Preface

Novel scientific ideas have historically been met with resistance from parts of society, best exemplified by Galileo Galilei and, more dramatically, Giordano Bruno. It is, thus, not surprising that even in the 21st century objections are expressed by many when the genetic modification of organisms and its use in potential applications are brought into discussion outside the strict scientific community. The potential use of genetically modified insects in the control of vector-transmitted diseases is no exception. The aim of this book, stated immediately at the beginning of this preface, is not to help overcome these objections but, rather, assist scientists in finding answers to these arguments and possible misunderstandings. It is hoped that this can be achieved by improving collaboration and cross-talk between them.

The diffusion and adoption of modern biotechnological innovations, from laboratory settings to full implementation in 'real life' is a complicated process. With many as yet unknown variables influencing the speed at which this may occur there are six general factors affecting the adoption process of novel methodologies aiming at controlling vector-transmitted diseases:

1. The technology should have a relative advantage or be of a complimentary nature to existing tools available for these diseases.
2. The approach should be consistent with the values, experience and needs of the society in places where the technology is to be applied.
3. The technology should be easy to understand, develop and implement without the need for significant investment in knowledge and skills acquisition.
4. The technology should be able to be trialled or piloted on a limited basis.
5. The technology should deliver noteworthy public-health benefits
6. Last but not least, the technology should be shown to pose no threats to either local or global environment.

With regards to the current status of the development of new genetic control methods for disease vectors, none of the above points are fully met or they remain simply unknown, making adoption highly unlikely. As governments and agencies responsible for vector control in disease-endemic countries have not seen any outcome of transgenic approaches beyond laboratory experimentation, it will at present be hard to justify a commitment of their limited resources to such new approaches rather than to tools known to deliver certain public-health gains. At present, therefore, no advantages of modern genetic control tools can be seen, pressing the need for all parties involved to establish proof-of-principle beyond laboratory boundaries. This book is the first of its kind to describe the opportunities to do so, and stresses throughout that this will depend on active and genuine collaborative efforts between those working at the bench and those conducting field research.

A huge gap has arisen between those developing molecular-genetic approaches to render disease vectors incapable of transmitting disease and those practicing vector research, and control in the field and mechanisms for bridging this gap are lacking. University curricula promote specialization rather than diversification, hindering opportunities to bridge existing gaps. Students in developing countries lack the resources needed to acquire the high-tech laboratory skills available in the North.

Beyond experiencing this for a limited duration (e.g. during a PhD project or coursework in northern laboratories) they are limited to basic and often rudimentary infrastructural facilities and end up practicing skills acquired prior to their 'high-tech' experience. It is somewhat surprising that five years after the first successful germline transformation of *Anopheles* no single laboratory in sub-Saharan Africa has developed

the research infrastructure to conduct similar research. Yet, as mentioned above, equitable partnerships and collaborative research are at present the most likely drivers of the adoption process.

Developments over recent years have been dramatic and the prospects of using genetic control methods to reduce vector-borne disease are becoming, albeit in the long-term, real. The most challenging part of this endeavour is the transition of technology from the laboratory to field settings, which, no doubt, will be a lengthy and difficult process. This book provides key insights into this process, lists many examples of research components for which the transition may soon be undertaken, and summarizes thoughts, ideas and opportunities drafted jointly by both laboratory and field scientists who met in Nairobi, Kenya in July 2004.

It is our sincere hope that this volume may facilitate the adoption process of modern biotechnological approaches to combat vector-borne diseases and may ultimately expedite the full evaluation of these approaches in terms of public-health benefits in the developing parts of the world.

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