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Climate-informed response to an invasion of the Asian tiger mosquito

Abstract:
The Asian tiger mosquito, Aedes albopictus, is among the world’s most invasive species. Its spread has been facilitated by rapid global transport of cargo and potentially by the warming of climate, and it is now established on every continent except Antarctica. This species represents a “triple threat” to human health, being a day-biting pest, a competent vector of globally important dengue and chikungunya viruses, and a potential bridge vector of several zoonotic arboviruses.

As a result of its importance, the biology of Ae. albopictus is also well-studied, but the fine-scale processes by which it becomes established in a given location are poorly understood. This is because even intensive surveillance systems yield limited information during the early phase of invasions when densities are low, and detection often occurs after populations are relatively widespread. Fine-scale spatial models for mosquito dynamics and movement offer a way forward, marrying our understanding of Ae. albopictus biology with surveillance paradigms and detailed data on the real landscapes where invasions occur.

In this presentation, I will consider the impacts of climate on the biology of Ae. albopictus and explore their implications for the ongoing invasion and establishment of Ae. albopictus in Los Angeles since 2011. We have used hierarchical modeling to account for heterogeneities in household-level suitability, then we modeled the stochastic dynamics of Ae. albopictus on this landscape using the suitability surface and a temperature-dependent, dynamical model for reproduction and spread. I will discuss the modeling approach and use the model results to answer policy-relevant questions related to our ability to detect and control these highly invasive mosquitoes.

Tuesday 10 February 2015, 11:00 a.m.
Foothills Lab Large Auditorium

This seminar will be recorded and webcast live, see UCARConnect for more information http://ucarconnect.ucar.edu/live