PLASTICITY WITHOUT LIMITS

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As an experimental biologist working on the evolution and plasticity of development in nematode worms, I participated in the focus group "Adaptive Plasticity". During my three-month stay at Wiko, I therefore aimed at being plastic myself: trying to leave professionally imposed biological barriers behind me, exposing myself to different scholarly views and thoughts. Surprise came in three parts. 1. How little I knew about how non-biologists work and think. 2. How very deep the cultural separation goes between the different academic fields, such as the natural sciences and the humanities. 3. Most importantly: How many interesting things there are to know outside biology! The intellectual richness of the Wiko environment typically experienced in discussions over lunch, dinner or coffee/beer made me quickly realize that Wiko wasn't the seclusive, workaholic monastery I had hoped for (or not).

The objective of my Wiko project was to develop the conceptual aspects of my experimental research on the topic of phenotypic plasticity, in particular, its role in the evolutionary process. The term *phenotypic plasticity* describes all forms of environmentally

induced phenotypic variation – whether adaptive or non-adaptive. Central in the nature-nurture debate, phenotypic plasticity reflects the flexibility of a single genome to express a variety of different phenotypes. That the environment may dramatically affect the development and morphology of many organisms has been acknowledged for a very long time. Yet, with the rise of genetics during the early 20th century, the developmental role of the environment and its evolutionary significance became largely ignored. Despite important exceptions, such as the work by the great British biologist Conrad Hal Waddington, it was only relatively recently that interactions between genes, development and environment received increased attention, particularly in evolutionary biology. The concept and relevance of phenotypic plasticity in evolutionary processes have been controversial and subject to much discussion. In the past decades, it has become very clear that phenotypic plasticity of a given trait is often heritable and might contribute to the persistence of natural populations when they are confronted with extreme environmental conditions. However, the notions that plasticity has pronounced effects in processes of adaptation and speciation remain vague and little supported by empirical data, and theoretical aspects have not been well elaborated. While my limited expertise prevents me from working on theory, I hope to contribute to resolving this issue by focussing on two empirical aspects. First, studying the molecular and developmental mechanisms underlying phenotypic plasticity by exposing a model organism (*C. elegans*) to ecologically relevant environmental variation. Second, studying the evolution and evolutionary consequences of plastic traits through experimental evolution assays. I strongly believe that the detailed understanding of the molecular genetic and developmental underpinnings of plasticity need to be understood for this research program to be successful.

Alexander von Humboldt apparently once said, "Our imagination is struck only by what is great; but the lover of natural philosophy should reflect equally on little things." I am taking this statement as calming reassurance about having turned into a biologist working on a tiny worm that eats bacteria on rotting fruits. Also, in contrast to many other Wiko Fellows, I can ignore the biological and cultural complexity of humans (well, besides the fact that even biologists are human beings). This insight sometimes provides relief. Overall, my stay at Wiko allowed me primarily to catch up with a lot of literature that was piling up in my office, unread for years. It also helped me to organize my thoughts, plan projects and write papers and grants. Moreover, many scientific seminars at Wiko and the discussions with my fellow biologists Mark, Thomas, Ricardo, Steve and many more were highly motivating and inspirational for my own research activity.

Naturally, the most lasting memories were shaped through interactions with other Fellows at Wiko. One major challenge in my daily scientific life is to bridge a gap between molecular biologists – concerned with proximate causation of biological processes – and evolutionary biologists, primarily focusing on ultimate causation in biology. A non-trivial endeavour. Evolutionary biologists accuse molecular biologists of rampant molecular reductionism, while the latter belittle evolutionary biologists for lack of rigour in causative analysis. At Wiko, such interdisciplinary confrontations (of a mainly positive nature) are taken to extremes, with artists and scholars of philosophy, social sciences, biology or theology entering into dialogue – or at least: listening to each other's monologues. Never before in my life had I been exposed to such a diversity of surprising thoughts and views, intriguing personalities and academic knowledge. My Wiko experience turned into an enjoyable mental oscillation between fascination, intellectual hunger and mild culture shock. Certain Tuesday Colloquia felt like alien abductions – though, for most part, pleasant to endure. Despite the fact that seminar participation is enforced by Wiko policy, I was always looking forward to the colloquia, eagerly anticipating lecture content and style and the usually wide spectrum of curious, lengthy and impenetrable questions; although at question time, anticipation became increasingly physical, focused on another gourmet lunch.

An overarching Wiko theme is crossing the borders of different academic and artistic professions. This is certainly a very welcome and positive endeavour. But to what extent are we actually able to communicate across these borders? And to what extent do we learn and benefit from these interactions – at a professional and a personal level? I had the impression that interdisciplinary communication, in particular between biologists and non-biologists, was often severely limited, without wanting to blame one or the other side. Nevertheless, while seeking interdisciplinary exchange may sometimes be futile in terms of measureable results, at the very least, interdisciplinary exchange trains our capacity to listen, to be modest – and to be surprised.

My time at Wiko was wonderful. I am taking with me many memories of inspiring and unique interactions with many Fellows. I am very happy and thankful to have shared this time with them. My gratitude to Wiko is great.