



READ, THINK, INTERACT
JACOB C. KOELLA

Born in 1958. After having received a diploma in Mechanical Engineering from the ETH Zurich, Jacob Koella started to work on problems of evolutionary ecology as a Ph.D. student of Steve Stearns, with whom in 1986 he co-authored an influential paper about life-history theory. His scientific career continued in several countries. Until recently he was Professor of Epidemiology at Imperial College London. As of September 2012 he is Professor of Parasitology at the University of Neuchâtel. Jacob Koella's research interests lie in the evolutionary ecology of host-parasite interactions; he tries to understand their complex co-evolutionary dynamics by combining theoretical models, laboratory experiments and field investigations of several host-parasite systems. Publications: Koella, J. C., A. Saddler and T. P. S. Karacs (2011). "Blocking the evolution of insecticide-resistant malaria vectors with a microsporidian." *Evolutionary Applications* 5: 283–292; Koella, J. C., P. A. Lynch, M. B. Thomas, and A. F. Read (2009). "Towards evolution-proof malaria control with insecticides." *Evolutionary Applications* 2: 469–480; Stearns, S. C. and J. C. Koella (1986). "The evolution of phenotypic plasticity in life-history traits: predictions of reaction norms for age and size at maturity." *Evolution* 40: 893–913. – Address: Institut de Biologie, Université de Neuchâtel, rue Emile-Argand 11, 2000 Neuchâtel, Switzerland. E-mail: jkoella@gmail.com

My report on a year at Wiko can only begin with a big thank you to the staff who created such a comfortable environment, who did almost anything to make our stay pleasant and productive, and who managed to be cheerful despite all the strange requirements that we

Fellows may have had. They contributed enormously to a very enjoyable and unforgettable year.

What makes Wiko so special, among other things, is the company of and discussions with an amazing group of people, the location of Wiko in the city of Berlin, and having the freedom and time to think about my research interests.

Before arriving at Wiko, I was looking forward to, but also anxious about, the interactions with the other Fellows, many of whom are much more accomplished than me. My worries turned out to be unnecessary, my hopes more than fulfilled. Wiko managed to create an environment that was intellectually stimulating, yet friendly and relaxed. The Tuesday Colloquia and the lunches and dinners were conducive to creating intellectual and personal links among the diverse Fellows and their families, who come from a wide range of backgrounds, ages and nationalities. This led in my case to many stimulating, interesting, and eye-opening conversations about areas I had very little knowledge of. The relaxed and friendly atmosphere also let us discover aspects of others that we see too rarely in professional colleagues. For me, the most important and enjoyable one was the musicality of a large number of people at Wiko, giving me regular opportunities to play chamber music (indeed I haven't played so much cello in many years) with staff (Sonja), Fellows (Mark, Daniel, and Hollis) and the Fellows' partners (Clara and Gemma). Thus, Wiko has been a source of wonderful and wonderfully interesting people to talk to and to play music with. I suspect and hope that at least some of friendships we have forged will last longer than July 15 when we sadly must leave to return to the real world.

It became most clear to me how much we had grown together as a community after my stay at Wiko was unfortunately cut short when my wife fell ill, so that I had to spend most of the last three months of the year in the UK. Concerned e-mails from my fellow Fellows and warm greetings when I arrived back in Berlin were a great comfort and gave me the feeling of being part of a large family.

Then there is Wiko's setting in an amazing city. Foremost are the number, quality and diversity of the musical culture, with outstanding performances at the Philharmonie, the Deutsche Oper, and many other venues. Indeed, with enough time (and money) one could enjoy a great concert almost every day. Of course this is not restricted to classical music; a favorite jazz club (A-Trane) is almost just around the corner from Wiko. On the other hand, what is also just around the corner from Wiko, and what struck me whenever I passed it as I was jogging, is "Gleis 17", a monument at the train station from where tens

of thousands of people were deported to death camps. Indeed, one of the most striking aspects of Berlin is this ubiquitous proximity of the best and worst of humankind.

One of my first impressions of Berlin was of space, induced by its big streets, its parks, its lakes, and most importantly (in particular in comparison with the other large cities I have lived in, Paris and London) the lack of crowds. The city usually feels quite empty. I sometimes jogged in Grunewald without seeing a single person; I was almost always able to find a seat in the S-Bahn or U-Bahn, even on Friday evenings (whereas in London it's difficult to even get into the tube). Berlin is a great city to travel in on bike: it is flat and has an impressive network of bike paths (though I realized a bit late that a trip to the eastern parts of Berlin is a rather long bike ride). It does, though, seem strange to build many of the bike paths in the middle of the sidewalk. I had a number of near-hits with pedestrians crossing the bike paths.

Finally, being at Wiko gave me the opportunity to read and think and to evaluate and redefine my research interests. Most of my thinking this year has been about how the quality of a host's environment affects the epidemiology and evolution of its parasites. This led to two grant proposals on issues that had been at the back of my mind for quite some time. One is to predict how our current climate changes might affect the development of mosquitoes, their interaction with malaria parasites, and thus the epidemiology of malaria. Although there are numerous studies suggesting that climate warming will increase the transmission of malaria, it has long appeared to me that most of these ideas are much too simplistic and in particular that they neglect important issues of the natural history and the evolutionary biology of the mosquito-malaria interaction. My time at Wiko let me formalize these ideas more concretely. The other is on how a host's food levels influence the growth and evolution of the parasites that infect it. Most ideas about the evolution of parasites neglect that the host's condition influences the parasite's pathogenicity, although it seems fairly obvious that, for example, undernourished individuals suffer more than well-nourished ones. Such differences must influence the parasite's optimal strategy. My work on these issues during the last year has been theoretical, writing down equations describing the host's and parasite's evolution when they are constrained by the host's energy budget (the difference between the energy the host takes up, the energy it uses for its metabolism and the energy stolen by the parasite to support its own growth). I started working on this with the idea that I could use standard evolutionary theory relating the host's growth to its life-history traits. I realized, however, that the way this is generally done is inconsistent with the mechanics of the energy budget. I hope that,

after several months of frustration and quite a bit of input from fellow Fellows, I have managed to find a way that gives a mechanistic underpinning of the link between the host's growth and life-history traits and that I can thus continue thinking about the co-evolution of the host and parasite. I am looking forward to considering some of these issues experimentally in my lab.

Although I managed to give up my editorial duties on journals and to say "no" to most invitations for talks, I was only partly successful in restricting my work to thinking about new ideas. Other work has included helping Steve to teach a course on evolutionary medicine in Portugal, which would have been difficult without the freedom of being at Wiko, and applying for a new position in Switzerland, which I have received (certainly in part due to the feedback I received from Fellows on my application and presentation) and am in the process of moving to.

I end as I started, with a big thank you. I am grateful to Wiko for enabling me to enjoy an exciting and productive year and to my fellow Fellows and their families for providing so much fun and intellectual stimulation.