BEE GUT MICROBIOTA

Significant declines in bee populations over the last two decades have raised concerns in Europe and North America. While such a phenomenon has not yet been reported in Africa, devastating bee pathogens such as mites and viruses are being increasingly found in the continent. As a result, bee health is now a priority of national governments, development agencies as well as farmers and beekeepers.

icipe, Kenya Agricultural and Livestock Research Organization (KARLO) and the University of Liverpool, UK, have received a grant from the Newton Fund to develop microbe-based strategies for improved bee health. The research will involve characterising the gut microbiota of African honey bees, the 'friendly bacteria' that aid insect defence against pathogens. Overall, these studies will contribute towards food security in Kenya by reinforcing bee pollination services, and also enhance rural incomes by bolstering the quality and quantity of bee derived products.

In addition, the research is envisioned to elevate *icipe*'s ongoing bee gut microbiota studies to world-class status, connecting it to European and USA networks. Further, this research project will contribute to the understanding of the causes of global bee population declines and develop a potential bee health diagnoses technique based of bee gut microbiota characterisation.

A panel library of bee gut microbiota will also be established, forming an invaluable tool for future *icipe* research and for the scientific community.

SCHISTOSOMIASIS RESEARCH

icipe, Kenya Medical Research Institute (KEMRI), Egerton University, Kenya, the University of Aachen and the Helmholtz Centre for Environmental Research, Leipzig, both in Germany, have received a research grant from the German Research Foundation (DFG), to conduct studies on Schistosomiasis, a neglected tropical disease.

Caused by blood flukes (trematode worms) of the genus *Schistosoma*, this acute and chronic parasitic ailment is transmitted through contaminated fresh water (lakes and ponds, rivers, dams) inhabited by snails carrying the parasite. Larvae from the snails, once in contact with an individual, penetrate the skin and then develop into adult schistosomes that live in the blood vessels for years. The females continue to release eggs, some of which are passed out of the body in the faeces or urine thereby continuing the parasite's lifecycle. Others become trapped in body tissues, leading to immune reactions and progressive damage to organs.

Schistosomiasis disables more than it kills, resulting in significant economic and health impacts.

Schistosomiasis disables more than it kills, resulting in significant economic and health impacts. In children, the disease can cause anaemia, stunting and a reduced ability to learn, although the effects are usually reversible with treatment.

Estimates show that at least 258 million people in 52 endemic countries required preventive treatment in 2014 alone.
Around 90% of those most vulnerable to Schistosomiasis live in Africa, with the disease being overly prevalent in communities without access to safe drinking water and adequate sanitation.

In Kenya, control of Schistosomiasis involves largescale treatment of population groups at risk, provision of safe water, improved sanitation, hygiene education and snail control. This latter aspect is an important component in the fight against Schistosomiasis, and a clear understanding of the snails' ecology is required to predict its distribution and vectorial capacity.

Therefore, the research by *icipe* and partners, which will be conducted in western Kenya, will have two thrusts. The first is investigations of the effect of freshwater pollution (specifically the effects of pesticide pollution) on the distribution and vector competence of Schistosoma host snails in freshwater streams. The second research aspect will be an assessment of exposure of water and biota to pesticides and other pollutants to investigate the exposure of host snails as well as of competitors to pesticides and other potentially toxic chemicals.