

Report from the 5th International Congress of Vector Ecology

By Thomas Buckley
for
The City of Lake Elsinore
And
The Northwest Mosquito and Vector Control District

For the edification of our residents I have compiled my notes from the recent Congress. I hope they will be helpful and that we can all benefit from the information provided below.

It is only in a room full of bug killing scientists that you will hear anyone openly wish that Batman was really more like a bat and ate bugs rather than fought crime. That being said, the 300 or so people who attended the Congress were some of the most dedicated and aware group of professionals I have ever met. They know the importance of the subject; they know that the mosquito is one of the most deadly animals on the planet; they know that vectors have no boundaries; they know that cooperation leads to the saving of lives. Here are the useful highlights of the Congress.

Military Issues:

One of the most moving moments of the Congress was when a seemingly innocuous photo was put up on the screen. It showed a soldier in Iraq sacked out on the hood of a Humvee. The presenter, an armed forces entomologist, then asked the audience if they noticed anything odd. To be honest, no one did. He pointed to the soldier's boots on the top of the Humvee – they had common flea collars wrapped around them in a vain effort to stave off sand flies, the cause of leishmaniasis, which, though non-fatal, is a disease that causes recurrent open sores and has affected about 2,000 soldiers.

The US military has been trying to fight this problem since day one and has numerous fighting entomologists on the ground in Iraq and Afghanistan. It appears they have some success, but the problem still remains (the flea collars don't work, by the way.) German forces in Afghanistan have begun building block walls around their camps rather than relying on earthen berms in large part because of leishmaniasis – the flies cannot fly over three meters high and the gerbils (yes, gerbils) that are a disease reservoir can no longer burrow into the berms. This seems to have had a major positive impact on the situation and is under investigation by other nations. (The Canadian representative at the Congress said their forces in Kandahar are having surprisingly few bug-related problems, adding that their two main health issues are diarrhea and STDs.)

The US Armed Forces Pest Management Board maintains five labs around the world to study vector issues facing the military. They have developed uniforms that are treated with the repellent permethrin, assisted with disaster response, and are working on numerous ways to curb and cure vector-borne disease. One recent study showed that DEET, a popular mosquito repellent, actually loses its efficacy surprisingly quickly when people exercise. The typical sedentary (say a backyard BBQ) effectiveness time range is about six hours; vigorous exercise (say jogging, yard work) can reduce that to as little as two hours.

On a side note, a presenter noted a surprising emergence of malaria in Korea, mostly along the demilitarized zone. He stated that it appeared that it came from China via North Korea and may be difficult to stop due to the environment of the DMZ, both physical and military (it's rather marshy in spots and spraying pesticides from helicopters, for example, is out of the question as the helicopters would tend to get shot down). His comment caused the representative from the Chinese CDC to become rather excited, who angrily stated that it was impossible that malaria went from China to Korea. In order to avoid an international incident, the presenter publicly hedged a tiny bit, but afterwards privately reiterated his position.

Finally, a quote from an Army entomologist to close: "In the field, if you're the bug guy you're the medical guy too so everything comes to you...We're here to provide protection from enemies with more than two legs."

Potential New Disease Threats:

Dengue – Also called "brokebone disease," dengue is prevalent in Africa, Asia, and Central and South America and may be moving north. Carried by the mosquito *aedes aegypti*, an urban mosquito well habituated to interaction with humans, dengue's nickname of "brokebone" is highly accurate. The main symptom is a feeling for a few weeks that something has broken most of the bones in your body. The good news is that a dengue vaccine is being developed and the disease will soon face a smallpox-type eradication effort. It has not yet appeared in America.

Chikungunya – Similar to dengue, though spread mainly by *aedes albopictus*, the disease is sometimes mistaken for dengue. Having the disease can essentially be like catching horrible arthritis that could last for years. It has not yet appeared in America.

Blue Tongue – A disease of sheep that is aptly named is spread by midges and has already appeared in America, in big horn sheep in Riverside County to be exact. It can be fatal to various types of animals – sheep, cattle, etc. – but does not appear to be able to jump to humans yet.

There are three other potential new disease that could "go urban" and arrive in America – Mayaro, similar to dengue; Zika, similar to dengue and very infectious (an outbreak on the island of Yap infected 73 percent of the population); and Venezuelan Equine Encephalitis, a

disease that appeared briefly in Texas 20 years ago and for some reason retreated back into Central America. Mostly limited to horses, VEE can jump to humans, where it can make a person crazy and then kill them.

New Protection Strategies:

Your HVAC system already offers rather good protection from mosquitoes, but it could soon become even more effective. Mosquitoes, in large part, find people by tracking the carbon dioxide emission when a person breathes. UC-Riverside researchers have discovered at least three compounds that “turn-off” the neurons in the mosquito’s brain that detects carbon dioxide, making people far harder to find. These compounds could be put into HVAC filters and outdoor emitters to provide spatial mosquito protection. As for topical protection, researchers are looking at which other human odor compounds attract mosquitoes and are trying to develop masking compounds. (By the way, it is true that some people are far less attractive to mosquitoes than others due to their individual odor compounds. It is also true that women who are ovulating should re-apply DEET more often than normal as they are highly attractive to mosquitoes.)

Another new concept is the mosquito curtain. Similar to mosquito bed nets, the new curtains cut the number of mosquitoes in a home (windows open) by more than 50 percent. Also, the curtains are being designed to be sheer, attractive, and match interior décor. They can also be used outside, for example around a covered patio. It is not yet clear when they will be available in the United States as Bayer, the manufacturer, is still testing them in Mexico.

The Implications of Malaria Eradication:

As many people know, Bill Gates has pledged \$1 billion to eradicate malaria, a disease that kills at least 1 million people every year. A number of presenters moved beyond science when discussing malaria and integrated vector management, citing some startling statistics. Malaria, said one, is a disease of poverty, illiteracy, and corruption and demands more than just new pesticides.

Sadly, not every third-world country sees malaria necessarily as a problem. In nations that already cannot feed, house, clothe, and provide opportunities for their existing populations, death by malaria may be seen as a “safety valve,” i.e., fewer people mean fewer problems. Additionally, people who do not die from malaria tend to be chronically ill for most of the rest of the lives. These are not people who have the physical stamina to take to the streets and demand change, which to a despot is a good thing.

Obviously, the eradication of malaria is a laudable goal and a good thing. However, it is just as clear that the Gates program must go beyond the science and address the other issues. Assume malaria has been eradicated – there are now millions of more people who need to

access various resources, resources that are already stretched beyond the capacity to provide for the existing population. Therefore, does not dying of malaria at the age of five mean that a person will starve to death at the age of 10, or die in a civil war at the age of 15?

The places currently struggling with malaria have significant problems – lack of infrastructure, lack of resources, lack of opportunity, lack of proper governance, lack of freedom to choose another path in life – and adding millions of people to these already over-stressed systems could lead to horrible disasters. (Remember, the famines in the Horn of Africa have been largely man-made by callous governments.)

On the positive side, one must always remember that while every person borne has a stomach, they also have a brain and two hands and can work towards change. I've been asked to write a paper on the topic for the World Mosquito Control Association (another unpaid volunteer job).

In conclusion, I hope this memo has been helpful and educational. Our city can be proud of its involvement with the NMVCD, the headquarters of both SOVE and the WMCA, and an international leader in vector control.

Thomas Buckley