

## INSECTS AND DISEASE

Richard Wall from the School of Biological Sciences at Bristol University reports on some of the highlights at the biennial international symposium of the Royal Entomological Society, held at the University of Aberdeen, UK, from 10–12 September 2001

### The insect-host disease interface

Following a comprehensive overview of the emerging techniques for the control of plant and animal pests and pathogen vectors, by John Pickett (IACR-Rothamsted, UK), John Gatehouse (University of Durham, UK) described studies of the digestive protease enzymes used by phytophagous insects and the potential for incorporation of genes into crop plants for the synthesis of protease inhibitors, directed against the digestive system of the pests. Don Champagne (University of Georgia, USA) outlined the complex physiological responses of the vertebrate host to the probing of blood-feeding insects which, he argued, must be fully evaluated if intervention points in the process of disease transmission by vectors are to be identified. George Dimopoulos (Imperial College, UK) described the effects of malaria parasites on the mosquito vector, highlighting the fact that only a relatively small number of mosquito species are capable of acting as vectors of malaria, largely as a result of their longevity. The ability of the mosquito immune system to destroy the parasites as they pass through the gut, which is particularly evident in refractory strains, was highlighted and the genetics underlying the immune response of refractory mosquito lines outlined. This theme was extended by Rob Goldbach (Wageningen University, the Netherlands) who described the relationship between plant pathogen *Tospoviruses* and their thrip vectors. However, in this case, despite active replication in the thrip vectors and the devastating effects on the hosts of *Tospoviruses* such as Tomato spotted wilt virus (TSWV), the pathogen seems to have no negative effect on the vector. Flaminia Catteruccia (Imperial College, UK) described current studies directed towards the development of transgenic mosquitoes with a non-permissive phenotype for malaria transmission. As part of this work, studies have been undertaken to look at competition between transgenic green or red fluorescent protein expressing lines with wild-type *Anopheles stephensi*. Results to-date show that the transgenic strains have a competitive disadvantage and are rapidly excluded in culture. Finally, Frank Collins (University of Notre Dame, USA) described the state of progress in the project to sequence the entire genome of *Anopheles gambiae* and the potential value of this information in the development of novel genetic techniques for vector control.

### Insect control in the new millennium

Richard French-Constant (University of Bath, UK) discussed the idea that a greater understanding of the molecular basis

of natural selection of traits controlled by a single or a few genes, may provide insights into the way introduced novel genes in transgenic insect strains might behave in natural populations. This theme was extended by Denis Bourguet (Institut National de la Recherche Agronomique, La Minière, France) who considered the potential for the development of resistance in insect pests against the *Bt* toxin expressed in genetically modified crops. While theoretically possible, Dr Bourguet's studies indicated that resistance is likely to be slow to develop. Tariq Butt (University of Swansea, UK) outlined the use of fungi for insect pest control and John Pickett (IACR-Rothamsted, UK) described the use of plant derived semiochemical signals to manipulate the behaviour of the pest insect, in push-pull strategies. Paul Christou (John Innes Centre, UK) suggested that insect pest resistance to plants engineered with single insecticidal genes is more likely than to plants with multiple modifications, and described work underway to explore pyramiding resistance in rice using multiple insecticidal genes that target the same insect through a variety of different mechanisms. A second strategy is also proposed which uses fusion proteins that bind active proteins and appropriate receptors in the mid-gut of the insect pest. John Sutherland (University of Southampton, UK) presented an overview of a risk assessment scheme for exploring the potential environmental impact of transgenic plants and raised the possibility of using genes to insert traits for plant characters that might be advantageous for biocontrol. The biochemistry and genetics of insecticide resistance in mosquitoes was comprehensively described by Janet Hemingway (Liverpool School of Tropical Medicine, UK).

### The Royal Entomological Society

Founded in 1833 as the Entomological Society of London, the Royal Entomological Society plays a major national and international role in disseminating information about insects and improving communication between entomologists. Many eminent scientists of the past, Darwin and Wallace to mention but two, have been Fellows of the Society. The aim of the Society is "the improvement and diffusion of entomological science". The aim is achieved by holding meetings on all aspects of entomology; publishing the results of entomological research in six primary journals maintaining a large entomological library; supporting entomological expeditions; and informally, by generating discourse between entomologists, both amateur and professional.