

IN MEMORIAM

In memoriam Christian Peeters (1956–2020)

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Christian Peeters at the meeting of the French speaking section of IUSSI in Paris in August 2017

Christian Peeters, a passionate myrmecologist well known to the IUSSI, passed away on September 1st, 2020, in Paris. At 64 years of age, Christian held the eminent position of *Directeur de Recherche* at *Centre National de la Recherche Scientifique* based at the *Institut d'écologie et des sciences de l'environnement de Paris*. There, Christian communicated freely with his peers, his students and the public alike

on matters he found of interest and importance, which, for Christian, mostly involved ants. His contribution to social insect science over a period of 4 decades was steady, sound and significant. We are saddened that he is gone, but his worldly curiosity to discover and explore will live on through his former students and colleagues, and through his life's written and recorded work.

Christian was born in Brussels. He moved to South Africa for family reasons when he was 15. He did all his academia in Johannesburg, including his PhD at the University of Witwatersrand under the supervision of Prof. Robin Crewe (1983). After his PhD, he continued his career with four post-docs, at the University of Witwatersrand (1984), at the University of New South Wales (Australia) with Prof. Ross Crozier (1985 to 1989), at Nagoya University (Japan) with Prof. Yosiaki Ito (1990), and last at Würzburg University (Germany) with Prof. Bert Hölldobler (1991). With this experience in hand, he got a full-time research position at the *Centre National de la Recherche Scientifique* in France. He was initially based at the *Laboratoire d'éthologie expérimentale et comparée* at *Université Paris Nord* and later at the *Laboratoire d'écologie* at *Université Pierre et Marie Curie* (now part of *Sorbonne Université*) in central Paris.

Soon after his arrival in France, Christian started supervising four PhD students. All studied tropical ants. One was in Paris and three were based abroad and co-supervised with international collaborators. This international and tropical tropism is a hallmark of Christian's career, and indeed of his life. Although based in Paris for nearly 30 years, he travelled the world to study ants. He was interested in tropical species and did most of his field work in Africa, Australia and Asia, with a few visits to South America.

Christian was passionate about ants, which he studied with an almost childish jubilation. Over the years, he studied many aspects of their biology, ecology and evolution. He worked on a variety of topics, such as foraging and recruitment, nestmate discrimination, worker polymorphism, colony life cycle, developmental biology, reproductive hormones, association between ants and epiphytes, and even wasp parasitoids of ants. However, his main research interest

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was the division and the regulation of reproduction, which he studied through behaviour, chemical ecology and morphology. He started addressing this topic during his PhD, which was entitled “Social organization, breeding biology and the process of reproductive differentiation in *Ophthalmopone berthoudi* Forel, a ponerine ant”. During a conversation with Bill Brown, Christian and Robin Crewe coined the term “gamergate” that refers to a mated and egg-laying worker (Peeters and Crewe 1984).

Christian carried out many studies on the reproductive biology of species with gamergates, which include queenless ants but also species possessing both gamergates and queens. His work focused on how dominance interactions regulate access to mating and egg-laying rights (e.g. Peeters and Higashi 1989; Monnin and Peeters 1999), including worker policing (e.g. Gobin et al. 1999; Liebig et al. 1999), and the production and role of chemical cues of fertility (e.g. Peeters et al. 1999; Liebig et al. 2000; Dietemann et al. 2003). He studied the conditions favouring the existence of queens and gamergates in the same species (e.g. Peeters and Hölldobler 1995). Over the years, Christian studied a large diversity of species, notably from the genera *Diacamma*, *Dinoponera*, *Gnamptogenys*, *Harpegnathos*, *Myrmecia*, *Ophthalmopone*, *Pachycondyla*, and *Streblognathus*, including *S. peetersi* that was named in his honour.

Christian also approached the partitioning of reproduction through the prism of the evolution of queen/worker polymorphism. He studied the external morphology and the reproductive physiology (spermatheca and ovaries) of all possible types of females: gamergates, inter-castes, ergatoid queens, dwarf queens, brachypterous queens and winged queens. He linked the loss of flight ability of these female reproductives with the ecology and life history of their species, especially the modality of colony foundation. He showed that dependent colony foundation evolved repeatedly not only in ants (Peeters and Ito 2001), but also in other social insects (Cronin et al. 2013). Christian’s interest in the regulation of reproduction and caste dimorphism even led him to venture outside of his beloved ant world, to study these traits in the naked mole rat (O’Riain et al. 2000).

Although Christian studied reproductive females through most of his career, he was also interested in workers. Indeed, the morphology of both queens and workers have evolved to allow them to perform their respective roles, and Christian was interested in how the loss of flight in workers had allowed new possibilities of morphological reorganisation. For instance, the loss of flight muscles has allowed the evolution of more powerful neck and leg muscles, yielding more strength to workers to carry heavy loads (e.g. Keller et al. 2014). In recent years, Christian became interested in the biology of two genera that are closely associated with Diaspid scale insects and live in the wood of live trees, *Melissotarsus* in Africa and *Rhopalomastix* in Asia. These

ants display surprising morphological adaptations, such as powerful muscles to chew through live wood, silk production by adult ants to seal off open tunnels, and modified mid legs in *Melissotarsus* to better walk inside tunnels (Khalife et al. 2018; Billen and Peeters 2020).

Christian’s move to South Africa as a teenager made him a lifelong Springboks fan. This was somewhat irritating as he kept supporting the wrong team, especially given that it far too often defeated the right team. But Christian’s support for the “Boks” was partly a ruse, for his true support went to his many friends and visitors, with whom he enjoyed socialising. Christian’s passion for science and ants married his enjoyment for socialising during the many scientific meetings which he enjoyed so much. He loved traveling and meeting people. Though he always had many friends and colleagues to see at any scientific gathering, he was also interested in meeting new people and he was friendly and paid attention to students.

Christian was once president of the French-speaking section of IUSSI. He also very much liked participating in ant identification and training courses and engaged with other popular science events. He was always happy to talk, and ready to sort out any conflict through a peaceful and open-minded discussion, preferably at the terrace of a café or in a pub. Christian had started a series of short animated YouTube movies under his channel ‘ant life’ explaining the life of ants to the general public. He had many other plans to carry him through his retirement years. His enthusiasm, appetite for life and humour will be missed by us, his co-workers in Paris, and by many throughout this society and throughout the world. Christian is survived by his partner Nareth Phansua, with whom he produced the animated movies, and his sisters Annie Downes and Françoise Schilter.

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