



Evolution of Sex Determination in Insects

Nöthiger EvoSexDevo Workshop

Villa Orlandi, Anacapri,

April 2-5 2024

SUPPORTED BY



Organizers:

Giuseppe Saccone, Department of Biology, University of Naples Federico II, Italy

Daniel Bopp, Department of Molecular Life Sciences, University of Zurich, Switzerland

Program

Wednesday 3rd of April

Hymenoptera (Chair: Giuseppe Saccone)

- 08:45 Giuseppe Saccone *Welcome Address*
- 09:00 Martin Beye *To Bee or not: The honeybee system*
- 09:20 Pia Ulbricht *Molecular basis of social living behaviors in the male honeybee *Apis mellifera**
- 09:40 Martin Hasselmann *Insights into the genetics of sex determination in bumble bees*

10:10 coffee break

- 10:40 Eveline Verhulst *What is the role of Doublesex in *Nasonia* sex determination?*
- 11:00 Filippo Guerra *Intersex is not involved in wasp sex determination*
- 11:20 Elzemiek Geuverik *Many paths to make a female? Evolution of the sex determination cascade in parasitoid wasps*

12:00 Lunch

Diptera I (Chair: Lucas Sanchez)

- 14:00 Saccone & Vitagliano *Evolution of the Medfly Y-linked MoY male determining factor*
- 14.15 Sarah M. Mazzucchiello *An artificial maternal male sex determining transgene in Medfly.*
- 14.30 Ernst Wimmer *Conditional artificial M factors to produce male only progeny in Medfly.*
- 15:00 Emelyne Gaudichau *Elucidating molecular mechanisms of sex determination in stick insects*

15:30 coffee break

- 16:00 Mark Robinson *Emerging technologies for single cell and long read RNA profiling*
- 16:30 Max Scott *Homing gene drive in *Drosophila suzukii* targeting doublesex and an update on sex determination systems in blowflies*

- 17:00 Angela Meccariello *Engineering sex sorting systems in agricultural insect pest*
- 17:30 Daniel Bopp *A historical review on InSex studies*

Thursday 4th of April

Sex and Chromosomes (Chair: Frantisek Marek)

- 09:00 Leo Beukeboom *Frequencies of M loci in houseflies from Catalonia*
- 09:20 Xuan Li *Genomic characterization of sex-determining loci in the housefly*
- 09:40 Lucas Sanchez *Evolutionary pathways of sex determining mechanisms based on imprinting and chromosome elimination.*
- 10:10 coffee break**
- 10:40 Beatriz Vicoso *Sex chromosome conservation and turnover in insects*
- 11:00 Lorena Layana *Out-of-X in Diptera*
- 11:20 Giorgio Prantera *Epigenetic mechanisms of genomic imprinting and sex determination in Coccids*
- 11:50 Oct. Palacios-Gimenez *Orthopteran neo-sex chromosomes reveal dynamics of recombination suppression and evolution of supergenes*

12:20 Lunch

14:00 – 17:00

BOAT TRIP

Special Lecture

- 17:00 **Andrea Crisanti** *Unnatural Selection for vector control*



Professor of Molecular Parasitology Imperial College, London, GB

Friday 5th of April

Diptera II (Chair: Ernst Wimmer)

- 09:00 Yu Cai *Functional Analysis of Transformer 2 beta in Aedes aegypti*
- 09:30 Jarek Krzywinski *Sex determination and dosage compensation pathways in An. gambiae*
- 10:00 Jake Tu *Stably heritable sex conversions and synthetic homomorphic sex chromosomes in an arboviral vector Aedes aegypti: new insights and applications*
- 10:30 **coffee break**
- 11:00 Marianna Varone *Sex determination studies in Aedes mosquito species of Italian sanitary relevance*
- 11:30 Robert Baird *Monogenic reproduction in flies*

12:00 **Lunch**

Lepidoptera (Chair: Martin Beye)

- 14:00 Frantisek Marec *Convergent evolution of feminizing piRNA in pyralid moths*
- 14:20 Arjen van het Hof *Evolutionary origin of sex determination in satyrid butterflies*
- 14.40 Atsuo Yoshido *The effects of ploidy changes on sexual development and gene expression in Samia cynthia ricini*
- 15:00 **coffee break**
- 15:30 YongPing Huang *Reproductive development control by piRNA biogenesis factors in Bombyx mori*
- 16:00 Lansa Qian *SPSL1 is essential for spermatophore formation and sperm activation in Spodoptera frugiperda*

16:30 **Final discussions**

List of speakers and affiliations

Azadeh Aryan, research scientist, Virginia Tech, Biochemistry, Virginia Tech, USA

Robert Baird, University of Edinburgh, UK

Martin Beye, Heinrich Heine University, Düsseldorf, Germany

Leo Beukeboom, Xuan Li, University of Groningen, The Netherlands

Silvia Bongiorno, Department of Ecology and Biology, Università della Tuscia, Italy

Daniel Bopp, University of Zurich, Switzerland

Yu Cai, Temasek Laboratories, Singapore

Andrea Crisanti, University of Padua, Italy, Imperial College London GB

Emelyne Gaudichau,

Elzemies Geuverik, University of Groningen, The Netherlands

Filippo Guerra, Wageningen University, The Netherlands

Stephen Goodwin, University of Oxford, UK

Martin Hasselmann, University Hohenheim, Germany

Yongping Huang, Shanghai Jiao Tong University, China

Lorena Layana, Institute of Science and Technology Austria

Jarek Krzywinski, Polo Genomica Genetica e Biologia, Terni, Italy

Lucas Sánchez. Professor "Ad Honorem" C.S.I.C, Madrid. Spain

František Marec, Biology Centre CAS, Czech Republic

Sarah Maria Mazzucchiello, Department of Biology, University of Naples Federico II, Italy

Angela Meccariello, Imperial College, London, UK

Octavio Palacios-Gimenez, University of Jena, Germany

Giorgio Prantera, Department of Ecology and Biology, Università della Tuscia, Italy

Mark Robinson, University of Zurich, Switzerland

Giuseppe Saccone, Department of Biology, University of Naples Federico II, Italy

Marco Salvemini, Department of Biology, University of Naples Federico II, Italy

Max Scott, NC State University, USA.

Zhijian Jake Tu, Virginia Tech, Biochemistry, Virginia Tech, USA

Pia Ulbricht, Heinrich Heine University, Düsseldorf, Germany

Arjen E. van t Hof, Biology Centre CAS, Czech Republic

Marianna Varone Department of Biology, University of Naples Federico II, Naples, Italy

Eveline Verhulst, Wageningen University, The Netherlands

Beatriz Vicoso, Lorena Layana, Institute of Science and Technology, Austria

Luigi Vitagliano, Institute of Biostructures and Bioimaging (IBB), CNR, Naples, Italy

Ernst Wimmer, Georg-August-University Göttingen, German

Lansa Qian, Shanghai Jiao Tong University, China

Atsuo Yoshido, Biology Centre CAS, Czech Republic