

A Tiger Tale

Here in sweltering, Congress-free Washington during August, there just has to be a hot topic to fill the political void. This year, it's West Nile virus! (hereafter, WNV for short). It's so common in birds here that in neighboring Montgomery County, Maryland, folks were told not to bring in dead birds to be tested for WNV if their neighborhoods "had their quota." And the County Health Alert now tells us that the virus is in the Asian Tiger mosquito, *Aedes albopictus*, so we put insect repellent on during the day, because the Tiger, unlike the other vectors, is a notorious daytime biter.

What in the world, I hear you cry, is an Asian Tiger mosquito doing in the U.S. capital? Thereby hangs a Tiger Tale, a strange story that begins in Brazil during the 19th century, when the world's appetite for rubber makes the Amazonian city of Manaus a boom town. But even as the residents are feeding champagne to their horses and sending their laundry to Paris, the seeds of biogeographic crisis are being sown. Rubber seedlings are being transported (or perhaps smuggled) by an adventurer named Markham to Kew Gardens in England. There they are propagated, and their descendants are sent to establish rubber plantations in Southeast Asia. Soon Asian rubber dominates the world market, and the elegant Manaus opera house falls into decay (much later to be renovated to delight tourists).

Massive efforts to establish rubber plantations in the New World, notably by Henry Ford, are ruined by a devastating indigenous leaf-blight fungus. Fast forward to World War II: The Asian plantations fall into Japanese hands, and there are crash programs to develop synthetic rubber substitutes in the Allied countries. By war's end, synthetic tires are filling most military needs and are being adapted to civilian use. That would have been the end of this story, but the forces of economic globalization took over and added the twist that brought us the alien mosquito.

The success of small cars made in Japan and Europe changed the world tire market by establishing a demand for radial tires, which require real rubber to stick to the steel belts. That brought about another global shift in the locus of production, and Akron seemed doomed to follow Manaus into economic distress. A by-product of the shift was the birth of a modest secondary market in the U.S. for lightly used Japanese tires. Tire casings are ideal transporters for mosquito larvae; if you doubt this, just try to empty the last pint of water from one. That's how the first cohort of Asian Tiger mosquitoes arrived in the Houston Ship Channel in the early 1980s on a freighter deck, and then established a U.S. breeding population. The invader then spread northward and eastward; unlike its close relative *Aedes aegypti*, it is able to diapause and to survive temperate-zone winters.



Asian Tiger mosquito

This history is a cautionary tale about the relationship between economic forces and biogeographic rearrangement. Globalization is here to stay, but it can have unexpected consequences. Washingtonians worry about their alien mosquito, whereas those responsible for the rubber economy in Malaysia worry that a careless tourist (or perhaps a careful agrobioterrorist) could import spores of the South American leaf-blight fungus. That's why travelers who have come from South America experience fungicidal treatment on arrival at Kuala Lumpur airport.

How worried should Washingtonians really be about WNV and the Tiger? "Concerned but not alarmed" is the judgment of Duane Gubler, director of the Division of Vector-Borne Infectious Disease at the Centers for Disease Control laboratory in Fort Collins, Colorado. The Tiger can carry WNV all right, but the epidemiology here is complicated. The major carriers are *Culex* mosquitoes; they feed primarily on birds, where the main epizootic resides, and rarely bite humans. *Aedes albopictus* is primarily a mammal feeder and could be a human problem were the virus epizootic in wild mammals. We know that WNV sometimes occurs in mammals; if we knew more (could identify a "bridge vector"), we'd be better able to assess the risk. Alas, we don't: We have shortchanged the science base needed by our public health infrastructure, limiting our capacity to deal with infectious agents or their vectors, however they arrive. The Tiger's story, in which globalization, invasive species, and public health merge, is a reminder that we must rebuild that capacity.

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Science **297** (5586), 1445.

DOI: 10.1126/science.297.5586.1445

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Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

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