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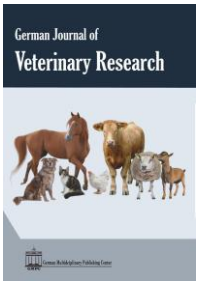
Commentary note

Commentary on: Serosurvey, cultural, and molecular detection of circulating *Leptospira* spp. in different animals in selected areas of Bangladesh

George Tsiamis

Laboratory of Systems Microbiology and Applied Genomics, Department of Sustainable Agriculture, University of Patras, Agrinio, Greece



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***Corresponding author:**
George Tsiamis
gtsiamis@upatras.gr

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Introduction

Leptospirosis is a widespread zoonotic disease caused by *Leptospira* (*L.*) spp. Although many infections remain subclinical, symptomatic cases can range from mild febrile illness to severe disease involving jaundice, multi-organ dysfunction, and potentially death. Current estimates suggest that approximately one million infections occur each year worldwide, leading to around 60,000 deaths among humans due to leptospirosis (Rajapakse et al., 2025). Strengthening research efforts is crucial to investigating the global burden of leptospirosis. I have read with great interest the article of Affroze et al. (2025) titled "Serosurvey, cultural, and molecular detection of circulating *Leptospira* spp. in different animals in selected areas of Bangladesh". Affroze and her team provide a thorough examination of *Leptospira* infection in cattle, rodents, and dogs in Bangladesh (Affroze et al., 2025).

This study addresses a significant information gap in a country where leptospirosis has not been well studied. Using serological, culture-based, and molecular diagnostic methods, this study improves our understanding of this zoonotic pathogen in South Asia. However, several methodological considerations must be taken into account to accurately situate these results within the wider One Health framework.

Significance and strengths

The main contribution of the study is its multi-species surveillance approach, which covers several districts. This provides a comprehensive view of how *Leptospira* spreads, accounting for interactions among humans, animals, and the environment. This strategy is particularly essential for Bangladesh, where climate factors, farming practices, and frequent flooding create conditions that promote disease transmission.

Using different diagnostic techniques, this study revealed strong evidence of widespread pathogen presence. The prevalence rates were notably high: 42.15% in bovine urine, 38.33% in rodents, and 28.84% in dogs. The discovery of *Leptospira interrogans serovar canicola* in dogs is important, especially given that stray and shelter populations had higher infection rates (45%) than pet dogs (18.75%). This finding highlights the crucial role of managing animal populations in initiatives to reduce disease. Ecological studies of rodent populations have provided valuable insights into these species. The higher carriage rate seen in Greater Bandicoot rats (*Bandicota indica*, 61.81%) compared to house rats (*Rattus rattus*, 18.46%) suggests differing abilities to carry diseases. This has obvious consequences for rodent control strategies that are specific to each species. The highest incidence of leptospirosis occurs during the monsoon months, specifically from June to August, underscoring the need for increased monitoring during this period.

Methodological considerations

While this study provides significant basic information, several factors must be considered to properly interpret the results. The *Leptospira hardjo*-specific ELISA is effective for use in dairy cattle (van den Brink et al., 2023); however, the authors do not address the potential for cross-reactivity with other serovars. The difference between the low seropositivity rate of 6.6% and the high PCR positivity rate of 42.15% seems puzzling. Another issue that should be addressed is the sampling method, which did not use a fully systematic design. This means there were no clear estimates for sample size or proper representation across different ecological areas. The samples taken from government farms and caught animals certainly do not represent the situation in the wider population, especially on smallholder farms, where management methods vary significantly. Furthermore, a sample size of only 15 rats per location is likely insufficient to capture geographic variation fully.

Relying solely on genus-level polymerase chain reaction (PCR) without sequencing confirmation limits our understanding of the serovars that are present and their potential dangers. The one exception is when we are talking about detecting *L. canicola* in dogs. Since serovars exhibit distinct epidemiological patterns and vaccine development depends on their characterization (Pyskun and Richter, 2025; Rajapakse et al., 2025), future work should include comprehensive molecular characterization using multilocus sequence typing (MLST) or whole-genome sequencing (WGS).

Public health implications and what comes next

The prevalence of *Leptospira* in Bangladesh is a significant concern. The high prevalence in rats near human settlements (60% in university office areas) and in dairy cattle suggests substantial environmental contamination and occupational exposure risk. Although correlations between cattle seropositivity and reproductive issues are plausible, the cross-sectional design limits causal conclusions.

Given Bangladesh's large agricultural workforce and its frequent flooding, these findings suggest that special actions are needed. These include programs for occupational health, improved livestock management, and thorough rodent control measures. The pattern of higher carriage in female and adult rats deserves deeper investigation to inform targeted control measures. Future research should focus on: i) the concurrent examination of human seroprevalence and animal surveillance data; ii) the molecular characterisation of circulating strains to facilitate phylogenetic analyses and vaccine development; iii) the sampling of water sources to identify contamination hotspots; iv) the execution of longitudinal studies to elucidate transmission patterns and their relationship with seasonal agricultural activities; v) assessing economic impacts on livestock to justify prevention spending; and vi) creating intervention strategies using a One Health approach.

This study helps us better understand leptospirosis, a global health epidemic that hasn't been fully acknowledged. The data align with those observed in other South Asian countries, reinforcing the idea that Bangladesh is grappling with the same regional impact of this neglected tropical disease. Given the limited amount of data currently available, these findings are particularly valuable for establishing baseline surveillance. Effectively controlling the disease requires collaborative efforts across human health, veterinary medicine, and environmental science.

The complex transmission networks that require combined treatments are shaped by interactions among farming methods, urbanisation (especially the presence of stray dog populations), environmental conditions such as flooding, and animal reservoirs. The study's results clearly indicated that animal reservoirs actively release the pathogen. The next step is to turn this understanding into real-world surveillance and control programs. Leptospirosis sometimes masquerades as dengue or other infections that cause fever, a phenomenon that likely leads us to underestimate its prevalence significantly. Countries like Bangladesh should prioritise building laboratory capacity, especially using molecular techniques.

Conclusion

Affroze and her team have presented critical information showing that *Leptospira* is widespread among animals in Bangladesh, proving a substantial but often underestimated disease issue. Although future research could benefit from improved methods, this study underlines the urgent need for Bangladesh's public health community to address this issue. The widespread occurrence across many host species, along with favourable climatic conditions and a lack of public awareness, allows the spread to continue unchecked. In the future, a combined One Health surveillance system that links animal, human, and environmental data will be vital for understanding how diseases spread and for creating effective control measures. Key priorities include systematic monitoring, molecular analysis of circulating strains, identification of risk factors for human infection, enhancement of diagnostic capabilities, and implementation of evidence-based interventions. Considering the existing climate and socioeconomic conditions, leptospirosis will likely remain a persistent public health issue. This requires ongoing attention from both researchers and public health officials.

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