

IMPACTS OF INVASIVE SPECIES ON ARBOVIRUS TRANSMISSION ECOLOGY IN THE EVERGLADES

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The indirect or cascading impacts of invasive species are difficult to quantify and predict yet have the potential to be even more damaging and costly than the direct impacts. Particularly worrisome are the indirect impacts that invasive species may have on human disease, given the profound ways that invasive species shape ecosystems and the importance of these ecosystems in supporting or suppressing the transmission of pathogens. The composition of wildlife communities can have strong effects on transmission of zoonotic vector-borne pathogens, with more diverse communities often supporting lower infection prevalence in vectors (dilution effect). The introduced Burmese python, *Python bivittatus*, is eliminating large and medium-sized mammals throughout southern Florida, USA, impacting local communities and the ecology of zoonotic pathogens. We investigated invasive predator-mediated impacts on ecology of Everglades virus (EVEV), a zoonotic pathogen endemic to Florida that circulates in mosquito-rodent cycle. Mammal activity and diversity, and mosquito host selection and EVEV infection rate, were measured at field sites across a range of predicted python presence. Using binomial generalized linear mixed effects models, we observed a strong effect of the dilution host (non-rodent mammal) diversity on blood meals in the vector, and a strong positive effect of relative cotton rat host use on EVEV infection in vector mosquitoes. The Burmese python has caused a dramatic decrease in mammal diversity in southern Florida, which has shifted vector host selection towards EVEV amplifying hosts (rodents), resulting in an indirect increase in EVEV infection prevalence in vector mosquitoes, putatively elevating human transmission risk. Our results demonstrate how an invasive predator can impact wildlife communities in ways that indirectly impact human health, highlighting the need for conserving biological diversity and natural communities.

PRESENTER BIO: Dr. Burkett-Cadena is Associate Professor of Entomology at the University of Florida's Florida Medical Entomology Laboratory (FMEL). His research program focuses on the ecology of zoonotic vector-borne disease, especially how environment shapes host selection and arbovirus transmission by mosquitoes and no-see-ums.