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Analysis of the Synergistic Epidemic of Arboviruses and Coronavirus Disease in Brazil

Biology - Time: Mon 4:30pm-5:30pm - Session Number: 3066
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Gabriela Jansen

Arboviruses are diseases mainly transmitted by the mosquito *Aedes Aegypti*.Viruses that can be spread by these mosquitos cause Dengue fever, Chikungunya, and Zika infections. These diseases are prevalent in tropical areas where the mosquito strives. Brazil experienced the first outbreak of Dengue fever in 1986. Since then, the population continuously suffers from seasonal epidemics during the rainy season. Chikungunya fever and the Zika diseases emerged in Brazil in 2015. Consequently, reoccurrent epidemics of the three arboviruses became a serious concern for the Brazilian health system. The novel coronavirus disease 2019 (COVID-19) initially registered in Brazil on February 26th, 2020. Subsequently, the numbers increased exponentially and Brazil continuos to have the third highest number of cases, behind only the United States and India. The emergence of the novel coronavirus coincided with the common epidemics of the other arboviruses. The concurrent infection of coronavirus and arboviruses in Brazil can pose a deadly threat to the population, in addition to a serious burden for the health system. The current research project is designed to analyze the trends of the ongoing synergistic epidemic of arboviruses and coronavirus disease to the Brazilian population, along with the socioeconomic impact on the country. The data has been obtained from Brazil's Ministry of Health database from January 2018 to October 2020, including number of infections, number of deaths, gender and age. Comparisons will be made between each disease for the number of deaths and hospitalizations and total numbers of deaths due to arboviruses will be compared before and during COVID-19. Additionally, data on health care system burden before and after COVID-19 will be presented.

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Using novel biologging technologies to study age-old questions of magnetic sensing in free-roaming wild boar

Biology - Time: Tue 11:00am-12:00pm - Session Number: 439
Fabian Ramos-Almodovar, Luis Estrada, Kalliste Capdevila, Michael S. Painter, Department of Biology, Barry University, 11300 NE 2nd Avenue, Miami, FL 33161
Fabian Ramos-Almodovar, Luis Estrada, Kallista Capdevila

Throughout the animal kingdom, a multitude of taxa have been shown to use the Earth's magnetic field for migration, orientation and navigation behavior. For example, the magnetic field has been shown to provide a reliable compass reference during migratory behaviors, whereas specific components of the magnetic field can provide a magnetic map sense. A wealth of field-based observational studies provide evidence for a less intuitive form of magnetic behavior known as spontaneous magnetic alignment (SMA) during which animals passively align the body axis with respect to the geomagnetic field. Not only does the adaptive significance of SMA remain a topic of debate, but designing studies to investigate these relatively subtle spatial behaviors in free-roaming animals under natural contexts have proven challenging, as traditional approaches lack experimental power, are laborious, time consuming, and subject to observer bias. Therefore, we have taken advantage of emerging biologging technologies which provide high resolution data across long-term temporal scales to further characterize SMA in free-roaming mammals under natural contexts. Specifically, we have developed biologging collars equipped with triaxial accelerometer and magnetometer sensors to collect data from free-roaming wild boar (Sus scorfa), previously shown to exhibit SMA during resting and feeding behaviors. In tandem, we are developing behavioral classifiers to identify discrete behaviors in wild boar from raw accelerometer profiles which are then compared to ground-truth video records to evaluate classifier performance. Time-synced magnetic compass orientation can then be extracted from the raw magnetometer data to provide evidence for or against SMA during behaviors of interest (e.g. resting) without the need for direct observation. We look forward to presenting our findings using this novel approach to study magnetic orientation in free-roaming mammals. The continued development of these techniques will offer a powerful approach for studies of spatial behavior in wild animals.

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