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OROPOUCHE VIRUS: A SILENT ARBOVIRAL THREAT ON THE RISE AND ITS IMPLICATIONS FOR EMERGING RISK ZONES IN CENTRAL BRAZIL

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Abstract: The emergence and spread of **the Oropouche virus (OROV)** in Brazil and the Americas represent a growing challenge for epidemiological surveillance, particularly in areas historically considered low risk, such as the state of Goiás. **Introduction:** OROV is an arbovirus of the *Orthobunyavirus* genus associated with acute fever transmitted mainly by *Culicoides paraensis*, with symptoms similar to those of dengue and other arboviruses, making clinical diagnosis difficult. **Objectives:** This study aims to describe the recent epidemiological landscape of the Oropouche virus, assess the potential risk to the state of Goiás, and analyze implications for regional public health. **Methodology:** A systematic review of scientific literature, epidemiological reports from international and national organizations (PAHO/WHO, Ministry of Health), and entomological analyses were conducted to map the distribution of the vector and confirmed cases. **Results:** The data show a substantial increase in cases in Brazil since 2023, with autochthonous transmission in multiple states, although Goiás has not yet registered local transmission but has environmental conditions favorable to the vector. **Perspectives:** Integrated surveillance, strengthening of laboratory diagnostics, and research on vector competence and transmission dynamics are essential for mitigating future risks.

Introduction

The **Oropouche virus (OROV)**, a member of the *Orthobunyavirus* genus in the *Peribunyaviridae* family, was first described in 1955 in Trinidad and Tobago and has since become an important arbovirus agent in South America, traditionally associated with outbreaks in the Amazon region (CDC, 2025; WHO, 2025). Oropouche is transmitted primarily by the insect *Culicoides paraensis*, known as **maruim**, and secondarily by some species of mosquitoes that can act as vectors in urban transmission cycles (CDC, 2025; WHO, 2025). The clinical pattern of infection is typically nonspecific, characterized by sudden onset of fever, severe headache, myalgia, and arthralgia, symptoms that overlap with other arboviruses such as dengue, chikungunya, and Zika, which complicates clinical diagnosis without laboratory confirmation (Ministry of Health, 2025).

In recent years, especially since the end of 2023, there has been a substantial increase in the number of cases of Oropouche fever in Brazil and other parts of the Americas, with more than 11,888 confirmed cases in Brazil by mid-2025 and documented autochthonous transmission in several states (PAHO/WHO, 2025). Factors such as climate change, deforestation, disorderly urbanization, and human mobility have been identified as possible determinants for the geographical expansion of the virus and its vectors, facilitating outbreaks in areas previously considered free of the disease (PAHO/WHO, 2025; WHO, 2025).

Although the state of Goiás had not yet recorded any autochthonous cases of Oropouche as of 2024, the Ministry of Health reports that only a few Brazilian states, including Goiás, had only imported cases and no established local transmission cycle by the end of 2024, a configuration that may change with the evolution of the epidemiological scenario (Ministry of Health, 2024). The presence of ecological conditions favorable to vector survival and social and economic connections with endemic areas make Goiás a territory of epidemiological concern, requiring enhanced surveillance and adapted prevention strategies (Ministry of Health, 2024).

Methodology

This research adopted an integrative review method of the scientific literature available in indexed databases and public health institution portals up to January 2026. Peer-reviewed articles, epidemiological reports from the World Health Organization (WHO) and the Pan American Health Organization (PAHO/WHO), as well as technical notes and bulletins from the Brazilian Ministry of Health on Oropouche , were included. The keywords used in the searches were: "Oropouche virus," "Oropouche fever," "arbovirus Brazil," "Culicoides paraensis epidemiology," and "Oropouche Goiás." The selection of studies considered their relevance to the research objectives, focusing on epidemiological data, clinical characteristics, vectors involved, and risk analyses in areas outside the Amazon region. Data extraction was conducted in a standardized manner to record: geographic location of events, number of cases, vector characteristics, diagnostic methods, and recommended surveillance and control strategies.

In addition to the literature review, environmentally informed vector potential distribution models were used, similar to those described in *Culicoides parensis* modeling studies, which incorporate climatic variables (minimum temperature, annual temperature range) to predict risk areas in Brazil (e.g., modeling vector distribution). Analysis tools included reference software for managing bibliographic references (*e.g.*, Zotero) and spreadsheets for compiling national epidemiological data.

Results

The revised data indicate a rapid increase in cases of Oropouche fever in Brazil since the end of 2023, with the disease being reported in at least 22 states with confirmed autochthonous transmission by the end of 2024 (Ministry of Health, 2024). The case numbers show an increase of thousands of reported infections in 2024 and early 2025, with more than 13,000 cases in Brazil during this period, according to official epidemiological bulletins.

The table below summarizes the distribution of confirmed cases of Oropouche in Brazil by recent year, with data compiled from official reports:

Epidemiological findings confirm that the distribution of the *Culicoides paraensis* vector may extend to areas with favorable climatic conditions outside the Amazon, opening up space for transmission in states such as Goiás if the virus is introduced locally, a fact not yet observed in an autochthonous manner until the end of 2024 (Ministry of Health, 2024). Recent studies modeling the environmental distribution of vectors suggest that climatic variables such as minimum temperature and annual temperature range are strong predictors of the presence of *C. paraensis*, reinforcing the need for efficient entomological surveillance in areas of emerging risk.

Discussion

The results of this review broaden the understanding of the potential emergence of the Oropouche virus in extra-Amazonian areas, highlighting that many Brazilian states, including Goiás, may face future challenges related to the introduction of the

Year	Confirmed cases (Brazil)
2023	~8,000
2024	13,782
2025	2,790

*Partial data until early 2025.

Table 1 – Confirmed cases of Oropouche fever in Brazil (2023–2025) *(approximate figures based on official data from health authorities)*

Source: Ministry of Health (2025).

Figure 1 illustrates the transmission cycle of the Oropouche virus, involving both the primary vector (*Culicoides paraensis*) and potential secondary vectors, as well as the interaction with human and wild hosts, as described in the literature:

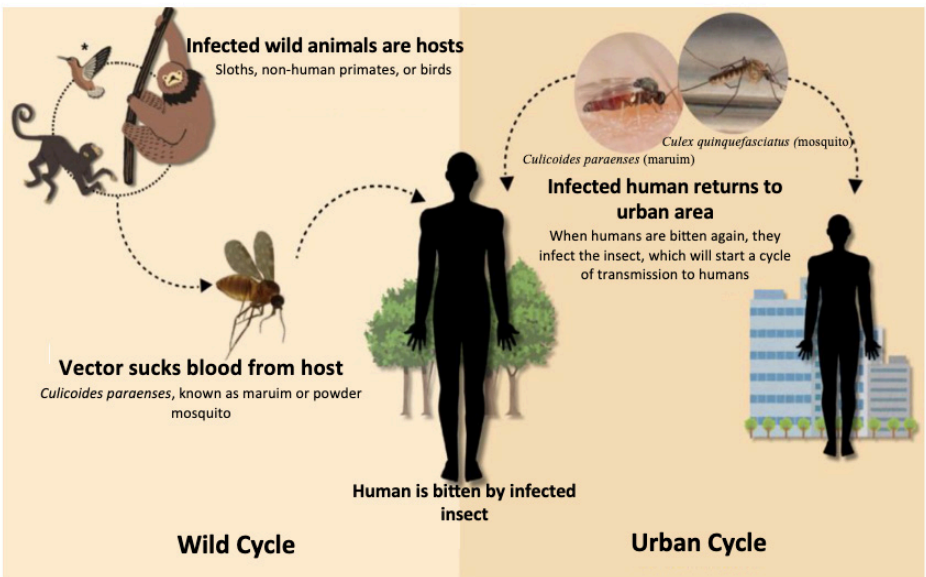

Figure 1 – Urban and wild transmission cycle of the Oropouche virus.

Caption: Primary and secondary vectors, urban and wild cycles.

Source: Adapted from WHO (2025).

virus. The identification of potential secondary vectors (*Culex*, *Aedes*) in entomological research suggests that transmission dynamics may be more complex than initially thought, especially in urban environments with dense mosquito populations that co-circulate with other arboviruses.

The absence of differential diagnoses for this virus, as well as a specific vaccine or antiviral treatment, places greater importance on vector control and integrated surveillance strategies, as well as on strengthening the diagnostic capabilities of public laboratories to differentiate Oropouche from other similar fevers.

Conclusion

The Oropouche virus is often overlooked when compared to better-known arboviruses such as dengue, but its recent emergence in Brazil and other countries in the Americas highlights its growing epidemiological relevance. Although the state of Goiás had not yet recorded any autochthonous transmission by early 2026, environmental and populati y conditions point to a scenario of potential risk. Active surveillance, multidisciplinary research, and cooperation among public health institutions remain essential to anticipate and mitigate possible epidemic events.

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