

2

From the Chair, *icipe* Governing Council

Dr Lukas Bertschinger,
Chair, *icipe* Governing Council



3

Invasive species and Africa

Dr Segenet Kelemu
Director General, *icipe*



5

INSTITUTIONAL NEWS

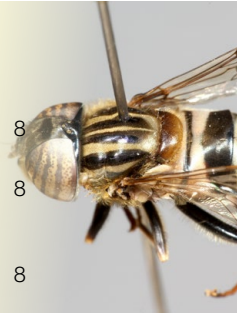
- icipe* designated OIE Collaborating Centre for Bee Health in Africa 5
- IDRC Board of Governors visit 6
- icipe* Technology Transfer Unit launched 6
- THRIVE annual general meeting 7
- World Malaria Day 7
- icipe* – KALRO MoA 7



8

NEW FUNDING

- Pollinator Information Network for sub-Saharan two-winged insects 8
- Push-Pull for sub-Saharan Africa 8
- MUSA – sustainable control of key banana pests and diseases 8



9

RECENTLY PUBLISHED

- Jewel wasps 9
- Push-Pull 100th publication 9
- Bee pest risk mapping 9
- Root-knot nematodes 9



10

RESEARCH HIGHLIGHTS

- Enhancing tsetse management 10
- Fall Armyworm 10
- Aferia capacity building 11
- Rothamsted International Fellowship 11
- Women empowerment research awarded 11



12

icipe IN ETHIOPIA

- National Sericulture Development Strategy 12
- White mango scale workshop 12



13

CAPACITY BUILDING AND INSTITUTIONAL DEVELOPMENT

- Recent graduates and thesis defences 13



15

icipe IN PICTURES

- icipe* Director General meets UN Secretary General 15
- AAS-AESA visit 15
- Visit by Prof. Andrew Campbell, Chief Executive Officer, ACIAR 15



16

STAFF NEWS

- Appointments 16



icipe BY NUMBERS

35

Peer reviewed journal articles (April – June 2017)



600

Farmers currently using tsetse repellent collars technology



3,566

Current beneficiaries of the Young Entrepreneurs in Silk and Honey Project



620

Media mentions





Dr Lukas Bertschinger,
Chair, *icipe* Governing Council

Dear Colleagues and Friends of *icipe*,

We are extremely pleased to bring you an update of *icipe*'s activities over the past four months (April – July 2017).

During this period we were most honoured to welcome a number of visitors representing the Centre's donors and collaborators. Such visits are important to us, as they re-emphasise our partnerships and also provide a chance to discuss new and innovative, science-led strategies to improve livelihoods across Africa. Among those who visited are: the Board of the Governors of the International Research Development Centre (IDRC); and colleagues from the Alliance for Accelerating Excellence in Science in Africa (AESA) and African Academy of Sciences (AAS).

We also received Dr Jean Philippe-Dop, Deputy Director General, OIE – World Organisation for Animal Health. This visit came in the wake of the confirmation of *icipe*'s designation as an OIE Collaborating Centre for Bee Health in Africa. This is delightful news that re-affirms our role as a hub of bee health expertise in Africa and globally.

Our unique position as a world class leader in insect science is an aspect that we continue to embrace, as is visibly emphasized by our participation in key global and regional initiatives. Notably, in April, we joined the international community in commemorating the World Malaria Day, asserting our commitment to the control of this deadly disease. We have also strengthened our involvement in the development of the sericulture industries in Kenya and Ethiopia.

Significantly, together with partners and stakeholders, we have initiated a range of activities

towards management of the destructive invasive Fall Armyworm. The topic of invasive species and strategies for reducing Africa's vulnerability, is of great concern to *icipe*, and is indeed the focus of the Director General's Thought Leadership column.

In this bulletin, we celebrate colleagues from the Push-Pull programme, who, in partnership with Rothamsted Research, UK, have recently published their 100th peer reviewed journal article.

Other publications highlighted in this report include results that provide promising leads for the development of ecofriendly strategies to control root-knot nematodes; and the description of new wasps, a part of *icipe*'s ongoing contribution of much needed knowledge to the global taxonomy hub on smaller organisms.

***icipe* embraces alert to its unique position as a world class leader in insect science. We are pleased that our partners and collaborators continue to recognise, and to support our mission.**

icipe's research portfolio continues to expand, some of the latest additions being a study on endophytes and biocontrol agents against key pests and diseases of banana, and on dipteran pollinators from the Afrotropics.

I would like to strongly acknowledge support from Biovision Foundation for Ecological Development, Switzerland, our longstanding partner, which has enabled us to establish a Technology Transfer Unit. As a result, we are now able to assign the role of technology dissemination to a dedicated, appropriately skilled team, thus increasing our ability to reach even more end users.

We thank all our donors, partners and staff, and anticipate that you will enjoy reading this publication.

Dr Lukas Bertschinger,
Chair, *icipe* Governing Council



Dr Segenet Kelemu
Director General, *icipe*

Invasive species and Africa

Back in the 1950s, Charles Elton, an English ecologist and zoologist, introduced the term “invasion” to describe destructive ecological explosions of exotic plants and animals.

Today, Elton’s military derived metaphor, which first appeared in his seminal book *The Ecology of Invasions by Animals and Plants*, has led to the adoption of the term “invasive species” as the universal definition of arthropod pests, diseases and weeds introduced accidentally or deliberately outside their natural habitats or countries of origin. The analogy of invasion also served as an early warning for a broad range of invasive species catastrophes with which we have become all too painfully familiar.

Despite several international mechanisms (for example, the Convention on Biological Diversity (CBD)), established to tackle invasive pests, their threat continues at an alarming rate, bolstered by globalisation, increasing movement of people and goods, land use changes, climate change, and physical and chemical disturbance to species distribution.

Indeed, globally, invasive species are now considered the second most important threat to nature, due to their severe and cross cutting impact on ecosystems, human and animal health, infrastructure, economic and cultural resources.

In sub-Saharan Africa (SSA), one of the most susceptible regions, the list of invasive species is long and diverse; their destruction often horrendous. As an example, since January 2016 the Fall Armyworm, a caterpillar that is endemic to the Americas, has been devastating maize and other crops in at least 20 African countries, placing at risk the food security, and indeed the very livelihoods, of around 300 million people.

icipe research on invasive species

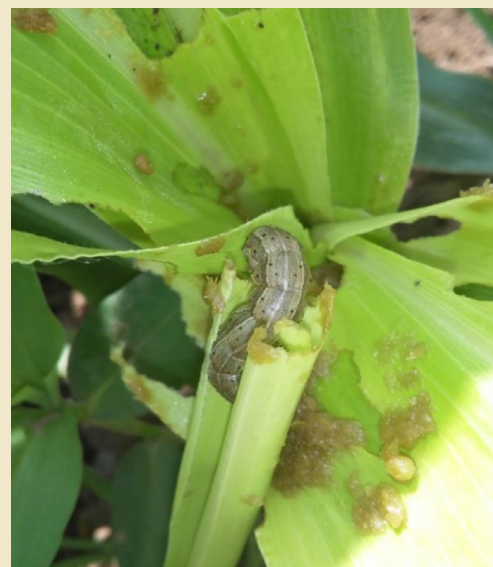
The Fall Armyworm, a hazard that *icipe* is currently addressing, piles on to a range of invasive species related threats. Some that have been the subject of *icipe* research in the recent past include the maize lethal necrosis disease (MLDN), caused by the maize chlorotic mottle virus and sugarcane mosaic virus. The Centre has also conducted studies on the larger grain borer, *Prostephanus truncatus*,

a serious postharvest pest capable of reducing stored grains to pulp, which was introduced from Central America into Africa in the late 1970s.

Africa’s backup staples, like potato, have not been spared from the invasion peril. Two years ago, the potato cyst nematode (PCN), microscopic, soil dwelling roundworm that are highly destructive to potatoes worldwide was reported in eastern Africa. *icipe* and partners, through the support of the Food and Agriculture Organization of the United Nations (FAO), have established that the pest has invaded several potato growing areas in Kenya.

The continent’s horticultural sector also continues to face untold challenges as a result of invasive pests. New entrants within the last five years alone include the oriental fruit fly, *Bactrocera dorsalis*, a native of Asia, which is now present in more than 30 African countries. Aside from ruining fruit and vegetable yield, at times up to 100%, *B. dorsalis*, like other fruit fly species, is also a quarantine pest, and its presence in Africa restricts the export of produce from the continent to European

Globally, invasive species are now considered the second most important threat to nature, due to their severe and cross cutting impact on ecosystems, human and animal health, infrastructure, economic and cultural resources. Sub-Saharan Africa is one of the regions most susceptible to this menace.



The Fall Armyworm is causing devastating damage to maize and other crops in Africa.

markets and emerging markets in North America. Other invasive fruit fly species on the continent include *B. zonata*, *B. cucurbitae* and *B. latifrons*. Further, *icipe* and partners have recently detected the Asian citrus psyllid, *Diaphorina citri*, a sap-sucking insect that can transmit the lethal citrus disease huanglongbing, also known as ‘citrus greening’. In addition, *Tuta absoluta*, a devastating leafminer originating from Peru has swept across Africa, leading to the declaration of a state of emergency in some of the continent’s main tomato producing areas. *icipe* and partners are making significant progress in addressing these challenges.

Meanwhile, emerging infectious diseases like malaria, Rift Valley fever, yellow fever and dengue, pose constant and growing threats to the continent. This is because, while these diseases are already causing significant problems in endemic zones, they are now also spreading to new geographical areas in Africa, and due to a number of factors, including climate change, they also represent a constant threat to regions beyond the continent. *icipe* recognises the responsibility of preventing the spread of emerging infectious diseases, and has therefore made this a focal research area.

Further, the Centre has focused attention on invasive weeds, like the *Prosopis* genus, enlisted for rehabilitation of African dry lands in the 1970s, but has since turned out to be a noxious, extremely aggressive invader that replaces native vegetation



The invasive *Parthenium hysterophorus* is extensively spread over cultivated and pastoral lands in East Africa, and is also able to sustain the malaria-transmitting mosquito, *Anopheles gambiae*.

and colonises important ecosystems like rangelands. A native of North and South America, *Parthenium* is considered one of the world’s most serious invasive plants. In East Africa, *Parthenium* is extensively spread over cultivated and pastoral lands. A significant element is the weed’s ability to sustain the malaria-transmitting mosquito, *Anopheles gambiae*, by extending its life, as a preferred sugar source, even in the absence of a blood meal.

icipe is also investigating *Parthenium hysterophorus*, known as famine weed in parts of East Africa, and its relationship to increase in malaria incidents in East Africa.

Creating a strong line of defence

The degree of invasive pests introductions, globally but especially in Africa, suggests lack of adequate contingency planning, preparedness and management measures. A three-stage approach is recognised internationally: prevention, early detection, and control and restoration.

Prevention involves pest risk analysis by relevant regulatory authorities to predict possible arrival, potential pathways, and the chances of a particular pest or pathogen becoming established in a new location. This information should allow regulators to determine the risk mitigation steps and the necessary phytosanitary measures to ensure that the risk is kept at acceptable levels. Ultimately, significant attention should be given to accurate and



Fruit fly Mania™, a protein bait developed through *icipe* research, which is now commercially available in Kenya, is expected to contribute strong defence to fruit flies, including the various invasive species.

timely detection of invasive species as a solid basis to respond to invasive species, reducing prophylactic treatments in case of already established species and ensuring economic and environmental benefits.

The steps outlined above should create a systematic, coordinated, consolidated, proactive and rapid response, based on a clear contingency plan, supported by enforceable policies, reference points, and an inventory of management options.

Unfortunately, in many cases in SSA, the response to invasive pests has been reactive and ad hoc rather than proactive. As discussed later in this publication, *icipe* has been collaborating with a number of partners to rectify this situation. In addition, the Centre in partnership with CABI and the International Institute of Tropical Agriculture (IITA) are planning a major workshop on invasive species in Africa later in 2017.

icipe recommendations

To effectively tackle invasive species in Africa, we recommend the following:

- Development of high-level scientific and policy dialogue between relevant authorities and stakeholders in regard to invasive species, and broad awareness creation of their economic impact.
- Strengthening of phytosanitary capacity and systems in Africa.
- Reinforcement of interdisciplinary research in the design and implementation of scientific and programmatic interventions for invasive species.
- Support for continent and nationwide surveillance of invasive species.
- Integration of invasive species threats into national disaster response units.
- Creation of coordinated and collaborative resource mobilisation for invasive species activities.
- Emphasis on novel intervention solutions that provide a sustainable way of controlling invasive pests.
- Support for crowd sourcing and citizen science in the management of invasive species.

icipe designated OIE Collaborating Centre for Bee Health in Africa

icipe has been designated an OIE Collaborating Centre for Bee Health in Africa by OIE – World Organisation for Animal Health (the intergovernmental organisation responsible for improving animal health worldwide).

This designation is significant as it formally recognises *icipe*'s role as a hub of bee health expertise in Africa and globally. Over the past decade, the Centre has been implementing a range of initiatives in this area, primarily through the establishment of the African Reference Laboratory for Bee Health, a partnership with the African Union Inter-African Bureau for Animal Resources (AU-IBAR), which provides a platform for monitoring and preventing bee diseases and pests in Africa. As an OIE Collaborating Centre for Bee Health in Africa, *icipe* will also be expected to provide bee health expertise internationally, extending collaborations to many of OIE's 181 Member countries.



The African honey bee, *Apis mellifera* is a key focus of *icipe* research.

In addition, the recognition by OIE re-energises *icipe*'s commitment to bee health research. *icipe* will advance its activities that currently revolve around three thrusts.

First, *icipe* is addressing the rising threats to bees in Africa resulting from factors such as climate change and habitat loss due to deforestation caused by population pressures, among others. Second, *icipe* aims to contribute knowledge on the colony collapse disorder (CCD), a phenomenon that has become a serious problem since 2006 and a major threat to commercial beekeeping and pollination operations in Europe and USA. In collaboration with partners, the Centre is mapping bee health risk factors, while investigating mitigating strategies in Africa and globally. Third, the Centre's researchers are characterising the gut microbiota of African honeybees, the 'friendly bacteria' that aid insect defence against pathogens. It is hoped that this increased understanding of how gut microbiota influences the health of bees will lay a foundation for microbe-based strategies for bee health management.

Watch: <https://www.youtube.com/watch?v=9kMpguF84Ok>



Dr Jean Philippe-Dop signs the Visitor's Book, seated in front of The African Reference Laboratory for Bee Health, a state-of-the-art facility, where *icipe*'s bee health research is coordinated.



Dr Samuel Wakhusama, OIE Sub-Regional Representation for Eastern Africa, samples the scent of *Ocimum kilimandscharicum*, a plant from which *icipe* has developed a biofumigant for bee health known as Apicure®, which has been tested in small-scale trials in Kenya and shown to be effective in killing varroa mites and in repelling small hive beetles in bee colonies. Looking on is *icipe* Bioprospecting Programme researcher John Bwire.

IDRC Board of Governors visit

On 5 July 2017, the Board of Governors of the International Development Research Centre (IDRC), made a familiarisation visit to *icipe*, and held a roundtable discussion with the Centre's researchers and IDRC's key partners on youth agripreneurship.

The visitors had a chance to learn about *icipe*'s broad contribution to youth employment in Africa. In particular, the session discussed opportunities available for the youth through the INSFEED project.



Members of the IDRC Board of Governors pose for a group photo with *icipe* staff during their visit.



Mary Anne Chambers, Governor, IDRC, speaking during the visit. Seated next to her is Jean Lebel, President, IDRC.



Jean Lebel, President, IDRC, listens as *icipe* researcher, Tanga Mbii, explains some of the Centre's ongoing insects for food and feed research.

icipe Technology Transfer Unit launched

icipe has established a Technology Transfer Unit (TTU), which will enable the assignment of the dissemination of strategies and solutions developed by the Centre to a dedicated, appropriately skilled team.

TTU will present a platform for synchronised, sustainable and visible technology dissemination. The Unit will build on pilot technology dissemination projects by *icipe* and partners, to scale them out for enhanced impact.

TTU will also strengthen cross-linkages between *icipe*, farmers, researchers, donors, enterprises and policymakers,

facilitating better processes for providing information and advice, testing and improving technologies, capacity building, innovative project development and business incubation.

The Unit is being nurtured within the Push-Pull Sub-Saharan Africa project, funded by Biovision Foundation for Ecological Development, Switzerland. Initially, TTU will support the large scale adoption of the Push-Pull technology across Africa, aiming to reach 70,000 new farmers, bringing the total number of Push-Pull farmers to 250,000 (from the current 180,000) by December 2018.

THRiVE annual general meeting

In May 2017, *icipe* hosted the annual general meeting (AGM) of the Training Health Researchers into Vocational Excellence in East Africa (THRiVE, <http://thrive.or.ug/>) consortium.

THRiVE-2 brings together eight institutions from East Africa and the United Kingdom: Uganda's Makerere University (lead partner), Gulu University and Uganda Virus Research Institute; Tanzania's Kilimanjaro Christian Medical College and the Tanzanian National Institute for Medical Research at Mwanza; the UK London School of Hygiene and Tropical Medicine the University of Cambridge, and *icipe*.



Dr Dan Masiga, THRiVE Coordinator at *icipe*, introducing the keynote speaker, Prof. Marleen Temmerman.

World Malaria Day



Dr Ulrike Fillinger, Interim Head, *icipe* Human Health Theme, presenting a prize to one of the winners of the 'mosquito hunt', game prepared for children during the event.

On 25 April, *icipe* joined the global community in commemorating the World Malaria Day, an occasion set aside by the World Health Assembly, the decision-making body of the World Health Organization (WHO), to highlight the need for continued investment and sustained political commitment for malaria prevention and control. This year's global theme for World Malaria Day was End Malaria for Good.

icipe marked the day at the Centre's Thomas Odhiambo Campus (iTOC), Mbita, on the shores of Lake Victoria, with the slogan: Family Fun and Education; the major goal being to create awareness among the local community, *icipe* partners,

government officials and the general public on the Centre's malaria research and to provide a space for dialogue on various aspects. The event was coordinated by the iTOC malaria research group.

The *icipe* World Malaria Day commemoration was supported by:

Biovision Foundation for Ecological Development, Switzerland; Med25 Hospital; Christco Church Mbita; SEEK Kenya; Equity Bank, Mbita branch; St Mary's Mission Hospital; Nagasaki University, Japan; Imani Computer Services; Humanist Hospital; Victoria Friendly Montessori; Mbita sub-County Ministry of Health; Rusinga Island Lodge and Seventh Day Adventist (SDA) Church Central.

icipe – KALRO MoA



icipe and the Kenya Agricultural and Livestock Research Organisation (KALRO) have signed a Memorandum of Agreement (MoA) towards technical cooperation for sericulture research and industry development in Kenya.

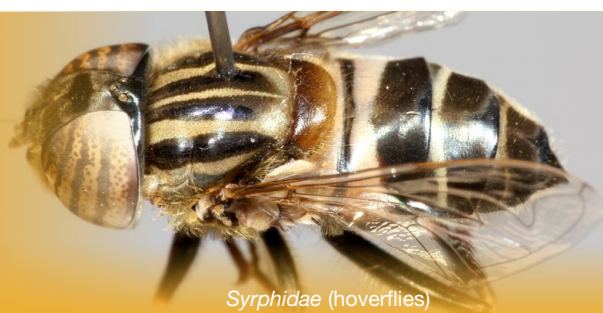
The MoA between *icipe* and KALRO will enable the two organisations to combine synergies by: facilitating information exchange through various scientific and non scientific fora; collaborative research, joint publications and resource

mobilisation; as well as capacity building and extension of research programmes.

icipe and KALRO will also share sericulture production resources and facilities, for instance, mulberry forage for rearing silkworms and processing plants for end products.

The two organisations also intend to contribute towards a strong sericulture value chain in Kenya.

Pollinator Information Network for sub-Saharan two-winged insects



Syrphidae (hoverflies)

The project will increase knowledge on the minimally investigated role of Diptera pollinators, which are possibly just as crucial as other insect pollinator taxa.

The Biosystematics Unit has received a grant from the JRS Biodiversity Foundation, for collaborative research with the Royal Museum for Central Africa, Tervuren, Belgium, under a project titled: the Pollinator Information Network for sub-Saharan two-winged insects

(PIN-DIP). The research aims to organise a network to collect, manage and share information on dipteran pollinators from the Afrotropics. Plant-pollinator networks are composed of a variety of flowering plants and an interacting, high variety of insect pollinators.

Push-Pull for sub-Saharan Africa



icipe has received funding from Biovision Foundation for Ecological Development, Switzerland, which will enable a strategic shift in the dissemination, adoption and long-term viability of the Push-Pull technology. Over the past two decades, Biovision Foundation for Ecological

Development has supported the development of innovative approaches towards gender-sensitive dissemination of Push-Pull in Kenya, Uganda, Tanzania and Ethiopia. The project has the following four objectives: implementation of strategic partnerships for scaling-out Push-Pull;

establishment of a sustainable supply of the seeds of the two Push-Pull intercrops, *Desmodium* and *Brachiaria*; instituting sustainable mechanisms for Push-Pull dissemination; and monitoring and evaluation.

MUSA – sustainable control of key banana pests and diseases



icipe and partners from Europe (Italy, Spain and Belgium); the United Kingdom; The Caribbean (Costa Rica and Cuba) and sub-Saharan Africa (Kenya and Ethiopia), have received a four-year grant from the European Union Horizon 2020 programme, to study endophytes and biocontrol agents (EBCAs) against key pests and diseases of banana (*Musa* spp). The **M**icrobial **U**ptakes for **S**ustainable management for major banana **A** pests and diseases (MUSA) project started in June 2017 and ends in May 2021. *icipe* will be involved in the screening of EBCAs against the burrowing nematode (*Radopholus*), the lesion nematode (*Pratylenchus*) and the

banana weevil (*Cosmopolitis sordidus*). These pests feed on, and damage banana roots, weakening the plant, causing toppling even in the lightest winds. *icipe* and partners will also produce knowledge on the biology and ecology of the beneficial organisms (entomopathogenic nematodes, entomopathogenic fungi and antagonists) and the pests (parasitic nematodes and banana weevil) in sub-Saharan Africa (SSA). Further, once promising EBCAs have been identified, their mass-production will be evaluated and validated in the field, in collaboration with *icipe*'s Kenya-based private sector partner, Real IPM Ltd.

Root-knot nematodes

A study by *icipe* and partners has provided promising leads for the development of ecofriendly strategies to control root-knot nematodes; highly destructive, soil dwelling, microscopic worms that cause up to 100% yield loss in important crops like tomato, pepper and African leafy vegetables.

Specifically, the research identified the chemical signals involved in the interaction between southern root-knot nematodes, *Meloidogyne incognita* Kofoid and White (Chitwood), one of the most damaging species, and a variety of pepper plants grown in East Africa. Although previous studies have shown that roots of host

plants may attract or repel nematodes, this is the first time that the mediating chemicals have been established. The findings, published in *Scientific Reports* create new opportunities for breeding peppers that are resistant to root-knot nematodes. Paper link: <http://rdcu.be/tgpn>



Researchers from the *icipe* push-pull integrated pest management (IPM) programme recently published their 100th peer reviewed journal article.

The publication reports findings from studies by *icipe* in partnership with Rothamsted Research, which have identified new Push-Pull intercrops with traits to protect and enhance cereal

production amidst enhanced damage, such as drought related stress and increased striga infestation, as a result of climate change. Based on their trials, the scientists have selected *Desmodium incanum* and *D. ramosissimum* as the most promising species.

Paper link: <http://www.sciencedirect.com/science/article/pii/S0261219417300844>

Jewel wasps

In a paper published recently in the *Journal of Hymenoptera Research*, *icipe* and collaborators have described an unusual new species of *Hedychridium Abeille* wasps in Africa. The new species, *Hedychridium buffingtoni*, Kimsey & Copeland, sp. n., is described from two male specimens collected in eastern Kenya by Dr Robert Copeland, Head, *icipe* Biosystematics Unit. Besides having startling colours, this popularly named jewel wasp has intricate sculpturing on its abdomen that differentiates it from other members of the Chrysididae family to which it belongs. The description of the new wasps is part of *icipe*'s continuing studies, which are contributing much needed knowledge to the global taxonomy hub on smaller organisms, such as wasps. Paper link: <https://jhr.pensoft.net/articles.php?id=12191>



Platyplectrus sp.

Bee pest risk mapping

Research by the *icipe* Geo-Information Unit has shown the potential revealed the potential to map and assess pests and diseases in bee colonies over countries and specific regions using innovative spatial prediction modelling. In a recently published paper, the researchers report the main innovation in their study, which was the development of an ecological niche model that not only uses crude data sets, like climate and elevation, but also sophisticated variables from satellite remote sensing on vegetation vigour (density) and vegetation seasonality. Paper link: <http://www.mdpi.com/2220-9964/6/3/66>



Enhancing tsetse management

Over the past two years, through the Integrated Biological Control Applied Research Program (IBCARP), *icipe* has been implementing a number of activities to enhance the management of the tsetse menace among affected communities in eastern Africa. The goals include increasing the commercial availability and sustainability of the Centre's tsetse repellent technology and community capacity building to monitor the flies.

The Centre is collaborating with communities, government agencies and private sector partners to scale-up their mass production and rollout, backed by a viable business plan for its commercialisation, packaging and wider dissemination.

icipe is also building the capacity of communities to use its other tsetse control strategies. Towards this objective, in June 2017, *icipe* and partners conducted an induction training for community-owned

resource persons (CORPs) in Kwale County, South Coast Kenya. CORPS are individuals who have demonstrated resourcefulness in *icipe*-led initiatives to monitor and control tsetse flies.

Participants received training on the use of NGU traps; how to handle insects collected in the field; application of GPS technology to locate and mark trapping positions, and how to use smart mobile data collection devices with open data kits.



Community-owned resource persons learning how to pitch an NGU tent.



Fall Armyworm

Dr Tadele Tefera, Head, *icipe* Ethiopia Office, during a field assessment visit to some of the areas in Ethiopia affected by the Fall Armyworm.

icipe in collaboration with partners and stakeholders, has commenced a range of activities towards the management of the Fall Armyworm. First reported in Africa in January 2016, the pest has now spread to more than 20 countries across the continent, with devastating impact on maize and other cereals. Estimates indicate that unless thwarted, the Fall Armyworm has the potential to affect over 300 million people in Africa, who, directly or indirectly, depend on maize for food and livelihoods. The pest also has the potential to feed on more than 80 plant species, including sorghum, rice, wheat, sugarcane, vegetables and cotton.

icipe and Virginia Tech and State University, USA, with support from USAID, have made preliminary assessments on the level of Fall Armyworm infestation, damage and possible control options in Ethiopia, Kenya and Tanzania. In addition, the three partners recently organised a regional workshop towards developing a cohesive strategy for the management of the Fall Armyworm.

The Centre has also been working with partners to create awareness and test pheromone traps in selected regions in Kenya and Ethiopia, towards early monitoring and detection of the pest. Moreover, *icipe* is collaborating with the

United States Department of Agriculture (USDA) in Florida to identify strains of the pest collected in East Africa.

The Centre's Push-Pull technology also continues to show significant impact on the pest and studies are ongoing to unravel the mechanisms surrounding the impact.

icipe has also been a keen participant in the Fall Armyworm consultative forums led by the Food and Organization of the United Nations (FAO) and the International Maize and Wheat Improvement Center (CIMMYT), in April and June 2017.

AFERIA capacity building



Participants of one of AFERIA capacity building sessions pose for a group photo.

Over the past several months, the Adaptation for Ecosystem Resilience in Africa (AFERIA) team has conducted a series of trainings to build the capacity of agricultural extension officers around fragile mountain ecosystems in eastern Africa, for more effective dissemination of climate change adaptation interventions.

Launched by the Ministry for Foreign Affairs of Finland and *icipe* in 2016, AFERIA aims to disseminate research findings on climate change and food security, developed through the Climate Change Impacts on Ecosystem Services and Food Security in eastern Africa (CHIESA), which was implemented by the two partners and collaborators from 2011–2015.

Rothamsted International Fellowship

A PhD student within the *icipe* Behavioural and Chemical Ecology Unit (BCEU), Xavier Cheseto, recently completed eight months training at Rothamsted Research, UK. He was supported by the Rothamsted International Fellowship Scheme (RIFS), which enables scientists from developing countries to conduct research jointly with a project leader at the Centre. Xavier was mentored by Dr Antony Hooper on a project entitled: The enantioselective synthesis of plant-based semiochemical kairomones of tropical insect disease vectors. The aim of the study is to develop plant-based super-attractive baits for *Aedes* and *Anopheles* mosquito, which can be used to reduce outdoor peridomestic disease transmission by these vectors. Currently, the available lures are mainly human-derived and are often constrained by their dependence on large amounts of carbon dioxide, which is expensive and unviable in remote malaria endemic areas in Africa.



Xavier Cheseto with Dr Antony Hooper working in the laboratory at Rothamsted Research, UK.

Women empowerment research awarded

A poster entitled: Women's empowerment in agriculture and determinants of empowerment indicators in rural Kenya, presented by Geoffrey Muricho, a postdoctoral fellow in the *icipe* Social Science and Impact Assessment Unit, was voted the best at the 91st Annual Conference held at the Royal

Dublin Society, Dublin, Ireland, from 24 – 26 April 2017.

The study's central argument is that empowering rural women in developing countries can improve agricultural productivity and other household welfare outcomes. Using the recently developed

women's empowerment in agriculture index (WEAI), the research assessed: extent of women's empowerment in agriculture, determinants of women empowerment indicators (production decisions; asset access/control; credit access/control; leadership and time) and tradeoffs and synergies between these indicators.

National Sericulture Development Strategy

icipe is among stakeholders involved in the establishment of a National Sericulture Development Strategy, aimed at providing systematic and coordinated guidance for Ethiopia's emerging silk farming sector.

Towards this goal, on 6 April 2017, *icipe*, in conjunction with the Ethiopian Ministry of Livestock and Fisheries and the Japan International Cooperation Agency (JICA), co-organised a validation workshop of the Strategy, which is currently in draft format.

The workshop was officially opened by His Excellency Dr Gebregziabher Gebreyohannes, State Minister of Livestock and Fisheries, Ethiopia, who underlined the Government's strong commitment to support the sericulture sub-sector towards the structural transformation of Ethiopia's predominantly subsistent smallholder agriculture. The forum was facilitated by Dr Workneh Ayalew, Coordinator of the Young Entrepreneurs in Silk and Honey (YESH) project, an initiative between Mastercard Foundation and *icipe*.

The National Sericulture Development Strategy for Ethiopia is expected to be ready for implementation during the next Ethiopian scal year (from the last quarter of 2017).



His Excellency Dr Gebregziabher Gebreyohannes, State Minister, Ministry of Livestock and Fisheries, Ethiopia, delivering the closing remarks during the National Sericulture Development Strategy validation workshop.



The destructive white mango scale, *Aulacaspis tubercularis*, was first recorded in Ethiopia in 2010, in the Oromia Region, and it has now spread to six other regions. On 24 July 2017 *icipe* and the Ministry of Agriculture and Natural Resources, Ethiopia, organised a workshop to address the challenge posed by the white mango scale and other pests, like fruit flies, in the country. The meeting recommended: conducting countrywide delimiting surveys; addressing research gaps; establishing and strengthening quarantine facilities; enforcing laws prohibiting inter-states movements of mango fruits and planting materials; building capacity of plant health clinics and applying biorational and recommended soft insecticides.



Workshop participants deliberate on the challenges and solutions of fruit pests in Ethiopia.

Recent graduates and thesis defences

(April – July 2017)



James Odanga
(Kenya; PhD)

Host project and funding: Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) project, funded by the Ministry of Foreign Affairs of Finland.

Registered at: University of Nairobi, Kenya.

Supervisors: Dr Samira Mohamed Faris and Dr Sunday Ekesi (*icipe*); Prof. Florence Olubayo (University of Nairobi).

Thesis title: Climate change induced-effects on biology and ecology of avocado insect pests along altitudinal gradient of Taita Hills, Kenya, and Mount Kilimanjaro, Tanzania.

Key findings: This study revealed that the false codling moth, *Thaumatotibia leucotreta*, is a key pest of avocado fruits across the altitudinal gradients of Taita Hills and Mount Kilimanjaro transects. On the other hand, the invasive fruit fly *Bactrocera dorsalis* was recovered mainly from the low land areas (< 500masl) of both transects. Although this pest was primarily found in previously damaged and overripe avocado, it still represents a major impediment to the export of the fruit from Africa, since it is a major quarantine pest.

Currently: Research Scientist, Invertebrate Zoology Section, National Museums of Kenya.



Charles Kwadha
(Kenya; MSc)

Registered at: University of Nairobi, Kenya

Host project and funding: *icipe* Bee Health project, funded by the European Union.

Supervisors: Dr Ayuka Fombong (*icipe*); Dr George Ong'amo and Prof. Paul Ndegwa (University of Nairobi).

Thesis title: Determination of attractant semiochemicals of the greater wax moth, *Galleria mellonella* L., in honeybee colonies.

Key findings: This study established that the behaviour of the greater wax moth, a honeybee pest, is controlled by a cocktail of odours released by the colony environment, and the life stages of the pest. The components of these odours were identified and evaluated in the laboratory. The results indicate that the identified components could be used in developing a control tool for the pest.

Currently: Undertaking various research support activities at *icipe*.



Ruth Muthoni Kihika
(Kenya; MSc)

Registered at: Kenyatta University, Kenya

Host unit and funding: Behavioural and Chemical Ecology, funded by United States Department of Agriculture/ Agricultural Research Service (USDA/ARS)

Thesis title: Identification of semiochemicals mediating root-knot nematode (*Meloidogyne incognita*) - pepper (*Capsicum annum*) interactions.

Key findings: The research identified chemical signals produced by the roots of four pepper varieties that influence the host seeking behavior of the southern

root-knot nematode (*Meloidogyne incognita*), reporting for the first time the mediating host signals in the pepper - root knot nematode interaction.

Supervisors: Prof. Baldwyn Torto (*icipe*), Dr Lucy K. Murungi (JKUAT), Prof. Ahmed Hassanali and Dr Margaret Ng'ang'a (KU)

Currently: Planning to commence PhD research on plant-nematode interactions towards improved control strategies of these phytoparasitic nematodes.



David Cham
(Cameroon; PhD)

Registered at: University of Nairobi, Kenya

Host project and funding: *icipe* Bee Health project, funded by a grant from the European Union

Thesis title: Diversity of honey bee, *Apis mellifera*, subspecies (Hymenoptera: Apidae) and their associated arthropod pests in Cameroon.

Key findings: This study revealed the presence of three *Apis mellifera* morphotypes in Cameroon, constituting five *A. mellifera* mtDNA haplotypes, three of which were new. The research also showed, for the first time, the occurrence of the Korean haplotype of *Varroa destructor* and *Megaselia scalaris* in Cameroon and a unique

haplotype of the small hive beetle *Aethina tumida* in honey bee colonies. These and other recorded pest species were found to be contributing factors to honey bee colony mortality.

Supervisors: Prof. Suresh K. Raina and Dr Ayuka T. Fombong (*icipe*); Prof. Paul N. Ndegwa and Prof. Lucy W. Irungu (University of Nairobi).

Currently: David has been collaborating with the Ministry of Livestock Fisheries and Animal Industries, Cameroon, towards improving conservation of pollinators.



Annette Busula
(Kenya; PhD)

Registered at: Wageningen University and Research, The Netherlands.

Host project and funding: Chemical signalling of malaria parasites, funded Netherlands Organization for Scientific Research (Top grant ZonMW).

Thesis title: Microorganism-mediated behaviour of malaria mosquitoes.

Key findings: The study showed that mosquitoes with different host preferences respond differently to smells from people and animals. The bacteria found on the skin of vertebrate hosts influence the interaction

between these hosts and different mosquito species. Natural infection with high densities of microscopic gametocytes (the malaria parasite stage infectious to mosquito vectors) increases attractiveness of human hosts to malaria mosquitoes and body odour of malaria-infected humans partially increases their attractiveness to malaria vectors.

Supervisors: Dr Dan Masiga and Dr Collins Mweresa (*icipe*); Prof. Willem Takken, and Drs Jetske de Boer and Niels Verhulst (Wageningen University and Research).

Currently: Exploring career opportunities.



Kukom Edoh Ognakossan
(Togo; MSc)

Registered at: University of Nairobi, Kenya

Thesis title: Assessment of rodents' postharvest losses in on-farm maize storage in Kenya.

Host project and funding: Reduction of Post-Harvest Losses and Value Addition in East African Food Value Chains (RELOAD) project, funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

Key findings: The results of this study showed that rodents are second most important cause of storage losses countrywide and the main storage problem in the lowland tropical zone. Actual weight losses over three

months of storage ranged from 2.2 to 18.3% depending of the maize storage form. Rodents-damaged grains were of lower quality in term of moulds contamination and nutritional value compared to the non-damaged grains.

Supervisors: Dr Hippolyte Affognon (ICRISAT), Dr Christopher Mutungi (*icipe*), Dr Daniel Sila and Prof. Willis Owino (Jomo Kenyatta University of Agricultural Technology).

Currently: conducting bio-acoustic research on rodents by characterising their sound profiles at *icipe*.



Shepard Ndlela
(Zimbabwe; PhD)

Registered at: University of Nairobi, Kenya

Host project and funding: Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) project, funded by the Ministry of Foreign Affairs of Finland.

Supervisors: Dr Samira Mohamed Faris and Dr Sunday Ekesi (*icipe*); Dr George Ongamo and Dr Paul Ndegwa (University of Nairobi).

Thesis title: Development and implementation of pre- and post-harvest management measures for *Bactrocera (invadens) dorsalis* (Drew, Tsuruta and White) and *Ceratitis cosyra* (Walker) (Diptera: Tephritidae) on mango in Kenya.

Key findings: Pre- and postharvest management measures for fruit flies explored in this study demonstrate the suppression of the invasive *Bactrocera dorsalis* species using methyl eugenol in the male annihilation technique, the establishment in Kenya of exotic parasitoids *Diachasmimorpha longicaudata* and *Fopius arisanus*, and their coexistence with native parasitoids. The study also proposed an effective postharvest disinfestation treatment against *B. dorsalis* using hot water treatment.

Currently: Entomologist (pest management), Tobacco Research Board of Zimbabwe; trainer, University of Zimbabwe.



Vincent Odhiambo Nyasembe
(Kenya; PhD)

Registered at: University of Pretoria, South Africa.

Host unit and funding: Behavioural and Chemical Ecology Unit, supported by the Swedish International Cooperation Agency (SIDA) through the *icipe*'s ARPPIS programme.

Supervisors: Prof Baldwyn Torto and Dr David P. Tchouassi (*icipe*); Prof Catherine L. Sole and Prof Christian W. W. Pirk (University of Pretoria).

Currently: Finalising manuscripts for publication.

Thesis title: Nectar feeding and chemical signatures influencing host plant selection in major Afro-tropical mosquito disease vectors.

Key findings: The study confirmed linalool oxide as a single plant-based compound attractive to Rift Valley fever and dengue mosquito vectors. The research also identified the natural host plants of malaria, dengue and Rift Valley fever mosquito vectors. Three component plant based lure attractive to male and female *Aedes aegypti* mosquitoes were isolated and formulated.

icipe Director General meets UN Secretary General

In June 2017, *icipe* Director General, Dr Segenet Kelemu, attended the third Meeting of the Nominating Committee for the position of Rector, United Nations University (UNU) and the 67th session of the Council of the UNU, New York, USA. Dr Kelemu was appointed a member of the United Nations University (UNU) Council in 2016, by the then UN Secretary General, Ban Ki-moon and Director General of the United Nations Educational Scientific

and Cultural Organization (UNESCO), Irina Bokova. The UNU is an autonomous UN organisation, which carries out research, postgraduate training and the dissemination of knowledge. It is above all a research institution but also serves as a think tank for the UN system, through its activities aims to contribute to capacity building particularly in developing countries, and serves as a platform for new and creative ideas and dialogue.



Dr Kelemu (5th from right) pictured with António Guterres, Secretary General of the United Nations (7th left), and other members of the UNU Governing Council.



Dr Kelemu (4th from right) pictured with Amina J. Mohammed, Deputy Secretary General of the United Nations (5th left) and other members of the UNU Governing Council.

AAS-AESA visit



Dr Tom Kariuki Director, Alliance for Accelerating Science in Africa (AESA) and Interim Executive Director, African Academy of Sciences (AAS); and Dr Elizabeth Marincola, AAS Senior Advisor for Science Communication and Advocacy, recently visited *icipe* to discuss potential collaborative opportunities. They are picture in front of a sculpture of Prof. Thomas R. Odhiambo, Founding Director, *icipe*, who was also the Founding President of the African Academy of Sciences.

Visit by Prof. Andrew Campbell, Chief Executive Officer, ACIAR



(l-r): Prof. Campbell; Dr Nicholas Korir, Policy Consultant, *icipe*, and Soil Fertility Consultant, Sanergy Ltd.; Mrs Wood, and Dr Komi Fiaboe, INSFEED project leader, *icipe*.

On 29 June 2017, Prof. Andrew Campbell, Chief Executive Officer, Australian Centre for International Agricultural Research (ACIAR), accompanied by Mrs Mellissa Wood, General Manager, Global Programs, ACIAR, made a progress assessment visit of the *icipe*-led Insect feed for poultry and fish production in sub Saharan Africa (INSFEED) project. Through the Cultivate Africa's Future (CultiAF) initiative, ACIAR, together with the International Development Research Centre (IDRC), Canada, are co-funders of INSFEED, an initiative that proposes to improve income generation, food and nutritional security in Kenya and Uganda, by developing insect-based feeds for sustainable, safe and cost-effective poultry and sh production.

APPOINTMENTS



Dr Sunday Ekesi, was, effective 1 May 2017, appointed *icipe* Director of Research and Partnerships. He has served *icipe* for 16 years, where he previously held various positions including; Head, Plant Health Theme; Leader, African Fruit Fly Program (AFFP); Leader, Insect for Food, Feed and other uses Program (INSEFF) and Interim Director of Research

and Partnerships. Previously, he was a Postdoctoral Fellow at Rothamsted Research, UK, and a lecturer in Crop Protection at Ahmadu Bello University, Nigeria.

Dr Ekesi holds a PhD from Ahmadu Bello University, attained through *icipe*'s African Regional Postgraduate Programme in Insect Science (ARPPIS) and an MSc in Applied Entomology and Parasitology from the University of Jos in Nigeria.

He has been a member of various international advisory and consultancy panels, for the Food and Agriculture Organisation of the United Nations (FAO), the International Atomic Energy Agency (IAEA), and the World Bank. Dr Ekesi has successfully secured over 35 grant proposals as principal investigator (PI) and co-PI. He has published more than 100 peer-reviewed scientific publications, and has been a member of editorial board of various journals. In 2016, he was recognised by *icipe* as the Outstanding Principal Staff of the Year. Dr Ekesi is a Fellow of the African Academy of Sciences (FAAS).



Dr Komivi Senyo Akutse has been appointed Biopesticide Development Scientist within the *icipe* Arthropod Pathology Unit. An agricultural entomologist and arthropods pathologist, Komivi was previously a postdoctoral research fellow (January 2016 – May 2017) at the Institute of Applied Ecology, Fujian Agriculture and Forestry University, China. Prior to this,

he was a postdoctoral consultant at *icipe*. Komivi obtained his PhD in Agricultural Entomology at North-West University, South Africa, through the *icipe* African Postgraduate Programme in Insect Science (ARPPIS) funded by the German Academic Exchange Service (DAAD). He also holds an MPhil in Entomology from University of Ghana, also undertaken through ARPPIS with DAAD support, and a BSc in Agricultural Sciences, obtained at the Institut National de Formation Agricole, Togo.



Dr Saliou Niassy has been appointed Head of the newly established *icipe* Technology Transfer Unit (TTU). Saliou obtained a PhD in Zoology from Jomo Kenyatta University of Agriculture and Technology, Kenya, in 2011, as a DAAD ARPPIS scholar at *icipe*. He also holds an MSc in Natural Sciences and a postgraduate degree in zoology from Cheikh

Anta Diop University, Dakar, Senegal.

Saliou undertook postdoctoral fellowships at *icipe* and at the University of Pretoria, South Africa. He also previously served as an *icipe* Research Scientist and Head of the Technology Transfer Unit under a project funded by the International Fund for Agricultural Development (IFAD). Saliou was the Coordinator of the Land Matrix Initiative between September 2015 – June 2017, and since 2013, he has been the Secretary General of the African Association of Insect Scientists (AAIS).



Dr Joel Bargul has joined *icipe* as a Postdoctoral Research Fellow supported by the Training Health Researchers into Vocational Excellence in East Africa (THRIVE) consortium.

He will conduct research on camel health improvement through identification and control of insect vectors responsible for transmission of trypanosomiasis and other zoonotic disease pathogens in northern Kenya. This study is a collaborative research study between *icipe* and the University of Cambridge, UK.

Joel holds a PhD in Molecular Parasitology from the University of Wuerzburg, Germany, funded by the German Research Foundation (DFG). A substantial component of his research was conducted at *icipe*.

icipe gratefully acknowledges the financial support of the following organisations and agencies

Core donors

- Ministry of Higher Education, Science and Technology, Kenya
- Swiss Agency for Development and Cooperation (SDC), Switzerland
- Swedish International Development Cooperation Agency (Sida)
- UK Aid, Government of the United Kingdom

Restricted project donors

- ACDI/VOCA Agribusiness Systems International (ASI) Kenya
- African Union
- African Women in Agricultural Research and Development (AWARD)
- AIRD (French Inter-institution Agency for Research and Development)
- Australian Centre for International Agricultural Research (ACIAR)
- Biotechnology and Biological Sciences Research Council, UK, through Rothamsted Research, UK
- Bayer: Science For A Better Life
- Biovision Africa Trust
- Biovision Foundation for Ecological Development, Switzerland
- Canadian Government through International Development Research Centre (IDRC)
- CIRAD – Agricultural Research for Development, France
- Consortium for National Health Research (CNHR), Kenya
- Cultivate Africa's Future (CultiAF) through International Development Research Centre (IDRC)/Australian Centre for International Agricultural Research (ACIAR)
- European Union
- Federal Ministry for Economic Cooperation and Development (BMZ), Germany
- Food and Agriculture Organization of the United Nations (FAO)
- German Academic Exchange Service (DAAD)
- German Research Foundation (DFG)
- Global Environment Facility (GEF)/United Nations Environment Programme (UNEP)
- Grand Challenges Canada (GCC)
- Humidtropics CGIAR Research Programme (CRP) led by International Institute of Tropical Agriculture (IITA)
- International Atomic Energy Agency (IAEA)
- International Centre for Genetic Engineering and Biotechnology (ICGEB)
- International Fund for Agricultural Development (IFAD)
- IRD, Institut de Recherche pour le Développement, France
- JRS Biodiversity Foundation through Royal Museum for Central Africa (RMCA)
- Liechtenstein Development Service (LED), Principality of Liechtenstein
- McKnight Foundation, USA
- Ministry for Foreign Affairs of Finland
- National Commission for Science, Technology and Innovation (NACOSTI), Kenya
- Netherlands Organisation for Scientific Research (NWO)
- Newton Fund
- R. Geigy Foundation, Switzerland
- Research Institute of Organic Agriculture (FiBL), Switzerland
- Russell IPM Ltd, UK
- Scottish Funding Council through University of Glasgow
- Swedish Research Council through The Kungliga Tekniska Högskolan (KTH)
- Swiss National Science Foundation (SNSF)
- SWITCH Africa Green
- The MasterCard Foundation, Canada
- The Volkswagen Foundation, Germany
- United Nations Environmental Programme (UNEP)
- USAID—United States Agency for International Development's IPM Innovation Lab (Feed The Future Innovation Lab for Integrated Pest Management) of Virginia Tech, USA
- United States Agency for International Development Partnerships for Enhanced Engagement in Research (USAID-PEER) Science program with funding from National Academy of Sciences (NAS)
- United States Department of Agriculture (USDA)
- United States National Institutes of Health (NIH)
- United States National Science Foundation (NSF)
- Wellcome Trust, UK
- World Federation of Scientists through the ICSC-World Laboratory
- World Health Organization
- World Trade Organization (WTO) – Enhanced Integrated Framework (EIF)

In realising its mission, *icipe* also benefits from extensive partnerships with research partners (including universities and research institutes in Africa and beyond), private sector partners, and communities across Africa.

For more information on these and other topics, please visit our

Website: <http://www.icipe.org> or contact us through our

Email address: icipe@icipe.org