

Diversity among bird populations found to reduce threat of West Nile virus

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A biologist and undergraduate student have discovered that what's good for an area's bird population is also good for people living nearby.

The research, by John P. Swaddle and Stavros E. Calos, published June 25 in the online peer-reviewed journal PLoS ONE, indicates that areas which have a more diverse bird population (biodiversity) show much lower incidences of West Nile virus infection in the human population. West Nile develops rapidly in bird populations, and then can be passed to humans or other animals through a vector mechanism, often a mosquito.

Swaddle completed the work while a Sabbatical Fellow at the National Center for Ecological Analysis and Synthesis (NCEAS) at the University of California, Santa Barbara. NCEAS supports integrative research that synthesizes existing data, and makes these data and inferences available for management and policy applications.

Swaddle and Calos's research constitutes the largest-scale application to date of the "dilution effect", a pattern whereby increased biodiversity in wildlife results in lower risks of humans becoming infected by animal diseases. The dilution effect was first reported in Lyme disease, but Swaddle and Calos are the first to demonstrate the dilution effect in a disease that has bird hosts. Other infectious diseases of concern, such as avian flu and bubonic plague, Swaddle said, may fit the dilution effect as well.

"We don't yet know the precise mechanism that drives this pattern, but it's likely to be due to diverse areas having relatively few of the bird species that are particularly competent hosts and reservoirs for the virus," Swaddle said.

Host competence, he explains, refers to a set of qualities that make a particular species of bird best able to contract the disease and pass it on through a vector. The highest levels of host competence are found in crows, jays, thrushes and sparrows-the very birds that tend to thrive when avian biodiversity is reduced.

Swaddle, back in residence as associate professor at the College of William and Mary, points out some implications of his research. Very small changes in land management, he said, could attract more bird species, with the increase in biodiversity paying off in the form of lower human infection rates during outbreaks of West Nile or other diseases in the bird population.

"Biodiversity is giving us a public health service that people have rarely considered and the value of this service should be considered when developing land and managing bird populations in the future," Swaddle said.

Source: University of California - Santa Barbara

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