LUMEN ET VIRTUS

Faunal biodiversity collected from 3 different locations with at least 10 species of insects

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ABSTRACT

Taxonomy, Systematics, and Phylogeny are important fields of study in the context of Biological Sciences. Studying biodiversity as well as understanding the evolutionary relationships between taxa is of fundamental importance. The objective of the present work is to demonstrate the presence of several species of insects, particularly mosquitoes, collected in the 2024.1 semester, by students of the mandatory discipline of General Systematics and Phylogênia (TA 464) as a practical part of the discipline's activities mediated by Academic Monitoring. The students of the discipline of General Systematics and Phylogeny (TA 464), due to the practical work carried out throughout the 2024.1 semester, postulate that it is a matter of time for the arrival of oropouche fever in the city of Tauá due to the faunal biodiversity of mosquitoes in the city and the fact that BR 020 serves as a "corridor" for the entry and exit of humans and mosquitoes transported by motor vehicles circulating 24 hours a day. day on BR 020. Stressing that interdisciplinary and transdisciplinary measures must be taken to minimize the impact on the population. As well as new research should be carried out with partnerships between CECITEC and LACEN/Tauá.

Keywords: Mosquitoes, CECITEC, Tauá.

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INTRODUCTION

Taxonomy, Systematics, and Phylogeny are important fields of study in the context of Biological Sciences. Studying biodiversity as well as understanding the evolutionary relationships between taxa is of fundamental importance. In the curriculum of the Full Degree Course in Biological Sciences of the Center for Education, Science and Technology of the State University of Ceará (CECITEC/UECE), this approach is first carried out by the mandatory discipline of the third semester, General Systematics and Phylogeny (TA 464). In the curriculum of the Full Degree in Biological Sciences of the Center for Education, Science and Technology of the Inhamuns Region of the State University of Ceará (CECITEC/UECE), the discipline of GENERAL SYSTEMATICS AND PHYLOGENY (TA 464) is offered in the third (3) semester and is mandatory, counting two (2) credits. The mandatory discipline of GENERAL SYSTEMATICS AND PHYLOGENY is extremely important in the training of the professional Biologist, including in its licentiate mode, in its praxis as a teacher of the Basic Education Units. Taxonomy, Systematics, and Phylogeny are important fields of study in the context of Biological Sciences. Studying biodiversity as well as understanding the evolutionary relationships between taxa is of fundamental importance. It is based on morphological, behavioral and molecular studies. Systematics is the area of Biology that is mainly concerned with understanding phylogeny, that is, the evolutionary history of species.

CECITEC is located in the city of Tauá (latitude: 6° 19' 7" S; longitude: 40° 9' 44" W; altitude: 345 m), 350 km from Fortaleza, occupying an area of territorial unit of 1,066.362 km². The climate of the region is classified as tropical hot semi-arid, with average rainfall of 506.3 mm and rainfall concentrated from January to April. The population of the municipality is estimated at 58,000 inhabitants (CEARÁ, 2020). An urban geographical aspect of the city of Tauá is the presence of the BR 020 that divides the city into two sides.

The city of Tauá, although located in the Sertão dos Inhamuns, is rich in the presence of insects, notably mosquitoes. Mosquitoes are insects of great relevance in Brazil, both for their abundance and for the significant impact they have on public health. Among the numerous species present in the Brazilian territory, some stand out for their potential vector of diseases, such as Anopheles, vector of malaria, and Culex, transmitter of filariasis and West Nile virus. However, it is Aedes aegypti that stands out as the species of greatest concern for health authorities. Aedes aegypti, originally from Africa, was introduced in Brazil several centuries ago. In 2024, an outbreak of cases that has more than 6 million probable cases, 3 million of which are confirmed in the laboratory and 2,846 deaths. In this bias, climatic factors and the lack of care of the general population favor the growth of these

numbers throughout the country, the Aedes is responsible for the transmission of the dengue virus, the chikungunya virus and the Zika virus. These infectious agents can cause various types of symptoms that can persist for many years. Therefore, the objective of the present work is to demonstrate the presence of several species of insects, particularly mosquitoes, collected in the 2024.1 semester, by students of the mandatory discipline of General Systematics and Phylogênia (TA 464) as a practical part of the discipline's activities mediated by Academic Monitoring.

METHODOLOGY

The methodology used in the present study consisted of carrying out night collections in three locations: 1) external area of CECITEC; 2) area contiguous to CECITEC (CE Land) and 3) East Land (Figure 1). To collect the insects, an ENTOMOLOGICAL NETWORK (Puçá) was used, consisting of a wooden handle or other light material (such as aluminum), to which a metal ring is attached and a filo or organza bag (voile) with a rounded bottom, used to capture insects in flight, such as dragonflies, butterflies and moths. flies, bees, wasps, cicadas and others. Subsequently, the collected materials were taken to the Biological Sciences Teaching Laboratory where they were initially frozen in a Petri dish in the freezer and then counted and visualized with light microscopy and magnifying glasses. Software such as ImageJ and Google were also used for improvements and research of the photographs taken from the collected samples.

The ImageJ program, which is a software for image processing and analysis, developed by Wayne Rasband at the National Institute of Mental Health, USA, was used to enhance the images obtained by optical microscopy. While Google with the Google Lens function for taxonomic identification.

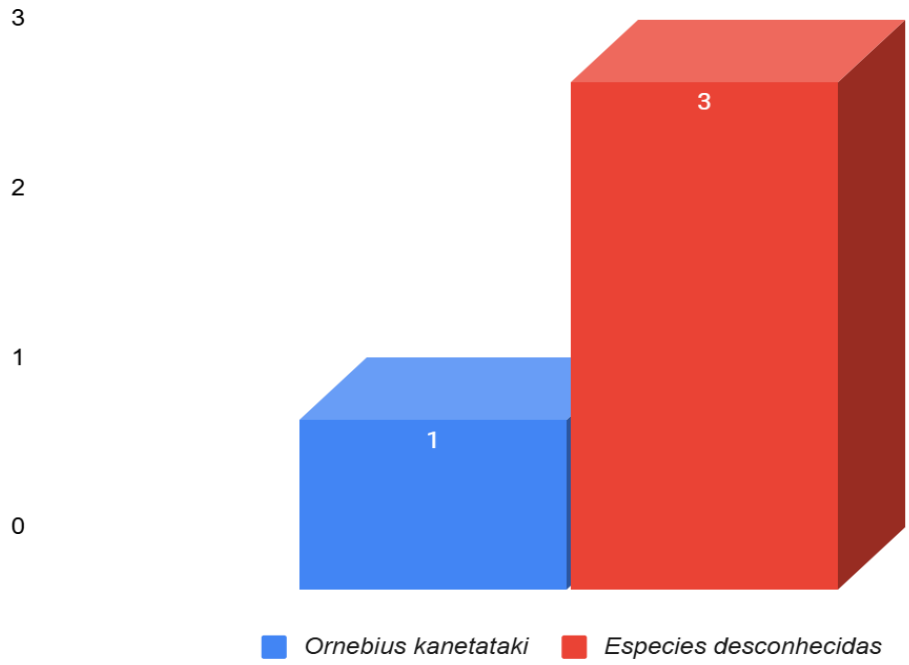
Figure 1 – Three collection sites.

Source: Authors: Google Earth (2024).

RESULTS AND DISCUSSION

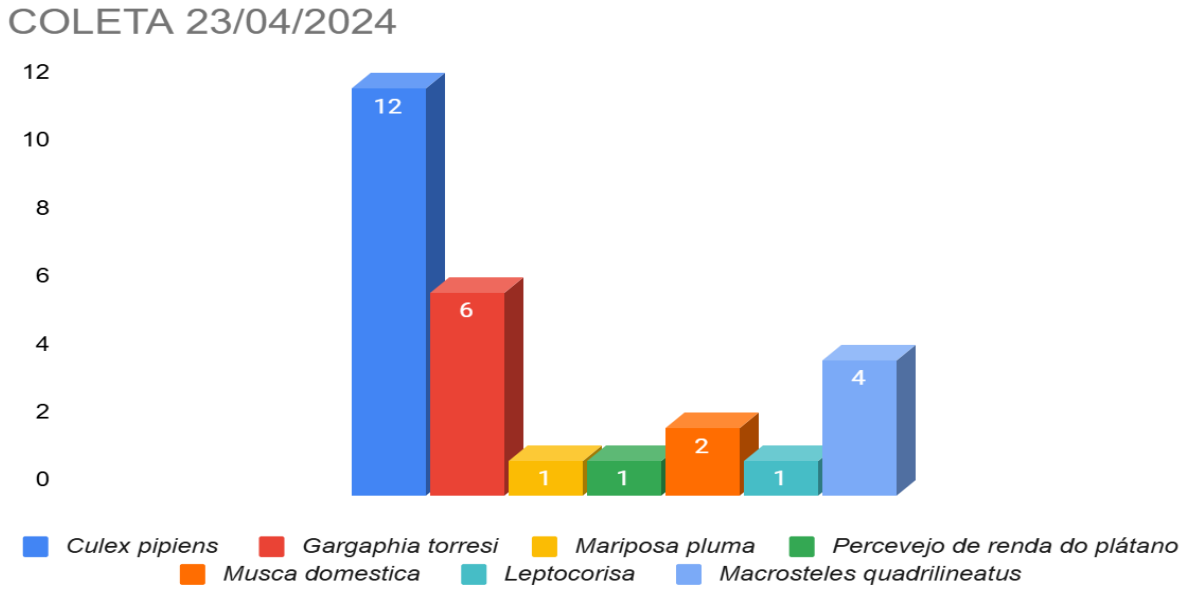
The results obtained in the practices carried out by the students of the TA 464 discipline demonstrate that at least 51 different specimens were collected in the three collections carried out throughout the 2024.1 semester (Tables 1, 2, and 3) also evidencing at least 51 different specimens in the three collections carried out throughout the 2024.1 semester (Tables 4) belonging to at least 10 different species.

Table 1 – Collection 03/02/2024 - CECITEC



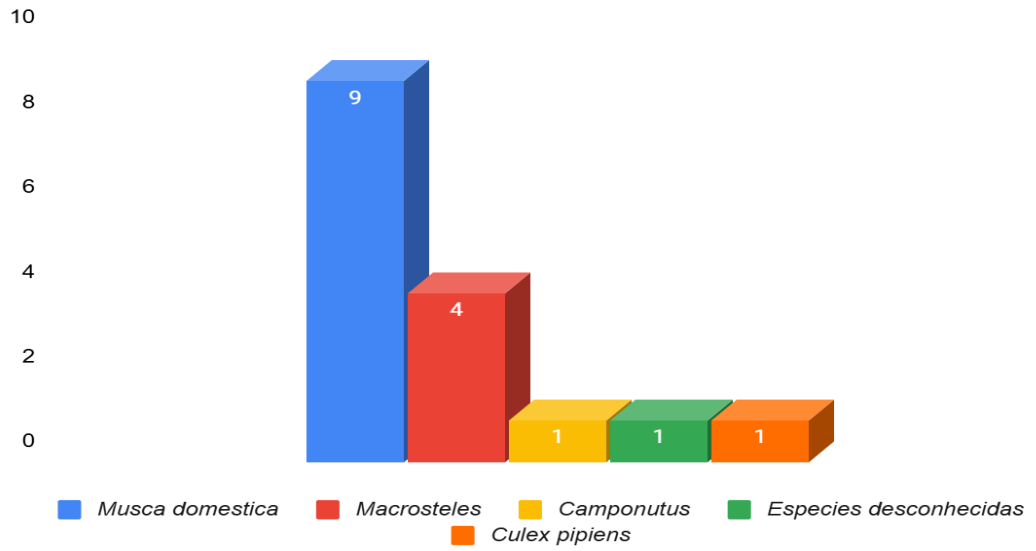
Source: authors.

Table 2 – Collection 4/23/2024 – CE LAND



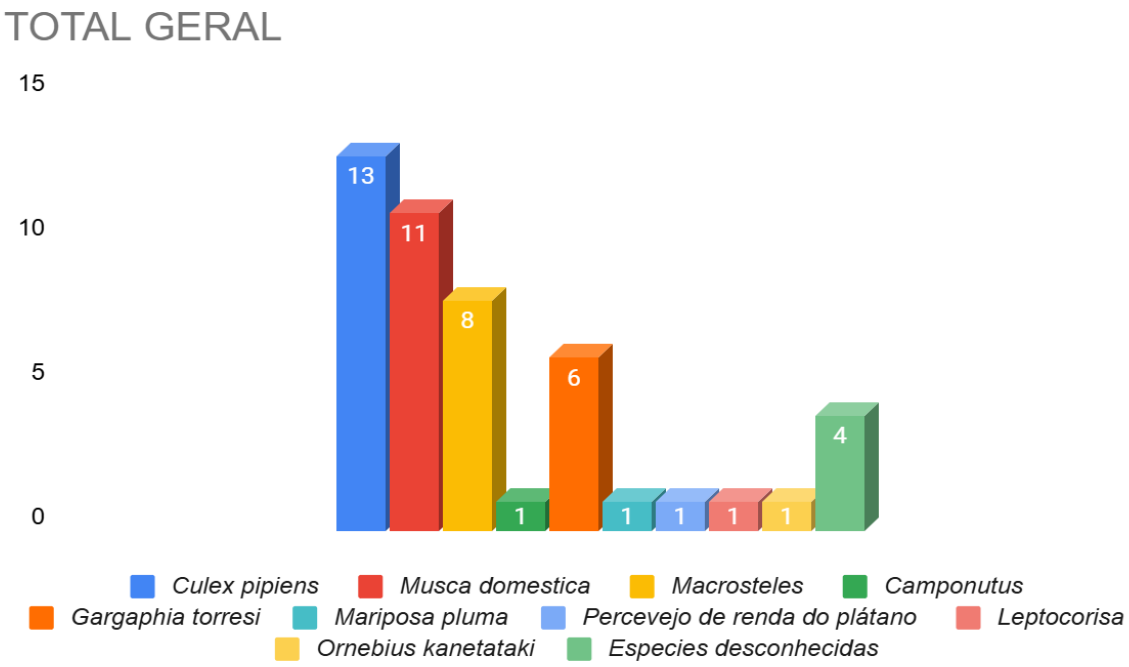
Source: authors.

Table 3 – Collection 5/22/2024 – EAST LAND



Source: authors.

Table 4 – Total samples collected by species.



Source: authors.

The biodiversity of the insect fauna is considerable, considering that such specimens were collected at only three distinct points near CECITEC, including the external area of the CECITEC building. The presence of the genus Culex (Figure 2) is already a cause for concern, as the genus Culex transmits filariasis and West Nile virus.

Figure 2 - Collection carried out on 4/23/2024.
Culex pipiens
Thread: Arthropoda
Classe: Insecta
Ordem: Diptera
Family: Culicidae
Genus: Culex

It is evident that the CE Land, contiguous to CECITEC, has a considerable fauna of insects due to the fact that it presents a vegetation of undergrowth with water sources and without the presence of construction in its space. Mosquitoes pose a significant public health challenge globally, especially in tropical and subtropical regions. These insects are transmitters of several serious diseases (Dengue, Zika, chikungunya, malaria and yellow fever, oroupoche) that together affect millions of people annually. Urban centers, including medium-sized ones such as the city of Tauá, have several factors that favor the breeding and dissemination of insects, such as mosquitoes: climate change; urban disorganization; global mobility; resistance to insecticides; deforestation; pollution, among others. These factors interact in complex ways, exacerbating mosquito proliferation and increasing the risk of vector-borne disease outbreaks. Although no samples of the Aedes aegypti species have been collected, the city of Tauá suffers from dengue. In addition, on the event horizon we have a new threat: oropouche fever.

While in 2023 832 cases were recorded, in 2024 the number jumped to 7,236. With the confirmation of two deaths and the investigation of the relationship between the disease and cases of microcephaly, concern about the spread of the virus increases. Oropouche fever is a disease caused by an arbovirus (mosquito-borne virus) called Orthobunyavirus oropoucheense (OROV). Transmitted to humans mainly by the bite of Culicoides paraensis (the main transmitter, but not the only one) known as maruim or gunpowder mosquito, this virus was detected in Brazil in the 1960s, from a blood sample of a sloth captured during the construction of the Belém-Brasília highway. Since then, isolated cases and outbreaks have been reported in Brazil, mainly in the states of the Amazon region. Cases and outbreaks have also been reported in countries such as Panama, Argentina, Bolivia, Ecuador, Peru and Venezuela.

Finally, just as the presence of Aedes aegypti was not found in the samples collected, it is possible that Culicoides paraensis is already part of the mosquito fauna in the city of Tauá.

FINAL CONSIDERATIONS

Throughout the 2024.1 semester, students in the discipline of General Systematics and Phylogênia experienced in practice important aspects related to biodiversity and its classification, in addition to interdisciplinary aspects related to invertebrate zoology and public health, especially in a context currently experienced by the dengue epidemic in Brazil and the growing increase in cases of oroupoche fever. It is a matter of time for the arrival of the oropouche fever in the city of Tauá due to the faunal biodiversity of mosquitoes in the city and the fact that BR 020 serves as a "corridor" for the entry and exit of humans and mosquitoes transported by motor vehicles circulating 24 hours a day on BR 020. Stressing that interdisciplinary and transdisciplinary measures must be taken to minimize the impact on the population. As well as new research should be carried out with partnerships between CECITEC and LACEN/Tauá.

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