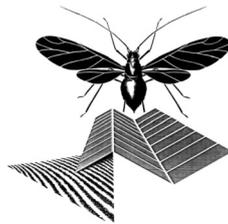


**3 | e**  
**Nederlandse**  
**Entomologendag**

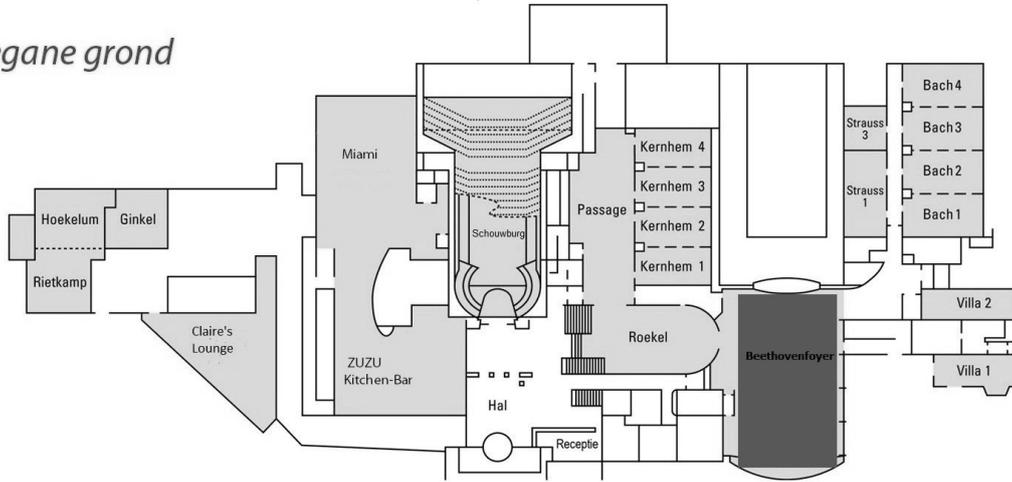
13 december 2019  
De Reehorst  
Ede

**P r o g r a m m a**  
**A b s t r a c t s**

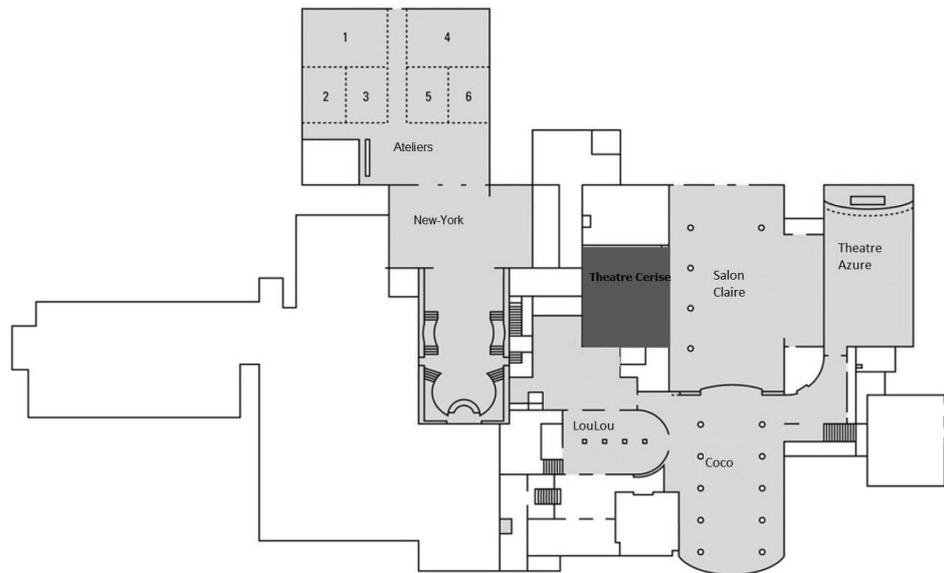


Sectie Entomologendag (v/h SETE)  
van de Nederlandse Entomologische Vereniging

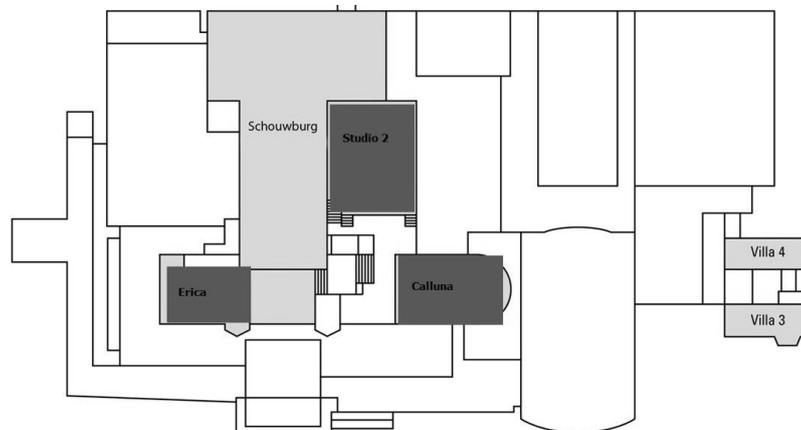
*Begane grond*



*Souterrain*



*Verdieping*



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## **ALGEMENE INFORMATIE**

### **GENERAL INFORMATION**

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#### **Locatie**

De 31e Entomologendag wordt gehouden in congrescentrum De Reehorst, Bennekomseweg 24, 6717 LM Ede. De Reehorst is zeer goed met openbaar vervoer te bereiken. Het ligt op 3 min. loopafstand van het treinstation Ede-Wageningen.

Automobilisten kunnen in Ede de routeborden 'De Reehorst' volgen. De Reehorst ligt ten zuiden van het station, aan het begin van de Bennekomseweg. Er is ruime parkeergelegenheid.

*The 31st Entomologendag will be held in De Reehorst, Bennekomseweg 24, 6717 LM Ede. De Reehorst is most easily reached by public transport: it is located at about 3 min. walking from train station Ede-Wageningen. By car: after reaching Ede, follow the signs 'De Reehorst'. De Reehorst is situated just south of the train station, at the beginning of the Bennekomseweg.*

#### **Inschrijf- en informatiebalie / Registration and Information desk**

De balie is open vanaf 08:30 uur. Hier kunt u terecht voor inschrijven, algemene informatie en het ophalen van uw naambadge. Als u zich wel aangemeld hebt, maar nog niet hebt betaald, dan kunt u dat ook aan de balie doen.

*The desk will be open at 08:30 hrs. Here you can register, get information throughout the day, and obtain your badge. If you registered before but have not as yet paid, you can also do this at the desk.*

#### **Dagindeling / Timetable**

08:30 Aanmelden/inschrijven bij de balie en ontvangst met koffie of thee. Posters ophangen. Voorbereiden presentatie. / *Registration, welcome with coffee or tea, mounting of posters. Prepare for presentation.*

10:00 Opening en plenaire lezing door Jaap de Roode (Emory University, Atlanta, GA, USA) / *Plenary lecture*

11:00 Koffie, thee, postersessie / *Coffee, tea, posters*

11:30 Start parallelle sessies

12:30 Lunch

13:30 Vervolg parallelle sessies

14:50 Koffie, thee, postersessie / *Coffee, tea, posters*

15:20 Vervolg parallelle sessies

16:25 NEV Dissertatieprijs en lezing / *NEV Dissertation award and lecture*

16:55 Borrel, postersessie / *Refreshments, posters*

#### **Organisatie / Organization**

NEV, Sectie Entomologendag (v/h SETE) / *Netherlands Entomological Society, Section Entomologendag*

Programmaboekje / *Abstracts:*

Jan Bruin (janbruin@bred.nl)

#### **Gaarne uw badge inleveren bij vertrek**

***Please, return your badge before leaving***

**Migration, microbes and medication  
in the monarch butterfly**

JAAP DE ROODE

*Emory University, Biology Department,  
Atlanta, GA 30322, USA, jderood@emory.edu*

Monarch butterflies are commonly infected with a protozoan parasite, which reduces monarch survival and migratory ability. Monarch butterflies use milkweeds as their larval food plants, and certain species of milkweed can strongly reduce parasite virulence and transmission. Our studies have shown that butterflies can reduce parasite growth and virulence in their offspring by preferentially laying their eggs on medicinal food plants. We are currently exploring the role of plant chemicals, monarch immunity and the microbiome in driving these medicinal effects. I will also discuss our population genetic and genomic work on monarch populations around the world, which has provided insights into worldwide dispersal and the genetics of seasonal migration.

**THEATRE CERISE****STUDIO 2****11:30 1.1 Microbes and insect egg-plant interactions**NINA FATOUROS  
*nina.fatouros@wur.nl*

Transmission of bacterial symbionts via deposited eggs is a common route reported for various insect orders. In my talk, I will discuss the hypothesis that bacteria present on insect eggs may play a role in the recognition of eggs by plants. Plants are able to detect and respond to insect eggs, e.g., by immediate killing to prevent future damage. Some responses resemble resistances against plant pathogens, e.g., eggs induce a hypersensitive response-like leaf necrosis that leads to egg desiccation.

**2.1 VectorNet European Network Med/Vet Entomology**MARIETA BRAKS  
*marieta.braks@rivm.nl*

VectorNet aims to continue the robust and consistent collaboration between entomologists in Europe, started in 2014 as a joint initiative of the European Centre for Disease Prevention and Control and European Food Safety Authority. VectorNet provides scientific support to both ECDC and EFSA in their risk assessments of vectors and vector-borne diseases and to update information on the geographic distribution, abundance and seasonality of targeted arthropod vectors in Europe.

### 3.1 Insect decline in freshwater ecosystems

HENRIK BARMENTLO, MAARTEN SCHRAMA & MARTINA VIJVER

*m.j.j.schrama@cml.leidenuniv.nl*

While insect decline on land is increasingly well described, much less is known about how land use intensification affects insect biomass and diversity in aquatic ecosystems. Here, we used a full factorial experiment in the Living Lab in Leiden to investigate how realistic concentrations of nutrients and pesticides influence diversity and structure of aquatic insect communities.

### 4.1 Flowers that don't smell and moths that can't smell

ALEXANDER HAVERKAMP, RICHARD FANDINO, FELIPE YON, BILL S. HANSSON, IAN T. BALDWIN, MARCEL DICKE, DANNY KESSLER & MARKUS KNADEN

*alexander.haverkamp@wur.nl*

Pollinators and flowers communicate through multitudes of information channels. Using wild tobacco flowers, in which the emission of flower volatiles has been genetically silenced, we demonstrate the importance of chemical information for pollination by hawkmoths. Conversely, we show that moths, in which all olfactory receptors have been knocked down do not recognize flowers for feeding. Understanding pollinator-plant communication will be crucial for conserving this important ecosystem service.

11:50

**1.2 Plant-associated microbes and insect resistance**

ARJEN BIERE

[a.biere@nioo.knaw.nl](mailto:a.biere@nioo.knaw.nl)

Microbes play an important role in plant-insect interactions. Insect-associated microbes like endosymbionts can strongly affect the nutritional and defensive capabilities of insects. Likewise, plant-associated microbes such as arbuscular mycorrhizal (AM) fungi can strongly alter the nutritional and defensive properties of their host plants and hence their quality as a food source for herbivorous insects. I will discuss the role of AM fungi in inducing resistance against insect herbivores.

**2.2 10 years of vector surveillance in The Netherlands**

ADOLFO IBÁÑEZ-JUSTICIA

[a.ibanezjusticia@nvwa.nl](mailto:a.ibanezjusticia@nvwa.nl)

In 2009, the Centre for Monitoring of Vectors (CMV) was founded with the mission of being the knowledge centre for vectors in The Netherlands and to minimize the impact of vectors in Animal and Public Health. This presentation will focus on the achievements of 10 years of national vector surveillance in The Netherlands with special emphasis on the collected knowledge on spatial distribution of indigenous vectors, and on the intercepted non-native vector species.

12:10

**1.3 Detoxifying symbiosis in the cabbage root fly**

CORNELIA WELTE

[c.welte@science.ru.nl](mailto:c.welte@science.ru.nl)

Plants produce various toxic compounds such as isothiocyanates in response to herbivore damage. Despite their toxicity, the larva of the cabbage pest *Delia radicum* will cope with these compounds. We found that symbiotic microorganisms residing in the insect's gut play a key role in the detoxification of isothiocyanates. In our study, we combine microbiology, biochemistry, and chemical ecology in order to obtain a better understanding of the interplay between symbionts and their host.

**2.3 Adult *Hyalomma* ticks in The Netherlands**

ARJEN STROO

[c.j.stroo@nvwa.nl](mailto:c.j.stroo@nvwa.nl)

In 2019, *Hyalomma* ticks hit the news. While the finding of the adult stage of ticks of this genus in The Netherlands was not new, it is not common. The finding of a number of ticks might indicate a change in ecological circumstances. This talk will focus on what happened, how and under what conditions the ticks were found, whether any changes happened, and what might be the implications. Data on the *Hyalomma marginatum* species complex and its status as a vector will be presented.

### 3.2 How will global warming impact aquatic insects?

WILCO VERBERK

[wilco@aquaticecology.nl](mailto:wilco@aquaticecology.nl)

To understand how aquatic insects will fare in a warmer world, it is important to understand the mechanisms by which warming affects aquatic insects. One hypothesis states that ectotherms such as aquatic insects 'run out of oxygen' in warmer water because temperature stimulates their metabolic oxygen demand. In this talk I will present experiments on aquatic insects to assess the validity of this hypothesis in a suite of different species (e.g., stoneflies, water beetles, mayflies).

### 3.3 Kleurkeur - voor meer kleur in onze berm

MILOU VAN SILFHOUT

[milou.vansilfhout@vlinderstichting.nl](mailto:milou.vansilfhout@vlinderstichting.nl)

De Vlinderstichting heeft dit jaar samen met Groenkeur 'Kleurkeur' ontwikkeld, een cursus voor het ecologisch beheren van bermen om de biodiversiteit te bevorderen. In oktober zijn de eerste Basis cursussen van start gegaan, bedoeld voor uitvoerenden. Volgend jaar zal de Gevorderdencursus voor het eerst gegeven worden, bedoeld voor de projectleiders en werkvoorbereiders.

### 4.2 What determines female mate choice?

NAOMI L. ZWEERUS, MICHEL VAN WIJK, COBY SCHAL & ASTRID T. GROOT

[n.l.zweerus@uva.nl](mailto:n.l.zweerus@uva.nl)

Pheromones used in sexual communication of moths can advertise mate quality and bias mate choice. While male mate choice and female sex pheromones have been well-studied, female choice has received less attention. We analysed the courtship of *Heliothis virescens* and evaluated the role of chemoreception in both sexes. We found that females can exercise mate choice, yet their antennae are not required for mating, which challenges the traditional perspective of reciprocal pheromone communication.

### 4.3 Egg parasitoid-attracting volatiles of cabbages

DIMITRIOS AFENTOULIS, ANTONINO CUSUMANO, LOTTE CAARLS & NINA E. FATOUROS

[dimitrios.afentoulis@wur.nl](mailto:dimitrios.afentoulis@wur.nl)

We tested whether *Pieris brassicae* egg deposition induces volatiles in different brassicaceous plant species, attracting different genotypes of *Trichogramma evanescens*. Moreover, we were interested how the plants recognize the eggs to start the emission of such OIPVs. Our results showed that three out of four tested plant species attracted different parasitoid strains. Application of egg wash triggered parasitoid attracting volatiles in one plant species.

13:30

#### 1.4 Smelly microbes influence aphid (hyper)parasitoids

JETSKE G. DE BOER, TIM GOELEN, HANS JACQUEMYN & BART LIEVENS  
*j.deboer@nioo.knaw.nl*

In this study, we tested whether volatiles produced by micro-organisms influence olfactory behavior of the aphid parasitoid *Aphidius colemani*. We also investigated the behavior of the hyperparasitoid *Dendrocerus aphidum*, which is a natural enemy of the aphid parasitoid. We discuss the possibility of using chemical ecology in management strategies for hyperparasitoids to enhance biological control of aphids.

13:50

#### 1.5 Sex-specific parasite-mediated selection in moths

KE GAO & ASTRID GROOT  
*gaoke0409@gmail.com*

Parasites can play an important role in host sexual selection. We tested how the presence of a protozoan parasite *Ophryocystis elektroscirrha* (OE) affected the fitness, mating behaviour, and sexual selection in a noctuid moth, *Helicoverpa armigera* (Lepidoptera: Noctuidae). We found that OE infections affected the fitness and reproductive strategies in both males and females, but in different ways, which suggests sex-specific parasite-mediated selection.

#### 2.4 Co-transmission of flaviviruses by mosquito vector

H Aidong Wang, Sandra R. Abbo, Tessa M. Visser, Marcel Westenberg, Corinne Geertsema, Constantianus J.M. Koentraadt & Gorbien P. Pijlman  
*haidong.wang@wur.nl*

Usutu virus (USUV) and West Nile virus (WNV) are mosquito-borne flaviviruses that are currently co-circulating in Europe. Both viruses maintain a similar transmission cycle involving *Culex pipiens* mosquitoes as main vector. Here, we observed a decreased infection rate of both USUV and WNV in a co-infection scenario compared to single infection. The transmission rates also decreased, in particular for USUV, less for WNV. This suggests that USUV is outcompeted by WNV during mosquito co-infection.

#### 2.5 The Asian bush mosquito: a vector for Zika virus?

Sandra R. Abbo, Tessa M. Visser, Haidong Wang, Giel P. Göertz, Jelke J. Fros, Marleen H.C. Abma-Henkens, Corinne Geertsema, Chantal B.F. Vogels, Marion P.G. Koopmans, Chantal B.E.M. Reusken, Sonja Hall-Mendelin, Roy A. Hall, Monique M. van Oers, Constantianus J.M. Koentraadt & Gorbien P. Pijlman  
*sandra.abbo@wur.nl*

The Asian bush mosquito *Aedes japonicus* is invading Europe and was first discovered in Lelystad, The Netherlands, in 2013. In this study, we investigated the vector competence of *Ae. japonicus* from The Netherlands for the emerging Zika virus (ZIKV). Field-collected *Ae. japonicus* received a blood meal containing ZIKV. After 14 days at 28 °C, 3% of the tested mosquitoes showed ZIKV-positive saliva, and we should therefore consider *Ae. japonicus* as a potential vector for arboviral diseases in Europe.

### 5.1 The selection response of moth sex pheromones

THOMAS BLANKERS, ELISE FRUITET, EMILY BURDFIELD-STEEL & ASTRID T. GROOT  
*thomasblankers@gmail.com*

Sex pheromones are important for mate finding and choice across all insect orders. Therefore, understanding how sex pheromone evolve, illuminates mechanisms of insect diversity and management of insect pests. Here, I discuss selection responses in pheromone and life-history traits of the noctuid moth *Heliothis subflexa*, after seven generations of selection on acetate levels, which are crucial to avoid heterospecific matings by deterring individuals from a related species, the tobacco budworm.

### 5.2 Transgenerational priming changes some IPI

FRANK A.C. VAN NEERBOS, GRACE FREUNDLICH, CHARLOTTE SHI-BANG YANG, KEEGAN C. CURRY, JOOP J.A. VAN LOON, PERRI K. EASON & LEILA PAZOUKI  
*frankvanneerbos@gmail.com*

Work in the past 30 years has shown that plants, when faced with high herbivory, are able to pass down their defensive response to their progeny. More recent work has shown that this response is able to be passed down for at least three generations. Previous work has been published on how the herbivore is affected, but I have shown how this phenomenon affects both higher trophic levels and the plant itself.

### 6.1 Biocontrol of invasive Asian knotweeds

SUZANNE LOMMEN  
*s.t.e.lommen@biology.leidenuniv.nl*

The Asian knotweeds *Fallopia japonica* (Dutch: Japanse duizendknoop), *F. sachalinensis*, and their hybrid are invasive outside Asia. Traditional methods fail in cost-effective control. CABI has found a Japanese psyllid and fungus specialized on Asian knotweeds that are safe for release in Europe. We formed a consortium of researchers and stakeholders to assess their release and use in The Netherlands ([tinyurl.com/biobestrijdingduizendknoop](http://tinyurl.com/biobestrijdingduizendknoop)). If permitted, this would be the first time that exotic agents are used here for weed control.

### 6.2 Latin America holds world record biocontrol

JOOP VAN LENTEREN, VANDA BUENO, GABY LUNA & YELITZA COLMENAREZ  
*joop.vanlenteren@wur.nl*

Info on the history and current use of biocontrol in Latin America was compiled by scientists of 30+ countries, resulting in the book 'Biological control in Latin America and the Caribbean: Its rich history and bright future' Van Lenteren, J.C., Bueno, V.H.P., Colmenarez, Y.C., Luna, M.G (eds). CABI, Wallingford, UK, 2020, 522 pp. Classical and augmentative biocontrol are applied on more than 30 million of hectares each. Examples of major biocontrol programmes will be presented.

14:10

### 1.6 *Wolbachia* determines the microbiome in *Asobara japonica*

PINA BRINKER, MICHAEL C. FONTAINE, LEO W BEUKEBOOM & JOANA FALCAO SALLES  
*p.brinker@rug.nl*

The wasp *Asobara japonica* occurs infected and uninfected with the endosymbiont *Wolbachia*, causing asexuality. As *Wolbachia* is not only interacting with its host, but also with other microbes we investigate whether in addition to environmental factors (geography) and the host genotype, the presence of *Wolbachia* is a driver of the microbial community. We found that infection status was the strongest driver of the microbiome by investigating the bacterial community and the population structure.

14:30

### 1.7 The power of the crowd

STIJN J.J. SCHREVEN, HUGO DEVRIES, GERBEN D.A. HERMES, GIACOMO ZENI, HAUKE SMIDT, JOOP J.A.VAN LOON & MARCEL DICKE  
*stijn.schreven@wur.nl*

Larvae of *Hermetia illucens* L. (Diptera: Stratiomyidae) can grow on many organic waste streams. We determined the relative impact of diet and larval density on the substrate and larval microbiota. We sampled bacterial DNA (16S rRNA gene) from substrates and larvae in three diets with four larval densities. Substrate microbiota differed among diets and in the presence or absence of larvae. Additionally, depending on diet, larval microbiota differed significantly from substrate microbiota.

### 2.6 Mosquito attraction: is it in our blood?

MARIEKE M. DE SWART, NIELS O. VERHULST, JOOP J.A. VAN LOON, LEO A.B. JOOSTEN, HAUKE SMIDT & CONSTANTIANUS J.M. KOENRAADT  
*marieke.deswart@wur.nl*

Humans differ in their attractiveness to malaria mosquitoes by the odours their skin microbiota produce from sweat. However, we do not know why mosquitoes have this preference for certain humans. Is it in our blood? We hypothesize that humans that are more attractive to the mosquito have blood that is beneficial to the mosquito. In an experiment with human subjects, we will study individual attractiveness to *An. coluzzii* and relate this to mosquito fecundity and survival.

### 2.7 Emergence of tick-borne encephalitis virus

JULIAN W. BAKKER, HELEN ESSER, WILLEM F. DE BOER, HEIN SPRONG, GERBEN P. PIJLMAN & CONSTANTIANUS J.M. KOENRAADT  
*julian.bakker@wur.nl*

One of the most important arboviral diseases in Eurasia is caused by tick-borne encephalitis virus, transmitted by *Ixodes* ticks. This disease recently emerged in The Netherlands. We are currently investigating the ecological and molecular factors underlying this. We have developed an assay to study the vector competence of ticks for tick-borne viruses via artificial feeding. Besides, we will explore if within-host factors (e.g., co-infecting viruses and bacteria) influence tick vector competence.

### 5.3 Novel mutations confer acaricide resistance

MASOUMEH FOTOUKKIAII, ZOË TAN, WENXIN XUE, NICKY WYBOUW & THOMAS VAN LEEUWEN

*s.m.fotoukkiaii@uva.nl*

We identified two novel mutations in the mitochondrial cytochrome b Q0 pocket of resistant *Tetranychus urticae* populations: G132A and G126S + A133T. Several lines of evidence were provided for the causal role of the mutations in resistance to the Q0 inhibitor acaricides bifenthrin and acequinocyl. Near isogenic lines carrying G132A revealed several fitness penalties in *T. urticae*, e.g., a lower net reproductive rate and intrinsic rate of increase and a more male-biased sex ratio.

### 5.4 The serosa and immune competence of eggs

SHIXIONG CHENG, CHRIS G.C. JACOBS, REMY VAN DER HULST, RYAN WILLIAMSON, ANNIKA KOUMANS, NISANTH PONNAR & MAURIJN VAN DER ZEE

*s.cheng@biology.leidenuniv.nl*

The serosa is an extraembryonic epithelium unique to insect eggs. In the beetle *Tribolium*, this epithelium can mount an immune response protecting the embryo. Here we expand our studies and report an immune response in eggs of the bug *Oncopeltus* and the grasshopper *Locusta*, but also a weak response in eggs of the springtail *Orchesella* that does not have a serosa. Thus, the serosa is not an absolute prerequisite for an immune response and other tissues produce antimicrobials in springtail eggs.

### 6.3 Classical biological control of *Trioza erytreae*

JESICA PÉREZ-RODRÍGUEZ, PABLO URBANEJA-BERNAT, KERSTIN KRÜGER, MERITXELL PÉREZ-HEDO, OMAR RUÍZ-RIVERA, ESTRELLA HERNÁNDEZ-SUÁREZ, ALBERTO URBANEJA & ALEJANDRO TENA

*jesica.perezrodriguez@wur.nl*

*Trioza erytreae* is a vector of Huanglongbing (HLB), the most devastating citrus disease in the world. It has recently been established in mainland Europe and even though HLB has not been detected yet, eradicating programs are being developed. In this context, classical biological control is the most promising strategy to reduce the vector's spread. We studied the parasitoid complex associated with *T. erytreae* in its area of origin and evaluated candidate species to be introduced in Europe.

### 6.4 Sluipvliegen verergeren processierupsen-plagen

THEO ZEEGERS

*th.zeegers@xs4all.nl*

De interactie tussen een sluipvlieg met microtype eieren (bijv. *Pales processioneae*) en vlinderrupsen (processierups) wordt onderzocht in een theoretische studie. Onder zeer algemene voorwaarden wordt *ab initio* aangetoond dat, paradoxaal genoeg, de aanwezigheid van dergelijke sluipvliegen de duur van de plaag van de gastheer niet inperken, maar juist verlengen. Dit verklaart de al vaak vastgestelde paradox dat grote dichtheiden sluipvliegen toch plagen van rupsen niet kunnen beteugelen.

15:20

**1.8 Phloem-based resistance to aphids and viruses**

KAREN KLOTH, RICHARD KORMELINK &amp; MARCEL DICKE

*karen.kloth@wur.nl*

The phloem is essential for growth and development, but simultaneously the Achilles heel of the plant, as it is a food source for phloem-feeding insects and a route for systemic spread of pathogens. Similarity between the aphid resistance gene SIEVE ELEMENT-LINING CHAPERONE I and resistance genes that restrict phloem transport of potyviruses raises the question whether plants use common defenses against aphids and viruses to protect their phloem sap.

15:40

**1.9 Aphid endosymbionts in greenhouses and nature**

HELENA DONNER, MARISKA BEEKMAN, MARCEL DICKE, BAS ZWAAN, EVELINE VERHULST &amp; BART PANNEBAKKER

*helena.donner@wur.nl*

Aphids can carry facultative bacterial endosymbionts. These endosymbionts can confer a variety of traits, such as defense against heat stress or parasitoids, host colour changes, or nutritional benefits. Although aphid endosymbionts can affect community dynamics in natural aphid populations and bio-control efforts in greenhouses, little is known about their occurrence in The Netherlands. Therefore, we have studied the occurrence of aphid endosymbionts in greenhouses and natural populations.

**7.1 Winter is coming; insects moving into our homes**

CINDY SCHOELITZ

*cschoelitz@kad.nl*

When temperatures are dropping insects go into diapause or migrate to warmer places. Some of these insects end up in our houses. At the Dutch Pest & Wildlife Expertise Centre (KAD) we identify species that can cause a nuisance. Every year around winter time the same species are sent in for identification. We will discuss some of these species and why they move indoors.

**7.2 Entomologists for One Health**

CONSTANTIANUS J.M. KOENRAADT, ARJAN STROO &amp; MAARTEN J.J. SCHRAMA

*sander.koenraadt@wur.nl*

As part of the Dutch Science Agenda, the multidisciplinary OneHealthPACT project is being launched that will investigate the impact global change on the risk of establishment and spread of mosquito-borne diseases in The Netherlands. Specific attention will be paid to how changes in the aquatic and terrestrial environment, such as eutrophication and wetland construction, affect mosquito diversity, abundance, as well as vector competence for viruses that may affect human and animal health.

### 5.5 Indirect folivore-florivore interactions

Q. RUSMAN, M. DIJKSTERHUIS, S. KNOPPERS, M. REICHELT, J. GERSHENZON, M. DICKE & E.H. POELMAN  
*quint.rusman@wur.nl*

Flowering plants are under attack by a range of herbivores that feed on roots, leaves, or flowers. Systemic herbivore-induced changes in the plant can alter plant interactions with other community members such as other herbivores. So far indirect herbivore-herbivore interactions have almost exclusively been studied in vegetative plants. We investigated how root and shoot herbivory affects plant interactions with flower feeders, and the underlying changes in phytochemistry of floral tissues.

### 5.6 Ecological effects of *Lasius neglectus*

HARMEN VERBOOM, JINZE NOORDIJK, ROB LEUVEN & ANDRÉ VAN LOON  
*harmenverboom@hotmail.com*

To determine the ecological effect of *Lasius neglectus*, three research questions were tested: the diversity/density of invertebrates is lower inside *L. neglectus* territory, the scavenging pressure of *L. neglectus* is higher compared to *L. niger*, and Sternorrhyncha density is higher when *L. neglectus* is present on *Acer pseudoplatanus*. This study did not find a decrease in diversity. Significant decrease of taxonomical orders were found and increase in Sternorrhyncha densities and scavenging pressure.

### 8.1 Defining Doublesex targets in *Nasonia vitripennis*

FILIPPO GUERRA & EVELINE C. VERHULST  
*filippo.guerra@wur.nl*

The transcription factor Doublesex is pivotal in insect sex differentiation, regulating expression of hundreds of genes. Thanks to the use of high-throughput techniques as DAMiD and DAP-seq we aim to define DSX targets in the pteromalid wasp *Nasonia vitripennis*, allowing reliable comparative studies and understanding of evolution mechanisms of sexual traits in insects.

### 8.2 Food matters: gene expression variation in moths

THIJMEN BRESCHOTEN, M. ERIC SCHRANZ & SABRINA SIMON  
*thijmen.breeschoten@wur.nl*

The majority of insect herbivores have evolved specialisation on a narrow host plant range. Yet, many Noctuidae species are able to feed on a wide degree of different plant families, often forming notorious pests. We studied host-dependent gene expression of different noctuid species and looked at the differences and commonalities in response to feeding on various host plant species in relation to larval performance. We found differential diet-dependent gene expression patterns.

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**UEA MSc Thesisprijs 2019**

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**1.10 Influence of cell size on thermal tolerance in *Drosophila melanogaster***

NADJA VERSPAGEN

*n.verspagen@student.ru.nl*

In the context of global warming, there is a growing interest in the mechanisms behind heat tolerance of ectotherms. One theory is that oxygen limitation at a cellular level may play a role in this. In this research, we found that warm-reared flies had smaller cells and were more tolerant to acute, intense heat stress, whereas cold-reared flies had larger cells and were more tolerant to chronic, mild heat stress. The results provide evidence for a role of oxygen in thermal tolerance.

**7.3 Insects for Peace: Producing BSF in Colombia**

KAROL B. BARRAGAN-FONSECA, JOOP VAN LOON &amp; MARCEL DICKE

*kbbarraganf@unal.edu.co*

The black soldier fly (*Hermetia illucens*) is a new source of animal protein in fish feed. This project aims to develop BSF as affordable, sustainable fish feed to reduce the costs of commercial feed used in the production of tilapia and to improve the quality of life of ex-combatants of the guerrilla movement FARC-EP in Icononzo-Tolima (Colombia). Production is developed on local waste streams. The project is presented in an integral way including social, economic and environmental aspects.

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**NEV Dissertatieprijs en lezing / NEV Dissertation award and lecture**

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*Invited Plenary Lecture***16:25****THEATRE CERISE**

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**posters**

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**A sex pheromone receptor in alfalfa plant bugs**

QI WANG, ALEXANDER HAVERKAMP, MARCEL DICKE &amp; YONGJUN ZHANG

*qi.l.wang@wur.nl*

Chemical communication plays a crucial role in finding mates. In this study, we identified the odorant receptor AlinOR33 which is narrowly tuned to four pheromone components in the alfalfa bug. AlinOR33 is localized in sensilla Trichoid and its expression increases gradually from nymphs to 3-day old adults. Silencing this receptor through RNAi changes the response to sex-pheromones on a neuronal and behavioral level. Our research may provide a reference for pheromone perception in Hemipterans.

**One insect's trash is a flowering plant's treasure**

KATHERINE BARRAGÁN-FONSECA, LIANA GREENBERG, JOOP VAN LOON &amp; MARCEL DICKE

*liana.greenberg@wur.nl*

A growing supply of waste from insect production may provide a sustainable soil amendment. These waste streams can improve plant growth, but the impact on plant fitness is unknown. In a common garden experiment, exuviae of *Hermetia illucens* were mixed into soil of *Brassica nigra*. Results show that plants grown in amended soil have enhanced growth, floral display, pollinator visitation, and seed yield, demonstrating that this amendment can enhance plant fitness in the field.

### 5.7 Plant responses to herbivore diversity attack

MAITE FERNÁNDEZ DE BOBADILLA, MITCHEL BOURNE, SARAH KALISVAART, JANNEKE BLOEM, GERRIT GORT & ERIK H. POELMAN  
*maite.fernandezdebobadilla@wur.com*

Black mustard plants were attacked by an increasing diversity (1, 2 or 4 species) of either phloem feeders, leaf chewers, or a mix of both. Higher diversity of chewers resulted in stronger resistance to subsequent attack by caterpillars of the diamondback moth, whereas increased diversity in phloem feeders compromised plant resistance. Attack by a mix of herbivores from different feeding guilds resulted in plant resistance similar to plants that were not previously exposed to herbivory.

### 8.3 Brain manipulation by a lepidopteran virus

SIMONE N. GASQUE, MONIQUE M. VAN OERS, HANNEKE SUIJKERBUIJK, STEFFI VAN DE WOUW, HANS M. SMID & VERA I.D. ROS  
*simone.gasque@wur.nl*

Few of the parasites that cause host behavioural alteration induce this from the CNS itself, and little is known about the mechanisms behind these alterations. Caterpillars infected by baculoviruses express hyperactivity and/or climb the vegetation in 'tree-top' disease. We have identified the immunoactivity of the three major amines in insect nerve signalling to create a 3D-model and studied the localization of AcMNPV in the CNS of *Spodoptera exigua* using a fluorescently tagged WT-like virus.

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## NEV Dissertatieprijs en lezing / NEV Dissertation award and lecture

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*Invited Plenary Lecture*

**16:25**

**THEATRE CERISE**

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### posters

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#### Beetle evolution on native and invasive plants

MICHIEL DE GROOT, MAURIJN VAN DER ZEE & MENNO SCHILTHUIZEN  
*m.d.de.groot@students.leidenuniv.nl*

An invasive plant can act as a new host for a native herbivore: the herbivores divide into subpopulations between the two hosts, and differentiation occurs. Black cherry (*Prunus serotina*) is an invasive species in The Netherlands on which native herbivores are starting to accumulate. One of these is the leaf beetle *Gonioctena quinquepunctata*, originally a rowan (*Sorbus aucuparia*) specialist. How do *G. quinquepunctata*'s *Prunus*- and *Sorbus*-derived subpopulations differ?

#### Host plant detoxification by the insect microbiome

SILVIA COOLEN, MAGDA ROGOWSKA & CORNELIA WELTE  
*s.coolen@science.ru.nl*

There is increasing evidence that insect-associated microbes support pest insects by facilitating efficient detoxification of plant defensive compounds. We aim at elucidating if and to which extent microbes are involved in insect resistance to plant defensive compounds via either detoxification or repression of plant defenses. Insights into these insect-microbiome-plant interactions can have great implications for sustainable crop protection and food production in the future.

### **Unravelling the strings of the puppet master**

CAMILO RIVERA & ALEXANDER HAVERKAMP

camilo.riveraarrivillaga@wur.nl

*Pieris brassicae* is a major herbivore on Brassicaceae plants. *Cotesia glomerate*, a natural enemy of this caterpillar, was found to inject a symbiotic polydnavirus (PDV) together with its eggs. This study focuses on the influence of PDV on the feeding behavior of *P. brassicae*. Behavioral trials demonstrate the influence of parasitisation on the taste preference of the caterpillar, while virus injection alone had no effect. Further electrophysiology studies will unravel the underlying mechanisms.

### **Plasticity and epigenetic host adaptation**

MARK LAMMERS, LUKAS SCHRADER & JÜRGEN GADAU

marklammers6@gmail.com

*Aphidius ervi* is a highly plastic parasitoid attacking many different host species. While host preference and parasitoid performance vary independent of genetic variation, they are capable of rapidly evolving host preferences in a few generations. We designed a year-long natural selection experiment to assess host specialization without genetic differentiation. We expect gene expression patterns to diverge during specialization and link this to quantifications of heritable epigenetic mechanisms.

### **Effect of color on insect trapping and auto-ID**

BRUCE SCHOELITZ, ROOS BARENDRECHT, GERON BLOEM, ROALS KRIJNS & MARGJE VOETEN

scb@has.nl

The efficacy of automatic camera trapping of insects depends on the setup of the device. To test whether the colour of the trapping surface affects the number of insects on the surface, white, yellow and blue screens were automatically photographed on five locations. The system was taught to annotate insects with NOUS and automatically ID'ed with ObsIdentify. The blue screens attracted most insects. Insects were mainly caught during the night and the majority consisted of Diptera.

### **Friends or enemies – polygyny in *Pogonomyrmex californicus***

JENNY MÄRZHÄUSER & JÜRGEN RUDOLF GADAU

j\_maer05@uni-muenster.de

Cooperation among ants is usually explained by Hamilton's rule. However cooperative behavior in non-kin groups of queens occurs in the California harvester ant, *Pogonomyrmex californicus*, with collaboration throughout colony maturity. Less aggressive groups seem to receive early fitness benefits. A reproductive skew occurs in a few colonies. Although some queens dominated the production of males and often simultaneously investing less in worker production, this phenotype remained rare overall.

### **Effects of blood storage on mosquito reproduction**

LAURA A.H. MOMMERS, CONSTANTIANUS J.M. KOENRAADT & MARIEKE M. DE SWART

laura.mommers@wur.nl

The high preference of *Anopheles coluzzii* for humans makes the species an important vector in the spreading of malaria. Rearing mosquitoes for research requires blood, which is not always freshly available. How does this affect mosquito survival and reproduction? Preliminary results will be shown of experiments with *An. coluzzii* fed with blood that was stored for different numbers of days.

### Quest for a reliable postal service

SAMINATHAN SIVAPRAKASHAM MURUGESAN, FILIPPO GUERRA & EVELINE VERHULST  
[saminathan.sm@wur.nl](mailto:saminathan.sm@wur.nl)

Maternal delivery of Cas9 in *Nasonia vitripennis* by exploiting the vitellogenin transfer pathway can help in bypassing embryo microinjection. Vitellogenin produced in the fat body is transferred to the developing oocyte by a highly conserved receptor-mediated endocytosis. Delivering Cas9 complexes containing *Drosophila* vitellogenin protein domains is established in dipterans. By delivering other proteins of interest, this method can also enable DNA-protein interaction studies in *Nasonia*.

### Root endophytic entomopathogen fungi vs. herbivores

JOZSEF TAKACS, GERBEN MESSELINK & JOOP WOELKE  
[tjoci88@gmail.com](mailto:tjoci88@gmail.com)

*Tuta absoluta* and *Chrysodeixis chalcites* cause severe damage in tomato. Biological control is not always sufficient. Systematic plant defence could be part of IPM. Seven strains of entomopathogenic *Metarhizium* fungi were tested as assumed root endophytes. Our hypothesis: endophytes have direct effect on the pests and enhance the defences of tomatoes and thus will slow down the development of the herbivores. No evidence was found either. Controversially, one strain shortened the developmental time of the pests.

### Microbial volatiles can attract parasitic wasps

TIM GOELEN, FRANK A.C. VAN NEERBOS, CHRISTOPHE VANDERAA, JÓZSEF VUTS, JOHN CAULFIELD, MICHAEL A. BIRKETT, HANS REDIER, TOM WENSELEERS, FELIX WÄCKERS, HANS JACQUEMYN & BART LIEVENS  
[frankvanneerbos@gmail.com](mailto:frankvanneerbos@gmail.com)

There is mounting evidence that microorganisms emit volatile compounds that can affect insect behaviour. Little information exists on the effect of bacteria on insect behaviour. In this study, we assessed how bacterial VOCs affected the foraging behaviour of a parasitoid species. We found a number of microbial VOCs to be linked to attractive and repellent behaviours. These results indicate that the application of bacterial volatiles can pose itself as an interesting avenue for biological pest control.

### Biological control in a circular economy

ELS M. VAN DE ZANDE, LINA OJEDA PRIETO, JOOP J.A. VAN LOON, MARCEL DICKE  
[els.vandezande@wur.nl](mailto:els.vandezande@wur.nl)

The production of insects as food and feed is increasing rapidly. Therefore, also the resulting waste streams, exuviae, and faeces are increasing. With this field experiment we show that the addition of exuviae from mealworm (*Tenebrio molitor*) and black soldier fly larvae (*Hermetia illucens*) to agricultural soil improved the growth of Brussels sprouts plants (*Brassica oleracea* var. *gemmifera*) and increased the proportion of parasitized cabbage aphids (*Brevicoryne brassicae*).

### A parasite's brain revealed by X-ray tomography

JITTE GROOTHUIS, TOMÁS FARAGÓ & THOMAS VAN DE KAMP  
[jittegroothuis@gmail.com](mailto:jittegroothuis@gmail.com)

A relatively novel use of X-ray tomography (or micro CT) is in biomechanical research, which benefits from the ability to study intact specimens. In an ongoing study of mandibles and their musculature, a male *Netelia ephippiata* (Hymenoptera: Ichneumonidae) was scanned with near-micrometer voxel dimensions. As the internal tissue was especially well-preserved, this provided an opportunity to describe the brain of *N. ephippiata* in great detail. The preliminary results are presented here.

## Programma B1e Nederlandse Entomologendag 13 dec 2019

08:30	Registratie en koffie in ontvangstruimte	
10:00	Theatre Cerise: Opening door voorzitter Sectie ENTOMOLOGENDAG, Plenaire lezing Dr. Jaap de Roode (Emory University, Atlanta, GA, USA): <i>Migration, microbes and medication in the monarch butterfly</i>	
11:00	KOFFIEPAUZE / POSTERSIESSIE IN ONTVANGSTRUIMTE	
ZAAL	Theatre Cerise	Studio 2
11:30	1. Insects & microbes	3. Insect decline
11:30	1.1 Fatouros Microbes and insect egg-plant interactions	3.1 Barmanto Insect decline in freshwater ecosystems
11:50	1.2 Biere Plant-associated microbes and insect resistance	3.2 Verberk How will global warming impact aquatic insects?
12:10	1.3 Welte Detoxifying symbiosis in the cabbage root fly	3.3 van Sijfhout Kleurkeur - voor meer kleur in onze bierm
12:30	LUNCHPAUZE / POSTERSIESSIE IN ONTVANGSTRUIMTE	
13:30	1.4 de Boer Smelly microbes influence aphid (hyper)parasitoids	5. Ecology & evolution
13:50	1.5 Gao Sex-specific parasite-mediated selection in moths	5.1 Blankers The selection response of moth sex pheromones
14:10	1.6 Brinker <i>Wolbachia</i> determines the microbiome in <i>A. japonica</i>	5.2 van Neebos Transgenerational priming changes some IPI
14:30	1.7 Schreven The power of the crowd	5.3 Fotoukiani Novel mutations confer acaricide resistance
14:50	KOFFIEPAUZE / POSTERSIESSIE IN ONTVANGSTRUIMTE	
15:20	1.8 Kloth Phloem-based resistance to aphids and viruses	6. Biological control
15:40	1.9 Donner Aphid endosymbionts in greenhouses and nature	6.1 Lommen Biocontrol of invasive Asian knotweeds
16:00	UE MSc Thesisprijs Nadja Verspagen - Cell size and thermal tolerance	6.2 van Lenteren Latin America holds world record biocontrol
16:25	Theatre Cerise: Uitreiking NEV Disseratatieprijs + plenaire lezing door winnaar	
16:55	BORREL / POSTERSIESSIE IN ONTVANGSTRUIMTE	
16:55	1.8 Kloth Phloem-based resistance to aphids and viruses	8. Genetics
15:40	1.9 Donner Aphid endosymbionts in greenhouses and nature	8.1 Guerra Defining Doublesex targets in <i>Masonia vitripennis</i>
16:00	UE MSc Thesisprijs Nadja Verspagen - Cell size and thermal tolerance	8.2 Breeschoten Food matters: gene expression variation in moths
16:25	Theatre Cerise: Uitreiking NEV Disseratatieprijs + plenaire lezing door winnaar	
16:55	BORREL / POSTERSIESSIE IN ONTVANGSTRUIMTE	
16:55	1.8 Kloth Phloem-based resistance to aphids and viruses	8.3 Gasque Brain manipulation by a lepidopteran virus
15:40	1.9 Donner Aphid endosymbionts in greenhouses and nature	8.3 Gasque Brain manipulation by a lepidopteran virus