

MARCH 2020
NEWSLETTER

NURTURING YOUNG AFRICAN SCIENTISTS

MENTOR | INSPIRE | EQUIP





PROJECT SUMMARY

Hello World! The future of African scientific research is extremely important. To secure it we must invest in mentoring, inspiring and equipping tomorrow's scientist so that its place in the world map is secured. The philosophy being 'catch em young!' by intentionally incubating malaria ambassadors in high school students in Western and Nyanza with a scientific understanding of all things malaria. The principal Investigator (PI) decided on three schools namely: Kijana Wamalwa Secondary School, Hilario Secondary School and Gendia High School.

The first phase of the project involved a career and life mentorship session which went down in November 2019. The aim of this session was to open up the students to science career possibilities.

It was followed by an in-depth question and answer session where the students' perplexities on all things science careers and life were unfounded. Subsequently, the students were taken through an in-depth malaria education on its causes, treatment and prevention. The second phase, a buildup on the first was all things contests. The students were tasked with communicating through art and science

projects—all the information that they had learnt about malaria. The contest days played host to some of the most innovative and creative pieces ever witnessed South of the Sahara.

This newsletter presents this labor of love led by a young female scientist whose passion to drive malaria out of Africa led her to take the malaria message to high school students in Nyanza and Western Kenya. This newsletter therefore is a visual summary of all the students' projects that she collaborated with. We hope you enjoy it. Viva!

EDITORIAL

Malaria is an infectious disease caused by Plasmodium parasite and transmitted from human to human by female Anopheles mosquitoes that carry Plasmodia. Species that cause malaria include *Plasmodium falciparum*, *P. ovale*, *P. malariae*, *P. vivax* and *P. knowlesi*. But *P. falciparum* that causes the most severe form of malaria is the most common in sub-Saharan Africa (SSA). In Kenya, malaria remains a major public health problem accounting for an estimated 16% of all outpatient visits. Here, children under the age of five and pregnant women are the most affected. When a country bears a huge malaria burden, like Kenya does, it affects its citizenry by eating into their time and money. It is no wonder malaria research has piqued the interest of Kenyan bio-chemists such as Trizah Koyi. Trizah has taken it further to practical solutions. Her natural product chemistry research hopes to contribute to the growing gaze into indigenous African/Kenyan answers to the malaria sting. Her other angle is even more interesting and important as she hoped with her community outreach projects to turn high school students into malaria ambassadors by building their capacity through one on one mentorship, training and assignment. This is one of the deliverables for her PhD program: A project that necessitated this newsletter so that the world can bear witness to how curiosity about science should be nurtured and channeled into the right direction. This included enabling the artistic students to communicate the malaria message via various performance arts. A foreshadow of what Trizah hopes them to be: Armies, equipped with malaria knowledge educating everyone in their circles. Let this scientist champagne continue flowing. VIVA!



TRIZAH'S BIO

Name
Trizah Koyi Milugo
Institution
International Center of Insect Physiology and Ecology (icipe), Kenya

Milugo Trizah Koyi is a PhD fellow of Training Health Researchers into Vocational Excellence (THRiVE) consortium (one of the DELTAS program) based at icipe, Kenya. She is currently pursuing a career in malaria research and is the PI of the DELTAS Africa CPE seed grant project “Science-Based Conversation, Knowledge and Skill Transfer to Students in Selected Secondary Schools in Western Kenya”. Her PhD research focuses on identifying innovative approaches to malaria control and elimination. As such, her engagement with high school students is focused on malaria prevention and treatment.

Specifically she wants to learn what students who live in malaria endemic regions know about causes of malaria and ways to prevent it. She anticipates that this knowledge might unravel novel strategies for malaria control or prevention. She engages with the high school students through career talks to create awareness and to instill a passion for science. She also uses her PhD project as a model for knowledge and skill transfer through demonstration of lab-based activity to enable the students to acquire hands on skills. By doing all these, she hopes to transfer her knowledge and skills to the students as well as stimulate their interest in malaria research. She anticipate that they will be inspired and will come up with a more creative and innovative approach to malaria control. She has an interest in nature and if she was not in science, her alternative career would have been tour guide.



THE INTERVIEW *Trizah Koyi Milugo*

Please paint us the global and Kenyan malaria picture?

Malaria prevalence remains high in Sub-Saharan Africa with Ninety percent of all malaria infections occurring here. The rest are in south East Asia . However, there are parts of the world where malaria has been eliminated though no country in sub-Saharan Africa has successfully eliminated malaria-we are still working on that. In Kenya, the burden is still very high because we are within that bracket. In Kenya the regions that are most affected are around the Lake region, towards the Coast and Western Kenya. But in recent times we have witnessed malaria outbreaks in dry ecologies such as Baringo and Turkana -that is very unusual. Therefore a lot need to be done to understand why these dry ecologies are beginning to have malaria outbreaks.

What parameter did you use to choose the participating schools?

I was looking for schools in areas with a high malaria prevalence in Western and Nyanza. I had a number of schools and the criteria I used to knock them out was the ability to sign consent forms. Consent to administer questionnaires, take photos and record videos because I needed that for my research

For this project, the idea was capacity building so as to create anti- malaria ambassadors. What was the motivation?

My vision is that the students participating in this project can mentor their classmates and family because I can not reach everyone. My vision is that if I can mentor two and those two get to mentor others, we will have a group or a movement of people who are interested in science and in natural products that can be used to alleviate the malaria burden.

In addition to the malaria message and the mentorship you gave the kids, Can you talk about the joy this project has sparked on the hearts of these students?

I never knew that a T-shirt could be this important until we witnessed the reception. If I were to do this again I would still distribute T-shirts to an even larger group of participants. Even the certificates they received meant a lot. I never told them about the incentives of the T-shirt and the certificates. It was a surprise. It added the element of joy and excitement.

TEAM PROFILES



Dr. Patrick W. Okanya is a senior lecturer of Biochemistry at the Technical University of Kenya. He obtained his PhD. in 2012 from the University of Saarlands, Germany where he worked on isolation, characterization and structure elucidation of compounds from myxobacteria. He has published widely in the fields of natural products and biotechnology. He is a member of the certification body of the International Federation of Biosafety Associations (IFBA) and holds IFBA professional certifications in Biorisk Management and Biosecurity. Dr. Okanya is the current Secretary General of the Biorisk Management Association of Kenya (BMAK) and an IFBA mentor for biosafety and biosecurity. He has organized and facilitated a number of biosafety and biosecurity trainings to both public and private institutions including presentations at national and international conferences. He has attracted funds for regional workshops from Global Affairs Canada and the Bio-engagement

Programme and facilitated workshop in Biorisk Management and IFBA professional certification examinations in Kenya. Dr. Okanya is also a career motivational speaker with a bias towards science, technology, engineering and mathematics (STEM) programs. He is very passionate about raising the next generation scientists. He was appointed as the team leader in an outreach program at the School of Biological and Life Sciences (SBLs), at the Technical University of Kenya to lead a team of colleagues dubbed “SBLs creation awareness team” to visit secondary schools and give career talks to high school students in a bid to encourage them to pursue careers in science. Currently, he is the lead consultant in the DELTAS project on science-based conversation, knowledge and skill transfer to students in selected secondary schools in Western and Nyanza regions in Kenya.

As a hobby, Dr Okanya does poultry farming and cultivation of subsistence crops such as maize, beans, sweet potatoes, arrow roots and kales to promote food security for his family and the neighboring communities in his rural area.



Cinephile. Raconteur. Bibliophile. Poet and musicophile. Claudia Onsare is a seasoned communication consultant, brand strategist, content producer, lecturer and researcher of communication. She has close to a decade of experience as a visual

storyteller, digital marketing training and writing. Previously, she worked as a producer and writer with The Kenya Broadcasting Corporation (KBC). She is also a PhD candidate at the University of Nairobi’s School of Journalism (SOJ).

When she has time to come up for air, she will be found mentoring juvenile offenders at Life song, knitting scarves, dancing to Riva or – cup of porridge in hand- head buried on a book page

“I was born out of ocean breath”



Onesmus Mwaura is a research assistant and an upcoming chemical ecologist based at behavioral and chemical ecology unit (BCEU) at the International Centre for Insect Physiology and Ecology (icipe) Duduvile campus, Kasarani. For the 3 years he has been at icipe, he has had the opportunity to work in projects that cut across all the 4-thematic areas that drive research at icipe namely human, animal, environment and plant health. His current research engagement involves studying the pest/parasite-host interaction for management of both below and above ground pest/parasite. This project involves a lot of field work and he is generally an outdoor person. Hence it compliments his strength and interest. With respect to the DELTAS science contest project, it gave him the opportunity to be himself. He is a great lover of creative art and performances, and the project enabled him to marry his passion for arts and science. Specifically, he was in charge of the creative art section where we explored the use of creative art and performance such as skits, poems, dances and drawings in creating awareness for malaria prevention and management. He found the project unique, engaging and rewarding. He would do this again.



Bosire Ouko is a Tutorial Fellow in the Department of Biochemistry and Biotechnology at The Technical University of Kenya. He is currently undertaking his PhD (Biotechnology) studies in the same institution titled "The potential of Co-enzyme Q10 to enhance chloroquine therapy in cerebral mouse model".

Mr. Ouko has been so passionate about malaria research that saw him graduate with a master of science degree in Applied Parasitology (UoN) that focused on malaria vaccine development at KEMRI-Wellcome trust in Kilifi county (malaria endemic region). He is a holder of Bachelor of Science degree in Microbiology and Biotechnology from University of Nairobi.

Away from science and research, David is enthusiastic about scrabble that saw him win a regional award in Kisumu county. His love for soccer, social group activities and cooking is massive.

"It is only by drawing often, drawing everything, drawing incessantly, that one fine day you discover, to your surprise, that you have rendered something in its true character."

Camille Pissarro



CAPACITY STRENGTHENING



Mary Koki

holds a Bachelor of Technology in Biotechnology from The Technical University of Kenya. Currently, she is a Technical assistant at the Behavioral and chemical ecology unit, International Center of Insect Physiology and Ecology (icipe), working under the DELTAS-THRIVE Project. The project gave her a golden opportunity to grow, expound her hands on skills and gain new technical skills in research. She had the opportunity to interact with post graduate students and scientists in their various research projects which enabled her to acquire hands on skills. Also, she attended a number of project presentations and talks held at the research Centre.

The high school's science contest program gave her a great opportunity to build her self-esteem, and improve on her public speaking and communication skills. She participated in the DELTAS funded program as a facilitator for the science demonstration. Specifically, her roles included i) demonstrating to the high school students the use of personal protective equipment when working with hazardous chemicals ii) separation techniques such as chromatography and iii) solvent-solvent partitioning

as an extraction method for plant extracts. The interaction with the high school students was awesome and encouraging. She really enjoyed the school's visits as they also gave her a chance to visit new places that she only heard of before. She feels lucky and highly honored for the immense positive impact and mentorship she has received through the DELTAS project. Her passion for research and education motivates her to press on despite the hardships. She's positive about getting a scholarship to further her studies. Her social and selfless nature is inspired by her humble family background.

Cynthia King'ori

is currently a technical assistant at the Behavioral and Chemical Ecology unit, ICIPE. Her key role in the DELTAS Science project includes giving a demonstration on mosquito identification at the schools, data entry and report generation. She holds a First-Class Honors in Bachelor of Technology, Biotechnology from the Technical University of Kenya. Besides research, she enjoys outdoor activities such as ziplining, going to concerts, reading books and watching comedies.

Working on the DELTAS/THRIVE project has given me the much-needed experience in community engagement activities. I had previously never worked in such a setting since I always thought it was under social sciences. However, working on the project made me realize that merging science with community engagement has farther reaching effects in implementing research output than publishing papers. I came to realize that if one does not involve the community during the research design and process, then the output will have minimal impact to the society. I now have a clearer understanding on how best to undertake research in the future.



"To a plant, all things are normally quiet, eternal, each thing identical to itself. From the period of low organisms, man has inherited the belief that there are identical things (only experience which has been educated by the highest science contradicts this tenet). From the beginning, the first belief of all organic beings may be that the whole rest of the world is One and unmoved.

- Nietzsche

WAMALWA KIJANA FRIENDS SECONDARY



Mentorship



Painting and drawing



Performance Art



Art & Science



Science Contest

WAMALWA KIJANA SECONDARY SCHOOL

It is a public sub-county school located at Kamukuywa , Kimilili constituency in Bungoma county. It has a student population of about 750 students.

HILARIO SECONDARY

Performance

Arts, Drawing



Award Ceremony



HILARIO SECONDARY SCHOOL

This is a public mixed day secondary school situated in Wekhonye location, Ki-minini constituency in Trans-Nzoia county. The school was established in the year 2004 through a religious organization sponsorship. It boasts of a student population of about 800 students.

GENDIA HIGH

Arts, Painting and drawing



Award Ceremony



GENDIA HIGH SHOOOL

Gendia High School is a public county boys school located in East Karachuonyo near Kendu Bay town, karachuonyo constituency in homa Bay county in the former Nyanza province. It has a student population of about 800 students.

MENTOR SHIP



"Children must be taught how to think, not what to think."

— Margaret Mead

Best Insha and composition write up...

BEST INSHA

OCHIENG JAPHETH APACHE KIDATO CHA NNE

Aaah! Duniani kote mnapigania jinsi ya kuniangamiza lakini nimekuwa hatari kwa jamii nzima ya kibinadamu. Kutoka enzi za kitambo wanadaktari wametafuta madawa ili waweze kuniua, na hata katika enzi hii kuna watu wengi wanapigania ujuaji kwa namna ya kuniua lakini nimewaweza. Madaktari wamekunywa kemikali makali kwenye mahabara wakijitahidi jinsi ya kuninolea upanga wa kunikata lakini wapi? Wanasayansi nao vilvevile wamekosa usingizi kwa vile wanatafuta njia mbalimbali ya kukabiliana nami lakini wapi?

Mimi kama baba mbu ningependelea kutoa nasaha kwa wanasayansi kwamba mara kwa mara wasijitazite kwani sisi kama familia tumejitolea kudhuru na kwa hakika hatutalegea. Katika dunia nzima ni malaria ambayo imekuwa tatizo kubwa sana. Madaktari na wanasayansi wanatatizika kila uchao kukabiliana na maadhara yetu: malaria, ilhali wanasababisha haya wameachiliwa huru wakiendelea kusababisha madhara yale yale.

Muweze mkaweka mazingira yenu safi, ungewasikia maafisa wa afya wakiwanasaha wanajamii lakini wao hawashughuliki, wanapoamua kufyeka nyasi ndefu yaliyoko karibu na nyumba zao na kuacha maji yale ya taka yaliyokusanyika mimi na familia yangu huwa tunashukuru Mola. Pia wengine huyaondoa maji yake na kuacha vijichupa vidogo vidogo vinavyo beba maji ndani na hapo ndipo sisi husherekea tukiangalia namna ya kudhuru hawa wenye pia wanajitahidi kutudhuru. Wale wanaokataa nyumba zao kupigwa madawa yanayozuia mbu basi wanakuwa ni wateja wetu na hapo ndipo sisi huelekea.

Mimi na familia yangu tumekuwa watiifu sana kwa familia wanaoshirikiana na kulala ndani ya neti. Pia kuna wanaosema kuwa neti hizo za kuzuia mbu huwapata mawasho ya uso zao na pia haiwapi usingizi unaojaa. Hawa tunapowasikia sisi husherekea na kwa furaha tele hunyonya damu zao na kuweza kuwaambukiza ugonjwa wa malaria. Hivi punde wanadamu wanashangazwa na maafa yanayosababishwa na malaria. Kwa hivyo akili zote wamewekelea malaria na kutuacha sisi kama mbu tukitekeleza mujibu wetu bila wasiwasi wa kupoteza maisha ama mmoja wa familia yetu.

Pia wanasayansi wamejaribu kutowezesha mbu waume ili kuzalisha lakini kasi ya uzalishaji na ukuaji wa mbu umekuwa wa kushangaza mno, kwa mfano kutoka hapo wakati ambapo yai inazaliwa mpaka iwe mkubwa tayari wa kuza haichukui muda mrefu sana. Jinsi ya mbu inayosababisha maambukizi ni wa kike lakini wao wanashughulikia jinsia wa kiume.

Sisi ni wanyama wadogo sana, lakini binadamu wanashindwa kutumaliza. Na kwa hiari yetu sisi bado tatazidi kuambukiza malaria na hili litaleta maafa makubwa zaidi. Kila uchao wanamama hulia kwa kupoteza wanao lakini wao wanapoambiwa walale ndani ya neti hukiuka na kukataa kabisa. Sisi kwa pamoja tunawaambia wanadamu mtaka cha mvunguni sharti ainame na wanapoinama wawe wakijua sisi pia hatulali kwa sisi huwatembelea usiku wa manane wanapochukua usingizi bila ya kufahamu chochote.

Kwenye misitu hakukaliki basi sisi hukimbilia kwa manyumba na makao ya wanadamu. Kwa hivyo wao huishi na sisi kati yao wapende wasipende. Sisi tunapomaliza misheni yetu huwa mchana tunaponzika tukiingojea usiku mwingine. Baada ya siku moja hivi wanaanza kulaumiana na kushikiliana chuki wao kwa wenyewe kwani mama kasema watoto walale ndani ya neti nao wengine wanakataa na kwa hivyo wakaambukizwa malaria kutokana na kuumwa na mbu huyu wa kike.

Hatutegei hata kidogo. Shabaha yetu ni kuwaambukiza wanasayansi na pia madaktari ili wasiweze kutoa kampeni makali dhidi yetu. Wanaokuwa na shabaha ya kutuua naye huwa lengo yetu ili kumuambukiza na kumaliza ili tubaki kwa amani na kuendelea na lengo letu duniani. Shukrani ni kwa mola kwa kutuumba wanyama wadogo kiasi cha wanadamu hawewezi kutushika kwa mikonono bila kutumia kemikali makali. Sisi kama mbu tunasema wanadamu wawe kila siku macho kwani sisi husababisha malaria pia huua kwa hasara sana. Na sote kwa pamoja tuasema: tuwaangamize wanasayansi tuendeleze maambukizi ya malaria.

BEST COMPOSITION

JUSTUS BRUNE FORM TWO - AN ESSAY ON MALARIA

Malaria is a disease spread by the sting from a female anopheles mosquito.

Malaria has been a source of so much pain for my people. I have witnessed people lose their loved ones to malaria. I'd like to tell you story. Once there was a very powerful kingdom, the kingdom was headed by a very powerful king. He believed in herbalists and magicians, he could not allow anyone to go out or get into the kingdom without his permission. Whenever one was sick, he or she would be treated by his magicians and herbalists. The kingdom was situated near a very big river and very thick forest.

In time, children and even adults were infected with malaria and this king did not realize the source of the illness. He consulted his prophets but he never got the correct answer. Some of his false prophets said that the gods of their land had forsaken them. As the days continued, the death rate was increasing. The king became disturbed.

As the king was busy thinking of what was going on in his kingdom, he felt that something had bitten him. He looked at his arm and saw a small insect. He was curious to know which insect had bit him. As the day went by, the mosquito population increased, and yet the king did not know that a mosquito had bitten him. After a few hours, a group came crying, "O our king, our children are dying, everybody is suffering, please help us! Help us!"

The mosquitoes became very common and were in large numbers. The king took the sample and that evening the king travel to a far kingdom to consult their gods. This king was also very cruel and he was highly respected if anybody was against the king's law then he would be sentenced to death.

The cry was all over and everyday more than twenty people lost their lives. When this king came back, he was very tired and exhausted; he even refused to eat that day. As he sat on his chair in his palace, he fell into a deep sleep in the dream he saw some people with white garments carrying some things on their hands. Immediately he woke up, he called all his magicians told him everything about his dream and told them to interpret.

When they interpreted the dream, it came to realization that some cures would come to prevent this particular pandemic. The king was still disturbed; he did not want any foreigners to enter into his kingdom. Finally, the villagers came in large numbers crying and crying later. The king was tired and made up his mind and gave orders to let foreign people into their land so long as they are going to help them. One particular morning as the king was walking around the compound, he saw some people and realized that they were doctors, he wanted to inquire more about them, the doctors had already done their research and realized that it malaria.

They told the king about this and even how it can be prevented and the king was very amazed. Within no minute, the forest and thick bushes were cleared and everyone in every home was vaccinated and they also distributed nets. The king was very happy about this as malaria now reduced and there was no more death and the house was malaria free as the medicine was also sprayed. The villages were taught signs and symptoms of malaria and their preventions and the king was grateful and his kingdom grew healthy again.



"To a plant, all things are normally quiet, eternal, each thing identical to itself. From the period of low organisms, man has inherited the belief that there are identical things (only experience which has been educated by the highest science contradicts this tenet). From the beginning, the first belief of all organic beings may be that the whole rest of the world is One and unmoved".

- Nietzsche

ORGANIZATIONAL PROFILES

The International Centre of Insect Physiology and Ecology (icipe)

The International Centre of Insect Physiology and Ecology (icipe) carries out research and training in sustainable management of insects (arthropods) for improved comprehensive health and agricultural productivity in the tropics (www.icipe.org). As an International centre of insect research, icipe's jurisdiction is organized in a paradigm of 4-thematic areas namely animal, human, plant and environmental health. The combination of the 4-H theme provides a platform for holistic and integrated solution approach to challenges facing mankind. In this project, majorly the human health theme is central as it deals with insect of human health importance like malaria.



Training Health Researchers into Vocational Excellence (THRiVE)

Training Health Researchers into Vocational Excellence (THRiVE) is a research capacity building consortium partnering with four academic and four research institution. THRiVE collaborates with some of the best universities and research centers in East Africa with support from two leading universities in the United Kingdom. The synergy yields into a robust health research environment and capacity building for PhD and postdoc students involved in the collaborative projects. The PI of this project is a THRiVE-2 PhD scholar.



Technical University of Kenya (TUK)

The Technical University of Kenya is a chartered public university that offers diplomas in Technical and Vocational Education and Training (TVET) programmes as well as degrees for undergraduate and post graduate programmes anchored in three faculties namely; Applied Sciences and Technology, Engineering Sciences and Technology and Social Sciences and Technology”



TECHNICAL UNIVERSITY OF KENYA

GENDIA HIGH SCHOOL MALARIA PUZZLE

MAURICE ROBINSON OMONDI

Theme: Malaria causes and preventive Measures

1. Prevention
2. Education
3. Headache
4. Environment
5. Backpain
6. Cure
7. Conducive
8. Cough
9. Fever
10. Shivering
11. Quinine
12. Medication
13. Medicine
14. Vaccine
15. Net
16. Stagnant
17. Antibiotics
18. Vaccination
19. Prescribe
20. Doctor
21. Anopheles
22. Oil

P	R	E	S	C	R	I	B	E	A	V	E	A	O	E	N
R	N	O	I	T	A	N	I	C	C	B	A	C	I	D	N
E	D	U	C	A	T	I	O	N	I	V	O	C	V	S	I
V	N	C	C	O	U	G	H	C	Y	D	A	V	C	H	A
E	E	O	U	G	N	Z	I	O	L	I	T	I	I	I	P
N	T	U	H	C	N	D	A	C	H	F	D	V	T	N	K
T	V	U	C	V	E	V	U	O	A	N	E	Z	Z	E	C
I	I	J	C	M	V	T	O	S	B	B	I	V	W	D	A
O	K	L	H	M	A	L	A	R	I	A	Y	T	Z	W	B
N	O	S	T	V	S	T	K	N	O	V	C	V	D	C	R
C	U	R	E	A	V	J	V	G	O	I	E	V	E	R	O
B	S	U	O	G	E	N	V	I	R	O	N	M	E	N	T
V	C	B	A	N	V	O	I	O	I	L	I	B	C	D	C
D	C	V	G	A	N	O	P	M	E	I	E	S	V	O	O
C	Q	U	I	N	I	N	E	C	V	A	B	O	Z	O	D
D	A	A	N	T	I	B	I	O	T	I	C	S	B	O	I

Caution Malaria Kills, be aware !!!

Prevention

1. Sleep under nets
2. Clear bushes and grass
3. Drain away stagnant water and if not apply oil to destroy their breeding sites
4. Visit the doctor regularly
5. Complete the dose when prescribed by the doctor
6. Apply spraying detergents

It was closing day
November 1997
Screaming with classmates at play
Round about eleven
Not a care in the world to dismay

Concern Written all over her face
Our teacher beckoned me to her
Myn curious peers looking on with glee
Must be an assignment -They thought

Malaria! The doctor said
My Mother heavy with child
Dispensary kilometres away
Our family lost our rock

...Luwere...(song)

malaria will one die in Africa
Maybe, I know the cure
Maybe I have the cure

Wait! I might have a cure
Grandma says, Misati bring the
Mwarubaini leaves!

Claudia Ousave

*Mentor
Inspirive
Equip*