KEEP WHAT WORKS WORKING

Role of integrated pest management in resistance management

What is integrated pest management (IPM)?

Integrated Pest Management (IPM) is a sustainable, systems-based approach for pest management.

The primary goal of IPM is to manage pests effectively so that populations remain below thresholds that can cause economic damage to the crop.

IPM promotes a toolbox approach to pest management by using a combination of methods to reduce pest populations, where synthetic pesticides are only used as a last resort.

By reducing the reliance on synthetic pesticides, IPM helps to prevent resistance developing and extends the life and efficacy of pesticides.

How IPM contributes to resistance management

- promoting a combination of strategies including the use of resistant varieties, biological control, habitat management, and cultural practices
- prioritising non-residual, biodegradable crop protection control tools, which do not contribute to resistance, and
- encouraging the use of agrichemicals as a tool of last resort, based on monitoring and scouting to establish pest and disease thresholds, therefore mitigating overuse or repeated use of a single Mode of Action, which leads to resistance.

Principles of an IPM programme

- **Identification and monitoring:** Identify pests accurately and monitor population levels and damage to determine if control is needed, rather than using a spray schedule.
- **Prevention**: Implement strategies to prevent pests from becoming threats, such as sanitation and good hygiene practices.



Crop scouting for pests and beneficial insects is a key part of an IPM programme.

IPM is achieved by using:

- **Cultural practices:** to reduce pest establishment, reproduction, dispersal and survival, for example, using crop rotation, resistant varieties, planting at the correct time, changing irrigation practices, crop and shelter management.
- **Physical and mechanical methods**: to kill pests directly, such as using traps, screens, barriers, or heat or cold to manage pests, such as steam sterilisation to control soil diseases, or mulches for weed management.



Engytatus nicotianae, a native predatory mirid bug used as a biological control agent for tomato crop pests. Credit: Francis Ferrada-Hartley.



Artificial shelter can provide an effective barrier to the kiwifruit pest passionvine hopper, which moves from adjacent gullies into orchards and damages the fruit.

- **Biological methods**: the use of natural enemies, such as predators, parasites, pathogens and competitors, to control pests and their damage.
- **Chemical methods:** pesticides are used as a last resort, choosing the most selective, least toxic options, and applying them to minimise risks to humans and the environment.



The continual cycle of IPM

IPM relies on monitoring pest population levels to aid decision-making on the combination of methods chosen to reduce those pest populations.

The outcome from applying these methods needs to be monitored to determine their effectiveness and will inform pest management for the next growing cycle (Figure 1).

Using IPM reduces reliance on pesticides, maintaining the effectiveness of existing products, while also reducing resistance from developing, so products can retain their effectiveness for longer.

Figure 1 (left) IPM is a continual cycle of monitoring, applying a combination of methods to reduce pest populations, and evaluating their effectiveness.

Useful resources



- Read more about IPM and learn from a New Zealand case study in FAR Focus 12.
- Companion factsheets are available on '**What is pesticide resistance**? and '**Mode of Action - what it means and why Group numbers?**

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