



Summer School

Insects as Food and Feed, from producing to consuming

The field of rearing insects for human food and animal feed is new and exciting. There are many challenges in bringing insects on the market. How can we rear insects in a sustainable way with low environmental impact and contribute to a circular economy? What type of production design and facilities are needed to farm and process insects in an optimal way? Is it economically an interesting solution? By attending this Summer School you will explore a new alternative protein source with a potential to play a major role in creating a circular food chain and to contribute in solving the world`s food problem.

Target group

This programme is designed for everybody with an interest in insects as food and feed. Professionals from both the private sector and the public sector are welcome as well as academics.

Results

The aim of this Summer School is to learn the basic principles behind the factors that affect all processes in the insect production and consumption chain. Rearing, handling, processing and consumption of insects as food and feed are discussed. Together you will explore the future challenges and opportunities of insects as food and feed and how to apply new insights in your daily practice.

Dates 1 July - 5 July 2024
Location Wageningen Campus

Course leader Arnold van Huis,
Emeritus professor Wageningen
University & Research

Outline and topics

This course gives you an in-depth view on the following topics:

- Rearing and processing
- Nutrition and health
- Other applications than food&feed
- Processing and conservation
- Food safety and legislation
- Consumers, marketing and promotion

The Summer School offers lectures from leading international experts, academics from Wageningen University & Research, practical cases and a day-trip to the Insect Pilot Plant and research groups in Belgium.

There are plenty opportunities to interact with the experts and professionals, together looking for new and exciting ways to contribute to circular food chains.



Programme

Monday 1 July 2024

- *Welcome and introduction to the Summer School*
- *Ecosystem services and environment: potential of insects for humanity, insects welfare and environmental effects*
- *Industry challenge: mealworm production systems*
- *Informal dinner*

Tuesday 2 July 2024

- *Ento-technology: production, technology and design (includes processing)*
- *Maintaining healthy insect colonies*

Wednesday 3 July 2024

- *Nutritional value of insect: biotic and abiotic factors involved*
- *Special production systems (including the black soldier fly): rearing conditions and quality assurance*
- *Insects as feed: use of organic side streams, functional properties*

Thursday 4 July 2024

Field trip to Belgium: Thomas More University of Applied Sciences and Research Group for Insect Production and Processing of University of Leuven including the Insect Pilot Plant. Dinner is included.

Friday 5 July 2024

- *Food safety & legislation*
- *Consumer attitudes, marketing & promotion*
- *Outreach: challenges for companies dealing with edible insects*
- *Certification ceremony and Farewell drinks*

Practical information



The course fee is € 2,750.- per person and covers tuition, course materials including the book "Insects as food and feed: from production to consumption", lunches, 2 dinners and a field trip. Hotel accommodation is not included in the course fee.

For PhD students we offer a reduced course fee of €2,225.-



Between 25 and 40 participants.



After attending this Summer School a personalised certificate is issued.

Registration

Enrollment is possible until 1 June 2024, or if the maximum number of participants is reached. Register via wur.eu/academy.

[Register](#)

Wageningen Academy

We develop and organise courses for professionals, based on Wageningen University & Research expertise.

Contact

wur.eu/academy

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WURacademy



wageningenacademy

Today's knowledge,
tomorrow's business

Programme

- changes can still occur -

Summer School Insects as Food and Feed, from producing to consuming



Course leader

Arnold van Huis, Emeritus professor
Wageningen University & Research | Laboratory of Entomology

Date: 1 July – 5 July 2024

Location: Wageningen, The Netherlands

Organisation: Wageningen Academy

Telephone number support: + 31 317 484093

List of speakers

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| Prof.dr. M. (Mik) Van Der Borght | Professor Faculty of Engineering Technology, KU Leuven, Belgium |
| <i>Ing.</i> J. (Jonas) Claeys | Advisor Insect Rearing, Inagro, Belgium |
| Prof.dr M. (Marcel) Dicke | Professor Laboratory of Entomology, Department of Plant Sciences, WUR, The Netherlands |
| Dr A.R.H. (Arnout) Fischer | Associate professor Marketing and Consumer Behaviour, Department of Social Science, WUR, The Netherlands |
| Dr L. (Lotte) Frootinckx | Postdoctoral researcher Thomas More, Belgium |
| Prof.dr.ir. A. (Arnold) van Huis | Emeritus professor, Laboratory of Entomology, Department of Plant Sciences, WUR, The Netherlands |
| Dr R. (Robert) Kok | Emeritus professor, Department of Bioresource Engineering, McGill University, Canada |
| A. (Antoine) Lecocq | Assistant Professor, Department of Plant and Environmental Sciences, University of Copenhagen, Denmark |
| Dr N.P. (Nathan) Meijer | Scientific researcher, Agrochains Group, Wageningen Food Safety Research (WFSR), The Netherlands |
| Dr Apr. S. (Sabine) Van Miert | Research Manager @RADIUS Research, Lecturer Biomedical Laboratory Technology, Thomas More, Belgium |
| Dr <i>ir</i> D.G.A.B. (Dennis) Oonincx | Researcher Animal Nutrition group, Department of Animal Sciences, WUR, The Netherlands |
| <i>Ing.</i> M. (Marian) Peters MBA | CEO New Generation Nutrition, The Netherlands |
| S. (Seppe) Salari MSc | Head of Entomology, Insectocycle, The Netherlands |
| <i>Ir.</i> N. (Niek) Steeghs | Chief Insects Officer – Biotech R&D Operations Director, Ynsect NL, The Netherlands |
| J.K. (Jeffery) Tomberlin, PhD, D-ABFE | Professor & AgriLife Research Fellow, Department of Entomology, Texas A&M University TAMU, USA |
| Dr T. (Teun) Veldkamp | Senior researcher Animal Nutrition, Wageningen Livestock Research, WUR, The Netherlands |
| Dr D. (Dries) Vandeweyer | Postdoctoral researcher, Research Group for Insect Production and Processing, KU Leuven, Belgium |

Monday 1 July 2024

Location: Wageningen Campus, BUILDING TBD |
Room TBD
Address: TBD

Ecosystem services and environment

- 08.30 Registration and Welcome with coffee and tea
Wageningen Academy
- 09.00 Introduction course leader
Arnold van Huis
- 09.30 Short introduction *by all participants*
- 10.00 Small break
- 10.30 Introduction Summer School, Edible Insects: Progress and Prospects
Arnold van Huis
- 11.30 Exploring the potential of insects for the benefit of humanity: ecosystem services; pollination, waste disposal, insects as food and feed, insects in recreation and potential moderators
Marcel Dicke
- 12.30 Lunch on Wageningen Campus
Address: TBD
- 13.30 Insects Welfare
Arnold van Huis
- 14.00 Environmental effects of producing insects: ammonia and greenhouse gas emissions, environmental risks
Dennis Oonincx
- 15.00 Small break

Industry challenge

- 15:30 Challenges in industrial mealworm production systems
Niek Steeghs
- 16.30 Free time before dinner
- 18.30 Informal dinner at TBD
- 21.00 End of course day

Tuesday 2 July 2024

Location: Wageningen Campus, BUILDING TBD | Room TBD
Address: TBD

Ento-technology

- 08.30 Welcome with coffee and tea
- 09.00 Production technology and design (ento-technology): Part 1. Setting the stage
Robert Kok
- 10.30 Small break with coffee/tea
- 11.00 Production technology and design (ento-technology): Part 2. Systems and challenges
Robert Kok
- 13.00 Lunch on Wageningen Campus
Address: TBD
- 14.00 *Group picture at the Wageningen Campus by WUR photographer*
- 14.15 Production technology and design (ento-technology): Part 3. Processing
Robert Kok
- 15.45 Small break with coffee/tea

Insect's health

- 16.00 Maintaining a healthy colony
Antoine Lecocq
- 17.15 End of course day

Wednesday 3 July 2024

Location: Wageningen Campus, BUILDING TBD | Room TBD
Address: TBD

Special production systems

- 08.30 Welcome with coffee and tea
- 09.00 Black soldier fly:
Part 1. How to maintain in colony (incl genetics) and
Part 2. How to grow larve
Jeff Tomberlin
- 10.45 Small break
- 11.00 Black soldier fly: Part 3. Quality assurance
Jeff Tomberlin
- 12.00 Lunch on Wageningen Campus
Address: TBD
- 13.00 Consistent breeding and egg production
Seppe Salari

Insects as feed

- 13.45 Insects as feed
Teun Veldkamp
- 14.45 Small break

Nutrients

- 15.15 Nutrient content of insects
Dennis Oonincx
- 16.30 End of course day

Thursday 4 July 2024

Excursion day trip to Campus Geel and the [Insect Pilot Plant](#), Belgium

*Thomas More University of Applied Sciences and University of Leuven
Campus Geel, Kleinhoefstraat 4, 2440 Geel, Belgium*



07.00 **Departure touring car from Wageningen Campus to Campus Geel**

! Meeting point in front of Forum/Radix, Wageningen Campus

09.00 Welcome with coffee and tea

Research Group for Insect Production and Processing, Faculty of Engineering Technology, University of Leuven, Campus Geel

09.30 Presentations of the research programme

- Insect research at the Research Group for Insect Production and Processing (IP&P), with focus on microbiological research (30 min) by *Dries Vandeweyer*
- Chemical research at IP&P and introduction to the SymbIOnt building (30 min) by *Mik Van der Borght*

10.30 Short break

10.45 Visit to research facilities

12.15 Lunch

Radius, Thomas More University of Applied Sciences

13.15 Presentation of the research programme

- Insect rearing: Optimization of the reproduction and nursing process (30 min) by *Lotte Froominckx*
- Insect rearing: The multi-angle approach of Inagro's Insect Research Centre (IRC) (30 min) by *Jonas Claeys*
- Insects: a source of nutrients and biobased chemicals (30 min) by *Sabine Van Miert*

14.45 Break

15.00 Visit to research facilities / the Insect Pilot Plant

16.30 Small dinner

17.30 Transport back to Wageningen Campus

19.30 **Expected return at Wageningen Campus**

Friday 5 July 2024

Location morning:

Wageningen Campus, BUILDING TBD | Room TBD
Address: TBD

Food safety and legislation

08.30 Welcome with coffee and tea

09.00 Food safety
Nathan Meijer

09.45 Food legislation
Nathan Meijer

10.30 Small break coffee and tea

Consumer, marketing & promotion

11.00 Consumer attitudes, marketing, promotion
Arnout Fischer

12.00 Lunch at Wageningen Campus
Address: TBD

Outreach: challenges

13.00 Challenges of companies dealing with edible insects
Marian Peters

14.00 Course end messages and certification ceremony

14.30 Farewell drinks

