

IPM in protected crops: Theory into practice

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ABSTRACT

In 2009, the EU introduced the Sustainable Use Directive (Regulation 2009/128) with the aim of driving the uptake of low pesticide input systems across Europe. Every country was to produce a National Action Plan and implement IPM by 2014. The AAB IPM Group drew attention to the reality that the farming industry didn't have the 'tools' to do this and asked who would fund the R&D required to develop new technologies. The 2014 deadline passed and it became clear that EU policy makers had seriously underestimated the challenge presented to farmers. There was no effective method of measuring uptake of IPM and the SUD seemed to gradually fade into the background. However, five years on and the UK government is now becoming aware of the innovation crisis and have instigated an inquiry into "the role of science and technology in addressing challenges to food security and biodiversity".

There has been no shortage of innovation by UK tomato, pepper, cucumber and aubergine growers. They have been implementing whole IPM programmes for over four decades. During that time there have been many new challenges as non-indigenous pests have arrived and existing pests have changed their status. In addition, important target specific insecticides have been lost, energy prices have soared and retailers have squeezed growers' financial margins. Each problem has required an innovative solution.

IPM in protected edible crops is not an easy option. The glasshouse environment provides ideal conditions for over 20 species of herbivorous invertebrates. The number and combination of pests vary between crops but it is not uncommon to simultaneously combat over eight different species. The pests share common traits which allow them to exploit the habitat; *i.e.* they are largely polyphagous and breed continuously with high fecundity and short generation times. If left uncontrolled, each species is capable of destroying the crop.

The IPM programmes are knowledge-based and depend on a thorough understanding of the four-way interactions between plants, herbivores, natural enemies and environmental conditions. Day to day decisions are based on regular crop monitoring to assess the size of populations of both pest and beneficial species. Each pest is controlled by a combination of primary and secondary control measures. The primary controls are typically biological and suppress the pest population growth throughout the season. Cultural methods, physical controls and semiochemicals are all used to slow pest population growth while biological control agents become established. Compatible target specific pesticides and biopesticides may be used as secondary measures to redress the pest / natural enemy equilibrium at times when environmental conditions favour the herbivore. The key to success has been to understand how to use these control measures singly, or in combination, to maintain pest populations below economic damage thresholds.

Experiences over the past four decades have allowed the development of a theoretical approach to the design and implementation of IPM programmes in protected edible crops. As

an example, the author will describe the rapid development of a new IPM programme designed to combat the invasive, and extremely destructive, leaf and fruit mining moth, *Tuta absoluta*. This IPM programme utilises many of the techniques highlighted above.

The author will provide policy makers with the following important 'take-home' messages:

- IPM programmes are complex
- They must be based upon a solid foundation of knowledge
- A full armoury of compatible control measures are required from the outset
- Second line of defence controls provide a vital 'safety net' for growers
- Staff training is essential
- Practitioners must always be prepared for new challenges
- And last but not least, the need for innovative solutions never ends!

BIOGRAPHY

Rob Jacobson BSc PhD FRES MBPR (Hort) is an independent IPM consultant with over 35 years' experience in biological pest control. He has a successful history of implementing IPM in commercial crops with clients as far afield as Australia. Rob has a proven record of managing and delivering innovative R&D projects for government organisations, AHDB and many private companies. He was the previous convenor of the AAB's IPM Group and organised the AAB's IPM and Biopesticides conferences from 2008 to 2016. Rob is a long-serving member of the British Tomato Growers' Association Technical Committee and has won the 'Science into Practice' category at the Grower of the Year Awards for his work on IPM in tomato crops. Further information is available on "www.robjacobsonconsultancy.co.uk".