

3rd European Congress on Social Insects

St. Petersburg, Russia, 22–27 August 2005

PROGRAMME



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St. Petersburg State University

PROGRAMME

Monday 22 August

The University Conference Centre

9:00–9:30 **Opening ceremony**

9:30–10:25 **Adrian M. Wenner** (*University of California*): Odor and honey bee exploitation
Plenary lecture of food crops p. 33

10:25–11:05 **Coffee Break**

11:05–13:00 **Sumio Tojo, Sintaro Nomakuchi, Mantaro Hironaka & Lisa Filippi** (*Saga*
Plenary lecture *University*): Physiological and behavioural adaptation of a subsocial shield-bug,
Parastrachia japonensis, that allow it to survive on the drupes of its sole host
plant available only two weeks a year p. 35

13:00–14:15 **Lunch**

14:30–17:30 Guided bus tour all over the city of St. Petersburg

18:00–19:00 Concert: Ensemble of Russian Folk Instruments

19:00–22:00 Welcome Party

22:00 *The buses will depart from the University Conference Centre to get the participants
back to their hotels and hostels*

Tuesday 23 August

The University Conference Centre

8:45–9:40 **Mandyam Srinivasan, Shaowu Zhang, Judith Reinhard & Javaan Chahl**
Plenary lecture (*Australian National University*): Small brains, smart minds: Vision, navigation
and 'cognition' in honeybees p. 37

9:40–10:20 **Coffee Break**

Main Building: **Lecture Hall 133**

Lecture Hall 140

10:20–12:50 **S1:** Learning and memory in social
Two symposia systems (*first part*)
concurrently

S2: The molecular bases of social
behaviour and sociality

Programme

The University Conference Centre

12:50–14:00	Lunch		
14:00–14:55 <i>Plenary lecture</i>	Mark J. F. Brown (<i>Trinity College, Dublin</i>): The ecology of social insects and their parasites p. 37		
14:55–15:50 <i>Plenary lecture</i>	Jozef Šimúth, K. Bíliková, S. Hennig & H. Lehrach (<i>Institute of Molecular Biology, Bratislava</i>): Functional genomics of royal jelly proteins and antimicrobial peptides of honeybee <i>Apis mellifera</i> L. p. 38		
15:50–16:30	Coffee Break		
Main Building:	Lecture Hall 133	Lecture Hall 140	Lecture Hall 143
16:30–19:00 <i>Three symposia concurrently</i>	S1: Learning and memory in social systems (<i>second part</i>)	S3: The multifaceted functions of cuticular hydrocarbons in social insects	S4: Biodiversity of honeybees (16:30–18:00) Open Session 1: Contributed oral presentations (18:10–19:00)
19:00–20:00	Dinner (<i>At the University Conference Centre</i>)		

Wednesday 24 August

The University Conference Centre

8:45–9:40 <i>Plenary lecture</i>	Yves Roisin (<i>Université Libre de Bruxelles</i>): Origin, function, and ecological significance of termite workers p. 40		
9:40–10:20	Coffee Break		
Main Building:	Lecture Hall 133	Lecture Hall 140	Lecture Hall 143
10:20–12:50 <i>Three symposia concurrently</i>	S5: Aspects of termite phylogeny and evolution (<i>first part</i>)	S6: Perception, 'cognition', and social behaviour (<i>first part</i>)	S7: Thermoregulation of honeybee colony (10:20–11:35) S8: Multiplication of honeybee colonies by swarming (11:35–12:50)

The University Conference Centre

12:50–14:00	Lunch
14:00–14:20	Joint photographing

Programme

Main Building:	Lecture Hall 133	Lecture Hall 140	Lecture Hall 143
14:25–15:40 <i>Three symposia concurrently</i>	S5: Aspects of termite phylogeny and evolution (<i>second part</i>)	S6: Perception, 'cognition', and social behaviour (<i>second part</i>)	S9: Optimisation and regulation of work in social insects (<i>first part</i>)
15:40–16:30	Coffee Break (<i>At the University Conference Centre</i>)		
Main Building:	Lecture Hall 133	Lecture Hall 140	Lecture Hall 143
16:30–19:00 <i>Three symposia concurrently</i>	S10: Honeybee as new model for functional genomics	S11: Conservation biology of social insects	S9: Optimisation and regulation of work in social insects (<i>second part</i>)
19:00–20:00	Dinner (<i>At the University Conference Centre</i>)		

Thursday 25 August

The University Conference Centre

8:45–9:40
Plenary lecture

Susanne Foitzik, Miriam Brandt, Birgit Fischer-Blass (*Ludwig Maximilians Universität München*): Patterns of coevolution and local adaptation in slavemaking ants p. 42

9:40–10:20
Coffee Break

Main Building:	Lecture Hall 133	Lecture Hall 140	Lecture Hall 143
10:20–12:50 <i>Three symposia concurrently</i>	S12: Visually guided behaviour in social insects	S13: Diseases and parasites in social insects	S14: Ecology of social insects

The University Conference Centre

12:50–14:00
Lunch

14:00–14:55
Plenary lecture

Gennady Dlussky (*Moscow State University*): Paleontological history of ants and the evidences of Afrotropical origin of Myrmicinae p. 43

14:55–15:20
Invited talk

Kazuo Ogata, M. Kubota, C. Suzuki, T. Takahashi & K. Masuko (*Kyushu University*): Ants from Cretaceous amber of Japan p. 124

15:20–19:00
Poster session (*tee and coffee will be served*)

18:00–19:00
Dinner

19:00–22:00
Evening Session

Episodes in the History of Insect Sociobiology: Directed Reminiscences (*led by Christopher Starr, University of the West Indies*)

(Russian beer and soft drinks will be served during the session)

Friday 26 August

The University Conference Centre

8:45–9:40 **Dave Goulson** (*University of Southampton*): Decline and conservation of
Plenary lecture bumblebees p. 44

9:40–10:20 **Coffee Break**

Main Building: **Lecture Hall 133** **Lecture Hall 140** **Lecture Hall 143**

10:20–12:50 **S15:** Exploitation of food sources **S16:** Social insects **S17:** Can European
Three symposia in social insects: foraging, and their honeybees coexist
concurrently recruitment, and macroparasites with *Varroa* mites?
(*first part*)

12:50–14:00 **Lunch** (*At the University Conference Centre*)

Main Building: **Lecture Hall 133** **Lecture Hall 140** **Lecture Hall 143**

14:00–16:00 **S15:** Exploitation of food sources **Open Session 2:** **S18:** Honey bees and
Three symposia in social insects: foraging, Contributed oral social insects on the
concurrently recruitment, and presentations web (*round table*
(*second part*) communication mechanisms discussion)

16:00–18:00 “Technological break” – for the participants who wish to get back to their
hotels to drop their bags and get changed for the banquet

Meanwhile tea and coffee will be served *from 16:30 to 17:30* in the University
Conference Centre for those who prefer to stay at the University

18:00 *The buses will depart from the University Conference Centre to transport the
participants to Pavlovsk*

19:30–23:00 **Congress Banquet in the Russian Folk Restaurant “Podvorie” (Pavlovsk)**

23:00 *The buses will depart from the restaurant to get the participants back to their hotels
and hostels*

Saturday 27 August & Sunday 28 August

Post Congress Tours

(see p. 5)

List of Plenary Lectures

Monday 22 August, 9:30–13:00

Chair: Vladilen Kipyatkov

- Adrian M. Wenner** (*University of California, USA*): Odor and honey bee exploitation of food crops p. 33
- Sumio Tojo, Sintaro Nomakuchi, Mantaro Hironaka & Lisa Filippi** (*Saga University, Japan*): Physiological and behavioural adaptation of a subsocial shield-bug, *Parastrachia japonensis*, that allow it to survive on the drupes of its sole host plant available only two weeks a year p. 35

Tuesday 23 August, 8:45–9:40

Chair: Adrian M. Wenner

- Mandyam Srinivasan, Shaowu Zhang, Judith Reinhard & Javaan Chahl** (*Australian National University*): Small brains, smart minds: Vision, navigation and 'cognition' in honeybees p. 37

Tuesday 23 August, 14:00–15:50

Chair: Dave Goulson

- Mark J. F. Brown** (*Trinity College, Dublin, Ireland*): The ecology of social insects and their parasites p. 37
- Jozef Šimúth, K. Bíliková, S. Hennig & H. Lehrach** (*Institute of Molecular Biology, Bratislava, Slovakia*): Functional genomics of royal jelly proteins and antimicrobial peptides of honeybee *Apis mellifera* L. p. 38

Wednesday 24 August, 8:45–9:40

Chair: Anne-Geneviève Bagnères

- Yves Roisin** (*Université Libre de Bruxelles, Belgium*): Origin, function, and ecological significance of termite workers p. 40

Thursday 25 August, 8:45–9:40

Chair: Yves Roisin

- Susanne Foitzik, Miriam Brandt, Birgit Fischer-Blass** (*Ludwig Maximilians Universität München, Germany*): Patterns of coevolution and local adaptation in slavemaking ants p. 42

Thursday 25 August, 14:00–14:55

Chair: Vladilen Kipyatkov

- Gennady Dlussky** (*Moscow State University, Russia*): Paleontological history of ants and the evidences of Afrotropical origin of Myrmicinae p. 43

Friday 26 August, 8:45–9:40

Chair: Mark J. F. Brown

- Dave Goulson** (*University of Southampton, UK*): Decline and conservation of bumblebees p. 44

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<i>Organiser: Randolph Menzel (Freie Universität, Berlin)</i>	
S2: The molecular bases of social behaviour and sociality	p. 16
<i>Organiser: Guy Bloch (The Hebrew University of Jerusalem)</i>	
S3: The multifaceted functions of cuticular hydrocarbons in social insects	p. 16
<i>Organiser: Abraham Hefetz (Tel-Aviv University)</i>	
S4: Biodiversity of honeybees	p. 17
<i>Organiser: Yaacov Lensky (Hebrew University of Jerusalem)</i>	
S5: Aspects of termite phylogeny and evolution	p. 17
<i>Organisers: Anne-Geneviève Bagnères (Université de Tours), Corinne Rouland-Lefèvre (BioSol Centre IRD d'Île de France) & Paul Eggleton (The Natural History Museum, London)</i>	
S6: Perception, 'cognition', and social behaviour	p. 18
<i>Organisers: Judith Reinhard & Andrew Barron (Australian National University)</i>	
S7: Thermoregulation of honeybee colony	p. 19
<i>Organisers: Yaacov Lensky (Hebrew University of Jerusalem) & Alexander Komissar (National Agricultural University, Kiev)</i>	
S8: Multiplication of honeybee colonies by swarming	p. 19
<i>Organiser: Yaacov Lensky (Hebrew University of Jerusalem)</i>	
S9: Optimisation and regulation of work in social insects	p. 20
<i>Organisers: Karl Crailsheim & Thomas Schmickl (Karl-Franzens-Universität, Graz)</i>	
S10: Honeybee as new model for functional genomics	p. 20
<i>Organiser: Jozef Simuth (Institute of Molecular Biology, Bratislava)</i>	
S11: Conservation biology of social insects	p. 21
<i>Organisers: Mark Brown (Trinity College, Dublin) & Robert Paxton (Queens University, Belfast)</i>	
S12: Visually guided behaviour in social insects	p. 21
<i>Organisers: Misha Vorobyev (University of Queensland) & Natalie Hempel de Ibarra (Freie Universität, Berlin)</i>	
S13: Diseases and parasites in social insects	p. 22
<i>Organiser: Ingemar Fries (Swedish Agricultural University, Uppsala), Mark Brown (Trinity College, Dublin) & Robert Paxton (Queen's University, Belfast)</i>	
S14: Ecology of social insects	p. 23
<i>Organiser: John Breen (University of Limerick)</i>	
S15: Exploitation of food sources in social insects: foraging, recruitment, and communication mechanisms	p. 24
<i>Organisers: Stefan Jarau (University of Ulm) & Michael Hrncir (University of Vienna)</i>	
S16: Social insects and their macroparasites	p. 25
<i>Organiser: Patrizia D'Ettoire (Universität Regensburg, Germany)</i>	
S17: Can European honeybees coexist with Varroa mites?	p. 26
<i>Organiser: Ingemar Fries (Swedish Agricultural University, Uppsala)</i>	
S18: Honey bees and social insects on the web: global communication, regional networks, high school and university education (round table discussion)	
<i>Organiser: Malcolm Sanford (University of Florida)</i>	
S19: Palaeontology and evolution of ants	p. 26
<i>Organisers: Keiichi Masuko (Senshu University) & Vladilen Kipyatkov (St. Petersburg University)</i>	
Open Sessions: Contributed Oral Presentations	p. 27
Evening Session: Episodes in the History of Insect Sociobiology: Directed Reminiscences ..	p. 27

Programmes of Symposia and Sessions

Symposium 1

Learning and memory in social systems

Organiser: Randolph Menzel (*Freie Universität, Berlin*)

Tuesday 23 August – Main University Building: Lecture Hall 133

First Part

- 10:20–10:30 **Randolf Menzel**: Introduction to the symposium
- 10:45–11:00 **Thomas Collett, R. Harris, N. Hempel & P. Graham** (*University of Sussex*): Wood ants use feeding state for the selective priming of navigational memories . . . p. 46
- 11:00–11:30 **Galina Udalova** (*Research Centre of Ecological Safety RAS*) & **Anna Karas**: On the capability to conditioned switching in higher social insects p. 46
- 11:30–12:00 **Brian Smith** (*Columbus, USA*): Inattention and inhibition in honeybee learning
- 12:00–12:30 **Uli Müller** (*Saarland University*): Memory in honeybees: A network of parallel acting signaling cascades p. 47

Second Part

- 16:30–17:00 **Dorothea Eisenhardt & Nicola Stollhoff** (*Free University of Berlin*): Memory formation after acquisition and retrieval in the honeybee (*Apis mellifera*) . . . p. 48
- 17:00–17:30 **Bernd Grünewald** (*Freie Universität Berlin*): Ion Channels and Modulations. The cellular physiology of neurons involved in honeybee olfactory learning . . . p. 48
- 17:30–18:00 **Irene V. Ryzhova, N. G. Lopatina, E. V. Savvateeva, T. G. Zachepilo & E. G. Tchesnokova** (*Pavlov Institute of Physiology RAS*): Excitatory amino acids in memory formation and retention of the honeybee (*Apis mellifera L.*): ontogenetic and genetic aspects p. 49
- 18:00–18:30 **Randolf Menzel & Paul Szyszka** (*Freie Universität Berlin*): Watching the bee brain when it learns p. 50

Related Poster Presentations (numbers according to the List of Poster Presentations on p.):

10. **Anja Froese, M. Karrenbrock & D. Eisenhardt** (*Freie Universität Berlin*): AmCREB in memory consolidation of the honeybee (*Apis mellifera*) p. 139

Symposium 2

The molecular bases of social behaviour and sociality

Organiser: Guy Bloch (The Hebrew University of Jerusalem)

Tuesday 23 August – Main University Building: Lecture Hall 140

- 10:20–10:50 **Charles W. Whitfield, Y. Ben-Shahar, C. Brillet, I. Leoncini, Y. Le Conte, S. Rodriguez-Zas & G. E. Robinson** (University of Illinois): Genomic dissection of behavioral maturation in the adult worker honey bee, *Apis mellifera* p. 51
- 10:50–11:20 **H. Michael G. Lattorff, Robin F.A. Moritz** (Martin-Luther-Universität Halle-Wittenberg) & **R. M. Crewe**: The role of the "thelytoky" locus for reproductive dominance in honeybees Christina M. Grozinger (North Carolina State University): Genomic response to pheromones in the honey bee brain p. 51
- 11:20–11:50 **Christina M. Grozinger** (North Carolina State University) Genomic response to pheromones in the honey bee brain p. 52
- 11:50–12:20 **Jana Schlenstedt** (University of Potsdam), **A. Baumann & W. Blenau**: Molecular and pharmacological characterization of honeybee serotonin receptors . . . p. 52
- 12:20–12:50 **Guy Bloch** (The Hebrew University of Jerusalem): Molecular underpinnings of socially mediated plasticity in circadian rhythms in the honey bee *Apis mellifera* p. 53
- Related Poster Presentations** (numbers according to the List of Poster Presentations on p.):
37. **Piyamas Nanork** (Chulalongkorn University, Bangkok, Thailand), **J. Parr, N. C. Chapman, S. Wongsiri & B. P. Oldroyd**: Reproductive competition among queenless workers of dwarf honey bee *Apis florea* p. 163

Symposium 3

The multifaceted functions of cuticular hydrocarbons in social insects

Organiser: Abraham Hefetz (Tel-Aviv University)

Tuesday 23 August – Main University Building: Lecture Hall 140

- 16:30–16:55 **Abraham Hefetz** (Tel Aviv University): The multifaceted role of cuticular hydrocarbons in social insects p. 54
- 16:55–17:20 **Margaret Couvillon & Francis Ratnieks** - Sniffing Bees: Universal rejection of wasp intruders by honey bee guards supports hypothesis of overlapping recognition cue distributions between nestmate and non-nestmate bees
- 17:20–17:45 **Mamiko Ozaki** (Kyoto Institute of Technology), **A. Wada-Katsumata, K. Fujikawa, M. Iwasaki, F. Yokohari, Y. Satoji, T. Nisimura & R. Yamaoka**: Nestmate and non-nestmate discrimination by a CHC-sensitive sensillum in a Japanese carpenter ant p. 54
- 17:45–18:10 **Patrizia D'Ettorre** (University of Copenhagen): Queen signal and pheromonal parsimony in a ponerine ant p. 55
- 18:10–18:35 **Stephanie Dronnet & Anne-Geneviève Bagnères** (University of Tours): Genetic and cuticular hydrocarbon variations among and within colonies of a non-aggressive subterranean termite p. 56

Programme

18:35–19:00 **Katrin Kellner** (*University of Regensburg*), **P. D’Ettorre, J. Heinze & M. Ayasse**: The metamorphosis of the queen’s chemical signature in the ant *Pachycondyla villosa* p. 57

Related Poster Presentations (numbers according to the List of Poster Presentations on p.):

8. **Christine Errard** (*Université de Tours, France*), **A.-M. Le Guisquet, J.-P. Christides & A. Hefetz**: Early learning of volatiles chemical cues leads to interspecific tolerance between two ant species p. 137
45. **Shiri Shnieor, T. Katzav-Gozansky & A. Hefetz** (*Tel Aviv University*): Social regulation of reproductive and pheromone plasticity in worker honeybees p. 170

Symposium 4

Biodiversity of honeybees

Organiser: Yaacov Lensky (*Hebrew University of Jerusalem*)

Tuesday 23 August – Main University Building: Lecture Hall 143

16:30–16:55 **Ibrahim Çakmak** (*Uludag University, Bursa- Turkey*): The biodiversity of honeybee races in Turkey p. 58

16:55–17:20 **Alexey Nikolenko** (*Institute of Biochemistry and Genetics, Ufa Scientific Centre of RAS Russia*): Gene pool of Black European bee *Apis mellifera mellifera* L. in Ural region p. 60

17:20–17:45 **Alexander Komissar** (*National Agricultural University, Kyiv*): Races of honey bees, human nations and religions p. 61

Symposium 5

Aspects of termite phylogeny and evolution

Organisers: Anne-Geneviève Bagnères (*Université de Tours*), Corinne Rouland-Lefèvre (*BioSol Centre IRD d’Île de France*) & Paul Eggleton (*The Natural History Museum, London*)

Wednesday 24 August – Main University Building: Lecture Hall 133

First Part

10:20–10:50 **Paul Eggleton, D. Inward & D. Jones** (*The Natural History Museum, London*): The evolution of termite functional diversity: a global phylogenetic perspective p. 62

10:50–11:10 **Sarah Donovan** (*Plymouth University*): Phylogenetic information in worker termite gut characters

11:10–11:30 **Daegan Inward** (*The Natural History Museum, London*): Aspects of termite biology as revealed by a comprehensive new phylogenetic reconstruction

11:30–11:40 Break for discussion

11:40–12:00 **Thomas Lefebvre & C. Rouland-Lefèvre** (*Université Paris XII*): In search of coevolution between *Nasutitermes* and their actinomycete digestive flora . p. 62

12:00–12:20 **Corinne Rouland-Lefèvre, E. Miambi, F. Rinaut & J. Nguedegbe** (*Laboratoire d’Ecologie des Sols Tropicaux*): Macrotermitinae/fungi co-evolution: new data on other fungi than *Termitomyces* p. 65

12:20–12:40 **Natalia V. Belyaeva & Ilya G. Dovgobrod** (*Moscow State University*): New diagnostic characteristic for the species identification of termites p. 63

Related Poster Presentations (numbers according to the List of Poster Presentations on p.):

29. **Thomas Lefebvre** (*Université Paris XII*), **N. Châline & A.-G. Bagnères**: Phylogeography of an insular subspecies of termite *Reticulitermes lucifugus corsicus*: from origins to recent expanses on continental coasts p. 156

Second Part

14:25–14:55 **Judith Korb** (*University of Regensburg*): Workers of lower termites: no altruists, but hopeful reproductives p. 63

14:55–15:15 **Laurianne Leniaud, S. Dronnet, M. Kutnik, S. Dupont & A.-G. Bagnères** (*Université François Rabelais de Tours*): How flexibility of breeding systems in subterranean termites explains their invasive success p. 64

15:15–15:35 **Anne-Geneviève Bagnères** (*University of Tours*), **M. Kutnik, S. Dupont & E. Vargo**: Postglacial recolonization of southwestern Europe by subterranean termites: Genes tell complex story p. 66

15:35–15:40 Discussion and the end of symposium

Symposium 6

Perception, 'cognition', and social behaviour

Organisers: Judith Reinhard & Andrew Barron (*Australian National University*)

Wednesday 24 August – Main University Building: Lecture Hall 140

First Part

10:20–10:45 **Matthew Collett** (*Ludwig-Maximilians Universität*) & **Thomas S. Collett**: Integration of multiple sources of information by desert ants navigating familiar routes p. 67

10:45–11:10 **Paul Graham & Thomas S. Collett** (*University of Sussex*): The interaction between spatial memories in the wood ant p. 67

11:10–11:35 **Vladimir Kartsev, T. Oganosov & D. Kalinin** (*Moscow State University*): Learning at consequential stages of orientation in bumblebees and paper wasps . . . p. 68

11:35–12:00 **Shaowu Zhang** (*The Australian National University*): The learning of rules and concepts by the honeybee p. 69

12:00–12:25 **Johannes Spaethe** (*University of Vienna*), **A. Brockmann & L. Chittka**: How size limits sensory capabilities in bumblebees and why it matters for colony organisation p. 70

12:25–12:50 **Andrew B. Barron** (*The Australian National University*), **R. Maleszka & G. E. Robinson**: Neurochemical dissection of the honeybee dance language p. 71

Second Part

- 14:25–14:50 **Sarah M. Farris** (*West Virginia University*): Insect mushroom bodies and the evolution of sociality: insights from scarab beetles? p. 72
- 14:50–15:15 **Hideaki Takeuchi** (*The University of Tokyo*): Gene expression in honeybee mushroom bodies and its gene orthologues in non-social insects/invertebrates p. 72
- 15:15–15:40 **Charles Claudianos** (*The Australian National University*)**H. Ranson, J. Oakeshott, S. Biswas, J. Reinhard, R. Maleszka & R. Feyereisen**: Life history and behaviour shape honeybee genome evolution p. 73

Related Poster Presentations (numbers according to the List of Poster Presentations on p.):

14. **Daphna Gottlieb** (*Department of Entomology, The Volcani Center, Israel*), **A. R. Harari, Y. Lubin, A. Bouskila**: Local mate competition in the female palm stone borer beetle p. 143
28. **Alexander Komissar** (*National Agricultural University, Kiev*): The peculiarities of the honeybee perception of two-coloured near entrance marks p. 155

Symposium 7

Thermoregulation of honeybee colony

Organisers: Yaacov Lensky (*Hebrew University of Jerusalem*) & Alexander Komissar (*National Agricultural University, Kiev*)

Wednesday 24 August – Main University Building: Lecture Hall 143

- 10:20–10:45 **Marco Kleinhenz, B. Bujok, S. Fuchs & J. Tautz** (*University of Würzburg*): Brood nest incubation strategies in honeybees p.76
- 10:45–11:10 **Julia Jones** (*University of Sydney*), **P. Helliwell, M. Beekman, R. Maleszka & B. P. Oldroyd**: Thermoregulation and the effects of rearing temperature on developmental stability and learning and memory in the honey bee, *Apis mellifera* p. 77
- 11:10–11:35 **Alexander Komissar** (*National Agricultural University, Kiev*): Thermoregulation of honey bees in winter by means of vertical movement in the hives with vertical gradient of temperature p. 78
- 11:35–12:00 **Yaacov Lensky** (*Hebrew University, Israel*): Thermoregulation of honeybee (*Apis mellifera* L. Spin.) colonies during summer and winter in the Subtropics . . . p. 74

Symposium 8

Multiplication of honeybee colonies by swarming

Organiser: Yaacov Lensky (*Hebrew University of Jerusalem*)

Wednesday 24 August – Main University Building: Lecture Hall 143

- 11:35–12:00 **Ibrahim Çakmak** (*Uludag University, Bursa- Turkey*): Swarming of honeybee colonies in Turkey p. 79
- 12:00–12:25 **Zbigniew Lipiński** (*Poland*): Emotional nature of adaptive nest abandonment by honeybee swarms p. 80

Symposium 9

Optimisation and regulation of work in social insects

Organisers: Karl Crailsheim & Thomas Schmickl (Karl-Franzens-Universität, Graz)

Wednesday 24 August – Main University Building: Lecture Hall 143

First Part

- 14:25–14:50 **Matthias Fürst** (University of Regensburg) & **Patrizia D'Etterre**: Behavioural plasticity in ant queens of the *Pachycondyla villosa* complex p. 81
- 14:50–15:15 **Thomas Schmickl & Karl Crailsheim** (Karl-Franzens-Universität Graz): Simulating the regulation of task selection in honeybees p. 81
- 15:15–15:40 **Jaw-jinn Jong & How-jing Lee** (National Taiwan University): Temporal division of labor in the Gray-black Spiny Ant, *Polyrhachis dives* p. 82

Second Part

- 16:30–16:55 **Kerstin Fröhle & Flavio Roces** (University of Würzburg): Regulation of chamber size in nests of leaf-cutting ants p. 82
- 16:55–17:20 **Ronald Thenius, T. Schmickl & K. Crailsheim** (Karl-Franzens-Universität Graz): Modeling multiple transfer and nectar flow in honeybees? p. 83
- 17:20–17:45 **Chris Georgiadis & Anastasios Legakis** (University of Athens): Preliminary experiments on the foraging activity of *Messor* ants from Greece p. 83
- 17:45–18:10 **Oliver Mitesser** (University of Würzburg) & **Hans-Joachim Poethke**: Evolution of activity patterns in an annual eusocial insects p. 84
- 18:10–18:35 **Jelle van Zweden** (Universität Regensburg), **J. Heinze & P. D'Etterre**: Worker policing: a mechanism to discriminate between worker-laid and queen-laid eggs p. 85

Symposium 10

Honeybee as new model for functional genomics

Organiser: Jozef Šimúth (Institute of Molecular Biology, Bratislava)

Wednesday 24 August – Main University Building: Lecture Hall 133

- 16:30–17:00 **Jozef Šimúth** (Institute of Molecular Biology, Bratislava), **K. Bíliková, H. Lehrach & R. F. A. Moritz**: introduction to Symposium “Honeybee as new model for functional genomics” p. 86
- 17:00–17:30 **Philippe Bulet** (Atheris Laboratories, Geneva): Antimicrobial peptides in insects: structure and gene regulation p. 86
- 17:30–18:00 **Katerine Aronstein & E. Saldivar** (USDA-ARS-KSARC, Beneficial Insects Research Unit, USA): Characterization of honeybee Toll related receptor gene *Am18w* and its potential involvement in host immune responses p. 87
- 18:00–18:30 **Michel Solignac** (Laboratoire Populations, Génétique et Evolution, France), **F. Mougel, D. Vautrin, M. Monnerot & J.-M. Cornuet**: The linkage map of the honeybee: present status, use and prospects p. 88

Symposium 11

Conservation biology of social insects

Organisers: Mark Brown (*Trinity College, Dublin*) & Robert Paxton (*Queens University, Belfast*)

Wednesday 24 August – Main University Building: Lecture Hall 140

- 16:30–17:00 **Jonathan S. Ellis, B. Darvill, M.E. Knight & D. Goulson** (*University of Southampton*): Population genetics of rare bumblebees p. 90
- 17:00–17:30 **Jean-Luc Mercier, C. Errard, N. Fresquet, Y. Morizet and A. Lenoir** (*Université de Tours, France*): A study of *Myrmica sabuleti* (Hymenoptera, Formicidae), the ant host of *Maculinea arion* (Lepidoptera, Lycaenidae), in relation to a beltway construction project p. 89
- 17:30–18:00 **Tomás E. Murray** (*Queen's University Belfast*), **Ú. Fitzpatrick, R. J. Paxton & M. J. F. Brown**: The Role of Habitats in Structuring and Conserving Bumble Bee Assemblages p. 90
- 18:00–18:30 **Robert J. Paxton** (*Queen's University Belfast*) & **Fani Hatjina**: The role of social bees in provision of the ecosystem service of pollination in NE Greece p. 91
- 18:30–19:00 **Johnny S. C. Chen, J.-H. Shen & H.-J. Lee** (*National Taiwan University*): Monogynous and polygynous red imported fire ants, *Solenopsis invicta* Buren (Hymenoptera: Formicidae), in Taiwan p. 89

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20. **Jan Hrcek** (*University of South Bohemia, Czech Republic*), **M. Janda & Z. Krenova**: Spatial and temporal nest distribution in *Myrmica* ant community, hosting *Maculinea alcon* – preliminary results p. 148

Symposium 12

Visually guided behaviour in social insects

Organisers: Misha Vorobyev (*University of Queensland*) & Natalie Hempel (*Freie Universität, Berlin*)

Thursday 25 August – Main University Building: Lecture Hall 133

- 10:20–10:45 **Eric Warrant, A. Kelber, B. Greiner, W. Ribi & W. Wcislo** (*Lund University, Sweden*): Seeing in the dark: vision and landmark orientation in a tropical nocturnal bee p. 93
- 10:45–11:10 **Shaowu Zhang** (*Australian National University*): Visual cognition in honeybee navigation p. 94
- 11:10–11:35 **Rob A. Harris, P. Graham & T. S. Collett** (*University of Sussex, UK*): Visual memories in wood ants: binding of landmark edges to perceived centre of gravity p. 95
- 11:35–12:00 **Misha Vorobyev** (*University of Queensland, Australia*) & **Natalie Hempel de Ibarra**: Do honeybees optimally use optics of their eyes? p. 96

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- 12:00–12:25 **Natalie Hempel de Ibarra** (*Free University of Berlin*), **M. Vorobyev & R. Menzel**: How foraging bees are guided by floral displays p. 97
- 12:25–12:50 **Marie-Claire Cammaerts** (*Université Libre de Bruxelles*): Sensitivity of the ant *Myrmica sabuleti* to light intensity p. 98

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9. **Rikard Frederiksen & Eric J. Warrant** (*Lund University, Sweden*): Signal-to-noise ratio and information capacity in the eyes of halictid bees p. 138
15. **Birgit Greiner** (*Lund University, Sweden*), **W. A. Ribi, T. W. Cronin, W. T. Wcislo & E. J. Warrant**: Polarisation vision in a nocturnal bee p. 144
18. **Robert A. Harris, P. Graham & T. S. Collett** (*University of Sussex, UK*): Role of visual centre of gravity for landmark navigation in wood ants p. 147
19. **Mantaro Hironaka** (*Hamamatsu University School of Medicine, Japan*), **S. Tojo, S. Nomakuchi, L. Filippi, H. Horiguchi & T. Hariyama**: Round-the-clock visual navigation of a subsocial shield bug, *Parastrachia japonensis* using path integration p. 148
50. **Jamie Theobald & Eric Warrant** (*Lund University, Sweden*): Theoretical models of visual summation for night flight in *Megalopta* p. 173
53. **Anna M. Wertlen** (*Free University of Berlin*), **N. Hempel de Ibarra, A. A. Cocucci, A. Sersic, W. Kreisch & M. Ristow**: Distribution of colours and sugar rewards in the bee's natural environment p. 176

Symposium 13

Diseases and parasites in social Insects

Organiser: Ingemar Fries (*Symposium wedish Agricultural University, Uppsala*), Mark Brown (*Trinity College, Dublin*) & Robert Paxton (*Queen's University, Belfast*)

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- 10:20 Introduction
- 10:20–10:45 **Malcolm T. Sanford** (*Apis Enterprises, USA*): History and significance of small hive beetle introduction into the US p. 99
- 10:45–11:00 **Mario X. Ruiz-Gonzalez and Mark J. F. Brown** (*University of Dublin*): Testing the haploid susceptibility hypothesis: parasites and social organisation p. 99
- 11:00–11:10 **Ingemar Fries** (*Swedish University of Agricultural Sciences*) & **J. I. R. Larsson**: *Nosema bombi* - variation or sibling species? p. 100
- 11:10–11:35 **Elaine O'Mahony** (*Queen's University Belfast*) and **Wee Tek Tay**: Intra-genomic variation in the rRNA gene of the microsporidian parasite of the bumble bee, *Nosema bombi* p. 100
- 11:35–12:00 **Julia Klee** (*Queen's University Belfast*): Prevalence and distribution of the microsporidium *Nosema bombi* in bumble bees (*Bombus* spp.) p. 101
- 12:00–12:25 **Jozef J.M. van der Steen** (*Wageningen University and Research Centre*): Infection routes of *Nosema bombi* in *Bombus terrestris* p. 102

- 12:25–12:50 **Oliver Otti & Paul Schmid-Hempel** (*Ecology & Evolution, ETH Zurich*): Confusing Fitness Effects of *Nosema bombi* (Nosematidae, Microsporidia) in the Bumblebee *Bombus terrestris* p. 102

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36. **Sandra Mustafa, Julia Klee & Robert J. Paxton** (*Queen's University Belfast*): High incidence of infection of the microsporidium *Nosema bombi* in the ovaries of spring-caught bumble bee queens (*Bombus terrestris*): a case of vertical transmission? p. 162

Symposium 14

Ecology of social insects

Organiser: John Breen (*University of Limerick*)

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- 10:20–10:45 **Ivan Rusin, O. Kryuchkov & L. Rusina** (*Kherson State University*): Foraging behaviours of three social wasps species in southern Ukraine p. 103
- 10:45–11:10 **Elisabeth Brunner, N. Stroeymeyt & J. Heinze** (*University of Regensburg*): Conflict resolution in insect societies p. 104
- 11:10–11:35 **William G. Meikle, N. Holst, G. Mercadier & F. Derouané** (*European Biological Control Laboratory*): The use of balances linked to dataloggers to monitor honeybee colonies p. 105
- 11:35–12:00 **Audrey O'Grady & John Breen** (*University of Limerick*): Ant communities in Ireland with special reference to those on limestone grassland p. 105
- 12:00–12:25 **P. R. Swaran & R. V. Varma** (*Kerala Forest Research Institute, India*): Termite diversity in young eucalypt plantation in the tropical forests of Kerala State (India) p. 178
- 12:25–12:50 **Leila von Aesch & D. Cherix** (*Museum of Zoology, Lausanne*): Worker confrontations of invasive ants at food sources under laboratory conditions p. 106

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41. **Veronica Santorum & John Breen** (*University of Limerick, Ireland*): A comparison of pan traps and transects for the sampling of bumblebees in biodiversity surveys of agricultural landscapes p. 166
51. **Salvatore Vicidomini & Luigi Sannino** (*C. R. A. Istituto per la Sperimentazione sul Tabacco, Italy*): Social interactions in *Xylocopa violacea* (L.) nest in post-emersion phase of offsprings (Hymenoptera: Apidae) p. 174
52. **Salvatore Vicidomini & Luigi Sannino** (*C. R. A. Istituto per la Sperimentazione sul Tabacco, Italy*): Sex ratio and allocation, founding female investment type per nest, in a South Italian population of *Xylocopa violacea* (L.) (Hymenoptera: Apidae) p. 175

Symposium 15

Exploitation of food sources in social insects: foraging, recruitment, and communication mechanisms

Organisers: Stefan Jarau (*University of Ulm*) & Michael Hrnčir (*University of Vienna*)

Friday 26 August – Main University Building: Lecture Hall 133

First Part

- 10:20–10:50 **Claire Detrain & C. Devigne** (*University of Brussels*): The influence of social context on ants' collective foraging patterns and individual decision-making p. 107
- 10:50–11:20 **Elva J. H. Robinson** (*University of Sheffield, UK*), **D. Jackson, M. Holcombe & F. L. W. Ratnieks**: Negative pheromone in an ant foraging trail network . p. 108
- 11:20–11:50 **Flavio Roces** (*University of Würzburg*): Transport chains in foraging grass-cutting ants: efficient load carriage or improved information transfer? p. 108
- 11:50–12:20 **Nicole Saverschek** (*University of Würzburg*), **H. Herz & F. Roces**: The influence of experience on host plant selection by the leaf-cutting ant *Atta colombica* . p. 109
- 12:20–12:50 **Keiichi Masuko** (*Senshu University, Japan*): Trophic egg production and prey retrieval by the foundress in the ant *Manica yessensis*: Their contributions to the first worker production p. 110

Second Part

- 14:00–14:25 **Veronika M. Schmidt** (*University of Vienna*), **R. Zucchi & Friedrich G. Barth**: Recruitment in a scent path laying stingless bee to food sources of different profitabilities p. 111
- 14:25–14:50 **Michael Hrnčir** (*University of Vienna*), **R. Zucchi & F. G. Barth**: Vibrating food receivers: an optimal transmission of recruitment signals in bees p. 112
- 14:50–15:15 **Judith Reinhard, M. V. Srinivasan & S. Zhang** (*The Australian National University*): Associative learning and cross-modal recall as “recruitment” mechanisms in honeybees p. 113
- 15:15–15:40 **Mick E. Hanley, S. Pichon, B. Darvill & D. Goulson** (*University of Southampton*): The influence of floral rewards on bumblebee foraging behavior: higher quality pollen means more visits p. 114
- 15:40–16:05 **Thomas Eltz** (*University of Düsseldorf*): Tracing bumblebee footprints on natural flowers p. 114
- 16:05–16:30 **Jan Šobotník** (*Institute of Organic Chemistry and Biochemistry, Prague*), **I. Valterová, O. Hovorka & L. Cahliková**: Age-dependent structure and content of labial glands in males of *Bombus terrestris* p. 115

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12. **Oliver Geissler & Flavio Roces** (*University of Würzburg Am Hubland*): Crop loading and recruitment behavior in the nectar-feeding ant *Camponotus rufipes* p. 141

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24. **Reet Karise** (*Estonian Agricultural University*), **M. Mänd**, **M. Ivask**, **A. Luik** & **Ants Bender**: Bumble bee pollen forage on different colour morphs of hybrid lucerne (*Medicago x varia*) flowers p. 151
31. **Anne-Catherine Mailleux** (*Biological control and spatial ecology, Belgium*), **C. Detrain** & **J.-L. Deneubourg**: A behavioural rule of thumb adjusting ants recruitment to aphid productivity p. 158

Symposium 16

Social insects and their macroparasites

Organisers: Patrizia D'Ettoire (*Universität Regensburg, Germany*)

Friday 26 August – Main University Building: Lecture Hall 140

- 10:20–10:25 **Patrizia D'Ettoire**: Introductory remarks
- 10:25–11:05 **Alain Lenoir** (*University of Tours, France*), **S. Devers**, **P. Marchand**, **C. Errard**, **C. Bressac** & **R. Savolainen**: Microgynous queens in ants: social parasites or dispersal morphs? p. 116
- 11:05–11:45 **Carlos Lopez Vaamonde**, **W. Koning**, **R. Brown**, **W. Jordan** & **A. Bourke** (*Zoological Society of London*): Intraspecific social parasitism by reproductive bumblebee workers p. 117
- 11:45–12:05 **Elisabeth Brunner**, **A. Trindl**, **K. Falk**, **J. Heinze** & **P. D'Ettoire** (*University of Regensburg*): Reproductive conflict in social insects: male production by workers in a slave-making ants p. 117
- 12:05–12:25 **Jeanette Beibl** (*Universität Regensburg*), **A. Buschinger**, **S. Foitzik**, **P. D'Ettoire** & **J. Heinze**: Phylogeny of the ant genus *Chalepoxenus* p. 118
- 12:25–12:45 **Jaclyn Smith** (*Flinders University of SA, Adelaide*), **S. Tierney**, **Y. C. Park** & **M. P. Schwarz**: The evolution of social parasitism: Implications for sympatric speciation based on phylogenetic studies of allodapine bees p. 119
- 12:45–12:50 **Patrizia D'Ettoire**: Conclusive remarks

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48. **Danival J. Souza** (*Université François Rabelais, Tours, France*), **I. M. F. Soares**, **T. M. C. Della Lucia** & **A. Lenoir**: A new social parasite of leaf-cutting ants from Brazil p. 172
54. **Marion U. Zobel** (*Uni Tübingen, Zool. Institut, Germany*) & **Robert J. Paxton**: Nest usurpation and kinship in the primitively eusocial bee, *Lasioglossum malachurum* p. 177

Symposium 17

Can European honeybees coexist with *Varroa* mites?

Organiser: Ingemar Fries (Swedish Agricultural University, Uppsala)

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Friday 26 August – Main University Building: Lecture Hall 140

- 10:20–10:50 **Adrian Wenner** (University of California): The exciting potential of remote feral bee colonies for *Varroa* coexistence p. 120
- 10:50–11:20 **Ingemar Fries** (Swedish University of Agricultural Sciences): Honeybees and *Varroa* mites - natural selection versus directed breeding p. 121
- 11:20–11:50 **Peter Rosenkranz** (University of Hohenheim, Germany): Population dynamics of bees, brood and *Varroa* mites in honey bee colonies selected for tolerance to *Varroa* infestation p. 122
- 11:50–12:20 **Malcolm T. Sanford** (Apis Enterprises, USA): The use of soft chemicals to control *Varroa* mites in the US and Canada p. 123
- 12:20–12:50 **Jozef J. M. van der Steen, A.C.M. Cornelissen, L.A. Gerritsen and T. Blacquièrè** (Wageningen University and Research Centre, the Netherlands): Integrated control of *Varroa* in the Netherlands p. 123

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27. **Vladimir Kiryushin** (Shmalhausen Institute of Zoology, Kiev): Dynamics of *Varroa destructor* mites drops from honey bees belonging to different rases p. 154
40. **Stanislav Razumovsky & A. I. Anisimov** (St. Petersburg State Agrarian University): *Varroa* mite and honeybee mortality after treatments by two chemicals preparation (tests in apiary) p. 165

Symposium 19

Palaeontology and evolution of ants

Organisers: Keiichi Masuko (Senshu University) & Vladilen Kipyatkov (St. Petersburg University)

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- 14:55–15:20 **Kazuo Ogata, M. Kubota, C. Suzuki, T. Takahashi and K. Masuko** (Kyushu University): Ants from Cretaceous amber of Japan p. 124
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7. **Dmitry Dubovikoff** (St. Petersburg University): Origin of the ants fauna of Caucasian Isthmus

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- 18:35–19:00 **Anatoly Anisimov** (*St.-Petersburg State Agrarian University*), **I. V. Boykov, D. A. Gvozdarev & G. S. Talalay**: Test of new microbiological preparation for *Ascospheara apis* control in beehives p. 128

Open Session 2

Contributed oral presentations

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- 14:30–15:00 **Jean-Christophe Lenoir** (*Université de Tours, France*), **A. Schrempf, A. Lenoir, J. Heinze & J.-L. Mercier**: *Cardiocondyla elegans*: strict daughter composed nests invaded by unrelated sexuals p. 126
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- 15:30–16:00 **Taofic Alabi** (*Gembloux Agricultural University, Belgium*), **G. Lognay, L. Arnaud & E. Haubruge**: Do cuticular hydrocarbons provide kin protection in *Tribolium* genus like in social insects? p. 125

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Episodes in the History of Insect Sociobiology: Directed Reminiscences

Organiser: Christopher Starr (*University of the West Indies*)

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David H. Kistner (*Department of Biological Sciences, California State University, Chico*): Myrmecophilous and termitophilous Staphylinidae from Wasmann to the present p. 130

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