Press release

Intelligent mosquito counters made in Germany: facing competition from Microsoft?

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Regensburg, Germany, 2016/06/29 - Scientists all over the world can now track the growth of mosquito populations on their computers. "The BG-Counter is a new kind of mosquito counting machine that allows scientists and health authorities to be proactive against a coming infestation," says Dr. Martin Geier of Biogents AG in Regensburg, Germany. The high-tech equipment was developed by the Regensburg mosquito experts in cooperation with a company from Silicon Valley and has been successfully tested since autumn 2015 in the Florida Keys on the southern tip of the Florida peninsula. The counter is now going into serial production. Recently, a demonstration model has come online at Lake Starnberg south of Munich. Since mid-June, it has been possible to track the increase in mosquito populations after the recent floods and even the times at which these insects are particularly active.

Last week, Microsoft announced that it was developing a similar mosquito trapping system, indicating that the demand for such intelligent mosquito traps is great and will continue to grow in the future. Globally, mosquitoes are considered among the creatures most dangerous to humans. Hundreds of thousands of people die each year from mosquito-borne diseases. Biogents AG, headquartered in the Bavarian city of Regensburg, has a prominent position in this promising market. For example, Biogents traps are considered the gold standard for Yellow Fever and Asian tiger mosquitoes around the world. No wonder since they are based on more than twenty years of intensive research and development.

Whether the Microsoft traps will be comparable to those made by Biogents remains to be seen. "Microsoft wants to develop traps into some kind of flying laboratories that are supposed to solve every issue related to mosquito monitoring in one fell swoop. Our experience shows that it's better to establish effective technologies step-by-step and integrate them over time," says Dr Geier. Most importantly: before mosquitoes can be analysed and counted, they first must be attracted and trapped. When it comes to this essential detail, Biogents leads the field. Their particularly efficient traps are used by public health authorities and scientists worldwide. Even the US Centers for Disease Control and Prevention (CDC) recommends using Biogents' BG-Sentinel traps as

a monitoring tool in the fight against Asian tiger mosquitoes and Yellow Fever mosquitoes. Both these mosquitoes can also transmit Dengue, the Zika virus, and the Chikungunya viruses and are therefore considered to be particularly dangerous. According to the CDC, BG-Sentinel traps are currently the mosquito traps most commonly used to catch adult tiger mosquitoes.

The field trials of the BG-Counter on the Florida Keys have been very successful. 80-90% of the trapped mosquitoes are correctly identified and counted. "Other mosquito-fighting organisations have indicated their interest in these new counters," says Geier.

Since February, Biogents has joined forces with Irideon SL in Spain and the Technological Educational Institute of Crete to further develop the BG-Counter's sensors. The aim: to distinguish different mosquito species caught in the trap, and to identify those that are especially problematic as potential disease vectors. This project called REMOSIS (Remote Mosquito Situation and Identification System) is being funded by the EU's Horizon 2020 programme. Researchers around the world will then be able to track carriers of disease and invasive species even more accurately than ever before.

Reference: Pruszynski C (2016) The BG-Counter: A New Surveillance Trap that Remotely Measures Mosquito Density in Real Time. Wing Beats 27:1, 13-18.
Link: http://wingbeats.floridamosquito.org/WingBeats/

About Biogents AG:
Biogents mosquito traps are the result of more than 16 years of research in the behaviour of mosquitoes performed at the Institute of Zoology of the University of Regensburg. The result is a novel, highly effective type of trap that is used in diverse models for different regions and mosquito species.

According to the CDC (Center for Disease Control and Prevention), the Biogents traps are one of the most highly used mosquito traps to collect adult tiger mosquitoes (*Aedes aegypti* and *Aedes albopictus*).

Background – see press release in April:
An important aspect of successful mosquito control programs is quality control: What mosquito species are actually present, what are their population dynamics, and how are they actually affected by control measures? Answering these questions is the task of mosquito monitoring. This is done with special mosquito traps, often provided worldwide by Biogents (BG), a highly specialized

company from Regensburg, Germany. For important disease vector species, Biogents mosquito traps are widely considered as the gold standard.

On the Florida Keys - a chain of islands at the southern tip of the Florida peninsula - a novel and advanced Biogents trapping system for monitoring mosquitoes is now being tested. Called the BG-Counter, it is based on a Biogents mosquito trap with carbon dioxide as an attractant. The trap is complemented by a sensor module, which was developed together with the American company onVector. This module counts the captured mosquitoes electronically via a patented infrared light barrier, and discriminates mosquitoes from other insects or foreign particles with an accuracy of around 90 percent. At the same time, it continuously measures additional factors that are also needed for the assessment of future population dynamics and risks: Temperature, wind, relative humidity, and, if necessary, other environmental parameters. The collected data are regularly fed into the Internet. They can be accessed via a web-based interface, which can also be used to control the BG-Counter remotely.

To date, each of the 16 technicians of the Florida Keys Control District (FKMCD) spends about two hours per day to monitor the islands' mosquito populations. This is done at a total of 266 locations. The technicians record the number of mosquitoes that land on them within a minute before they proceed to the next locations to repeat the procedure. The data are collected following a regulation of the Florida Department of Agriculture and Consumer Science on mosquito control. The aim: To apply mosquito control measures as early as possible, in order to prevent or at least to mitigate the development and spread of large mosquito populations. The novel BG-Counter traps simplify the data collection, raising the efficacy and reducing the costs. "The freed resources can then be used in a long term and more focused, specific mosquito management," says Dr Martin Geier, Managing Director of Biogents AG in Regensburg, Germany.

The solar-powered BG-Counter is the first commercially available mosquito trapping system that allows for a precise monitoring of mosquito population over wide areas, in real-time, directly from the computer, and with minimum manpower. The real-time transmission of mosquito catch data also helps to identify activity patterns and to better understand population dynamics. The BG-Counter will help to better monitor mosquito populations and manage their breeding grounds. Countermeasures can be initiated earlier, more precisely, and therefore more effectively and with less environmental impact. The real-time data acquisition with BG-Counters also allows for a detailed assessment of how effective control measures are. This is especially important in countries were mosquitoes are also transmit diseases.

Supported by the EU's Horizon 2020 program, the REMOSIS Project (short for Remote Mosquito Situation and Identification System, www.remosis.eu) will now develop the BG-Counter even further. The aim is a sensor module which will be capable of distinguishing different mosquito species. This way mosquito species that are particularly dangerous for humans, such as tiger mosquitoes, can be targeted more precisely and more focused than before. (Tiger mosquitoes like the Asian Tiger Mosquito, *Aedes albopictus*, or its relative, *Aedes aegypti*, are vectors of yellow fever, dengue, chikungunya, and Zika virus.) Last, not least, the incorporation into the Internet if Things (IoT) will greatly facilitate the joint analysis of a host of data from traps in different contexts, as well as from other devices. This will make mosquito control and the prevention of mosquito borne diseases more specific, environmentally friendlier, and easier to plan.

Mosquitoes are mainly a nuisance in some countries. However, at the global level, mosquitoes top the list of creatures that are dangerous to humans. As carriers of many pathogens, they kill hundreds of thousands of people every year.