Preface

Disease reduction is a major, long-term goal for the application of insect molecular genetics. In recent years rapid advances were made in the molecular genetics of mosquitoes, such that unravelling the genome of a species is now becoming an increasingly frequent event. Knowledge gained from these accomplishments is expected to contribute new insights to multiple aspects of mosquito biology, including a better understanding of species interactions and reduction of disease caused by the pathogens that mosquitoes transmit. The idea of using genetically modified mosquitoes (GMM) to reduce vector-borne diseases is founded on the notion that genetic constructs that will render mosquitoes incapable of pathogen transmission can be driven into vector populations. Conceptually, this is an exciting and novel approach to improving public health. However, because the consequences of releasing genetically modified insects into the natural environment could be significant, utilization of GMM for disease control deserves thoughtful evaluation. For example, it can be argued that the evolutionary forces that shape natural ecosystems may produce unexpected outcomes when confronted with GMM. The question has been raised whether the outcomes for natural ecosystems and public health of releasing GMM are sufficiently well understood to predict results with some degree of certainty. It is generally agreed that a significantly elevated understanding of the ecological underpinnings of disease control by GMM will improve the prospects for its successful and safe application.

In order to develop a framework for future research that will contribute to a better understanding of the ecological aspects of GMM, experts in the field of mosquito ecology were invited to a workshop during June 2002 at Wageningen University and Research Centre. The meeting was noteworthy because it was the first time that mosquito ecologists met for the specific purpose of discussing the application of GMM for disease control. The meeting format consisted of oral presentations on selected topics followed by discussion and debate. Participants critiqued the current status of knowledge regarding potential affects that transgenic mosquitoes might have on a natural ecosystem and the force of malaria and dengue transmission. The chapters that follow are derived from presentations at the meeting. In some cases they were expanded or modified from their initial content based on discussion in Wageningen and/or inclusion of the most current published literature.

The Wageningen meeting was an important first step toward encouraging people with different but complimentary expertise to work together to develop strategies for disease reduction that emphasize improving public health and minimizing adverse environmental affects. It is our desire that this volume will be a stimulus for future meetings that recognize the value of vector ecology for prevention of vector-borne disease.

The organizers

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