



TIME TO THINK: SEX AND SOCIETY
BORIS BAER

Boris Baer, born in 1969, is an Evolutionary Biologist. He studied Biology at the University of Zurich in Switzerland. After fieldwork on primates in South America (French Guyana), he completed a Ph.D. 1997–2000 at the Swiss Federal Institute for Technology (ETH) in Zurich. He then moved as a Postdoctoral Fellow (2001–04) to the University of Copenhagen (Denmark) and is currently a Senior Lecturer at the University of Western Australia in Perth. His main scientific interest is the study of sexual reproduction in social insects, especially the way evolution has shaped some of these spectacular mating systems. He uses several social insect models systems for his work, such as bumblebees, honeybees and leaf-cuttings ants. – Address: Zoology Building, School of Animal Biology (MO92), The University of Western Australia, WA 6009 Nedlands, Australia.
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I was a Fellow at the Wissenschaftskolleg and spent three months in Berlin between February and April 2005. Given the short timeframe, I decided to use this stay to formulate my own scientific framework, which defines the areas of my future interests as well as the experimental approaches I could use for the years to come. The splendid library system at the Wissenschaftskolleg allowed me to access scientific literature dating back to the early 19th century, when initial discoveries were made on which we still base our work nowadays. In addition to the luxury of working in a completely undisturbed environment and on my very own project, I enjoyed the interdisciplinary interactions that gave me new insights, not only into my own research, but also quite generally into scientific thinking and scientific theory. My stay at the Wissenschaftskolleg was my first close contact with

disciplines in the humanities and social sciences. I was surprised how fundamental the differences are between the sciences when approaching an intellectual advance. Although I sometimes disagreed about the validity of the methods used or the way data were analysed, I enjoyed being taken to new and often fascinating worlds, especially during our weekly seminars and lectures. From this point of view, my stay will, without a doubt, have long-lasting effects, since my interest in an interdisciplinary exchange of knowledge and ideas is launched now.

As mentioned above, my project started as an attempt to reflect on the work I have done so far and to define new ways of advancing my studies on sexual reproduction in social insects. Social Hymenopteran insects (the ants, social bees, and social wasps) have fascinated humans for a long time, because these insects are not only highly successful in ecological terms, but have also evolved a social system that is quite different from our own human one. A lot of the scientific work on social insects therefore aimed to explain the functioning of these societies in an evolutionary context. As we have learned, social insect societies are not free of conflicts between the members of the society, because individual interests oppose the interests of the entire society (similar to our own society). This is also true for sexual conflicts, where males and females differ in their interests in paternity distributions and reproductive investments. In many non-social insect or vertebrate species, the sexes were found to have evolved a diverse arsenal of mechanical and biochemical weaponry to ensure their own reproductive interests over that of their mating partners. In other words, although sex is a social behavior and based on a common interest of the partners to gain fitness, it can ultimately turn into a war of roses. The study of sexual reproduction in a social context might finally also help us to understand the evolution of our own human societies, and discussions on feminism during my stay at the Wissenschaftskolleg offered me further fascinating insights and inspirations into the potential strength sexual selection is likely to have in *Homo sapiens*. Additional, more philosophical discussions on the strength of sexual selection in our human species and the way culture and gender might have influenced my own scientific thinking added further inspiration to my work. However, sexual reproduction is only marginally investigated in social insects, and we therefore do not know whether sexual conflict is expressed in these species and how such sexual conflicts influence these societies. The vast majority of social insects reproduce sexually, although copulations are restricted to one or very few nuptial flights early in the life of the reproductive queen. Whereas the male typically dies during or soon after the copulation(s), his ejaculate is stored in a specialized organ within the female (termed spermatheca) and survives there

over prolonged periods of times, sometimes even for several decades! Consequently, social insect mating partners are typically committed for life, a marriage that excludes a divorcing option.

My project advanced well during my stay and benefited repeatedly from inputs and discussions with other Fellows. I finally came to the conclusion that our knowledge of social insect reproduction is so little that I have to approach my future work in a twofold way: First of all, I need to know how sexual reproduction is practically performed in these species. This approach includes the study of how copulations are performed, the way sperm is transferred, stored, and maintained in the female, and the way sperm is finally used to fertilize an egg. Based on this knowledge, I can then start to speculate whether sexual conflict is expressed and use experimental approaches. Inspired by my time in Berlin, I will try to reflect on sexual conflict in social insects from two sides, the female's perspective as well as from the male's one (cryptic female choice versus sperm competition). Cross-species comparisons will not only allow me to gain insights into how these mating systems evolved, but also allow me to estimate the strength of sexual selection on the evolution of the societies.

I used the results of my stay in Berlin not only as guidance for my future scientific work, but also for grant and job applications – my first grant application was submitted a few days before I left the Wissenschaftskolleg. Consequently, the real success of my time in Berlin will become visible after some delay, when I will realize how successful referees will judge my manuscripts and job applications. Lets hope they get as excited about social insect reproduction as I am!