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UCMI JORNAL

RAISING AWARENESS ABOUT MALARIA BRINGS EDUCATION, MUSIC AND SMILES TO SCHOOLS

UCMI's community engagement team has been bringing information and lots of entertainment to schools and kindergartens with a special mission: combating malaria through awareness. With a route that covered several schools across the country, the initiative reached thousands of children, educators and teachers, always with a fun and educational approach. With many smiles across all districts and the Autonomous Region, the messages about malaria control measures shared by UCMI have been reinforcing the disease elimination strategy that has been implemented by PNEP, uniting schools, communities and families in a common goal : educate to protect.

UCMI REINFORCES THE TREATMENT OF LARVAL BREEDING SITES FOR MOSQUITOES THAT TRANSMIT MALARIA

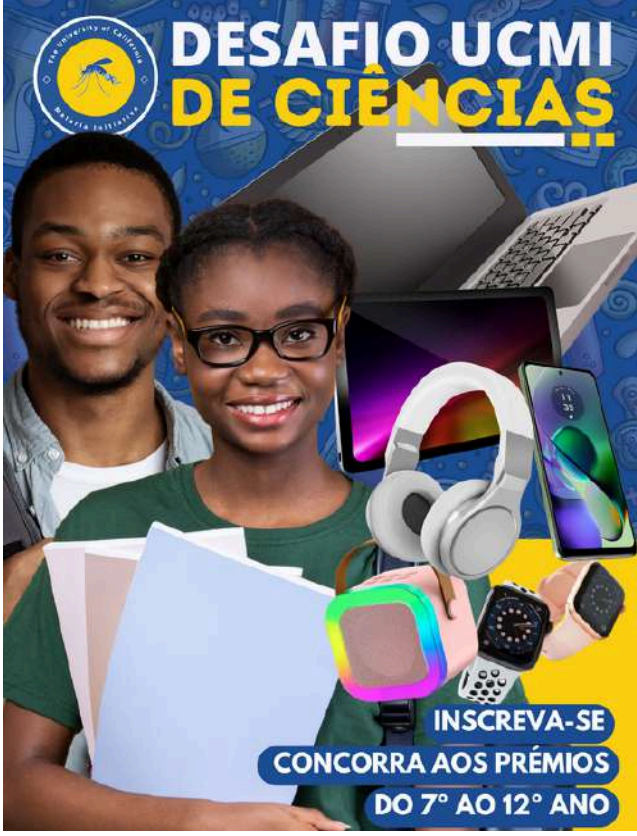
The increase in *Anopheles coluzzii* larval breeding sites as a result of the rainy season that has just begun, has led to an increase in the number of malaria cases in the country. The UCMI engagement team in partnership with technicians from the national malaria elimination program malaria have been implementing a strong campaign to treat larval breeding sites in several communities, aiming to reduce the spread of the disease and improve public health for the entire country.

VOLUNTEER ACTION TRANSFORMS CASA DOS PEQUENINOS WITH TALENT AND FUN

Casa dos Pequeninos, in Caixão Grande, was the target of a special action. The UCMI team, known for its commitment to community engagement actions, revealed unexpected talents that go far beyond their usual activities. With support from committed agents and artists, the team demonstrated surprising skills, transforming the environment of Casa dos Pequeninos ("Little Children's House") with lots of joy, color and teamwork. In addition to the usual engagement activities, the team dedicated itself to leaving the facility, a charity that welcomes orphaned and abandoned children, with more brightness and color. In the end, besides the painted walls, what stood out most was everyone's satisfaction at having collaborated in such a rewarding job. Between fun and lots of hard work, the UCMI participants left proud, with the feeling that they had become true professionals of the art and team spirit. With this action, UCMI not only revitalized Casa dos Pequeninos, but also strengthened the sense of community, showing that work and fun can go hand in hand.

SCIENCE COMPETITION CHALLENGES THE KNOWLEDGE OF NATIONAL STUDENTS

The Science competition promoted by UCMI, in partnership with the Ministry of Education, aims to stimulate learning in Science and Biology. The competition will be held in three phases, with two district competitions and the national final, with registrations starting in January 2025. The top three in each category will receive prizes such as a laptop, smartphone and tablet, as well as a special prize for finalists' schools. This competition is an excellent opportunity for students to stand out in the field of Science, with the support of UCMI and the Ministry of Education, aiming not only at academic development, but also at enhancing scientific education in São Tomé and Príncipe.



UCMI HOLDS A SCIENTIFIC WORKSHOP IN PARTNERSHIP WITH THE MINISTRY OF HEALTH

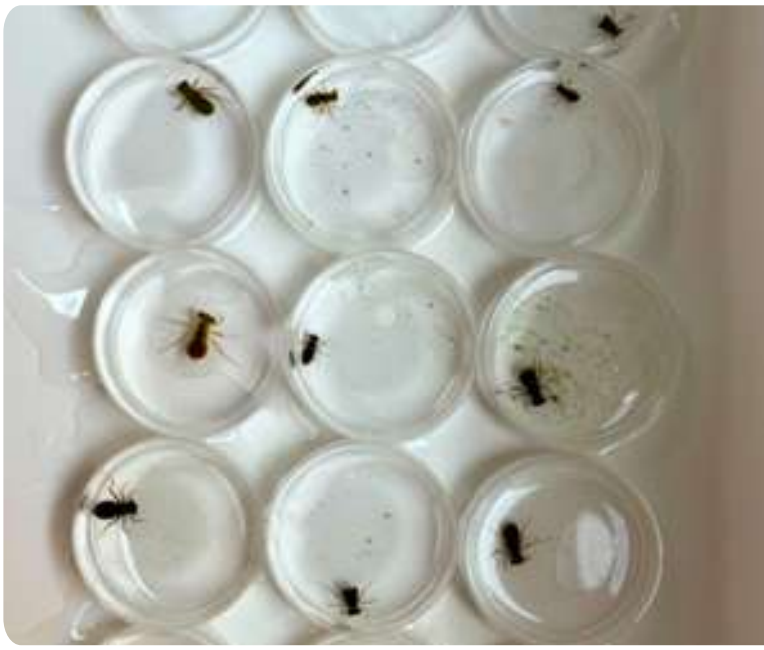
The Workshop featured the presentation and discussion of the results of 3 years of scientific research implemented by the UCMI Project in São Tomé and Príncipe in partnership with the National Malaria Elimination Program. The event was attended by several Ministry partners involved in the national malaria elimination strategy.

RESEARCHERS CARRY OUT ECOLOGICAL STUDIES OF THE *ANOPHELES COLUZZII* MOSQUITO ON PRÍNCIPE ISLAND

The UCMI field team, made up of researchers Anton Cornel, Hester Weaving and Ivan Mugeni, carried out an expedition to the island of Príncipe with the aim of deepening studies on the natural population of the Anopheles coluzzii mosquito in the RAP. The research focused on identifying natural breeding sites and analyzing the presence of aquatic predators, to understand their influence on the density of mosquito larvae.

Field activities were concentrated in urban areas close to the city of Santo Antônio, Ponta do Sol, Roça Sundy, Porto Real and Azeitona. The collected samples were sent to the UCMI Molecular Biology Laboratory, located at USTP, on the island of São Tomé. In the laboratory, DNA extraction will be carried out from the organisms found in the breeding sites, with the aim of identifying the presence of A. coluzzii in the stomachs of natural predators.

This work is part of a set of ecological studies that seek to better understand the vector's interactions with other organisms in its natural environment. The initiative is crucial for the development of more effective and sustainable control strategies.



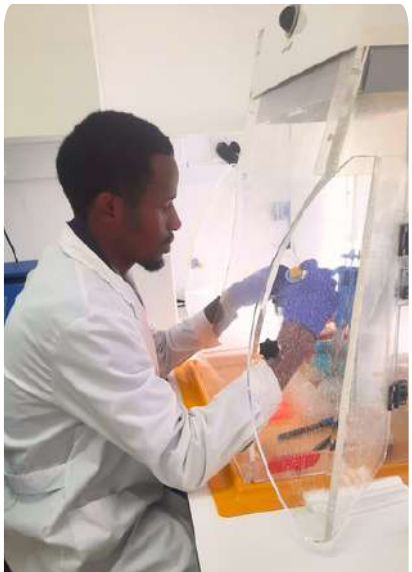
UCMI REINFORCES COMMUNITY AWARENESS ABOUT INDOOR SPRAYING

Given the current scenario in which there is an increase in malaria cases in the country, the national malaria elimination program has implemented an indoor spraying plan in several communities. The UCMI engagement team has been working together with the spraying brigades, raising awareness among communities, in order to maximize acceptance of spraying in homes and increase the coverage rate.

UCMI SCHOLARSHIP RECIPIENTS COMPLETE FIRST YEAR AND ADVANCE TO HEALTH RESEARCH IN STP

Students in the UCMI scholarship program completed the first year of their advanced studies at the Institute of Hygiene and Tropical Medicine at Universidade Nova de Lisboa (IHMT) with excellence. After academic success, fellows advance to the experimental phase of their courses, with research themes already defined and practical activities underway. The first steps include creating strategic partnerships with the National Center for Endemic Diseases and obtaining the necessary approvals from the Health Ethics Commission and the Data Protection Agency of São Tomé and Príncipe.

The projects cover areas crucial to public health, such as: Smart traps for automated capture and identification of mosquitoes, by Silvania Pina; Interspecific competition between mosquitoes of the genera *Aedes* and *Anopheles*, by Ediley Sousa; Characterization of asymptomatic malaria outbreaks in São Tomé and Príncipe, by Celdidy Monteiro; Resistance to antimalarial drugs, doctoral project by Edvaldo Varela.



UCMI ADVANCES RESEARCH ON MOSQUITO RESISTANCE TO INSECTICIDES

The UCMI team completed another cycle of bioassays to evaluate the susceptibility of mosquito colonies maintained in their insectarieS. These tests are essential for monitoring insecticide resistance and developing more effective control strategies against the malaria vector. Reference colonies, actively maintained since 2023 at the National Center for Endemic Diseases and the UCMI Molecular Biology laboratory, play a crucial role. They allow US TO compare the results of bioassays with mosquitoes captured in the field, contributing to the identification of resistance patterns. In this last cycle, after the bioassays, genetic analyzes were carried out in the Molecular Biology laboratory to identify possible mutations that confer resistance in the mosquitoes, especially against pyrethroid and DDT class insecticides. These studies provide essential data to adjust methods to combat the vector and reinforce the fight against malaria in the country. With modern insectaries and healthy colonies, UCMI maintains an ongoing commitment to cutting-edge research, supporting initiatives to reduce malaria cases and strengthen public health in São Tomé and Príncipe.

RESEARCHERS CAPTURE *ANOPHELES* MOSQUITOES IN PRÍNCIPE TO STUDY THEIR HABITS AND BLOOD PREFERENCES

UCMI, in partnership with entomological technicians and agents from the Ministry of Health, conducted collections of blood fed adult female *Anopheles* mosquitoes. The initiative aims to expand on our understanding of vector host preferences and resting habits. The collections were carried out in urban areas close to the city of Santo Antônio and in the towns of Praia Burra, Nova Estrela and Praia Abade. These locations were strategically selected to represent different environments inhabited by the vector. These studies are essential for improving control and prevention strategies for diseases transmitted by mosquitoes, such as malaria, contributing to public health in the region.

UCMI CARRIES OUT STUDY TO DETERMINE THE PHYSIOLOGICAL AGE OF MALARIA MOSQUITOES IN SÃO TOMÉ AND PRÍNCIPE

During the last expedition to the island of Príncipe, several collections of female *Anopheles* mosquitoes were carried out. The samples, collected in the city of Santo António, were sent to the UCMI Molecular Biology laboratory. In the laboratory, the females were dissected and went through an identification process to determine the number of times they laid eggs. In addition to the collection in Príncipe, other mosquito samples were collected on the island of São Tomé, specifically in the towns of Ribeira Afonso and Bairro da Liberdade. The study aims to deepen the understanding of biological aspects of the natural population of the malaria mosquito, focusing on the analysis of its reproductive capacity and longevity.

UCMI CARRIES OUT DNA ANALYSIS STUDY ON SPIDER WEBS ON PRÍNCIPE ISLAND

Biologist Hester Weaving, postdoc at the Vector Genetics laboratory, UCDavis, California, joined the UCMI field team to conduct work carried out in the autonomous region of Príncipe in November. She led the study of DNA analysis in spider webs collected in urban and remote regions on the island of Príncipe. This study aims to extract DNA from spider webs to identify the presence of *Anopheles coluzzii* mosquito DNA. Collections were carried out between residences in urban areas, where it is possible to identify the presence of the mosquito, and in more remote regions, where no adults or larvae of the vector were previously observed. This study is a complement to studies on the distribution of the vector and natural predators in the natural environment.

UCMI FIELD TEAM TEACHES BIOECOLOGY CLASS ON MOSQUITO VECTORS TO BIOLOGY STUDENTS AT THE UNIVERSITY OF SÃO TOMÉ AND PRÍNCIPE.

The UCMI project's field entomologist, Maria Corrêa, was invited to teach a class on the bioecology of the Anopheles coluzzii vector for third-year Biology students at the University of São Tomé and Príncipe (USTP). The class, entitled "Bioecology of mosquito vectors, with focus on the *Anopheles* group", covered several essential topics.

During the presentation, Maria Corrêa discussed the taxonomy of mosquitoes, with an emphasis on the medical importance of vectors, in addition to detailing the biology and behavior of the *Anopheles* group. A review of the main control methods recommended by the World Health Organization (WHO) in the fight against the vector was also provided. The class offered students a comprehensive view of the impact of *Anopheles* mosquitoes on public health, providing in-depth knowledge about their biology and strategies for preventing and controlling the diseases they transmit.

LAST STAGE OF LARVAL BREEDING STABILITY STUDY CARRIED OUT IN ÁGUA GRANDE

In December, the last stage of the study on the stability of larval breeding sites was carried out in the town of Bairro Verde, Água Grande. This study, which followed 34 larval breeding sites, aimed to understand their physical-chemical characteristics and stability, in addition to relating these factors to the choice of locations by mosquito females to lay their eggs. During the research, breeding sites were monitored on two occasions in the dry season and on two occasions in the rainy season. The study is part of a series of investigations into the bioecology of *Anopheles coluzzii* in its natural environment.

The results obtained are crucial for characterizing the vector's larval environments on the island of São Tomé, contributing to the advancement of knowledge about mosquito dynamics and offering valuable information for malaria control.

STUDY ON PARASITE-HOST INTERACTION IS CARRIED OUT IN THE INSECTARY OF THE NATIONAL CENTER FOR ENDEMIC DISEASES

UCMI is conducting an experimental study to deepen the understanding of the interaction between the parasite *Plasmodium falciparum* and the mosquito vector *Anopheles coluzzii.* The research, which takes place in the institution's insectarium, aims to analyze mosquito infection rates with the parasite, observing the production of oocysts in the insect's intestine after seven days of blood feeding in samples from gametocyte carriers. Oocysts are important structures, as they represent a phase of the parasite's life cycle within the mosquito, and the analysis of this production is essential to evaluate the vector capacity of *A. coluzzii* in the transmission of malaria. This study's main objective is basic research to better understand the behavior of the *A. coluzzii* vector and its ability to transmit *P. falciparum* on the islands of São Tomé and Príncipe. With this, it is expected to contribute to improving malaria control strategies and reducing the incidence of the disease.

STUDY INVESTIGATES ROLE OF BATS AND BIRDS AS PREDATORS OF THE *ANOPHELES* MOSQUITO IN PRÍNCIPE

A new study is being conducted on Príncipe Island with the aim of investigating the presence of DNA from the mosquito vector A. coluzzii in the feces of bats and birds. The research seeks to explore the possibility of these animals acting as natural predators of the mosquito during its adult phase, making their feces a potential source of useful genetic material for analysis. The fecal samples were collected in places where these animals rest, both in the urban region of Príncipe Island and in more remote areas, far from the human population, and will later be used in DNA extraction processes to identify presence of the mosquito. This study is part of a series of research that seeks to deepen knowledge about prey-predator interactions in the natural environment, contributing to the understanding of the island's ecological dynamics.

UCMI TEAM PRESENTS SCIENTIFIC ADVANCES IN THE FIGHT AGAINST MALARIA IN A MEETING WITH CNE AND PNEP

The UCMI team recently met with representatives from the Directorate of the National Center for Endemic Diseases (CNE) and the coordination of the National Malaria Elimination Program (PNEP) in order to share the results of scientific research carried out within the scope of combating malaria in the country. During the meeting, significant advances achieved in studies on the bioecology of the malaria vector mosquito, the resistance of these mosquitoes to insecticides and experimental infections that evaluate susceptibility were presented.

In addition to discussing the results obtained, participants also explored potential areas of scientific collaboration between the institutions, strengthening the partnership in the fight against malaria and paving the way for future joint research initiatives. This meeting reinforces the commitment of the institutions involved in promoting scientific advances that contribute to the elimination of malaria and public health in the country.

ADVANCED TRAINING IN MOLECULAR BIOLOGY FOR TECHNICIANS AT THE NATIONAL CENTER FOR ENDEMIC DISEASES

As part of the partnership between UCMI and the National Center for Endemic Diseases, training was carried out for laboratory and entomology technicians from the Ministry of Health and Women's Rights of São Tomé and Príncipe (MSDM). The objective was to train participants in advanced molecular biology techniques, with an emphasis on the polymerase chain reaction (PCR), applied to the study of malaria vector mosquitoes.

The training took place in the MSDM Reference Laboratory and included theoretical and practical classes, for a total of 12 technicians. The participants' performance was considered highly satisfactory, reinforcing the country's potential in operational research aimed at malaria control.

Happy Holidays

At the end of the year, UCMI is grateful for the effort and dedication of everyone who, together, has fought to build a better world. May the spirit of Christmas fill our hearts with hope, solidarity and unity. We wish you and your family a Christmas full of peace and joy and that 2025 will be a year of new achievements, health and, above all, malaria-free!

The University of California Malaria Initiative