis. To date, more than 80 years since it was first discovered in the West Nile district of Uganda, WNV has spread globally and it is continuously disseminating across Europe and other continents.

WNV is an emerging pathogen in Cyprus, with the first human case of infection reported in 2016, and another documented in 2018. A cluster of cases in humans was then reported in 2019. This PhD research study aimed to combine mosquito surveillance across the five districts of the government-controlled part of Cyprus and WNV surveillance in mosquitoes collected in 2019, as well as in wild birds captured between 2015-2020 to update the risk assessment and identify risk areas. Moreover, the relationship between the number of mosquitoes sampled and weather conditions was investigated for the identification of parameters that would predict mosquito presence and prevalence.

The most abundant mosquito species collected were *Aedes detritus*, *Culex pipiens*, and *Culiseta longiareolata*. Each of these species preferred a different set of environmental conditions, with *Aedes detritus* occurring in higher numbers earlier in the season when it was cooler and drier, *Culex pipiens* being more abundant later in the season when it was either warmer or more humid, but not both, and *Culiseta longiareolata* also occurring in higher numbers in more humid areas. The first positive record of WNV in mosquitoes in Cyprus was also documented. One out of 126 mosquito pools was found to be positive for the presence of WNV RNA. The relatively low WNV positivity in mosquitoes may be attributed to the low number of mosquitoes tested relative to other studies. Based on the outbreak in humans, WNV is likely to be present in other districts beyond the positive pool in Nicosia, and future testing is needed to

survey its prevalence. Furthermore, 11 of 836 avian blood samples were seropositive for WNV IgY antibodies. Seropositivity in wild birds captured in 2015 and 2016, before the human outbreak in 2019, and those from spring 2020, demonstrate prior and ongoing risk for the introduction and spread of WNV in the country beyond the 2019 outbreak. The WNV positivity in a mosquito pool immediately prior to the outbreak of 2019 and WNV seroprevalence in the avian population, before and during the 2019 outbreak, revealed key areas in Cyprus that are at a probable elevated risk for human infection. The findings of the current study contribute to the better understanding of the epidemiology of WNV on the island. The gained knowledge is of high significance for public health, not only for Cyprus, but for many other countries, since Cyprus constitutes a destination for many tourists.