

10-16 July 2023

Poultry feed



Edwin Sila takes visitors around his Black Soldier Fly (BSF) production unit on June 14. PIUS MAUNDU / NATION

**The oil in the larvae boosts immunity. A high level of larvae can lead to a significant reduction in the use of antibiotics in poultry.**

Dr Chrysantus Mbi Tanga

## Youth cuts niche in black soldier fly production

The flies thrive in an environment of 20 to 35 degrees Celsius and humidity of 60 to 70 per cent, experts say

BY PIUS MAUNDU

As the sun sets in Wote, the headquarters of Makueni County, two young men descend on garbage bins near Ngooni Hyper, the busiest supermarket in town.

They fill their buckets with food waste and disappear on motorcycles. Their destination is Molenyu, a village 20 kilometres away, where Edwin Sila produces Black Soldier Fly (BSF) larvae.

"We put the vegetable waste in molasses and crush the mixture into a paste," Sila tells the *Seeds of Gold*.

A medium-sized greenhouse with cages and racks greets visitors at the enterprise which supplies feed to poultry and fish farms nearby.

Known scientifically as *Hermetia illucens*, BSF larvae are a source of protein.

"Producing BSF begins with getting the breeding stock. The larvae attain full body mass in three to five days. We harvest the bulk of the larvae and leave some to develop into adult flies," Sila says.

"They then go through the pre-pupa and pupa stages. The BSF does not require feed in these stages, which take eight to 10 days. We transfer the pupa to the cages where they grow into adults." The adults mate and lay eggs in the love cages. One BSF lays 800 eggs on average in its week-long lifetime.

"The flies take water. They also like sugar, which prolongs their life. We use a smelly substrate (chicken waste mixed with water then put in a closed container for a week) to attract them to where we want them to lay eggs," he says.

"We collect the eggs for hatching after three days. A moist mixture of wheat bran and maize jam is used as the hatching substrate."

The 26-year-old, who trades as Biodudu Technologies, studied Sport Science at Kenyatta University.

The idea of producing BSF came while he was a third-year student. A visit to a friend who produced the insects in Nairobi was all it took.

He set up a structure at home using sticks and an old mosquito net the following week.

The BSF thrives in an environment of 20-35 degrees Celsius and humidity of 60-70 per cent.

"Below 15 degrees and the eggs do not hatch," says Dr Chrysantus Mbi Tanga of ICIPE.

It took Sila long to muster creating the right environment for optimal BSF production.

Things improved with a Sh800,000 grant from the Agriculture Sector Development Support Programme (ASDSP) early this year.

Makueni ASDSP Coordinator, Regina Maingi, says it is supported by Sweden and the devolved government.

"ASDSP supports innovative agribusinesses along the chicken, green gram and mango value chains owned by women and the youth," she says. The money went into expanding the venture through growing breeding stock, installing a hammer miller for crushing the waste and setting up a cage with temperature and humidity moderating features.

To attain the recommended level of humidity, the floor of the structure is lined with pieces of blankets that are watered regularly.

A kilogramme of breeding stock goes for

Sila shows visitors the process of producing larvae at his unit in Molenyu village. PIUS MAUNDU / NATION



Sh1,500 while the same amount of dry larvae is Sh150.

Sila's main customer is Mary Mathuli, an indigenous chicken farmer who grabbed headlines when she hosted American billionaire and philanthropist Bill Gates, early this year.

She dries the BSF larvae and crushes them into powder to formulate chicken feed.

"Chickens fed with BSF grow fast and lay eggs consistently," Mathuli says.

Though BSF larvae are rich in fat and minerals, they are known more for protein.

"The nutrient content of BSF depends on the substrate they feed on. The oil in the larvae has anti-microbial properties. It suppresses bacteria and boosts immunity in the birds. High levels of larvae can lead to a significant reduction in the use of antibiotics in poultry," Dr Tanga says.

ICIPE is among the organisations promoting the use of insects in animal feed.

The campaign comes when the cost of commercial feeds is weighing farmers down.

"Studies have shown that at least 70 per cent of the cost of producing chickens goes into feed. Many farmers cite the high cost of feed as the biggest challenge in chicken farming," says Dr Victoria Kyalo, the Makueni County Agriculture Chief Officer.

"To address the protein component of chicken feed, many farmers use maggots. It should, however, be noted that maggots transmit bacteria like salmonella to chickens and subsequently to humans." According to Dr Tanga, producing BSF is climate-friendly as it does not require a lot of water and space.

Producing the insects for feed is a waste-mitigation strategy, he says.

It also helps reduce greenhouse gases when compared to the production of other feeds and synthetic fertiliser.

"The residue of the BSF production system contains keratin, which is rich manure. This manure contains anti-microbial properties that boost plant defence mechanisms," Dr Tanga says. "The manure adds beneficial microbes in the soil, translating to increased harvests."

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Youth cuts niche in black soldier fly production

Saturday Nation, 15 Jul 2023



# Social Media



**David Hughes**  
@DH\_PlantVillage

This experiment for @CETC\_JL is carried out with a global community of experts from @michiganstateu @ITA\_CGIAR @icipe with in-country Universities like Moi University. Post COVID our world is one big cloud which accelerates scientific research.

**PlantVillage** @plantvillage · Jul 13

PlantVillage Kenya's Tracyline Jayo is conducting experiments in four counties: Bungoma, Busia, Siaya, and Kilifi to determine the effectiveness of lignocellulose banana paper in controlling soil-borne pathogens in sweet potatoes 🍆🍆



2:55 PM · Jul 13, 2023 from State College, PA · 964 Views



**Stephen Whitfield**  
@SWhitfield85

Fantastic to see the first publication from @femi\_wumi's PhD on agricultural innovation and push-pull biocontrol, in collab. with @icipe... There's a lot more to come from this v. cool research. @GlobalFoodLeeds

**Olufemi Adesina** @femi\_wumi · Jul 13

📄 Publication Alert!

I am thrilled to announce the publication of our latest research paper titled "Bridging the gap in agricultural innovation research: a systematic review of push-pull biocontrol technology in sub-Saharan Africa."

📄 doi.org/10.1080/147359...

INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY  
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### Bridging the gap in agricultural innovation research: a systematic review of push-pull biocontrol technology in sub-Saharan Africa

Olufemi Samson Adesina <sup>✉</sup>, Stephen Whitfield <sup>✉</sup>, Susannah M. Sallu <sup>✉</sup>, Steven M. Sait <sup>✉</sup> and Jimmy Pittchar <sup>✉</sup>

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#### ABSTRACT

Biological control for sustainable plant protection in sub-Saharan Africa (SSA) is gaining attention due to low crop productivity caused by pests, increasing costs of agrochemicals, and their harmful impact on health and the environment. A valuable case is the Push-pull technology (PPT) developed by the International Centre of Insect Physiology and Ecology (ICPPE). However, evidence for the success of PPT in reducing pest prevalence has not translated from experimentation and demonstration to wider-scale on-farm uptake. A systematic review was conducted to explore the research gaps, benefits of PPT, adoption determinants, barriers to uptake, and how farmers choose to adopt and adapt the technology. The study found a large body of evidence on the biophysical benefits of PPT, which comes from a relatively narrow set of ICPPE-led or managed experiments in Western Kenya. Besides, evidence of its social and economic benefits is less robust. Documented barriers to adoption include initial establishment costs, labour intensiveness, risk averseness of farmers, socio-cultural rigidity, and inadequate access to information and inputs. The review highlights the need for qualitative research, an in-depth examination of the social dynamics of innovation and decision-making processes on farms, and institutions' role in shaping innovation for sustainable agricultural development.

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Push-pull technology; biocontrol; integrated pest management; agricultural innovation; Africa

#### 1. Introduction

Insect pests, weeds and diseases cause up to 40% losses in crop production, costing the global economy at least \$220 billion yearly (FAO, 2021). Invasive pests alone are estimated to cost around \$70 billion annually, posing a serious threat to food security (Habit & Hiller, 2021). Across sub-Saharan Africa (SSA), native and invasive pests threaten food production (De Groot et al., 2020). Smallholder farmers who produce up to 70% of SSA's consumable food rely on agrochemicals to manage their farms' pests (Bagherani & Kishvaz Shaal, 2020; D'Annolfo

et al., 2021). Aside from the increasing cost of agrochemicals, inappropriate use has been linked to food safety issues, the development of pesticide resistance, and environmental contamination (Ratto et al., 2022a).

Despite scientific evidence of the potential benefits of biological control alternatives to chemical pesticides, their adoption and use among smallholder farmers in the region remains low (Ratto et al., 2022a). Studies have suggested that several interacting factors influence technology adoption decisions (Anjan et al., 2022; Okun et al., 2020), including farmers' socio-demographics, attributes of the

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Day 3: We are live 📺 with Dr. K. Senagi with exciting devts @icipe! Leveraging #MachineLearning to revolutionize agriculture in Kenya. #AI algorithms are helping us predict #pestoutbreaks, optimize crop yields, & ensure #FoodSafety #foodsecurity. #SustainableFarming #AgriTech

## Leveraging Machine Learning in Agriculture:

### Case of Kenya

Presenter:  
Dr. Kennedy Senagi

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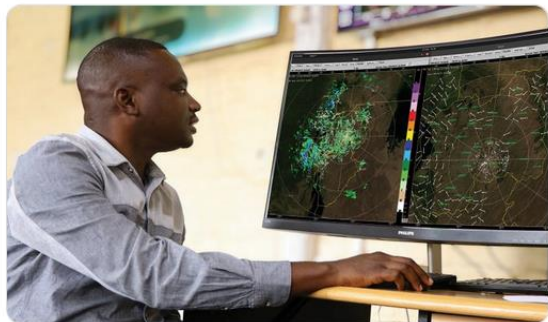


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**Gohar Ghazaryan**  
@ghazaryangohar

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1/ Exciting wrap-up of the 1st week in Kenya! 🌍 Presented first results of #EOAFRICA #ADMKenya (@ESA\_EO National Incubator project) & CropClim (funded by @EOAfricaRD) at #IALE2023. Great discussions with colleagues from @RCMRD\_ & @icipe on validation and next steps



6:03 PM · Jul 14, 2023 · 917 Views



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Many congrats to our @Agnes\_Kiriga, pioneer @NemAfrica team member and student, for commencing PhD journey @icipe under @IKEAFoundation-funded #OneHealth initiative Read more [icipe.org/sites/default/...](https://icipe.org/sites/default/...)



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