

THEMATIC AREA: Emerging viruses.

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## Oropouche Virus Molecular Field Data and Vector Competence: A Systematic Review of the Literature

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## ABSTRACT

**Introduction:** *Orthobunyavirus oropoucheense*, formerly Oropouche virus (OROV), is a re-emerging arbovirus, responsible for large-scale outbreaks across the Americas. *Culicoides paraensis* and *Culex quinquefasciatus* have been described as the main urban vectors, while *Coquillettidia venezuelensis* and *Aedes serratus* are proposed to maintain sylvatic circulation. The 2023-2025 outbreak, marked by the emergence of novel viral lineages and the introduction of OROV to Cuba, a previously non-endemic region, suggests potential shifts in vector ecology, the establishment of an urban cycle independent of wildlife reservoirs, and viral mutations with implications for vector competence.

**Methods:** This study presents a systematic review of entomovirological field evidence for OROV molecular detection, and vector competence experiments published up to July 2025. Six articles on molecular surveillance and 11 on vector competence were selected from peer-reviewed journals and preprint repositories and analyzed using a minimum data and metadata standard for vector competence experiments.

**Results:** OROV viral detection studies have only been conducted in Cuba, Brazil and Peru since 2013, with pool positivity rates ranging 0.4-56% in *Culicoides insignis*, *Limatus durhamii*, *Aedes albopictus*, *Ae. aegypti*, *Psorophora cingulata* and *Haemagogus tropicalis*, suggesting their potential role as urban and sylvatic vectors. Specifically, Ceratopogonids *Cu. paraensis* and *Cu. sonorensis* consistently demonstrate high transmission capacity (~30%), while mosquitoes (including *Aedes*, *Culex* and *Psorophora* spp.) exhibit low infection rates (<20%), and limited OROV transmission, implying midgut-level barriers. Furthermore, transmission was recently demonstrated in European lineages of *Ae. albopictus* (~12.5%), in specimens kept at 27 °C, 21 days post-infection, highlighting the need for temperature-based risk assessment, particularly in the Mediterranean basin.

**Conclusions:** These findings suggest that OROV remains a neglected virus, despite the scale of its epidemiological impact. Expanded genomic surveillance and vector competence research are needed to better understand OROV ecology at the sylvatic-urban interface, and to assess the risk of spread and establishment in non-endemic regions, especially beyond the Americas.

**Keywords:** Oropouche virus, vector competence, vector-borne infections, viral ecology.