Migrant mosquito harbors mysterious virus

An Asian mosquito species now spreading through the United States carries a potentially dangerous virus, new research indicates. Scientists say they have no evidence that the mosquito, which has migrated into 20 states since it arrived in Texas five years ago, has caused illness in any of those states. But the virus discovery raises the ante in a debate about the danger posed by this imported, aggressively biting insect.

The Asian tiger mosquito, *Aedes albopictus,* hit U.S. shores in 1985, lurking in a batch of used tires imported from Japan. Since that landfall, the black-and-white-striped immigrant has colonized the U.S. South and Midwest with extraordinary rapidity (SN: 9/23/89, p.202).

Some researchers fear that the mosquito, which in the Eastern Hemisphere transmits debilitating and sometimes fatal tropical diseases such as dengue fever and Japanese encephalitis, might serve as a carrier for these or other infectious diseases in the United States. Indeed, laboratory tests with deliberately infected mosquitoes have shown that *Ae. albopictus* can transmit several New World pathogens, including LaCrosse encephalitis virus, a mosquito-borne organism that already infects tens of thousands of U.S. individuals annually, causing brain inflammation in about 100 each year. But until now, scientists had no evidence that free-living *Ae. albopictus* in the United States actually harbored any viruses.

D. Bruce Francy, an entomologist with the U.S. Department of Agriculture in Fort Collins, Colo., presented the first such evidence last week in New Orleans at the annual meeting of the American Society of Tropical Medicine and Hygiene. Francy and his colleagues collected more than 14,000 *Ae. albopictus* specimens from sites in Indiana, Illinois and Missouri, then subjected batches of them to sensitive virus-culture techniques. To their surprise, they found that mosquitoes collected near Potosi, Mo., harbored a previously unidentified member of the Bunyamwera virus group.

It remains unclear whether this microbe, dubbed Potosi virus, can cause human illness. Some Bunyamwera viruses appear innocuous; others cause encephalitis in Panama and Africa, Francy says. In recent experiments, he found that laboratory mice whose brains were infected with the Potosi virus died in about nine days.

Francy notes that a preliminary search for Potosi virus antibodies in Missouri residents came up negative, suggesting the mosquitoes have not transmitted the virus to significant numbers of people. However, he adds, "this recovery of naturally infected mosquitoes clearly establishes the potential for this mosquito species to become a vector . . . of public health importance in the United States." Even if Potosi virus proves harmless, he says, "we think it's quite possible that *albopictus* may become involved in the transmission of LaCrosse virus and other viruses with human pathogenic potential."

Details on the Potosi findings will appear soon in SCIENCE, says co-worker George Craig, an entomologist at the University of Notre Dame in South Bend, Ind. He and others have expressed increasing alarm as *Ae. albopictus* — in defiance of state and federal mosquito control efforts — has almost completely displaced the more placid and easily controlled *Ae. aegypti* from many southern states. Richard L. Berry of the Ohio Department of Health in Columbus likens the spread of *Ae. albopictus* to a wholesale distribution of empty guns. "Sooner or later," he says, "Mother Nature is going to pass out the ammunition."

Not everyone agrees that the Asian mosquito's spread seriously threatens U.S. public health. "Could an [*Ae. albopictus*-generated] epidemic happen? Sure," says entomologist Robert W. Gwadz of the National Institute of Allergy and Infectious Diseases in Bethesda, Md. "But has it happened? No. And do I lose sleep over it? No."

Besides, he and others say, there's no love lost over the displacement of *Ae. aegypti,* which can transmit yellow fever.

Nonetheless, many entomologists voice concern that nearly every U.S. effort to eradicate the resilient Asian intruder — whether by burying used-tire piles, eliminating sources of standing water or applying insecticides to surrounding areas — has failed.

"It's just a matter of time before *albopictus* becomes a vector for a human pathogen in this country," says Thomas Monath of the Army Medical Institute of Infectious Diseases in Frederick, Md. "But just how important it will be remains to be seen." — *R. Weiss*

Stellar 'dots' pinpoint galactic distances

Just as the sun-dappled images in a Seurat painting dissolve into tiny dots of color when viewers near the canvas, close scrutiny of electronically generated galactic images reveals the "dots" of starlight making up those images. Astronomers using state-of-the-art telescope technology to examine and then compare neighboring collections of dots, or pixels, within an image report that their pointillistic approach offers a highly accurate method for measuring a galaxy's distance from Earth.

The technique, they say, promises to generate new data on the universe's rate of expansion and other cosmic enigmas.

To improve upon standard methods of measuring galactic distance, John L. Tonry and his colleagues at the Massachusetts Institute of Technology sought to obtain more precise values for the average brightness of stars within a small patch of sky. In their galactic images, each pixel collects light from such a patch, and each patch contributes to the overall brightness. By calculating the average surface brightness of a star in a patch, and comparing these values with estimates of the star's actual brightness — which includes far more light than ever falls on the CCD detector — Tonry's team determined how far away from Earth a star and its galaxy lie.

To analyze galactic light as discrete points, the astronomers relied on a highly sensitive, computer-chip-like detector known as a charge-coupled device (CCD), which contains a grid of light-sensing elements. The researchers examined galaxies in the Virgo cluster, using a CCD attached to the 4-meter telescope at the National Optical Astronomy Observatories near Tucson, Ariz. They knew that the total amount of light recorded within each pixel represented the contribution from about 1,000 Virgo stars — information sufficient for a rough calculation of the average brightness of an individual star. But comparing the varying brightnesses recorded at adjacent pixels on the same CCD image yielded a more accurate average value, Tonry says.

This comparison enabled the group to determine the distances of several Virgo galaxies with an error margin of only 3 percent, or several times the precision of other methods, they report in the November ASTRONOMICAL JOURNAL.

The new technique for assessing distance may help clarify or confirm a variety of cosmological phenomena, says Alan M. Dressler of the Carnegie Institution of Washington in Pasadena, Calif. Since the 1920s, when Edwin P. Hubble discovered that a galaxy's speed increases in proportion to its distance from another galaxy, scientists have equated velocity measurements with distance, Dressler notes.

The comparative approach — which doesn't require measurements of galactic velocity or mass — may shed new light on the assumed uniformity of the "Hubble flow" of galaxies, as well as indicate the magnitude of deviations from the flow, he says. Some researchers attribute such deviations to a localized concentration of mass, dubbed the Great Attractor (SN: 1/27/90, p.60).

Tonry told SCIENCE NEWS that he and Dressler have begun collecting data on galaxies in the Fornax and Centaurus clusters. Centaurus, he adds, may contain part of the Great Attractor. — *R. Cowen*