

SHAPHAN YONG CHIA

(Entomologist)

P.O. Box 16, Wageningen, 6700 AA
The Netherlands

+31620409215

chiashaphan2009@yahoo.com

SUMMARY

Enthusiastic Entomologist, driven by a passion for innovative and sustainable technologies that improve livelihood through applied and exploratory research. Enjoy collaborating with scientists from different disciplines to develop new skills and solve challenges in food production and environmental sustainability. Proven skills, education and work bring a blend of experience in insect cultivation for sustainable food production and livelihood improvement, soil health and crop production, an excellent fit to the concept of circular agriculture - **connecting sustainable crop** and **livestock production** through **insect farming**.

EXPERIENCE

Postdoctoral Researcher, 10/2020 - Current
Wageningen University & Research, Wageningen, The Netherlands

Research support and process management

- Wrote 3 research grant proposals: two as lead applicant and one as a co-applicant between May 2020 and June 2022.
- Evaluated 10 grant proposals for funding by the Dutch Research Council (NWO).
- Analyzed and interpreted results of 2 personal research projects and generated original ideas based on research outcomes.
- Coordinated 2 research projects to achieve overall team efficiency.
- Led the planning of research projects in collaboration with department supervisors and other research assistants.
- Communicated regularly with project donors and prepared final/end-of-project reports when a project was completed

Specific research experiences:

- Completed over 2 years of laboratory, greenhouse and field research to understand how residues from edible insect production added to the soil affect the interactions between plants, soil microbes, and insect herbivores.
- Amended soil with frass of 2 insect species: black soldier fly (BSF) *Hermetia illucens* and mealworms *Tenebrio molitor* from large-scale insect producers (Protix and Bestico) in the Netherlands.
- Uncovered effects of amending soil with frass on plant growth.
- Identified potential control of insect herbivores on brassica species under varying soil nutrient conditions using frass.
- Composted over 6 m^3 of BSF frass using 13 plastic crates in a semi-controlled climatic environment.
- Investigated microbial community composition in the frass-exposed rhizosphere, bulk soil as well as in pure frass of BSF.

Insect rearing

- Formulated diets for cabbage root fly (CRF) *Delia radicum.*
- Managed (feeding, breeding, cleaning, etc.) a colony of CRF for over one year and supplied eggs, larvae, pupae or adult insects to 4 different student projects, 2 internal staff and 2 external research projects.

Teaching and research development

- Contributed to teaching 3 MSc courses including *ENT-21306 - Insects as Food and Feed, ENT-*

50806 - Insect-Plant-Interactions; and ENT-30306: Ecological Aspects of Bio-Interactions.
- Assessed student knowledge, supervised student projects and developed students' research skills.

Consultancy and Professional Outreach
- Consulted (as an Academic Advisor) transdisciplinary-oriented academic projects for external commissioners (including governmental, private and civil society organizations) through the Academic Consultancy Training (ACT) Programme of Wageningen University & Research.
- Consulted 6 different ACT projects commissioned in the Netherlands and Indonesia on several topics including edible insects, circular economy, etc.
- Reviewed technical report on insect farming and welfare prepared by *Rethink Priorities, San Francisco, California.*
- Provided expert advice to different organizations including *World Poultry Foundation* and *veris investments* during planned meetings with staff representatives.

Teamwork and adaptability
- Collaborated with 7 multidisciplinary team members to accomplish ecological, microbial, genomic, and physicochemical research goals.
- Supported staff and students with research activities including data collection in large experimental setups.

Responsibility
- Coordinated departmental bi-monthly seminars called "ENTO-Lunch Meetings" for over two years during which staff members and students (and also external persons with Entomology-related research) presented their research findings to keep the department updated on the research front.
- Activities included preparing meeting schedules for the year, arranging meeting rooms, signing up presenters, setting up meeting announcements and reminders, and organizing hybrid meetings, especially during the COVID-19 pandemic.

Others experiences
- Monitored research activities to complete projects within stipulated timeframes and budget constraints.
- Met with departmental supervisor on regular basis including an end-of-year personal development interview to assess progress in the previous year and to maintain ongoing communication regarding the quality of performance.
- Collaborated with other researchers across the globe, mainly from North America, South America, Asia, Europe and Africa, and produced peer-reviewed journal articles in some of the collaborations.
- Designed and made presentations summarizing research findings

Senior Technical Advisor, 09/2020 - Current
MagoFarm Ltd., Nyamata, Rwanda

- Communicated with management, explaining complex technical information on black soldier fly (BSF) biology, feed and feeding with ease and clarity.
- Advised on the designing of the current BSF rearing facility at Magofarm
- Advised on technical strategy formulation in the production of BSF larvae at Magofarm.
- Reviewed BSF production guidelines.

Farmer, 02/2020 - 09/2020
Self-employed, Foumbot, Cameroon

- Managed 3 hectares of cultivated farmland and supervised workers in different aspects including land preparation, planting of seeds, weed control, fertilization and harvesting.
- Selected and purchased supplies and equipment such as seed and agricultural sprayers.
- Adjusted production strategies to account for changing factors such as human resources, and weather conditions.
- Managed crop maintenance including thinning and pruning for healthy crop growth.
- Oversaw farm workers, checking jobs done correctly and offering guidance.
- Handled farm operations, planting, cultivating and processing of crops for optimal harvesting.
- Scheduled and carried out field fertilizing to replenish depleted soil nutrients.
- Maintained farm storage facilities by cleaning and organizing repairs.

Doctoral Researcher, 01/2016 - 12/2018
icipe *- International Centre of Insect Physiology and Ecology,* Nairobi, Kenya

- Devoted special emphasis to punctuality and worked to maintain an outstanding attendance record to align with project activities.
- Carried out day-to-day duties accurately and efficiently including laboratory and fieldwork.
- Created plans and communicated deadlines to complete projects on time.
- Produced black soldier flies on 12 different diet formulations using agro-industrial substrates (including brewery spent grains, cane molasses, and brewery yeast) and 9 temperature regimes and assessed life their history parameters.
- Analyzed larval samples reared on different substrates for their nutritional composition (including crude protein, amino acids, and fatty acids).
- Assessed farmers' knowledge of insects as feed and their willingness to pay for insect-based feed in 4 counties in Kenya.
- Analyzed and interpreted results of personal and joint research.
- Monitored research activities to complete projects within stipulated timeframes and budget constraints.
- Coordinated research projects to achieve overall team efficiency.

Doctoral Researcher, 01/2018 - 08/2018
icipe /Kenya Agricultural and Research Organization (KALRO), Naivasha, Kenya

- Successfully designed and implemented two on-farm pig feeding trials at the Non-Ruminant Institute, KALRO.
- Formulated feed for pigs using black soldier fly larvae as a major protein source.
- Compared insect-based feed to conventional fishmeal-based feed fed to pigs.
- Ensured proper on-farm feeding and general management of pigs fed insect-based feed from piglets to the finisher stage.
- Assessed pig growth and health parameters under test feed conditions.
- Remained committed to learning non-Ruminant farm practices at KALRO, Naivasha.
- Navigated large workloads (handling a large herd of pigs, formulating tonnes of feed, etc.) with a sense of calm and superior organizational skills.
- Worked well independently and as part of a team to complete tasks.
- Published 2 peer-reviewed journal articles from data generated in this 8-months project.

SKILLS

Insect mass rearing
- Rear BSF on organic streams including fruit and vegetable residues, spent grains and spent yeast, animal manure, chicken feed, etc.

Insect-based feed formulation, animal feeding and care
- Able to formulate pig feed containing larvae of BSF as a replacement for fishmeal
- Care of weaners, growing-finishing pigs

Grant application
- Skilful in grant proposal writing
- Experienced in evaluating grant proposals submitted for funding

Microsoft and writing skills
- Microsoft Word, Excel and PowerPoint
- Proofreading and editing
- Literature analysis
- Manuscript writing and publication

Data Science and software/coding skills
- Data entry and processing
- Data visualization
- Biostatistics (univariate and multivariate analyses)
- Implement statistical analysis of data using the R environment for statistical computing
- Implement statistical analysis of data using the SPSS software
- Knowledge of GIS
- Knowledge of Git and GitHub

Language skills
- Kom (dialect) - proficient
- English Language - proficient
- French Language – beginner

Other skills
- Research project process management
- Working autonomously and in a team
- Critical thinking
- Logical & independent mind
- Meticulous
- Decisiveness
- Excellent written & oral communication skills
- Determination and patience
- Excellent analytical skills
- Web search and Website design

EDUCATION

***Wageningen University and Research**, Wageningen, The Netherlands, 2019*
Doctor of Philosophy (PhD)

- PhD Graduate
- Worked on a multidisciplinary project and assessed the potential of the black soldier fly larvae in commercial production of a low-cost, high-quality protein source.
- Researched to ensure high nutrition of the insect-based feed.
- I completed my PhD research project and produced seven research articles (from the project), all published in peer-reviewed journals.
- Defended my thesis at Wageningen University & Research in 2019.

Field of study: Agricultural Entomology.

Focus: Insects for Food and Feed

Dissertation title: *Black soldier fly larvae as a sustainable animal feed ingredient in Kenya*, 248 pp.

***University of Ghana**, Legon, Ghana, 2015*
Master of Philosophy (MPhil)

- MPhil. Graduate under the African Regional Postgraduate Programme in Insect Science (ARPPIS).
- Received the German Academic Exchange Service (DAAD) scholarship to support my studies and research work.

Field of study: Agricultural Entomology
Focus: Crop Protection

Dissertation title: *Species composition and host association of thrips (Thysanoptera) in the Eastern and Greater Accra Regions, Ghana.*

***University of Buea**, Buea, Cameroon, 2011*
Bachelor of Science (BSc)

- Studied Zoology (Major) and Medical Laboratory Technology (Minor)

CERTIFICATIONS

- **Animal Feed Production: Feed Quality** - *EIT Food and Queen's University Belfast - 2022*
- **Editing and Proofreading Made Simple**, *LinkedIn Learning - 2022*
- **Critical Thinking & Argumentation**, *Wageningen Graduate Schools, Wageningen University – 2018*
- **Communication with the Media & the General Public**, *Wageningen Graduate Schools, Wageningen University – 2018*
- **Interpersonal Communication for PhD students**, *Wageningen Graduate Schools, Wageningen University – 2018*
- **Reviewing a Scientific Paper** - *Wageningen Graduate Schools, Wageningen University – 2018*
- **Scientific Writing and Publishing**, *International Centre of Insect Physiology and Ecology* – 2017
- **Principles of Biostatistical Reasoning**: **A Practical Introduction to Statistical Methods in Biological Research** - *International Centre of Insect Physiology and Ecology – 2016*
- **Website Design, Information & Communication Technology,** *West Africa Information & Communication Technology Foundation, Accra, Ghana - 2015*
- **Statistical Package for Social Sciences (SPSS) for Graduates**, *Leonfield Company Limited, Accra, Ghana – 2014*
- **Project Management,** *Institute of Project and Business Management (IPBM), Accra, Ghana - 2013*

ACCOMPLISHMENTS

Research Grants

- Secured 2 of 3 research grants applied for.
  - The WOTRO-NWO Impact and Innovation Grant (I&IG) grant - 2021
  - Africa Talent Programme (ATP) - 2020

PhD Thesis

- **Shaphan Y. Chia** (2019). Black soldier fly larvae as a sustainable animal feed ingredient in Kenya. Wageningen University & Research, The Netherlands.

Selected Works and Related Publications

Insect mass rearing

- **Shaphan Y. Chia,** Tanga CM, Osuga IM, Mohamed SA, Khamis FM, Salifu D, Sevgan S, Fiaboe KKM, Niassy S, van Loon J.J.A., Dicke M, Ekesi S. (2018). Effects of waste stream combinations from brewing industry on the performance of black soldier fly, *Hermetia illucens* (Diptera: Stratiomyidae). PeerJ: 6:e5885.
- **Shaphan Y. Chia,** Tanga CM, Khamis FM, Mohamed SA, Salifu D, Sevgan S, et al. (2018). Threshold temperatures and thermal requirements of black soldier fly *Hermetia illucens*: Implications for mass production. PLoS ONE 13(11): e0206097.
- Hettie A. Boafo, D. S. J. C. Gbemavo, E.C. Timpong-Jones, V. Eziah, M. Billah, **Shaphan Y. Chia,** O.F. Aidoo, V.A. Clottey, and M. Kenis (2022). Substrates most preferred for black soldier fly *Hermetia illucens* (L.) oviposition are not the most suitable for their larval development. Journal of Insects as Food and Feed: 0 (0) - Pages: 1 - 10.

Insect-based Livestock feed formulation and feeding

- **Shaphan Y. Chia,** C.M. Tanga, I.M. Osuga, A.O. Alaru, D.M. Mwangi, M. Githinji, T. Dubois, S. Ekesi, J.J.A. van Loon and M. Dicke (2021). Black soldier fly larval meal in feed enhances growth performance, carcass yield and meat quality of finishing pigs. Journal of Insects as Food and Feed: 7 (4) - Pages: 433 - 447.
- **Shaphan Y. Chia;** Tanga, C.M.; Osuga, I.M.; Alaru, A.O.; Mwangi, D.M.; Githinji, M.; Subramanian, S.; Fiaboe, K.K.M.; Ekesi, S.; van Loon, J.J.A.; Dicke, M. (2019). Effect of Dietary Replacement of Fishmeal by insect meal on growth performance, blood profiles and economics of growing pigs in Kenya. Animals: 9(10), 705.

Nutritional Composition of reared insects

- **Shaphan Y. Chia,** Chrysantus M. Tanga, Isaac M. Osuga, Xavier Cheseto, Sunday Ekesi, Marcel Dicke, Joop J.A. van Loon (2020). Nutritional composition of black soldier fly larvae feeding on agro-industrial by-products. Entomologia Experimentalis et Applicata: 168, (6-7).

Insect Welfare

- Meghan Barrett, **Shaphan Y. Chia,** B. Fischer, J.K. Tomberlin (2022). Welfare considerations for farming black soldier fly, *Hermetia illucens* (Diptera: Stratiomyidae): a model for the insects as food and feed industry. Journal of Insects as Food and Feed: 0 (0) - Pages: 1 - 30.

Insects, Sustainable Livestock feed production, Smallholder farmers' Knowledge

- **Shaphan Y. Chia,** Chrysantus M. Tanga, Joop J.A. van Loon, Marcel Dicke (2019). Insects for sustainable animal feed: inclusive business models involving smallholder farmers. Current Opinion in Environmental Sustainability: 41:23 – 30.
- **Shaphan Y. Chia,** Macharia J, Diiro GM, Kassie M, Ekesi S, van Loon J.J.A, Marcel Dicke (2020). Smallholder farmers' knowledge and willingness to pay for insect-based feeds in Kenya. PLoS ONE: 15 (3): e0230552.

Valorization of insect by-products - frass

- Daniel Dzepe, Théclaire K. Mbenda, Gabrièle Ngassa, Hervé Mube, **Shaphan Y. Chia**, Yaouba Aoudou, Rousseau Djouaka (2022). Application of black soldier fly frass, *Hermetia illucens* (Diptera: Stratiomyidae) as sustainable organic fertilizer for lettuce, *Lactuca sativa* Production. Open Journal of Applied Sciences: 12 (10) - Pages: 1632 -1648.

Manuscripts under journal review

- Mube Kuietche Hervé; Nke Bella B. J; Dzepe Daniel; Vemo Bertin; Manga M.J. Ebile Dayan; Tatsinkou A. S; Kana Jean Raphael; **Shaphan Y. Chia** (2022). Dietary inclusion of black soldier fly larvae reared on hatchery waste affects serum biochemical and haematological parameters of Brahma chickens. Advances in Animal and Veterinary Sciences.

- S.A. Siddiqui, O.F. Aidoo, J. Osei-Owusu, K. Asante, A.K. Dofuor, B.O. Boateng, S.K. Debrah, K.D. Ninsin and **Shaphan Y. Chia** (2022). Edible insects: Friends or Foes? Frontiers in Nutrition.

Manuscripts in preparation.

- **Shaphan Y. Chia,** J.J.A. van Loon and M. Dicke (2023). Frass derived from black soldier fly (*Hermetia illucens*) larvae and yellow mealworms (*Tenebrio molitor*) affects growth performance and resistance to insect herbivores in Field mustard (*Brassica rapa*). In prep.
- **Shaphan Y. Chia**, J.J.A. van Loon and M. Dicke (2023). Raw and processed frass of black soldier fly (*Hermetia illucens*) larvae influence rhizosphere and bulk soil microbial communities and promote plant growth. In prep.
- Daniel Dzepe, Hervé Mube, **Shaphan Y. Chia** (2023), Upcycling cocoa pod husks using black soldier fly larvae (*Hermetia illucens*). In prep.

GRANT ACQUISITION

Research Grants

1. **ATP-Africa Talent Programme**
Funding: Wageningen University & Research, Netherlands - 2020
Position: Postdoc
Project no.: 318.401.9043

2. **Impact and Innovation Grants (I&IG): Enhancing circular agriculture**
Funding: Netherlands Organization for Scientific Research (NWO) - 2021
Position: Postdoc
Project no.: 481.20.122

Study Grants

1. **ILIPA-Improving Livelihood by Increasing Livestock Production in Africa**
Funding: Netherlands Organization for Scientific Research - 2016 - 2019
Position: Doctoral Researcher
Project no.: W 08.250.202

2. ARPPIS – African Regional Postgraduate Programme in Insect Science
Funding: German Academic Exchange Service (DAAD)
August 2013 – July 2014 (Master/1st Year) - Individual Code Number: A/13/94249
August 2014 – July 2015 (Master/2nd Year) - Individual Code Number: 91560045

Conference Subsidy

1. **The 2nd International Conference 'Insects to Feed the World', Wuhan, May 2018.**
Funding: UYTTENBOOGAART-ELIASEN STICHTING (UES) and *icipe*
Position: PhD candidate
Subsidy no.: CONG.2017.12.03 (UES)

INDUSTRY AND OTHER TECHNICAL SKILLS

Black soldier fly rearing and use
Sourcing organic substrates, pre-processing of substrates and larval feeding, harvesting and processing of larvae into animal feed. Key aspects include:

- Breeding of larvae on artificial and low-grade organic substrates
- Larvae nutrition
- Climate control
- Vertical and horizontal production of larvae
- Harvesting and processing into crispy snacks or larval meal

Molecular biology and Microbiology skills

- Isolate microbial genomic DNA from environmental samples including rhizosphere and bulk soil and frass, using DNeasy PowerSoil Pro.
- Quantify the amount of DNA isolated using Spectrophotometry
- Assess bacterial (16S rRNA) and fungal (ITS) community composition in frass and soil samples.
- Identify beneficial soil microbes and their impact on plant growth promotion.
- Actively participate in research conception, design and execution to address defined questions.

Bioinformatics tools for data processing

- Process microbial genomic sequence data using the Ernakovich Dada2 and QIIME2 pipelines.
- Access large datasets using High-Performance Clusters in Linux to filter, denoise, merge and remove chimeras from genomic paired-end sequences for downstream visualisation and statistical analysis.

Document management, equal participation, teamwork, data storage

- Ability to use OneDrive and google workspace and dropbox cloud services for simultaneous teamwork, data sharing and storage
- Perform statistical analysis using Rstudio with a connection to GitHub.
- Create codes and communicate with supercomputers using version control systems and applications such as git, git bash and putty. E.g., when processing large data sets including sequencing data, etc.

SCIENTIFIC CONFERENCES & NETWORKING

- The 34th Netherlands Entomologists Day (34e Nederlandse Entomologendag 2022, December 16, Reehorst, Ede, Netherlands
- VICTAM Asia and Health & Nutrition Asia 2022; September 7 - 9, Impact Exhibition Centre, Bangkok, Thailand – Virtual
- The 17th Symposium on Insect-Plant relationships 2021; July 25 - 30, Leiden University, Leiden, the Netherlands
- The 3rd International Conference Insects to Feed the World 2020; June 2 - 6, Québec Convention Centre, Canada – Virtual
- Global challenges programme call 1 & 2 final conference: Inclusive Agribusiness learning event with NWO-WOTRO research projects 2019; November 14 -15, The Hague, Netherlands
- The 30th Netherlands Entomologists Day (30e Nederlandse Entomologendag 2018, December 14, Reehorst, Ede, Netherlands
- Symposium Earth Future 2018, October 19, Wageningen University & Research, Wageningen, Netherlands
- The 2nd International Conference ‘Insects to Feed the World 2018, May 15 - 18, Wuhan, China
- International Conference on ‘Legislation and Policy on the Use of Insects for Food and feed in East Africa' 2016, March 2 - 3, Kisumu, Kenya

REFERENCES

Prof. dr. Marcel Dicke
Laboratory of Entomology
Wageningen University & Research
marcel.dicke@wur.nl

Prof. dr. Joop J.A. van Loon
Laboratory of Entomology
Wageningen University & Research
joop.vanloon@wur.nl

Mr Vernooij Adriaan
Animal Breeding and Genomics
Wageningen Livestock Research
adriaan.vernooij@wur.nl

SOCIAL MEDIA

- **LinkedIn** - http://linkedin.com/in/shaphan-chia-4b8546116
- **Google Scholar** - https://scholar.google.nl/citations?user=KrzsenUAAAAJ&hl=en
- **Facebook** - https://www.facebook.com/chiashaphan.yong
- **Twitter** - https://twitter.com/Shaphan_Chia
- **Website** - www.s-chia.com

PROFESSIONAL AFFILIATIONS

- Member, The Netherlands Entomological Society (NEV) (https://nev.nl/en/)
- Member, Zoology Educational & Research Society of the University of Buea (ZERS UB) Alumni Association (https://www.zersubalumni.org/)