



# INSECTA 2022

## CONFERENCE PROGRAM

jointly organized by



# ACKNOWLEDGEMENTS

We would like to thank the following persons for their support, creating INSECTA 2022 as a successful event:

## ORGANIZING TEAM

Julia Durek, Jessica Lietze, Shikha Ojha, Thomas Piofczyk, Marios Psarianos, Giacomo Rossi, Oliver Schlüter, Beate Spehr, Andreas Vilcinskas

## SCIENTIFIC COMMITTEE

Alaa El-Din Bekhit, Marco Dalla Rosa, Julia Durek, Henry Jäger, Rosalba Lanciotti, Michael Ngadi, Shikha Ojha, Umezuruike Linus Opara, Francesca Patrignani, Thomas Piofczyk, Pablo Daniel Ribotta, Amauri Rosenthal, Oliver Schlüter, Brijesh K. Tiwari, Mik Van Der Borgh, Grant W. Vandenberg, Andreas Vilcinskas

## SPECIAL THANKS TO

Justus Liebig University Giessen, LOEWE Center for Insect Biotechnology & Bioresources, Fraunhofer Institute for Molecular Biology and Applied Ecology (IME) Giessen

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# PROGRAM – September 14, 2022

02:30 p.m.	Registration	Foyer
03:30 p.m.	Welcome – Opening remarks <b>Oliver Schlüter</b> (Chair, ATB) <b>Andreas Vilcinskis</b> (Co-Chair, Justus Liebig University Giessen) <b>Priska Hinz</b> (Minister of state for environment in Hessen) <b>Alexander Goesmann</b> (Vize president of Justus Liebig University Giessen)	Auditorium
04:00 p.m.	<b>KEYNOTE: Jefferey K. Tomberlin</b> Synergy between animal welfare & industrial production of insects: Opportunities created- not lost	
04:40 p.m.	<b>KEYNOTE: Dorothee Tegtmeier</b> The black soldier fly gut microbiome and its contribution to the bioeconomy	
05:20 p.m.	<b>KEYNOTE: Martin Rühl</b> Biotechnology in food and feed applications with insects	
06:00 p.m.	<b>Eleonore Glitz</b> (Projekträger Jülich) BMBF-Programm KMU-innovativ Bioökonomie	
06:15 p.m.– 09:00 p.m.	<b>Get-Together</b>	Foyer

# PROGRAM – September 15, 2022

08:00 a.m.	Registration	Foyer
09:00 a.m.	<b>KEYNOTE: Karol Barragán-Fonseca</b> Integrating social aspects in insect farming	Room C112
09:30 a.m.	<b>KEYNOTE: Shikha Ojha</b> Implementations of innovative technologies in the edible insect processing pathways	
10:00 a.m.	<b>Company Presentation: Better Insect Solutions</b> <b>Lars-Henrik Lau Heckmann</b> Better Insect Solutions – Setting the standard in insect farming	

**Session 1**

Room C05a

**Insect rearing and production systems****10:15 a.m.****Are black soldier fly trial results influenced by larvae handling?***Sara Bellezza Oddon et al., Italy***10:35 a.m.****The influence of *H. illucens* larvae on digested municipal sewage sludge microbial activity and functional diversity***Piotr Bulak et al., Poland***10:55 a.m.****Bacterial babysitters: Decrypting the microbiota on the Black Soldier Fly's embryo surface and their origin***Carina D. Heussler et al., Austria***11:15 p.m. Coffee break and poster session****Session 3**

Room C05a

**Insect rearing and production systems****11:45 a.m.****Increasing the  $\omega$ -3 fatty acids content of Black Soldier Fly Larvae through substrate fermentation***Freek IJdema et al., Belgium***12:05 p.m.****The influence of dietary starch, fibre, and water on the nitrogen balance in black soldier fly larvae production***Tom van den Beuken et al., The Netherlands***12:25 p.m.****Can the use of brewing by-products modulate microbiota and mycobiota of black soldier fly larvae?***Ilaria Biasato et al., Italy***12:45 p.m.****Visualization and quantification of microplastics in the gut of black soldier fly larvae (*Hermetia illucens*)***Siebe Lievens et al., Belgium***01:05 p.m. Lunch break and poster session****Session 2**

Room C05b

**Ethical and environmental aspects****10:15 a.m.****The influence of the product name on the acceptance of insect based food***Anna Lürkens, Sonja Floto-Stammen et al., The Netherlands***10:35 a.m.****What motivates consumers to accept whole and processed mealworms in their diets? A cross-country study in Belgium, China, Italy, Mexico, and US***Daylan Amelia Tzompa-Sosa et al., Belgium***10:55 a.m.****Sensory analysis of edible insects in Czechia: does size really matter?***Martin Kulma & Lenka Kouřimská, Czech Republic***Session 4**

Room C05b

**Ethical and environmental aspects****11:45 p.m.****Sensorial properties of raw and heated, fresh and spoiled Mediterranean crickets (*Gryllus bimaculatus*)***Nils Th. Grabowski et al., Germany***12:05 p.m.****Feeding habits and acceptance of insect-based products by dog and cat owners – a survey***Fien Carron, Camila Baptista da Silva et al., Belgium***12:25 p.m.****Zero Waste Protein Factories: Leveraging Biology to empower the industry for waste-to-protein conversion on-site***Katharina Unger, Austria***12:45 p.m.****Economic viability of insect farms in the Netherlands***Hilde Niyonsaba et al., The Netherlands*

## Session 5

## Room C05a

### Insect rearing and production systems

02:05 p.m.

**Bioconversion potential of agro-industrial by-products by *Tenebrio molitor* – long term results**

Anna Bordiean et al., Poland

02:25 p.m.

**Nutritive value of different raw materials in yellow mealworms: optimizing *Tenebrio molitor* nutrition**

Bruno Fasce, Juan José Pascual et al., Spain

02:45 p.m.

**Statistical comparison of insect growth parameters at different test sites**

Siebe Berrens et al., Belgium

03:05 p.m.

**Too hot, too cold: Scaling effects and standardised research for industry relevance**

Julie C. Wray, Meghan D. Cooling et al., Canada

03:25 p.m.

**Development of a continuous reproduction system for the BSF**

Sepepe Salari & Lisanne de Goede, The Netherlands

03:45 p.m.

Coffee break and poster session

## Session 6

## Room C05b

### Insect processing for food and feed

02:05 p.m.

**Evaluation of black soldier fly larvae proteins as substitute of poultry by-product meal in extruded dry diets for dogs**

Aman Paul et al., The Netherlands

02:25 p.m.

**Development of an enzymatic treatment followed by tricanter centrifugation to produce insect meal with improved characteristics from *Hermetia illucens***

Sandra Balsells, Anna Margenat et al., Spain

02:45 p.m.

**The oxidative stability of commercial *Hermetia illucens* meal**

A. Mouithys-Mickalad, Ghina Kotob et al., The Netherlands

03:05 p.m.

**Differences in process control starting with the killing of the larvae between *Hermetia illucens* and *Tenebrio molitor* in dry and wet processing – A detailed view of intermediates and end products**

Verena Böschchen et al., Germany

03:25 p.m.

**Hygienic status of black soldier fly based feeds during processing – A detailed view of intermediates and end products**

Patrick Sudwischer et al., Germany

## Session 7

## Room C05a

### Insect rearing and production systems

04:15 p.m.

**The influence of dietary fat on the yield, bioconversion efficiency, and body composition of black soldier fly larvae**

Ruilong Zheng et al., The Netherlands

04:35 p.m.

**Multifaceted approach to high fiber waste management using black soldier fly larvae**

Pratibha Yadav, Austria

04:55 p.m.

**Making insect farming simple and accessible to everyone, anywhere, by complete decoupling of BSF breeding from rearing & processing**

Yuval Gilad et al., Israel

05:15 p.m.

**Studies of *H. illucens* mating behavior under high density conditions**

Rachel Toaff-Rosenstein et al., France

07:00 p.m.–

12:00 a.m.

**Conference barbecue at LOEWE Center for Insect Biotechnology & Bioresources (Fraunhofer IME)**

## Session 8

## Room C05b

### Insect processing for food and feed

04:15 p.m.

**Nutritional analysis of seaweed flies *Fucellia maritima* (Haliday, 1838) reared on five different substrates**

Felipe Lourenço et al., Portugal

04:35 p.m.

**Microbial characterization of *Bombyx mori* and possible reutilization of chrysalides as food ingredient: circular economy approach in sericulture**

Filippo Marzoli et al., Italy

04:55 p.m.

**Taurine content in insects**

Lenka Kouřimská et al., Czech Republic

05:15 p.m.

**Zinc twice: A trace element to benefit insects and consumers**

Claudia Keil et al, Germany

# PROGRAM – September 16, 2022

08:30 a.m. Registration

Foyer

09:00 a.m. **KEYNOTE: Heinrich Katz**  
Insect production and processing in Europe -  
Recent developments and perspectives

Room C112

09:30 a.m. **KEYNOTE: Thomas Wilke**  
Insects as sustainable aquaculture feed

10:00 a.m. **Company Presentation: Royal Dutch Kusters Engineering**  
Jeroen Kusters  
Insect rearing technologies

## Session 9

Room C05a

### Insect processing for food and feed

10:15 a.m.

**Effect of conservation, blanching and drying conditions on the safety and quality of**

***Tenebrio molitor* larvae**

*José C. Ribeiro, et al, Portugal*

10:35 a.m.

**The influence of different side streams on the nutritional composition of the yellow mealworm (*Tenebrio molitor*)**

*Isabelle Noyens, Geert Verheyen et al., Belgium*

10:55 a.m.

**Detection of changes in physicochemical properties during storage of high pressure treated mealworm paste**

*Giacomo Rossi et al., Germany*

11:15 a.m.

**DTI – Insect industry prospects**

*Mads H. Juul & Neda N. Moghadam, Denmark*

11:35 a.m. **Coffee break and poster session**

## Session 10

Room C05b

### Non-food applications of insects

10:15 a.m.

**The fertilization potential of *Hermetia illucens* larvae post-breeding residue**

*Monika Kaczor et al., Poland*

10:35 a.m.

**Can further composting improve the fertilizer value of frass?**

*Arthy Surendran & Rob Lillywhite, United Kingdom*

10:55 a.m.

**Compliance of frass with legal requirements**

*Lotte Frooninckx et al., Belgium*

11:15 a.m.

**Insects in the fight against antibiotic resistance: in vitro characterization of black soldier fly antimicrobial peptides**

*Laurence Van Moll et al., Belgium*

**Session 11**

**Room C05a**

**Insect rearing and production systems**

**11:55 p.m.**

**New species of culturable bacteria from insects**

Juan Guzman & Andreas Vilcinskis, Germany

**12:15 p.m.**

**Ozone treatment to control mite infestation in reared crickets (*Acheta domesticus*) oviposition substrate**

Michela Bertola et al., Italy

**12:35 p.m.**

**Dose-response effects of starch in chicken excreta on *Musca domestica* larval performance and bioconversion efficiency**

Lennard PISA et al., The Netherlands

**12:55 p.m.**

**Higher larval density leads to lower survival and fat content, smaller size, longer development time and increased investment into immunity in the black soldier fly**

Leonard O. Opere et al., Estonia

**01:15 p.m.**

**Closing remarks**

**VDI BEST YOUNG SCIENTIST'S PRESENTATION (oral and Poster)**

**AWARD Sponsor: VDI – Magdeburger Bezirksverein**

**01:30 p.m.**

**Refreshments for farewell**

**02:00 p.m.**

**Visit of LOEWE Center for Insect Biotechnology & Bioresources (optional)**

**03:00 p.m.**

**End of conference**

**Session 12**

**Room C05b**

**Non-food applications of insects**

**11:55 p.m.**

**The chemical diversity in arachnid venom as a source of biomolecular innovation in medicine and agriculture**

Tim Lüddecke et al., Germany

**12:15 p.m.**

**Venomomics of the native myrmicine ants *Myrmica rubra* and *Myrmica ruginodis***

Sabine Hurka et al., Germany

**12:35 p.m.**

**Educational leadership chair in the production and primary processing of edible insects**

Marie-Hélène Deschamps & Grant W.

Vandenberg, Canada

**12:55 p.m.**

**Insect School: A way to move the BSF industry forward**

Bob Holtermans, The Netherlands

**Room C112**



# POSTER LIST

## Poster session: Insect rearing and production systems

Poster no. Title, Authors

- 0.01** Unraveling the gut virome in Black Soldier Fly larvae (*Hermetia illucens*)  
*Jeroen De Smet, Belgium*
- 0.02** Development of genetically improved Black Soldier Fly strains using targeted genomic mutagenesis  
*Anna Goren et al., Israel*
- 0.03** Amino acid profile of Jamaican field (*Gryllus assimilis/locorojo*) and Mediterranean crickets (*Gryllus bimaculatus*) fed exclusively with chicken starter feed  
*Nils Th. Grabowski et al., Germany*
- 0.04** Container size affects life cycle duration and survival rate in Jamaican field crickets (*Gryllus assimilis/locorojo*)  
*Nils Th. Grabowski et al., Germany*
- 0.05** The effect of feed fermentation and inoculation level on total biomass weight of *Hermetia illucens* larvae  
*Bartosz Grodzki & Mirena Zhelezarova, Bulgaria*
- 0.06** Determination of microbiological safety of farmed and wild harvested edible insects from Kenya  
*Carolyne Kipkoech, André Goehler et al., Germany*
- 0.07** The co-housing microbiome of black soldier fly larvae  
*Thomas Klammsteiner, Carina D. Heussler et al., Austria*
- 0.08** Optimizing substrate for sustainable mass production of black soldier fly (*Hermetia illucens*) larvae utilizing side streams  
*Miika Tapio, Susanne Heiska et al., Finland*
- 0.09** Identification of polystyrene degrading bacterial community isolated from *Tenebrio molitor* digestive system  
*Zoltan Vajnai et al., Hungary*
- 0.10** Effects of live yeast *Saccharomyces cerevisiae* on growth, protein and fat content of the Black Soldier Fly *Hermetia illucens*  
*Felix Würtz et al., Germany*
- 0.11** Bioassay methods for optimizing Black Soldier fly (*Hermetia illucens*) rearing at industrial scale  
*Meytar Zabbar et al., Israel*

## Poster session: Insect processing for food and feed

- 0.12** Heating black soldier fly larval frass according to EU regulatory requirements significantly reduces in vitro antifungal activity against a range of phytopathogens  
*Ghazaleh Arabzadeh, Grant Vandenberg et al., Canada*
- 0.13** Establishment of examination procedures for edible insects in official food monitoring  
*Tomke Marie Asendorf et al., Germany*

## Poster session: Insect processing for food and feed

Poster no. Title, Authors

- 0.14** Cecal volatilome and microbiota profile of organic chickens supplemented with black soldier fly live larvae  
*Giovanna Battelli, Francesco Gai et al., Italy*
- 0.15** Can black soldier fly live larvae supplementation modify gut histomorphology of organic chickens?  
*E. Colombino, Ilaria Biasato et al., Italy*
- 0.16** Ultrasound-assisted enzymatic extraction of protein from *Acheta domesticus*  
*Konstantina Döhring et al., Germany*
- 0.17** SensiBug- potential use of *Tenebrio molitor* in veterinary food for dogs with diet-dependent enteropathies  
*Remigiusz Gałęcki & Tadeusz Bakuła, Poland*
- 0.18** Infrared spectroscopy combined with multivariate, a novel technique to predict the insect protein added to raw doughs  
*Nerea García-Gutiérrez, Carmen Méndez-Sánchez et al., Spain*
- 0.19** Changes in the nutritional value of *Gryllus assimilis* and *Tenebrio molitor* depending on various culinary treatment  
*Barbora Lampová et al., Czech Republic*
- 0.20** Insect lecithin extraction and potential application in oil-in-water emulsion  
*An Li et al., Belgium*
- 0.21** Prediction of insect lipids composition using infrared spectroscopic combined with multivariate analysis  
*Carmen Méndez-Sánchez et al., Spain*
- 0.22** Fatty acid composition of Black Soldier Fly Larvae reared on comparable diets of different origin  
*Manfred Mielenz et al., Germany*
- 0.23** Evaluation of the biochemical composition of the black soldier fly larvae (*Hermetia illucens* (L.)) and blow fly maggot harvested from poultry waste in Abeokuta, Ogun state, Nigeria  
*Esther Onifade et al., Nigeria*
- 0.24** Utilization of biomass from house crickets into valuable ingredients  
*Marios Psarianos et al., Germany*
- 0.25** Allergenic potential of cricket powder and the effect of *Yarrowia lipolytica* RO25  
*Samantha Rossi et al., Italy*
- 0.26** Hazards and risks associated with the use of honey bee drone brood as food  
*Laura Schiel et al., Germany*
- 0.27** Improvement of the nutritional value of Jamaican field cricket (*Gryllus assimilis*) as a result of the addition of carrots to the feed  
*Kateřina Šebelová et al., Czech Republic*

## Poster session: Insect processing for food and feed

Poster no. Title, Authors

- 0.28** Insects for food and feed: microbiological and molecular methods for Salmonella detection verified according to ISO 16140-3:2021 standard  
*Daniilo Sgura, Mara Scremin et al., Italy*
- 0.29** The effect of technological treatment on microbiological changes of edible insect  
*Petra Škvorová et al., Czech Republic*
- 0.30** Determination of Chitin in Insect Based Products  
*Patrick Sudwischer, Germany*
- 0.31** Effect of tyrosine-supplementation on browning and emulsifying properties of protein fractions of yellow mealworm (*Tenebrio molitor*)  
*Laura Weißenborn et al., Germany*
- 0.32** Effects of the incorporation of extruded mealworms on the nutritional and sensory properties of wheat bread  
*V. Wiedenmann, Anna-Kristina Marek et al., Germany*

## Poster session: Ethical and environmental aspects

- 0.33** SMARTinFOOD: Insect-based food sources to Supplement nutrient deficiencies in vulnerable areas  
*Sandra Balsells, Anna Margenat et al., Spain*
- 0.34** A multitrophic culture system for the production of black soldier fly larvae (*Hermetia illucens*)  
*Andre Dequara et al., Malta*
- 0.35** Effect of acidulants on post-mortem off-color formation in BSF larvae (*Hermetia illucens*)  
*Imad Mhanna, Bulgaria*
- 0.36** Increasing yields in maize production by application of insect frass and pupae shells of BSF  
*Yannik Weinreis & Jonas Finck, Germany*

## Poster session: Non-food application of insects

- 0.37** Optimisation of heat treatment for black soldier fly (*Hermetia illucens*) and yellow mealworm (*Tenebrio molitor*) frass: compliance with EU regulation microbiological safety  
*Ann De Volder, Jeroen de Smet et al., Belgium*
- 0.38** Optimized production platform for the insect metalloproteinase inhibitor (IMPI)  
*Carolin A. Lappöhn et al., Germany*
- 0.39** Toxins from insects as a source for valuable new therapeutics and insecticides  
*Anne Paas et al., Germany*
- 0.40** Insect-based biopolymers for developing functional coating: effect on the quality of fresh-cut apples  
*Marika Valentino, Giacomo Rossi et al., Italy*

# INFORMATION

## ADDRESSES

### Kick-off and Get-Together (14.09.)

Justus Liebig University Giessen

Ludwigstraße 23, 35390 Giessen [50.58047595285615, 8.67706852536427]

### Conference venue (15./16.09.)

Justus Liebig University Giessen, Institute of Food Chemistry and Food Biotechnology

Heinrich-Buff-Ring 17-19, 35392 Giessen [50.568595571633004, 8.674018713821136]

### Evening event (15.09.)

LOEWE Center for Insect Biotechnology and Bioresources

Ohlebergsweg 12, 35392 Giessen [50.57065349439104, 8.675542208471406]

## PROGRAM UPDATES

The organizers reserve the right for **program changes**.

The **program** will also be available on our conference website.

## ORGANIZATION

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## PUBLIC TRANSPORT

Travel service of German Railways: <https://reiseauskunft.bahn.de/bin/query.exe/en>

Public transport in Giessen: <https://www.swg-verkehr.de/>

## FURTHER INFORMATION

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