Opinion: Mosquitoes helped America win independence

By John R. McNeill

The spread of Zika virus by *Aedes aegypti* is not the first time a mosquito-borne virus has broken loose in the Americas. Mosquitos and viruses have shaped the history of the Western Hemisphere in surprising ways for centuries; the United States might not be an independent country without them.

After the arrival of *Aedes aegypti* from West Africa during the transatlantic slave trade, the mosquito colonized parts of the Americas and served as the primary carrier for yellow fever and dengue, viruses that are cousins of Zika.

Together these mosquitos and their fevers decided the fate of empires. In 1697 the kingdom of Scotland attempted to establish a trading colony on the Caribbean shore of Panama. Within two years, however, about 70 percent of the Scots were dead of “fever.” In 1707, Scotland accepted union with England partly to pay debts incurred by the disaster.

By the end of the 18th century, mosquitoes were not just intervening in imperial schemes; they were helping the Americas win their liberty. Yellow fever and malaria ravaged European armies sent to prevent revolution in what is now Haiti and Venezuela, leading to the creation of independent countries.

Even the U.S. owes its independence in part to mosquitoes. In 1780, the southern colonies, which had widespread malaria, became a decisive theater in the American Revolution. British troops had almost no experience with malaria, and thus no resistance to it. American militiamen, and much of the Continental Army, had grown up in the South and faced malaria every summer. So in the summer of 1780, the British Army

hosted its own malaria epidemic, which was particularly intense in the South Carolina Lowcountry. At times, half the British Army was too sick to move.

In 1781, the British commander in the South, Lord Cornwallis, decided to move his army north to avoid “the fatal sickness which so nearly ruined the army” the summer before. His superiors, however, ordered him to move to the tidewater. So in June, Cornwallis dug in at Yorktown.

In the warm months, mosquitoes (including a malaria vector species called Anopheles quadrimaculatus) started to bite and by late summer of 1781, malaria had taken hold of his army once again. Fifty-one percent of his men were too sick to conduct the counter-siege operations that Cornwallis knew were required. American and French forces penned the troops in until Cornwallis surrendered in October, which in effect decided the outcome of the American Revolution.

Mosquitoes only lost their political importance after medical researchers realized that they were spreading the fevers. The first to publish the idea that *Aedes aegypti* could carry yellow fever was a Cuban doctor, Carlos Finlay. U.S. military doctors led by Walter Reed confirmed Finlay’s hypothesis. Armed with this knowledge, when the U.S. Army occupied Cuba (after 1898) and Panama (after 1903) they made life miserable for *Aedes aegypti*—covering up water containers and putting a drop of kerosene into those without covers. Within a couple of years, mosquito control had banished yellow fever from Cuba and Panama’s Canal Zone.

Over the next 70 years or so, mosquito control acquired ever more weapons. Insecticides, such as DDT—brought to bear in the 1940s—proved deadly to all mosquitoes (and other creatures).

But *Aedes aegypti* control proved too successful for its own good. Once the mosquito populations had fallen drastically, and the risk of yellow fever and dengue diminished, budgets

were redirected away from mosquito control all over the Americas.

Had the Zika virus come to the Americas in the 1930s or 1950s its prospects would have been poor—*Aedes aegypti* was under control. But since the 1980s *Aedes aegypti* has made a dramatic comeback in the Americas. While the main reason is the lapse in mosquito control, the warming climate has extended the mosquito's range. Today, Zika's chances of spreading widely among human populations via *Aedes aegypti* are far greater. And it will have help from *Aedes albopictus*, another mosquito capable of transmitting the virus, which arrived from East Asia in the 1980s.

Confronting Zika requires mosquito control. Malaria may have helped Americans win the revolution in 1780-81, but their descendants cherish their liberty and say, in effect, "don't tread on me" in response to pesticide spraying or orders to cover water containers. Perhaps a vaccine will sideline Zika, but until then mosquitos again have a chance to make history.

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