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Predicting Hotspots of Marburg Virus in Africa using Ecological Niche Modeling

Straw-coloured or *Eidolon helvum* bats are known as the reservoir of many re-emerging zoonotic diseases such as filoviruses, i.e. Ebola and Marburg virus. On March 22, 2023, a Marburg virus outbreak was reported in Equatorial Guinea. Marburg virus is a dangerous disease with up to 90% fatality rate. In this work, Ecological Niche Modeling (ENM) is used to identify the hotspots in Africa where the Marburg virus may re-emerge, in the future. MaxEnt is a powerful machine learning technique based on the maximum entropy theory that uses presence-only data and returns the probability of suitability of the environment for the species to survive. Presence data of *Eidolon helvum* fruit bats were collected from online sources. Raster images provided by Africlim were used to characterize the background data by 21 different factors. The model was able to accurately predict the hotspots of the *Eidolon helvum* fruit bats in Africa (Area Under the Curve (AUC) > 0.8). Despite the limitations in the prediction due to not having adequate presence samples, a risk map was provided through the trained model. The results of this work could help policy-makers and health officials control and contain the Marburg virus disease in the future.