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Salle de réunion

VECTOR-BORNE DISEASES CONTROL AND TAYLOR'S LAW OF FLUCTUATION SCALING: THE CASE OF CHAGAS DISEASE IN ARGENTINA

par

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📍 Many major human vector-borne diseases, including Chagas disease, need improved vector control and elimination. Improved sampling designs and methods contribute to locate and estimate vector populations more efficiently. In recent work we discovered a previously unnoticed pattern in the spatial distribution of the insect vectors of Chagas disease: the insects conform to Taylor's law.

📍 Taylor's law posits that the sample variance of population size relies to a power function of the sample mean of population size in different samples. We showed that Taylor's law described remarkably the counts of four insect vectors of Chagas disease (assassin bug in the subfamily Triatominae/kissing bugs) in 30.000+ habitats in the Chaco region (Argentina), before and after various types of insecticide spraying.

📍 The exponents of the Taylor's law power law most often ranged from 1.50 to 1.75, consistent with significant spatial heterogeneity or insect aggregation. Predictions of new models of the effect of vector control measures on Taylor's law agreed with field data. It is proposed that Taylor's law can be an efficient tool to identify key habitats with highly heterogeneous infestation and hence, provides a new tool for disease control and elimination programs.



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