



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

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- *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

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

### Wednesday 3 July 2024

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- *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

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*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

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- *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.

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## Registration

Enrollment is possible until 1 June 2024, or if the maximum number of participants is reached. Register via [wur.eu/academy](http://wur.eu/academy).

[Register](#)

You can combine this summer school with our upfront course [The Proteins of the Future](#) from 26-28 June. The programmes are complementary, offering participants a broad understanding of alternative proteins and their applicability in practice.

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## Wageningen Academy

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

### Contact

[wur.eu/academy](http://wur.eu/academy)

E [info.wageningenacademy@wur.nl](mailto:info.wageningenacademy@wur.nl)

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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

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) Froominckx	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

