Book review

Genescapes: The Ecology of Genetic Engineering

S. Nottingham

Zed Books, 2003; 211pp. £12.95 paperback.

ISBN 1-84277-037-3

Heredity (2003) 90, 203. doi:10.1038/sj.hdy.6800199

From the title of this book, it appears that a technology can have an ecology: an interesting metaphysical idea but not one that endears itself to an ecological geneticist like me! However, the intentions are clearly spelt out on the first page – Nottingham sets out to explain the ecological principles behind risk assessment of GMOs. He makes a solid job of explaining how GM crops are constructed and why biotechnologists are so keen on using transgenic techniques to modify crop phenotypes. This leads to a section linking selected ecological principles to the risks posed by some transgenic organisms, then launches into three chapters discussing potential risks from microorganisms and transgenic crops, implying that, to date, ecological risks have been high. How he reaches this conclusion is beyond me, because the truth is that in many cases we cannot really quantify risk because there are insufficient data to do so. Nottingham touches on this key deficiency in risk assessment in two short paragraphs, but frustratingly does not dig deeper. I might have been happier with this section had he concluded that the jury is still out on many areas of risk assessment, and that a cautious approach to environmental release of some GMOs is justified on these grounds alone. However, to be fair he makes this point later in the book.

In a chapter on 'genetic pollution' he seems to accept concepts of 'genetic contamination' and 'pollution' as having scientific validity without closer examination of these keystones of opposition to biotechnology. The key question of 'does gene flow matter?' is left hanging in the air. I would have preferred a bit more on impacts of transgenes on fitness in natural and farmland ecosystems.

In later chapters, he surveys transgenic work on microorganisms, fish and trees, looking at potential risks with a reasonably objective eye. He explores how ecological risk assessment is done but does not clearly explain the

processes in, say, the UK and the US, concentrating instead on what he sees as deficiencies via various case studies. He makes the important point that there should be a unified risk assessment process for all novel organisms, but then somewhat confusingly tries to make a case for uniqueness of ecological risks from GMOs, focussing on gene silencing, where there may be unique risks, and pleiotropy and gene stacking, which can equally occur in 'conventionally' bred organisms. One of the case studies he gives is the current UK farm scale evaluations. Nottingham says that these experiments compare the biodiversity of the crops, but in fact they compare the impacts on field biodiversity of different herbicide regimes used on the crops. I found this section pretty muddled, not least because it veers off into a detailed description of attacks on the trials by anti-GM protestors, exploring more politics than science. This political theme sets the scene for the part of the book dealing with diversity and the precautionary principle. Nottingham makes a good case for transgenic technology to be used as a component in sustainable agricultural systems, acknowledging that biotechnology and sustainability are not mutually exclusive. This section establishes his credibility as a reasonably objective writer on what is a controversial subject.

This is not a volume to be dipped into because the chapters do not easily stand alone, but gradually build a landscape of what the technology is about and how its products could affect our environment. The book is presumably aimed at the 'informed lay' audience and as such seems understandable, balanced and informative. To my mind this is not so much a book on the ecology of genetic engineering (whatever that may be), but a straightforward account of what has happened scientifically and politically in the world of transgenic technology in agriculture, aquaculture and forestry. Ending on a note of caution, he makes a good case for not rejecting transgenic technology but moving forward on the basis of good scientific risk assessment.

B Johnson
Agricultural Technologies Group, English Nature
Taunton TAI 5AA, UK
E-mail: brian.johnson@english-nature.org.uk