

MANAGE RESISTANCE *Now*

Protect your land, one field at a time



MANAGING INSECTICIDE RESISTANCE: Follow Insecticide Best Practices

Using insecticides appropriately can significantly reduce pest populations that threaten crop yield and quality. However, insects can become resistant to insecticides. More than one-third of Canadian growers are concerned that insecticide resistance will increase in the next five years.

Growers can slow the development of resistance by taking three actions: evaluate the need for an insecticide; follow insecticide best practices; and practice Integrated Pest Management (IPM).

This factsheet focuses on best practices to follow when you plan to use a chemical insecticide.

BEST MANAGEMENT PRACTICES

Insecticides are often a necessary part of insect management strategies. Once the decision has been made to apply an insecticide, following best practices can make a big difference in reducing the likelihood of insects developing resistance.

When choosing chemical insecticides, select the right products for the right insect pest (and growth stage of the pest) on the right crop. Follow practices such as rotating chemical groups (modes of action) and applying products according to label directions and economic thresholds (where available).

Most of the practices described below apply to all methods of pesticide application, including seed treatments, foliar sprays and soil applications.

Rotate among chemical families

Chemicals are classified by mode of action (MoA) and are categorized by groups based on the action of an insecticide at its target site. Insecticide containers include numbers and letters on the front panel to indicate which group they belong to. For more information, visit the Insecticide Resistance Action Committee's [website](#) or your provincial Ministry of Agriculture website.



GROUP NUMBER

Application guidelines

Multiple applications (generally less than three) of the same MoA insecticide are acceptable if they are used to treat a single insect generation or are used within a window.

A window is the duration of an insect generation or approximately 30 days.

The following application guidelines should be part of your resistance management strategy:

- Following a window of any MoA group, rotate to an insecticide from a different MoA group in the next application window.
- Insecticides that include multiple MoA groups are effective and recommended, but be sure to rotate to different MoA groups in the next application window.
- If a pest generation is difficult to discern, then use approximately 30 days as the length of a treatment window for rotation.
- For short cycle crops (<50 days), the duration of the crop cycle should be considered as a window, so it is recommended to alternate to a different MoA for the next crop cycle.
- For pests with only a single generation per year, consider rotating products from different groups in alternate years.

In most cases, when an insect develops resistance to an insecticide, it may also develop resistance to other products in the same group. Do not re-spray an area with a product of the same group in the same season when insect resistance has been verified. Consider insecticides from other groups, biopesticides or other non-chemical control methods.

Maximize spray impact

Part of minimizing the development of resistance is maximizing control when you do spray. Always read the insecticide label and follow both the recommended rates and water volumes for good coverage. Labels often have rate ranges depending on pest pressure, with lower rates for lower insect levels. Be aware that using an application rate that's lower than recommended can promote the development of resistance.

When choosing chemical insecticides, select the right products for the right insect pest on the right crop. Follow practices such as rotating chemical groups and applying products according to label directions and economic thresholds.

To achieve good coverage, ensure that spray rigs and nozzles are properly chosen and calibrated, especially for contact insecticides (e.g., pyrethroids) and crops with thick canopies. Calibration should be completed at the beginning of each season (or following any prolonged period of disuse) to ensure optimal coverage.

- **In field crops**, growers are encouraged to recalibrate mid-season and after making any significant change to their sprayers (e.g., new tires, different tractor, new nozzles, new pump or lines).
- **In horticulture crops**, recalibration should coincide with major physiological changes to the crop being sprayed. Sprayer settings should reflect changes in the environment and the targets they are spraying. Provincial or private extension offices may provide calibration services, and the manufacturer or supplier of your equipment may do so as well.

If a product does fail, keep in mind it could be for reasons other than insecticide resistance. This includes, but is not limited to, application error (e.g., missing the application window), environmental conditions such as wind, rainfall, sunlight (UV) and temperature, and non-optimal spray droplet size. Different products move differently in the target pest – some are systemic, some are contact. For example, product failures may occur if spray coverage is insufficient to contact the pest or deposit it where it feeds.

Insecticide mixtures (“tank mixes”) are not primarily used for purposes of insect resistance management but may offer benefits when included in a rotation strategy with other MoAs. Mixtures have the advantage of targeting multiple pests at once, increasing the level of control of a single target pest and providing more complete control of a pest generation by impacting other life stages (e.g., adult, egg). If your pest situation requires the use of a mixture, ask a crop advisor for options that will minimize resistance risk. Ensure that the residual activity between the two tank-mix partners is given consideration.

Seed treatment recommendations

Scout and consider farm history when selecting seed treatments for your operation. Understand the residual control period and the group of the seed treatment insecticide so that you can rotate to other groups in subsequent treatments if required.

For more information on best management practices to manage resistance, please refer to additional factsheets on **ManageResistanceNow.ca** or consult with your crop advisor.



Always read the insecticide label and follow both the recommended rates and water volumes for good coverage.



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For more information, visit **ManageResistanceNow.ca**

This information is brought to you by CropLife Canada.



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Insecticide Resistance Action Committee's website: www.irac-online.org/