Woman and cattle in West Africa
Image Poppy Berdoy-Webster

Battling evolving parasites in West Africa

Working in the lab at Barkedji, Senegai
Image Poppy Berdoy-Webster

Adult schistosomes
Image Anna Borlase

For more information about the ZELS programme please visit: bbsrc.ukri.org/zels

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The ability of some parasites to adapt to human efforts aimed at overpowering them is extraordinary to observe – and a major challenge for everybody seeking ways to achieve sustainable disease control or elimination.

This was the case for researchers working in West Africa on the ZELS project **Epidemiology and evolution of zoonotic schistosomiasis in a changing world.** Schistosomiasis, infection with blood flukes, is among the group of diseases known as neglected tropical diseases (NTDs) because, despite the enormous health and livelihood impacts it has little attention has historically been paid to it. More than 240 million people are infected with schistosomiasis globally, predominantly the poorest of the poor.

"These impressive parasites can rapidly change and adapt to all that is thrown at them, always to maximise their own reproductive success and fitness. This emphasises the importance for bio-scientists and policymakers that they too must adapt in response if we are ever to achieve sustainable control and improve human and animal health."

Lead researcher Professor Joanne Webster

Recent large-scale, mass drug administration programmes aimed at school-age children have had some success, particularly in terms of reducing morbidity, and helped lead to a revision of the World Health Organization's (WHO's) strategic plan and a vision for "a world free of schistosomiasis". Yet, despite such successes, challenges remain – in particular, those exerted as new selective pressures placed on the schistosomes (the parasite causing the disease) result in their rapid change and adaptation as they maximise their ability to survive and multiply.

A major finding of the ZELS researchers working in West Africa found that ongoing hot-spots of schistosomiasis transmission and sickness among both children and adults in Senegal and Niger were driven not by a human schistosome species, as had been previously assumed, but through schistosome species from humans and their livestock combining and forming highly transmissible viable parasitic hybrids.

Determining the infection and disease dynamics of these hybrids – that are biologically ingenious but alarming in disease control terms – therefore became the key research focus for the team. Such work, through revealing the interdependence between people, animals, parasites and their environment, has helped incorporate a One Health approach into the currently revised WHO guidelines for schistosomiasis elimination in sub-Saharan Africa, as well as facilitating appropriate awareness and treatment practices within disease-endemic regions. The results will also enhance our understanding of a wide spectrum of multi-host parasitic diseases of people and animals across our rapidly changing world.

Epidemiology and evolution of zoonotic schistosomiasis in a changing world

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Zoonoses in Emerging Livestock Systems