Unmasking and Combating the Midnight Pestilence

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Abstract

Parasitic diseases, aptly described as the "midnight pestilence," remain among the most pervasive yet underappreciated threats to human and animal health, particularly in tropical regions. This inaugural lecture interrogates the biological, ecological, and socio-economic dimensions of parasitism, with emphasis on their enduring burden in Nigeria and across the developing world. It presents parasites as stealthy, adaptive organisms that thrive at the human–animal–environment interface, often eluding detection until significant damage has occurred.

Drawing from historical insights and contemporary evidence, the lecture highlights the ubiquity and diversity of parasites, protozoa, helminths, and ectoparasites, and their profound implications for public health, livestock productivity, and food security. In Nigeria, parasitic infections contribute significantly to reduced agricultural output and persistent cycles of poverty. Transmission dynamics are further exacerbated by poor sanitation, open defaecation, climate change, and increasing human encroachment into wildlife habitats.

At the core of this work is the epidemiological characterization of parasitic infections across diverse host systems, including livestock, wildlife, and humans. Through extensive field surveys, laboratory investigations, and molecular analyses, this research elucidates patterns of prevalence, transmission dynamics, and host–parasite interactions. These insights are complemented by the application of mathematical and economic modeling to quantify disease burden and evaluate the cost-effectiveness of control strategies. By integrating biological data with economic parameters, these models provide robust decision-support tools for optimizing resource allocation, enhancing intervention efficiency, and informing evidence-based policy. Notably, the trypanosomiasis–transhumance nexus illustrates how disease ecology intersects with pastoral mobility, influencing livestock productivity, intensifying resource competition, and contributing to farmer–herder conflicts.

A central theme of the lecture is the remarkable survival and adaptive capacity of parasites, reflected in the emergence of drug resistance and the re-emergence of infections once considered controlled. This underscores the limitations of conventional control approaches and the urgent need for innovative, sustainable strategies. Advances in diagnostic technologies are therefore explored, including molecular and computational tools that enable early detection, surveillance, and predictive modeling of parasitic diseases such as onchocerciasis, malaria, and African animal trypanosomiasis. The lecture also presents original contributions in natural-product-based drug discovery, highlighting the therapeutic potential of indigenous plants such as *Khaya senegalensis*, *Leucaena leucocephala*, *Vernonia amygdalina*, and *Spondias mombin*. Computational identification of mangiferin derivatives as promising anticoccidial agents, alongside the isolation of phaeophorbide-a from *S. mombin* with potent anthelmintic activity, exemplifies the integration of traditional knowledge with modern scientific techniques.

Framed within the One Health paradigm, this lecture underscores the intricate interconnectedness of human, animal, and environmental health, while highlighting the pivotal role of Veterinary Parasitology in safeguarding food security. In unmasking the midnight pestilence, it advances a multidisciplinary, evidence-driven approach that harmonizes scientific innovation, sound policy, and community engagement. Ultimately, the control of parasitic diseases transcends the boundaries of scientific inquiry; it is a pressing developmental imperative, central to improving health outcomes, enhancing agricultural productivity, and securing a resilient and sustainable future.