

## Introduction

Research on medical and veterinary entomology (MVE) is especially needed in the Caribbean islands, which are threatened by the burden of several arthropod species due to their tropical climate and environment. Identifying relevant MVE-related scientific activity in these countries and examining the characteristics of its outputs can aid in the analysis of trends, knowledge gaps and decision-making in vector-borne disease research management. Despite the importance of entomology research for human and public health, very few scientometric studies analyze the dynamics, advances, and contributions of this discipline, either globally or in the Caribbean region (Fontecha, et al., 2021). This study used bibliometric methods to understand how research in this discipline developed in the insular Caribbean countries during the first two decades of this century.

## Methodology

A bibliometric analysis of the scientific production of the insular Caribbean countries in MVE was carried out, encompassing the first two decades of this century (2001-2020). The data was extracted from the Web of Science Core Collection™ indices and SciELO Citation Index™. Records extracted from the WoS enabled the identification of regional publications with high international visibility representing the main contribution of Caribbean researchers to mainstream scientific literature in the field of MVE. SciELO Citation Index was employed considering that this data source has better coverage of Latin American and Caribbean scientific publications than WoS, especially when assessing the scientific output of non-English speaking countries of this region (Galbán-Rodríguez, et al., 2019).

## Results and discussion

Scientific production of MVE in the region underwent constant growth during most of the period studied. The most productive years were 2016 and 2002, reflecting an increase of 91% and 69%, respectively (fig.1). This increase in scientific production is linked to the rise in the incidence of problems caused by arthropods. In recent years the Caribbean region has experienced an unprecedented crisis of epidemics due to arboviruses transmitted mainly by *Aedes* mosquitoes (PAHO-WHO, 2019). Cuba was by far the largest regional producer (41% of total production), with the Instituto de Medicina Tropical Pedro Kourí serving as the region's leading center (table 1).

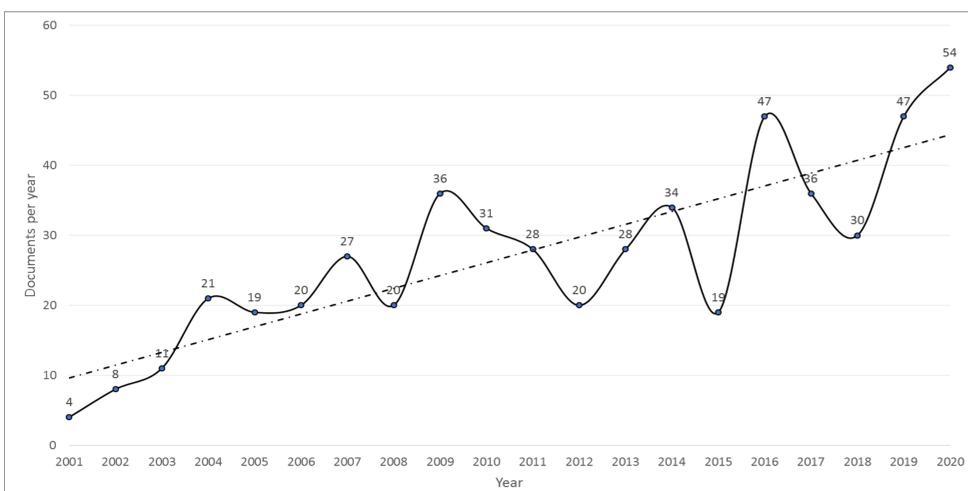


Fig. 1. Annual evolution of insular Caribbean scientific production in the field of MVE, 2001-2020.

Table 1. Distribution by country of insular Caribbean scientific production in the field of MVE, 2001-2020

Country	%
Cuba	41.1
Trinidad and Tobago	15.6
Puerto Rico	14.9
Guadeloupe	8.3
St. Kitts and Nevis	5.0
Dominican Republic	3.8
Martinica	3.3
Haiti	2.3
Jamaica	1.6
Granada	1.4
Barbados	1.0
Antigua and Barbuda	0.9
St. Lucia	0.3
Curaçao	0.2
Dominica	0.2
Total	100

Diptera, Ixodidae, Ceratopogonidae, Muscidae, and Reduviidae were the five taxonomic categories (families) most studied in the field of MVE in the Caribbean (fig. 2). Research has primarily focused on Diptera because Culicidae are considered the most relevant family of arthropods in the insular Caribbean (Alarcón-Elbal et al., 2017; Francis et al., 2021). In this geographic context, some well distributed mosquito species, such as *Ae. aegypti*, *Ae. albopictus* and *Cx. quinquefasciatus*, stand out due to its role in arbovirus transmission (Alarcón-Elbal et al., 2021). This is consistent with the results obtained in the analysis of the literature by family, where most of the literature is focused on Culicidae (69%).

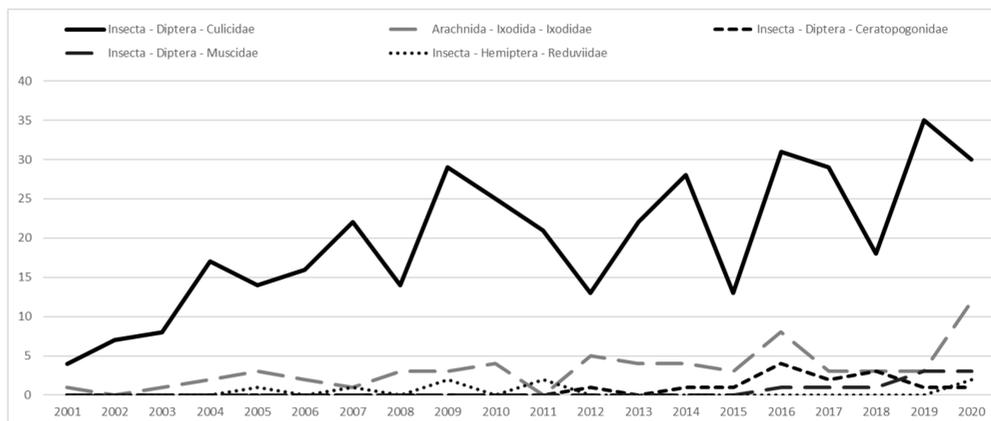


Fig. 2. Annual research output in the insular Caribbean according to top five taxonomic categories of the field of MVE, 2000-2021.

## Final remarks

In an increasingly globalized society, the study of MVE is a constantly changing field, influenced by the ongoing movements of arthropod vectors and their pathogens (Smith, 2020). In this context, the importance of a One Health approach needs to be emphasized, requiring many professionals to unify their efforts in the management of vector-borne diseases, several of which are zoonoses. There are still many gaps to be filled in this field, even more so in the insular Caribbean, where there are many low- and middle-income countries with vulnerable healthcare systems and economies heavily dependent on tourism. In recent years, several promising MVE studies have been carried out in different countries of the insular Caribbean. It is crucial to ensure knowledge transfer across generations of researchers to generate trained human resources that will allow these studies to continue in each country in the future.

## References

- Alarcón-Elbal, P. M., Paulino-Ramírez, R., Diéguez-Fernández, L., Fimia-Duarte, R., Guerrero, K. A., & González, M. (2017). Arbovirosis transmitidas por mosquitos (Diptera: Culicidae) en la República Dominicana: una revisión. *The biologist*, 15(1), 193-219. <https://doi.org/10.24039/rtb2017151155>
- Alarcón-Elbal, P. M., Rodríguez-Sosa, M. A., Ruiz-Matuk, C., Tapia, L., Arredondo Abreu, C. A., Fernández González, A. A., ... & Paulino-Ramírez, R. (2021). Breeding Sites of Synanthropic Mosquitoes in Zika-Affected Areas of the Dominican Republic. *Journal of the American Mosquito Control Association*, 37(1), 10-19. <https://doi.org/10.2987/20-6953.1>
- Fontecha, G., Sánchez, A., & Ortiz, B. (2021). Publication Trends in Neglected Tropical Diseases of Latin America and the Caribbean: A Bibliometric Analysis. *Pathogens*, 10(3), 356. <https://doi.org/10.3390/pathogens10030356>
- Francis, S., Frank, C., Buchanan, L., Green, S., Stennett-Brown, R., Gordon-Strachan, G., ... & Delgoda, R. (2021). Challenges in the control of neglected insect vector diseases of human importance in the Anglo-Caribbean. *One Health*, 13, 100316. <https://doi.org/10.1016/j.onehlt.2021.100316>
- Galbán-Rodríguez, E., Torres-Ponjuán, D., Martí-Lahera, Y., & Arencibia-Jorge, R. (2019). Measuring the Cuban scientific output in scholarly journals through a comprehensive coverage approach. *Scientometrics*, 121(2), 1019-1043. <https://doi.org/10.1007/s11192-019-03233-6>
- Pan American Health Organization - World Health Organization (PAHO-WHO) (2019). *Health Information Platform for the Americas* (PLISA). Available at: <http://www.paho.org/data/>
- Smith, R. C. (2020). Highlights in Medical Entomology, 2019: Familiar foes and new frontiers. *Journal of Medical Entomology*, 57(5), 1349-1353. <https://doi.org/10.1093/jme/tjaa120>