



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

3 July - 7 July 2023

welcome & intro on Sunday 2 July

Location

Wageningen Campus

Course leader Arnold van Huis,
Emeritus professor WUR

Outline and topics

This course gives you an in-depth view on:

- Insect rearing and processing
- Insects and nutrition
- Insects for food, feed and cosmetics
- Insect and food safety, legislation
- Insects and consumers, marketing and promotion

The Summer School offers a varied and attractive mix of high profile lectures, practical cases, group work and a field trip.

Leading international experts from Wageningen University & Research, other research institutes and private companies are engaged in this programme. Check the [website](#) for a list of speakers. There are plenty opportunities to interact with the experts and between participants.



Programme

Sunday Evening 2 July 2023

Welcome and introduction to the Summer School

Monday 3 July 2023

- *Ecosystem services and environment*: potential of insects for humanity and environmental effects
- *Industry challenge*
- *Introduction group work*

Tuesday 4 July 2023

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

Wednesday 5 July 2023

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.

Thursday 6 July 2023

- *Special production systems*
- *Insects as feed*: bio-waste, processing, nutritional value & functional properties
- *Nutrients and food technology*: content of insects, processing and conservation

Friday 7 July 2023

- *Food safety & legislation*
- *Consumer & marketing*
- *Outreach*: challenges for companies dealing with edible insects
- *Group work & presentations*
- *Evaluation & certification ceremony*

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 €1,995.-



Between 25 and 40 participants.



After attending this Summer School a personalised certificate is issued.

Registration

Enrollment is possible until 5 June 2023, or if the maximum number of participants is reached. Register via www.wur.eu/academy.

[Register](#)

You can combine this summer school with our upfront course [The Proteins of the Future](#) from 28-30 June. The programmes are complementary, offering participants a broad understanding of alternative proteins and their applicability in practice.

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

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: 3 July – 7 July 2023 (welcome reception Sunday evening the 2th)

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
Jan-Willem Heesakkers	Project Manager R&D, Bühler Insect Technology, The Netherlands
Prof.dr.ir. A. (Arnold) van Huis	Emeritus professor, Laboratory of Entomology, Department of Plant Sciences, WUR, The Netherlands
A. (Antoine) Lecocq	Assistant Professor, Department of Plant and Environmental Sciences, University of Copenhagen, Denmark
N.P. (Nathan) Meijer	Junior researcher Toxicology, BU Toxicology Novel Foods & Agrochains, Wageningen Food Safety Research (WFSR), The Netherlands
Chelsea Miranda, PhD	Postdoctoral Research Associate, F.L.I.E.S. Facility, Department of Entomology, Texas A&M University TAMU, USA
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
Mads Skjærbæk	Project Manager and Consultant, Danish Technological Institute, Denmark
Dr.- <i>Ing.</i> habil. Oliver K. Schlüter	Spokesman Program Area Healthy Foods, Department of Systems Process Engineering, Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Germany
<i>Ir.</i> N. (Niek) Steeghs	Chief Insects Officer – Biotech R&D Operations Director, Ynsect NL, The Netherlands
S. (Sergiy) Smetana PhD	German Institute of Food Technologies, Germany
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

Sunday 2 July 2023

Evening programme with drinks & bites

Location: [Fletcher Hotel-Restaurant De Wageningsche Berg](#) | Tel: + 31 317 495911
Address: Generaal Foulkesweg 96, 6703 DS Wageningen

- 19.30 Registration and Welcome
by Wageningen Academy
- 20.00 Introduction
by course leader Arnold van Huis
- 20.30 Short introduction *by all participants*
- 21.30 End evening programme

Monday 3 July 2023

Location: Wageningen Campus, FORUM | Room B0435
Address: Droevendaalsesteeg 2, Building 102, 6708 PB Wageningen

Ecosystem services and environment

- 08.30 Welcome with coffee and tea
- 09.00 Introduction Summer School and introduction case/assignment
Arnold van Huis
- 10.00 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
- 11.00 Small break
- 11.30 Environmental effects of producing insects: ammonia and greenhouse gas emissions, environmental risks
Sergiy Smetana
- 12.30 Lunch on Wageningen Campus

Industry challenge

- 13.30 Challenges in industrial mealworm production systems
Niek Steeghs

Nutrients

- 14.15 Nutrient content of insects
Dennis Oonincx
- 15:15 Small break
- 15:30 Assignments, introduction group work
- 16:15 Start group work
- 17.00 End of course day

Tuesday 4 July 2023

Location: Wageningen Campus, FORUM | Room B0417

Address: Droevendaalsesteeg 2, Building 102, 6708 PB Wageningen

Ento-technology

- 08.30 Welcome with coffee and tea
- 09.00 Production technology and design (ento-technology): Setting the stage
Mads Skjærbæk
- 10.30 Small break
- 11.00 Production technology and design (ento-technology): Systems and challenges
Mads Skjærbæk
- 13.00 Lunch on Wageningen Campus
- 14.00 Group picture at the Wageningen Campus by WUR photographer
- 14.15 Group work
- 15.15 Small Break

Insect's health

- 15.45 Maintaining a healthy colony
Antoine Lecocq
- 17.00 End of course talks
- 18.15 Informal dinner (Wageningen City Centre)
- 21.00 End of course day

Wednesday 5 July 2023

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
Dries Vandeweyer
- Chemical research at IP&P and introduction to the SymbIOnt building
Mik Van der Borght

Short break

11.00 Visit to research facilities

12.30 Lunch

Radius, Thomas More University of Applied Sciences

13.30 Presentation of the research programme

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

15.00 Break

15.00 Visit to research facilities / the Insect Pilot Plant

17.15 Small dinner

18.15 Transport back to Wageningen Campus

20.00 **Expected return at Wageningen Campus**

Thursday 6 July 2023

Location: Wageningen Campus, FORUM | Room B0417
Address: Droevendaalsesteeg 2, Building 102, 6708 PB Wageningen

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
Chelsea Miranda
- 10.45 Small break
- 11.00 Black soldier fly: Part 3. Quality assurance
Chelsea Miranda
- 12.00 Lunch on Wageningen Campus

Insects as feed

- 13.00 Insects as feed
Teun Veldkamp

Food technology

- 14.00 Production technology and design (ento-technology): Processing
Oliver K. Schlüter
- 15.30 Small break
- 15.45 Processing and conservation in practice
Jan-Willem Heesakkers
- 16.45 Group work cont'd
- 17.30 End of course day

Friday 7 July 2023

Location: Wageningen Campus, FORUM | Room B0417

Address: Droevendaalsesteeg 2, Building 102, 6708 PB Wageningen

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

11.00 Consumer attitudes, marketing, promotion
Arnout Fischer

12.00 Lunch on Wageningen Campus

Outreach: challenges

13.00 Challenges of companies dealing with edible insects
Marian Peters

14.00 Participants present their results in groups of 4/5 incl. discussion
- including drinks -

16.30 Course end messages and certification ceremony

17.00 Goodbye drinks on Wageningen Campus

