

Red Orbit, USA

DNA 'Barcodes' May Prevent Spread Of Elephantiasis

Posted on: Wednesday, 29 April 2009, 15:10 CDT

For the first time ever, scientists are using DNA "barcodes" to help prevent the spread of a elephantiasis, an often disfiguring disease that affects roughly one billion people in 80 nations throughout the world.

The University of Ghana is pioneering use of the "barcodes", which will be used to map mosquito species in West Africa that spread the disease, also known as lymphatic filariasis (LF).

The underlying technology allows scientists to quickly and accurately distinguish species based on a simple DNA analysis.

Using a short DNA sequence from a particular genome region, scientists can then obtain a species' 'barcode' identity. Such barcodes are needed because closely related mosquito species, with differing abilities to transmit LF, are otherwise hard to distinguish.

The ability to precisely identify mosquito species in this way is a promising advance in the battle against LF. More than 120 million people have the parasitic infection, which has left 40 million permanently disabled or disfigured.

The research is helping to identify species spreading the worm larvae that clog the human lymph system, often causing grotesque swelling. By revealing the species' habitat and range, it also helps improve our understanding of environmental factors that influence their breeding and abundance.

"The scientific breakthrough of DNA barcoding, which grew explosively from a single Canadian research paper in 2003, is shedding new light on LF – a horrific and entirely preventable health scourge in developing countries," said principal investigator Prof. Daniel Boakye of the University of Ghana.

"Beyond the immediate battle against this disease in West Africa, the value to human health of these important new tools will grow as the range and habitats of specific mosquito species shift due to climate change."

LF is a leading cause of permanent and long-term disability throughout the world, and results from a microscopic, thread-like worm spread between humans through a mosquito bite. Living within the blood, the worm larvae grow into adults that mate and produce other larvae, known as microfilariae.

Symptoms often appear years after infection. The disease can permanently damage the lymph system and kidneys, which results in fluid collecting and swelling in the arms, breasts, legs, and, for men, the genital area. The disease also makes it difficult for the body to fight germs and infections.

Poor sanitation and rapid growth in tropical and subtropical areas has created more places for mosquitoes to breed and thus to more LF infection.

World health authorities have earmarked the disease for eradication by 2020 through mass drug administration (MDA). Officials are identifying communities where LF is endemic and treating people at risk with annual doses of a combination drug therapy.

The drugs reduce the density of worm larvae in humans. This LF elimination strategy relies on a belief that the region's main LF vector, the Anopheles mosquito, is incapable of transmitting low-density worm larvae.

However, the Anopheles family is highly diverse and contains hundreds of species. And new molecular studies reveal that not all Anopheles species are created equal, with some able to transmit the disease despite the drugs' thinning of the worm larvae.

The research is identifying places infested with the menace species and, therefore, where the drug strategy needs to be supplemented with insecticides to successfully eliminate LF.

Prof. Boakye said that blanket vector control using insecticides can have serious impact on non-target organisms, leading to biodiversity loss. The additional information and insights into specific mosquito species allows for those species and areas to be targeted, reducing the level of spraying and its effect on other organisms.

"The expertise to create databases is in short supply in Africa; the JRS Foundation is assisting science in very meaningful ways," he says.

On the Net:

- [University of Ghana](#)
- [JRS Biodiversity Foundation](#)

Source: redOrbit Staff & Wire Reports