Rift Valley Fever Strategies

Rift Valley fever (RVF) is a viral disease spread to livestock (cattle, sheep, goats and camels) and humans via mosquitoes that transmit the virus through biting. This disease is a major human, agricultural and economic threat in Africa and the Middle East.   It has not reached the United States, but having a way to predict potential outbreaks allows the United States to implement preventive measures. The rapid spread of West Nile virus—once only prevalent in Africa—demonstrates the nature of disease threats, and the importance of being able to track and prevent insect-transmitted diseases.

USDA-ARS researchers partnered with the United Nations Food and Agriculture Organization (FAO), the World Health Organization (WHO) and Federal partners from NASA, CDC and the DoD to form the Rift Valley Fever Outbreak Early-Warning Team in a global effort to develop and transfer an early-warning system to detect and predict RVF.

The model is based on analyzing satellite images to detect when temperatures in the Pacific and Indian oceans elevate concurrently to produce widespread and heavy rainfall in Africa, which causes vegetation to grow at rapid rates in specific areas that experience extremely moist weather conditions, including heavy rainfall, elevated humidity and heavy cloud cover. These conditions flood mosquito breeding habitats and give rise to major increases in the number and longevity of infected mosquitoes that spread the disease. Similar models can also help predict outbreaks of other diseases of livestock and people such as malaria, cholera, and dengue.

A Rift Valley Fever outbreak was successfully predicted several months in advance for the first time with a model developed by a team assembled by USDA-ARS scientists. In October 2006, when the model predicted that RVF would flare up within 3 months in sub-Saharan Africa, a warning was sent to FAO and WHO, which then passed on the warning to countries such as Kenya, Ethiopia, Tanzania, Uganda and Somalia. The early warning allowed the countries most likely to be in harm's way to step up surveillance and controls for disease-carrying insects. Subsequently, from 2007–2010, additional specific warnings were issued to Sudan, Southern Africa and Madagascar months prior to the detection of RVF disease in animals and people.

An outbreak of Rift Valley Fever was blamed for the deaths of hundreds of people in Kenya in 1997–1998. Twenty years earlier, in 1977–1978, an RVF epidemic in Egypt involved 200,000 human cases and 600 fatalities.

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