

Potential reservoir and associated factors for West Nile virus in three distinct climatological zones

ABSTRACT

West Nile virus (WNV) is a zoonotic single-strand RNA arbovirus (family Flaviviridae: Flavivirus), transmitted among avian hosts in enzootic cycles by a mosquito vector. The virus has a significant disease effect on humans and equines when it bridges into a cycle with various sequelae with epidemic potential. This study was carried out to identify the potential spectrum of WNV hosts in three geographic areas with climatologically distinct features: Malaysia, Qatar, and the United States of America (U.S.). Serum samples were collected from avian and mammal species suspected to be reservoirs for the virus at these areas in a cross-sectional epidemiologic study. The samples were tested for the presence of antibodies against the virus using an enzyme-linked immunosorbent assay. Data on putative risk factors were also collected and analyzed for significance of association with seropositivity using the logistic regression analysis. Among the tested avian and mammalian species, raccoons had the highest seroconversion rate (54%) followed by crows (30%), horses (27%), camels (10%), other avian species (7%), and canine species (3%). It was almost twice as likely to detect seroconversion among these mammalian and avian species in the fall in comparison to other seasons of the year. Only mammalian and avian species and seasons of the year were significantly associated with the likelihood of seroconversion to WNV when we controlled for other factors in the multivariate analysis. Our data from the U.S. showed that raccoons and camels are susceptible to infection by the virus and may play a role in the perpetuation of endemic foci for the disease.

Keyword: West Nile virus; Climatological zone; Reservoir; Risk factors