

Out-of-reach alternatives

Clare Shaddick traces the UK's slow-track progress towards biopesticides

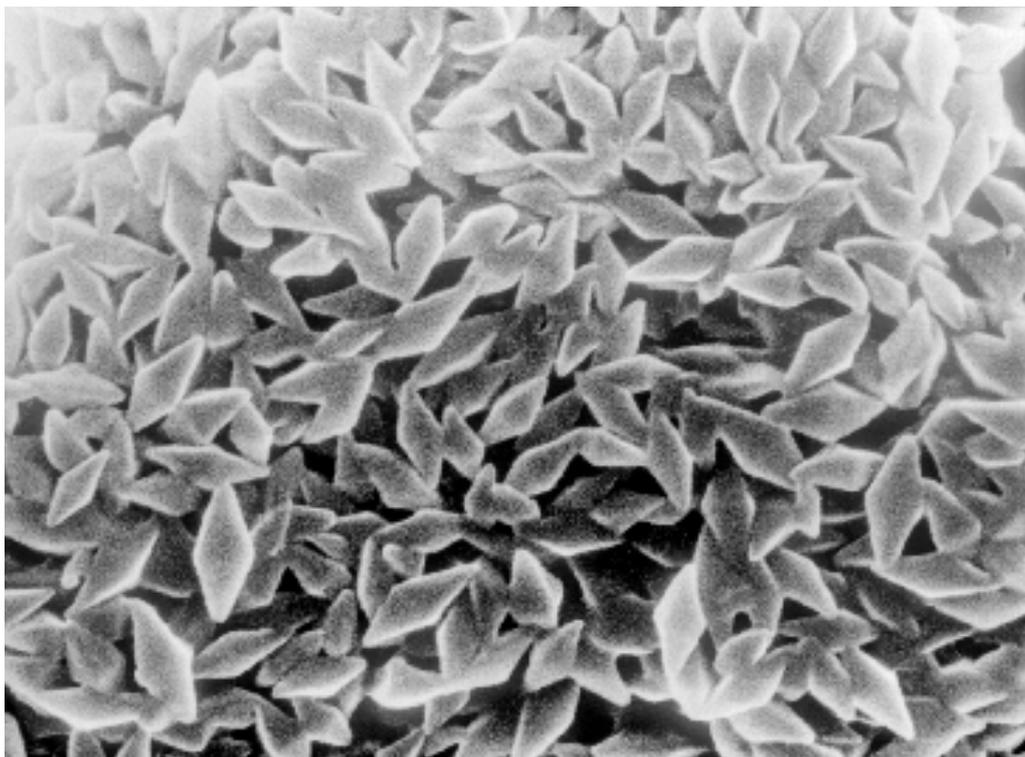
There cannot be one area of growing that has not felt the effect of the current EU Pesticides Review. Estimates suggest as much as 60% of all active substances will be lost by the time the programme draws to a close.

Dr David Chandler of HRI says biopesticides are host specific, harmless to vertebrates and not reaching the market as rapidly as he would have expected. Left: Metopolophium dirhodum aphid losing out to Verticillium lecanii.

Unfortunately for growers horticultural crops are being hit the hardest with some pesticides falling by the wayside purely because of the economics – sales in a niche market sometimes cannot justify the cost to a supplier of ushering a chemical through the regulatory appraisal.

For the same reason growers are also missing out on new alternative methods of pest and disease control. Biopesticides have as their active ingredient a micro-organism, such as a virus, bacterium or fungus. In the case of products developed for pest control these make use of natural relationships in the same way as classic biocontrol agents, widely applied in pro-

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ected crop production. But for the purposes of regulation they are treated in the same way as conventional agrochemicals.

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Fraught story

HRI researcher Dave Chandler says insecticides based on micro-organisms can make a valuable contribution to sustainable pest control. They are harmless to vertebrates and cause little environmental pollution. "They tend to be host specific, which is good from an integrated pest management perspective," he says. "But the story of their commercialisation is fraught with difficulties with products not reaching the market place as rapidly as you would expect based on the research."

One of the hurdles is the high cost of registration in the UK, compared with the potential commercial returns. Under new EC legislation it now costs half as much to register a biopesticide as it does to register a chemical – but the £45,000 fee is still out of all proportion to its sales value. And that is just the start – compiling the accompanying dossier of data can run into hundreds of thousands of pounds, which rules it out for smaller companies who are often the innovators in this type of pest and disease control.

Registration obstacles

Another obstacle is the inappropriateness of a system designed to assess chemical efficacy and toxicology. "There is no set procedure for registering biopesticides," says Melvyn Fidgett, chairman of the new UK arm of the International Bio-control Manufacturers' Association. "The data requirement is open ended. They can just keep asking us questions."

He adds: "The Government can't set a uniform requirement

until a company is prepared to take the risk of submitting a product for approval. It's a Catch 22."

This is why there are less than a handful of biopesticide products currently approved for UK horticulture (see panel), all registered many years ago and then only for pest control.

Different in the US

The situation is very different in the US where they have found a way of advancing the introduction of biopesticides through a government and industry partnership, called Inter-regional Research Project 4, or IR-4. This was set up in 1963 initially to ensure growers of minor crops – the American definition of a minor crop is one occupying 120,000ha or less and effectively includes most fruit, vegetable and ornamental crops – continued to have a choice of pest and disease control products.

For the last 20 years IR-4 has run a programme dedicated to biopesticides which finances both early-stage research as well as efficacy and performance studies to speed up their progress through the approvals system. "IR-4's support has resulted in over 300 biopesticide clearances," says associate director Jerry Baron. The £8 million of public funding IR-4 receives each year is, of course, the key.

The attitude of the regulating authority, the Environmental Protection Agency, also helps. It regards biopesticides as posing fewer risks than conventional products so asks for less registration data. Biopesticides are often registered in less than a year. Compare that to the six-years-and-counting that applications for bioinsecticides based on the fungus *Beauveria bassiana* have spent languishing at the offices of the Pesticide Safety Directorate while it is legally used abroad on produce destined for UK shops.

New approach

But moves are afoot to break down some of the barriers denying access to biopesticides in the UK. The Advisory Committee on Pesticides – the expert panel that advises Ministers on pest control matters – is currently working on the potential for the wider use of alternatives to conventional pest control

Biopesticides are generally accepted as products based on micro-organisms, whereas in the US, where a greater diversity of products is available, naturally occurring chemicals such as pheromones, plant extracts and 'plant-incorporated-protectants' (substances produced by genetically modifying the crop plant) are formally classified as biopesticides.

Some also characterise products which use nematodes as biopesticides but, because of their multicellular structure, these are treated by UK regulators in the same way as insects used as biological control agents and are governed by the Advisory Committee on Releases to the Environment (ACRE) rather than Control of Pesticides Regulations 1986, which extends to products with unicellular organisms as the active ingredient. ACRE regulation is not based on consumer or operator safety which means it is much cheaper to comply with and is why more pest control products are available based on nematodes than microbes.

The bacterium *Bacillus thuringiensis* is the most widely used biopesticide, having been developed in the 1970s

for insect control. According to Dave Chandler, there are more than 40 Bt products available worldwide for control of caterpillars, beetles and mosquitoes. In the US it is cleared for all crops: in the UK, only one product is available – DiPel sold by Fargro.

Two other microbial insecticides are approved in the UK out of more than 80 worldwide – Mycotal and Vertalec from Koppert, both based on the insect-killing fungus *Verticillium lecanii*.

Elsewhere in the world, products have been developed against soil-borne, aerial and post-harvest diseases and also to kill weeds.

One consequence of the regulatory burden on companies pursuing approvals for biopesticides is the emergence of products described as growth promoters or soil conditioners which may well have pesticidal action but because they make no claims as such can bypass the approvals system. This is one area the Advisory Committee on Pesticides would like to see reviewed and possibly controlled.

Opposite: Jerry Baron, director of the US Interregional Research Project 4 that has secured over 300 biopesticide clearances. Far left: Scanning electronmicrograph of crystals of Bacillus thuringiensis.

techniques, including biological pest control. Recommendations are due to be submitted to Government early this year and will call for a new approach to risk assessment, which would take into account the product type and use and how much is likely to be applied.

It would also like to see fast-streaming of approvals for products that have been approved elsewhere in the EU. 'Current mutual recognition procedures require a Maximum Residue Level to be established for the products,' says its draft report. 'This hampers mutual recognition of those pest control methods for which MRLs are not applicable. This issue needs to be addressed at EU level.'

Another recommendation is an invitation to Defra to reconsider its position on not funding near-market research. 'If the wide use of alternative pest control methods means that fewer conventional pesticides are used, and thereby reduces social costs, then there may be an argument for public support of research in these areas.'

The IBMA would like to see Government funding put aside to develop a data package requirement for biopesticides, the lack of which is, in effect, blocking new products from reaching growers and making a nonsense of the £13 million the Government spends on basic research on alternative techniques. "As chemicals are lost, politicians say there are lots of alternatives," says Melvyn Fidgett. "Yes, there are alternatives; but, no, growers can't use them."

Meanwhile PSD has started a pilot scheme for products based on pheromones, plant extracts or biological organisms,

which calls for a reduced data package. Registration costs have been cut for this scheme and could fall further.

The EU, in the Pesticides Review of alternative substances such as biopesticides – the programme's so-called fourth stage – is also talking about pursuing a 'lighter regime'. In its recent letter to approvals holders the PSD says: 'The objective is to maintain essential health and environmental protection safeguards whilst trying to avoid a situation in which many substances are lost because the data requirements cannot be fulfilled economically'.

More choice for growers

New products in the shape of biopesticides may offer growers more choice in crop protection, but they are no silver bullet. 'It is still extremely unlikely that growers could achieve the same level of pest control with these alternatives as they do with conventional pesticides,' says the ACP's report. 'Even when they work as planned they rarely eliminate pests, so some level of pest damage is inevitable.' While their performance is sometimes misjudged, Dr Chandler says biopesticides cannot be expected to deliver similar results to conventional chemicals. They also tend to be more expensive.

Another drawback to biopesticides in the longer term could also be the way the public view them. Some experts question the point of identifying them as a type of pesticide when this description has such a tarnished image while others wonder how some people would react if they knew their food had been sprayed with a 'bug'.

And despite the number of new products coming through in the US, uptake by growers is still slow. "Much of the commercial failure can be attributed to experiences when the biopesticide did not work properly," says Professor Baron. "This bias has resulted in reluctance to try integrating new generation biopesticides into production systems."

A new alliance of manufacturers in the US is looking at developing standards and a seal of approval as a way of instilling confidence. While such a scheme is outside the scope of IBMA, says Melvyn Fidgett, it is currently drafting a code of conduct for its members.

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