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Parasites Transmission through Global Changes.

Amelia Smith*

Department of Biotechnology, Nanyang Technological University, Singapore

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Editorial

Infections with parasites are common in animal, cattle, and human populations, and parasite rich habitats are common. Their negative consequences, on the other hand, can be devastating. Understanding how predicted and cryptic changes in a system affect parasite transmission at the individual, local, and global levels is crucial for long term human and cattle management. We present information on the possible impacts of 'system changes' (both climatic and anthropogenic) on parasite transmission from natural host-parasite systems. Such data could help develop more effective and long lasting parasite control programmes for domestic animals and humans. Many examples from a variety of terrestrial and aquatic natural systems demonstrate how abiotic and biotic elements influenced by system changes can interact additively, multiplicatively, or antagonistically to influence parasite transmission, such as changing habitat structure, biodiversity, host demography, and evolution. Despite this, few studies of managed systems explicitly include these higher order interactions, as well as the subsequent consequences of parasite development, which can obscure or exaggerate measured control effects.

Climate change, pollution, ocean acidification, habitat loss and fragmentation, urbanisation, agricultural expansion and intensification, and other changes in the use of water and land resources are all affecting all species on the planet, either directly or indirectly. These shifts may cause crucial thresholds, or planetary boundaries, to be crossed or corroded, resulting in physiological stress or complete system malfunction, with detrimental repercussions for individuals, populations, and species. The natural history of parasites and the risk of infectious disease will be significantly influenced by such mechanisms.

The expectation of global change is currently not reflected in human parasite intervention programmes; instead, the focus is on identifying vulnerable groups using retrospective data and then targeting those populations for action. In an effort to synthesise and implement cost effective therapies against Neglected Tropical Diseases (NTDs), a concentrated effort has been made to distribute human medications through Mass Drug Administration (MDA) programmes in high transmission areas, with the help of donations from large pharmaceutical corporations. These MDA programmes focus heavily on the treatment of ostensibly exposed individuals in 'at risk' populations. Repeated MDA, based on the results of mathematical models, is expected to diminish the size of the parasite population while also lowering the levels of infection related morbidity. These intervention programmes are possible thanks to advances in our understanding of the life cycles and ecology of parasitic parasites that affect humans and livestock, which were predominantly obtained during the Victorian era. Until the middle of the twentieth century, health practitioners in wealthier countries were optimistic that control and intervention measures would eliminate infectious diseases, despite early (and lasting) optimism, relatively little success has been accomplished, at least in terms of eradication. Only the Guinea worm is scheduled for elimination among the NTDs.

***Correspondence to:**

Amelia Smith
Department of Biotechnology
Nanyang Technological University
Singapore
E-mail: Ameliasmith1612@gmail.com