New tool to map malaria developed

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The olive sunbird, a tropical rainforest bird that SF State scientists studied in order to map malaria in Africa.

Malaria kills an estimated 1 million people each year, but humans aren't the only animals under attack. Birds also contract the disease through mosquito bites. SF State biologists have been studying malaria among birds in Africa in an effort to understand the geography of the disease, and their work has culminated in the creation of a new model, capable of predicting where malaria is present now and where future outbreaks could occur.

"We can now predict where malaria will show up in Africa," said Ravinder Sehgal, assistant professor of biology. "We expect our results could apply to malaria in humans, too, since mosquitoes are mosquitoes, whether they are biting people or birds."

Malaria is caused by tiny parasites which are transmitted from a mosquito's saliva into the human body, where the parasite, called Plasmodium, multiplies within red blood cells.

For the last 20 years, SF State scientists have been collecting blood samples from the olive sunbird, a tropical rainforest bird found across West Africa. Recently they mapped the prevalence of the parasite Plasmodium in these birds. Studying birds enabled them to examine the dynamics of the disease, even in remote areas where there are no human inhabitants, and allowed them to analyze the relationship between ecological conditions and malaria without human factors getting in the way.

The researchers collected hundreds of blood samples from birds at 28 sites in West Africa, and compared the results against maps of conditions, such as rainfall, temperature and vegetation type, identifying relationships between environmental conditions and malaria infections.

"We used this data to create complex computer algorithms that can predict the prevalence of malaria in regions where malaria levels aren't known, or predict future scenarios, when climate change or deforestation might affect the spread of the disease," Sehgal said.

So far, testing has proved the model to be accurate in predicting avian malaria in Cameroon, Ghana and Cote d'Ivoire, countries where levels of the disease are moderate. However, Sehgal says more work is needed to refine the model for use in areas where the parasite Plasmodium is extremely prevalent. "We're going to refine the model to work better in the very humid Nigerian rainforests where malaria levels are thought to be very high, and we also hope to expand the model for use in East and South Africa," Sehgal said.

More information: Sehgal and colleagues published their research in September in the biology journal *Proceedings of the Royal Society B*.

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