Annual Review of Entomology, 2011. May R. Berenbaum, Ring T. Cardé and Gene E. Robinson (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 56. xi + 532 pp. Price: US$ 86.

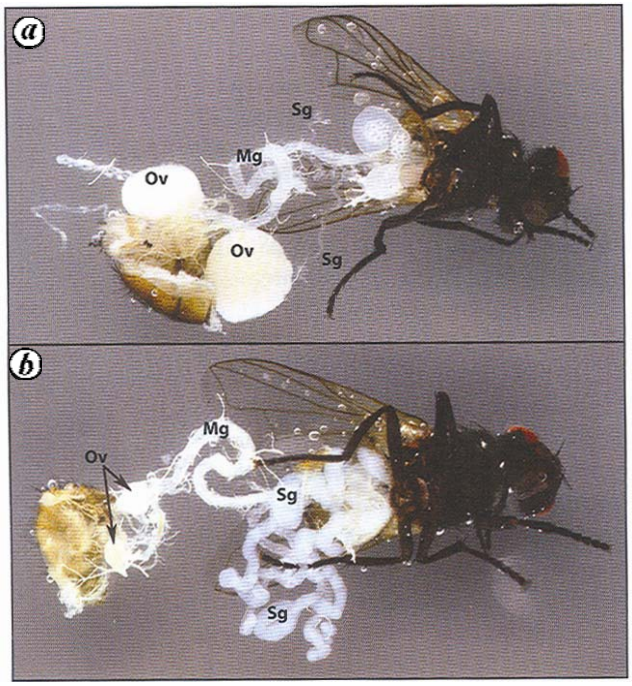
Even while we have compartmentalized science into many disciplines and subdisciplines for the convenience of practice, it is a unifying concept, and boundaries between disciplines become fuzzy as a field grows and acquires volume. Just as this is true at the level of physical, chemical and life sciences, it is also true at the level of the areas of specialization within these disciplines. Biology has probably the largest number of fields of specialization among the various mother disciplines of science; this is because it is difficult to understand the complexity of life without probing deep. Entomology has emerged as an independent discipline nearly three centuries ago, and has seen many new advances since. Interest in insects is no longer limited to taxonomical categorization, anatomical explorations, or pest control. Today, research in the field of entomology spans many disciplines, from taxonomy to molecular biology, microbiology to ecology, mechanics to toxicology and physiology to behaviour, to name a few. This volume of the *Annual Review of Entomology* is an excellent attempt to compile reviews in many such areas of research on the most abundant taxon of the world – insects.

This volume features articles in the classic areas of taxonomy, physiology, pest control and ecology from various perspectives, along with interesting articles on insect navigation, physio-chemistry, applied entomology and cognition. Here, I discuss a few of the more interesting reviews in some detail so as to provide the readers a taste of the different flavours that have been carefully chosen to make this issue delectable to a large readership.

Vector-borne diseases have always been a subject of concern and intensive research in the field of entomology. Diseases like malaria and dengue, that were once thought to be under control, are re-emerging as a threat, especially in the developing countries, and research in many areas have been targeted to fight such diseases, be it at the level of the vector or the pathogen. The review by Eisen and Eisen on the use of the Geographical Information System technology in the modelling of vector-borne diseases across the world is quite interesting. The authors not only mention the various model-based approaches used in this field of research, but also elaborate on how some countries have put this technology to use in the control of such diseases. They conclude with a positive look at the future, suggesting that the poorly developed, disease-intense areas should be targeted for future research on vector-borne diseases, using cheap and easily accessible technology.

Research in biotechnology has been used to enhance agricultural output for many years now. In an insightful review, Chen *et al*. discuss 20 years of contemporary history in China, from 1989 to 2009, the years that saw the journey of genetically modified (GM) rice from the research laboratories to the markets. China is the largest producer and consumer of rice in the world and various records show that rice cultivation dates back about 7700 years in China. In spite of the high production, China faces the threat of a crisis unless it can increase rice production to 0.2 billion kilograms per year, which is equivalent to the current worldwide rice production. One of the ways to face this demand is obviously to come up with better pest-management strategies, and the government-backed research institutes to work on developing pest-resistant varieties of rice through biotechnology. This led to the production of the first *Bt* rice in 1989. The review discusses the many obstacles in this research and the means by which some of these have been bridged. The Chinese government issued the first two biosafety certificates for the commercial production of *Bt* rice in 2009. However, this is only a short step towards the future, and the authors conclude that research on GM rice needs to reach newer heights to ensure effective insect pest management in the future.

One of the reviews that caught my attention because of its novel perspective is titled 'Arthropod-borne diseases associated with political and social disorder'. Here the author focuses on people who have been forced to leave their homes as refugees due to political, economic and environmental disasters. Such movements inevitably lead to large numbers of people living a life of utmost destitution and such people become the prime targets of ectoparasites like lice, fleas, ticks, mites, flies and bed bugs. The review discusses the etiology, geographic distribution and complications of various diseases caused by these ectoparasites, like trench fever, epidemic typhus, plague,



Musca domestica females with (***a***) healthy and (***b***) hypertrophied salivary glands showing the lack of ovarian development in the SGHV-infected fly (***b***). Mg, midgut; Ov, ovary; Sg, salivary gland.

spotted fever, scabies, etc. Though the review is quite extensive in terms of the various arthropod-borne diseases that it covers, I was left a little unsatisfied, because from the title I had built up an expectation for a more detailed discussion on the socio-economic perspective of these diseases. But for anyone who is interested in just the biology, this review would be informative.

Forensic entomology has emerged as a useful branch of forensic science in the last three decades. Forensic entomologists are typically asked to judge the time of death by investigating arthropod development rates and community succession in corpses. Though the assessment of the time of death based on these evidences is accepted in the court of law, it is accepted by entomologists that such assessments are based on certain assumptions. The European Forensic Entomology Association recognizes that the onset of arthropod colonization does not necessarily coincide with the actual time of death, and hence, the time for which arthropods were present in a corpse should not be directly taken as the post-mortem interval. On the other hand, it has been suggested that the period of insect activity in the corpse, defined as the time from arthropod colonization until discovery of the remains, might be used by forensic entomologists. Tomberlin *et al*. have discussed the possibility of using the knowledge of arthropod behaviour in conjugation with molecular tools to bridge this gap between current practices in forensic entomology and basic research, so as to attain higher levels of accuracy in forensic analysis. The article is well written, and the arguments put forth by the authors are strong and clear. Since forensic research is a field that directly affects lives, the need to take stock of the current scenario and engage in more intense research is indeed high.

Having been trained in social insect behaviour, I have a soft corner for ants, bees and wasps, in spite of their bites and stings. Hence it is not surprising that I was attracted to the review by Roulston and Goodell, on the factors affecting the regulation of wild bee populations. Bees are major pollinators in various ecosystems, and also for many crop plants. In recent years, there has been a decline in wild bee populations in many countries, and this is an alarming situation for agriculturists and ecologists alike. This article discusses the various factors like floral resource abundance, limitations of nesting sites, parasite and pathogen effects, etc. that are thought to affect bee populations in nature. Though such factors are generally considered to be important in the management of bee populations, controlled experiments in which the roles of the various factors are tested by manipulating some factors while keeping the others constant are lacking. There is a need to undertake such manipulative experiments that would enhance our knowledge of the ecology of the bees and hence manage them better.

This volume has been highly informative and enlightening for me. However, I felt that the focus of the book is a bit skewed towards applied entomology, though the editors have made an effort to have articles on taxonomy, evolution, ecology, behaviour, molecular biology and medical entomology. The slight bias towards applied entomology is understandable, because worldwide there is more thrust on research in the field of pest management, climate change and disease management. I would have liked to see a review of the progress in the field of social insect behaviour in the last couple of decades, because this field has indeed expanded its horizons immensely in the recent past. One recent development in the area of social insect research has been the use of network theory to understand social systems, which has opened up new horizons for research where theoretical predictions can be tested using interesting model systems that can be manipulated easily. On the whole, I feel this volume would be a good addition to many university libraries because it can provide sumptuous food for thought to students of entomology.

I firmly believe in Theodosius Dobzhansky's statement 'Nothing in biology makes sense except in the light of evolution', and I would like to end this piece with a special mention of the review by Allen *et al*. that appears towards the end of this volume. Amongst a series of articles that discussed applied entomology from various perspectives, I was quite happy to find this outlier – a review of sexual dimorphism in Lepidoptera that discusses sexual and natural selection, and the interplay between the two in the evolution of the differences between the two sexes in moths and butterflies. I strongly recommend this article to anyone interested in the Lepidoptera sexual selection or evolution in general. And of course, for the diehard taxonomists and evolutionary biologists there is dessert on page 487 – a detailed discussion of the last 25 years of research in the field of heteropteran systematics. Weirauch and Schuh take us on an enlightening journey from the slow days of comparative morphology to the modern-day molecular systematics to delve into the evolutionary history of the true bugs of the world.

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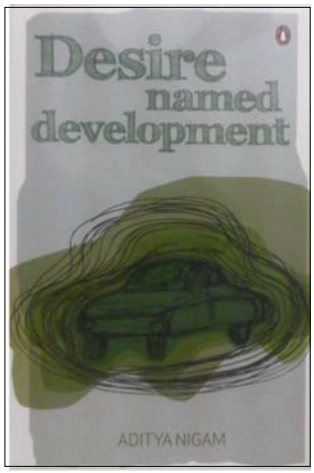

Desire Named Development. Aditya Nigam. Penguin Books India Pvt. Ltd, 11 Community Centre, Panchsheel Park, New Delhi 110 017, India. 2011. 106 pp. Price: Rs 199.

…And thus, one day when the rich are richer, when corporations make super profits, when we achieve 10 per cent decennial growth, we will find that wealth will trickle down and that day the people at the bottom of the pile will also start getting the benefits of growth. The unemployed will find jobs and the hungry will have food…But for that to happen, in the