

SUCCESS STORY

SOCIAL LIFE / The Evolution of Social Life and Division of Labour

Research area: FP7 – European Research Council / Evolutionary, Population and Environmental Biology (LS8)
Beneficiary: Prof. Laurent Keller

Host institution: University of Lausanne (UNIL)
Start date – End date: 2010-05-01 to 2015-04-30
Duration: 60 months
Funding: € 2 497 500
Type of contract: ERC Advanced Grant



LAURENT KELLER



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“A good researcher also needs artistic flair.”

A KEEN INTEREST IN THE WORLD OF ANTS

Professor of Evolutionary Ecology at the University of Lausanne (UNIL), Laurent Keller is a world-renowned specialist in the world of ants. In 2010, he received an Advanced Grant from the European Research Council to conduct work on the evolution of social life and the division of labour among social insects.

What is the purpose of your European-funded project?

The hallmark of insect societies, e.g. those made up of ants, is the division of labour along reproductive lines, which is commonly associated with huge differences in terms of body size and behaviour — between queens and the various categories of workers within a colony. We are trying to understand how this works using a three-way methodology.

What are the approaches of this methodology?

The first is genetics. We are studying how a group of genes on a chromosome influences the social structure of a colony. The second part involves using computer-controlled cameras to monitor even the slightest movements of 200 worker ants. To achieve this, we have fixed minute, individual bar codes to the thoraxes of the ants. The computer then measures the position of each ant in the nest twice per second. As such, we can understand all types of interactions between the different members of the colony. The third part of the project comes under the heading of

“experimental evolution”. We use robots equipped with neural networks and a virtual DNA sequence of the genes that manage connections between these neurones.

That sounds like a mammoth project

We have to deploy huge resources to obtain some types of information. For example, recording ant movements twice per second over the space of a month and correlating this information with insect age generates masses of data. This is processed at Vital-IT, the Center for high-performance computing of the SIB (Swiss Institute of Bioinformatics) in the Lake Geneva area.



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ABOUT THE PROJECT

Laurent Keller has been awarded € 2.5 million by the ERC to study social insects. Approximately twenty team members (PhD and postdoc students) are working on this cross-departmental project, which requires expertise in evolutionary biology, animal behaviour, bioinformatics, engineering and molecular biology. The aim is to investigate the guiding principles of social structure and the division of labour, examine how altruistic behaviour and the reliability of communication channels are

shaped by a colony's family bonds, and testing whether the chromosome involved in social polymorphism among social insects shares properties with the sexual chromosome.

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