

Biopesticides regulation informed by RELU research

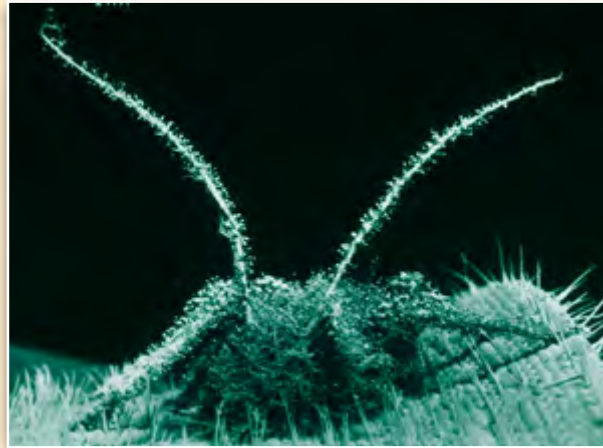
Research at the University of Warwick has contributed to UK and EU policy discussions on the regulation of biopesticides¹ – pest management measures based on microorganisms or natural products. The project developed a series of recommendations to aid the commercialisation of biopesticides, and provided advice to regulators, policy-makers, several major UK supermarkets, and companies developing new products. It was supported by the Rural Economy and Land Use (RELU) programme², which received funding from ESRC, BBSRC and NERC.

“Biopesticides have presented a fantastic challenge to both regulators and those developing alternative control measures; working with the RELU team has helped people over that hurdle,” said Richard Davis, Director of Approvals at Defra, in a project impact statement published at the end of the project in 2008³. “Our biopesticides scheme is now a pathfinder in Europe – no other member state has a scheme like this,” he adds.

“The RELU programme was an opportunity to combine social science and biological science to understand the regulatory and commercial barriers to getting biopesticides out in the field,” explains Dr Dave Chandler, senior research scientist at the University of Warwick⁴ and a co-investigator on the project.

Harnessing nature’s power

Biopesticides are a diverse group of pest control agents from natural sources. They include microbes, secondary



Moth infected with an insect pathogenic fungus used for biocontrol. Credit: Dr Dave Chandler/University of Warwick

metabolites from plants, and semiochemicals – signalling compounds produced by one organism that cause a behavioural change in another – such as insect sex pheromones. They are an important part of integrated pest management (IPM), which aims to use complementary methods to manage pest populations at low levels, rather than eliminate them entirely⁵.

The European market for biopesticides was worth around US\$54M in 2010, and is growing rapidly⁶. It can be difficult, however, for companies to commercialise new biopesticides, as the UK regulatory system was designed originally for synthetic chemical pesticides.

To address this, project leader Professor Wyn Grant⁷

Impact Summary

RELU-funded researchers developed recommendations to improve biopesticide regulations and worked with UK regulators to reduce barriers to commercialisation.

UK supermarket Marks and Spencer has used the research to improve their pesticide strategy.

The findings also informed European Parliament discussions. A new EU Directive on the regulation of biopesticides represents a ‘seismic shift’ in biopesticide policy.

The project’s impact on biopesticides regulation and the biopesticides industry was recognised in a report from the Defra Science Advisory Council.

The EU biopesticides market was worth US\$54M in 2010, and growing rapidly. Biopesticides could replace some synthetic chemical pesticides, which can harm the environment and health.

from the University of Warwick, Chandler and colleagues conducted a series of interviews and observations of biopesticide manufacturers and the regulator, the Chemicals Regulation Directorate⁸ (CRD, formerly the Pesticides Safety Directorate) to explore the challenges facing companies looking to register their biopesticides. The result was a series of recommendations to improve the regulatory regime for biopesticides. “We set out a series of design principles for a better system for biopesticide regulation,” says Grant⁹.

For instance, the researchers recommend that a government body takes the role of ‘biopesticides champion’ to act as an advocate for the products. The researchers also suggest regulators make changes to efficacy testing requirements, an important part of the product registration process, to reduce costs. Efficacy testing for biopesticides is often expensive, often accounting for up to 50 per cent of the cost of registering the products, compared to 10 per cent of the cost of registering chemical pesticides.

Regulators, manufacturers and supermarkets

The researchers also worked with the CRD to help the Directorate understand biological control and IPM. Grant and Chandler gave regular seminars to CRD staff and ran a series of lectures to explain biopesticides and some of the issues surrounding regulation.

“The lectures Wyn and his colleagues gave on their visits were pitched very well. They gave us a good idea of

how someone’s PhD work might lead on to developing a product, and how we can help by ensuring they have an awareness of the regulatory requirements from the very beginning, potentially saving them both time and money,” says Lisa Moakes, Biopesticides champion at the CRD³.

At the same time, the CRD were developing their new biopesticides scheme, which was launched in 2006¹⁰. The researchers were able to contribute to the development of the scheme, and help shape how the scheme was implemented.

Grant also worked with the International Biocontrol Manufacturers Association¹¹ that represents the manufacturers of biopesticides, many of which are relatively small companies. “It was important to engage not just with the regulator but to engage with the manufacturers and those who may register products, and the consultants who specialise in this area, who are important intermediaries,” says Grant. “Often the manufacturers weren’t really set up to deal with the regulatory process,” he adds.

Similarly, UK supermarkets Sainsbury’s and Marks & Spencer were involved with the project. Many large supermarkets require that fresh produce has no detectable pesticides residues so farmers cannot use synthetic chemical pesticides close to cropping times, forcing them to look for alternatives such as biological control.

The problem with crop pests

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Pests can cause substantial damage to crops, with some reports suggesting they could account for a 40 per cent loss in yield globally⁵. As concerns have been raised about the environmental and health impacts of synthetic chemical pesticides, and as pests have developed resistance to some common pesticides, attention has turned to biological alternatives and methods such as integrated pest management to control pests. Yet the previous UK regulatory regime, established to manage the requirements of synthetic chemical pesticides, made it difficult for manufacturers and others to register new biopesticides.

This is a problem Chandler and colleagues at Warwick had encountered previously. “We had a number of projects, principally Defra-funded but also industry projects, to develop biopesticides... we could take these things all the way to field trials but there was very little chance of getting them commercialised, because of the regulatory barrier.”

“Inevitably involvement with such a proactive programme has influenced how a company such as Marks & Spencer approaches crop and product development. For example we have had follow up meetings with researchers on biological pest controls which in turn has helped inform our pesticide strategy,” said David Gregory, former Technical Director for Marks and Spencer and BBSRC Council member³.

“Retailers are very important actors in this area as they impose their own requirements on growers which go beyond what is statutorily required,” Grant explains. “Sainsbury’s and M&S were particularly proactive in what they were doing.”

The Defra Science Advisory Council recognised the value of the project in a report published in 2007. The report stated that “this inter-disciplinary Rural Economy and Land Use (RELU) funded project, led by a political scientist and involving biologists and environmental scientists, has succeeded in opening up a new dialogue among a range of stakeholders from regulators through manufacturers, consultants and retailers to growers, and is helping to prime the emergence of a new industrial sector around bio-pesticides”¹².

Informing European policies

In 2008, Chandler, Grant and colleagues were invited to present their work and prepare a report for the Agricultural and Rural Development Committee of the European

Parliament¹³, to advise them on future crop protection policy and use of IPM. “We wouldn’t have done that if it wasn’t for the RELU funding,” says Chandler.

The researchers also became involved with an EU policy action called REBECA (Regulation of Biological Control Agents). Grant sat on the steering group for REBECA¹⁴, which looked at what biopesticide and IPM regulations were needed across the EU, enabling him to influence policy at an international level.

The EU has since published the EU Sustainable Use Directive on Pesticides¹⁵. “It represents a seismic shift in policy,” says Chandler. “A central plank of the policy says that biological control and other interventions must be used in preference to traditional chemicals where it can be shown they are useful.”

“And they’re making IPM mandatory within Europe by 2014,” he adds.

Notes and references

1. <http://www.relu.ac.uk/research/projects/Grant.htm>
2. <http://www.relu.ac.uk/>
3. Quotes from David, Moakes and Gregory were taken (with permission) from the RELU project impact statement, which can be found at: <http://relu.data-archive.ac.uk/media/36422/grantimpactstatement.pdf>
4. <http://www2.warwick.ac.uk/fac/sci/lifesci/people/dchandler/>
5. For an overview of biopesticides, Integrated Pest Management and the challenges facing biopesticide regulation, see: Chandler, D., Bailey, A.S., Tatchell, G.M., Davidson, G., Greaves, J. and Grant, W.P. (2011). The development, regulation and use of biopesticides for integrated pest management. *Philosophical Transactions of the Royal Society B*. 366, p 1987 – 1998.
6. <http://www.cplsis.com/index.php?reportid=334&category=76>
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9. Grant, W.P., Greaves, J., Chandler, D., Davidson, G., & Tatchell, G.M. Design principles for a better regulatory system for biopesticides. RELU/University of Warwick. Available online at: http://www2.warwick.ac.uk/fac/soc/pais/research/biopesticides/publications/design_principles_glossy.pdf
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