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

30 May 2023
List of speakers

Prof.dr. M. (Mik) Van Der Borght  
Professor Faculty of Engineering Technology, KU Leuven, Belgium

Ing. J. (Jonas) Claeyys  
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) Frooninckx  
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 ir D.G.A.B. (Dennis) Oonincx  
Researcher Animal Nutrition group, Department of Animal Sciences, WUR, The Netherlands

Ing. M. (Marian) Peters MBA  
CEO New Generation Nutrition, The Netherlands

Mads Skjærbæk  
Project Manager and Consultant, Danish Technological Institute, Denmark

Dr.-Ing. habil. Oliver K. Schlüter  
Spokesman Program Area Healthy Foods, Department of Systems Process Engineering, Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Germany

Ir. 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

30 May 2023
Tuesday 4 July 2023  
**Location:** Wageningen Campus, FORUM | Room B0417  
**Address:** Droevendaalsesteeg 2, Building 102, 6708 PB Wageningen

**Ento-technology**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08.30</td>
<td>Welcome with coffee and tea</td>
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<tr>
<td>09.00</td>
<td>Production technology and design (ento-technology): Setting the stage &lt;br&gt;<em>Mads Skjærbaek</em></td>
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<td>10.30</td>
<td>Small break</td>
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<tr>
<td>11.00</td>
<td>Production technology and design (ento-technology): Systems and challenges</td>
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<td><em>Mads Skjærbaek</em></td>
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<td>13.00</td>
<td>Lunch on Wageningen Campus</td>
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<td>14.00</td>
<td>Group picture at the Wageningen Campus by WUR photographer</td>
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<tr>
<td>14.15</td>
<td>Group work</td>
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<tr>
<td>15.15</td>
<td>Small Break</td>
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**Insect’s health**

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<tr>
<th>Time</th>
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<tr>
<td>15.45</td>
<td>Maintaining a healthy colony &lt;br&gt;<em>Antoine Lecocq</em></td>
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<td>17.00</td>
<td>End of course talks</td>
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<tr>
<td>18.15</td>
<td>Informal dinner (Wageningen City Centre)</td>
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<tr>
<td>21.00</td>
<td>End of course day</td>
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**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*

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**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 Claeyes*
- 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 larvae  
*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