

Evaluating a novel test-and-treat control strategy for livestock schistosomiasis in sub-Saharan Africa

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What is schistosomiasis?

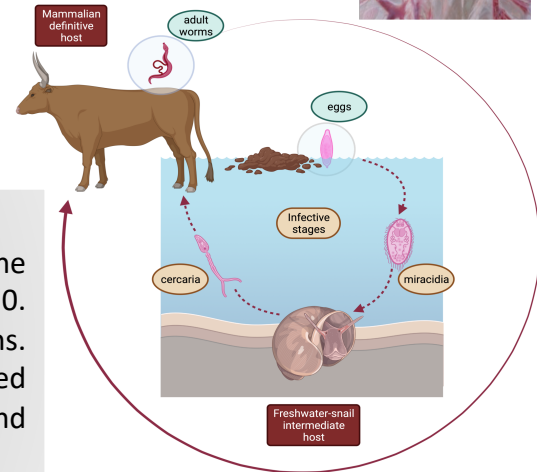
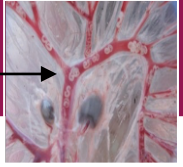
Schistosomiasis is a widespread, parasitic, neglected tropical disease (NTD) found predominantly in sub-Saharan Africa (SSA ~90% global cases), as well as in Asia, the Caribbean and South America.

The genus *Schistosoma* not only infects humans but also animals, with increasing awareness of spillover of species from livestock-to-humans and interspecies hybridization (1).

Current context

Latest WHO NTD Roadmap (2) and Guidelines (3) target the disease for elimination as a public health problem by 2030. Control involves mass drug administration campaigns in humans. Measures targeting animals have, so far, only been implemented in Asia. However, recent research reveals high economic and welfare burden of livestock schistosomiasis in SSA (4).

Dioecious trematode pair in the mesenteric vessels



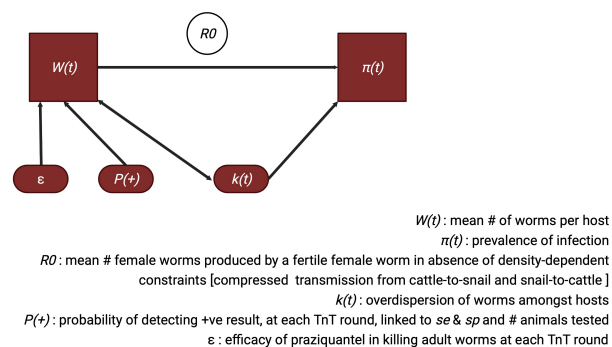
Novel test-and-treat (TnT) mathematical model for livestock schistosomiasis in SSA

Aim: To assess the impact on livestock schistosomiasis of a theoretical test (annual point-of-care diagnostic)-and-treat (praziquantel) control strategy.

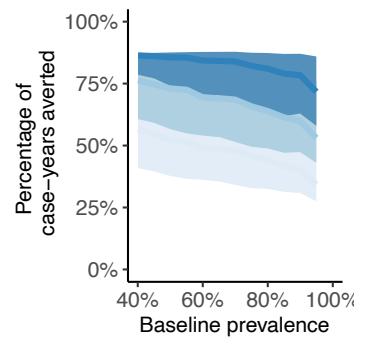
We fit our model with data collected in Northern Senegal in 2017 (1), where 4/8 locations had very high schistosome prevalence of ~90% in cattle (locations highlighted with a star on the right-hand side map).



Our deterministic mathematical model tracks worm burden ($W(t)$) and schistosome prevalence ($\pi(t)$) in a cattle herd:



The TnT strategy has potential to avoid a varying proportion of case-years depending on initial prevalence levels and # animals tested per round (1, 2, or 4 – blue color bands on right-hand side graph).



Findings

The simulated TnT strategy can be highly effective in suppressing infection by means of an imperfect rapid point-of-care diagnostic applied to a small number of animals per herd.

The proposed targeted chemotherapy One Health control strategy could not only improve livestock productivity and subsistence livelihoods (4) but also limit zoonotic transmission and the emergence of hybrids.

As acknowledged in the recently launched WHO guidelines (3), veterinary public health interventions will be a necessary step towards achieving the NTD Roadmap 2030 goal for schistosomiasis.

References & Acknowledgements

- Leger et al (2020) *Lancet Planetary Health*
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- WHO (2022) WHO guideline on control and elimination of human schistosomiasis
- Adeyemo et al (2022) *In Review Research Square*

