

# MANAGE RESISTANCE *Now*

Protect your land, one field at a time



## KEYS TO MANAGING FUNGICIDE RESISTANCE:

### PART B: Selecting fungicides strategically and maximizing fungicide efficacy

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Crop, pathogen type and environmental conditions all factor into disease development. Using fungicides appropriately can significantly reduce disease levels in crops. However, some diseases can become resistant to certain fungicides. Fungicide resistance affects many crops in Canada. To effectively manage disease and fungicide resistance, a series of best management practices (BMPs) are recommended. This article focuses on two practices and how to put them to use.

## BEST MANAGEMENT PRACTICES (BMP)

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### SELECT FUNGICIDES STRATEGICALLY

Before selecting a fungicide, it's important to first understand the resistance risk of the fungicide, the specific disease, and the impact of agronomic conditions. If possible, and where high resistance risk exists (for certain pathogens), plan to mix and rotate fungicide groups active on the pathogen.

Some diseases are more likely to develop resistance, and some fungicides are easier for diseases to develop resistance to. Knowing the risk level in your crop/disease combination can help you choose effective cultural practices and pest control products. Use fungicides that are labelled for the diseases that pose a threat to your crop yield.<sup>1</sup>

#### **The more mode of action options that will control the target disease, the better**

Fungicides are grouped according to their mode of action (MoA), and these groups are classified according to their risk level of developing resistance. Group codes (also known as FRAC<sup>2</sup> Codes) are included on all fungicide labels and are organized by numbers and letters (there are currently 45 numbered groups and 3 lettered groups).

**Knowing the risk level in your crop/disease combination can help you choose effective cultural practices and pest control products.**

You can find a list of fungicides groups and their risk level at: [FRAC Code List](#). Some fungicides are multi-site and can be a valuable resistance management tool. Be aware that a disease resistant to one fungicide in a group may impact sensitivity to other fungicides in that group. This is known as cross-resistance.

Rotating fungicide groups will help prevent or delay the development of resistance. In a single year, rotate fungicides with different modes of action either through tank mixes or by alternating sprays (or blocks of spray applications). When possible, rotate both during a growing season and if growing a host crop from one season to the next.

When there is a moderate to high risk of fungicide resistance, two or more fungicides with different modes of action may be mixed together according to label directions. If this mixture is applied at the recommended rates, it can delay the onset of resistance. Some fungicides are also sold as pre-mixed formulas with multiple MoA in the same product. If you are targeting one disease species, ensure both modes of action are effective on it. Avoid using at-risk fungicides when possible. If necessary, choose a partner fungicide that has a lower risk of resistance development (e.g. a product with multi-site activity), and be aware of the potential for cross-resistance in fungicide mixtures.

### MAXIMIZE FUNGICIDE EFFICACY

Once you select a fungicide, maximize its efficacy by applying at the optimal time to control disease. If timed poorly, the application will be ineffective and costly. Consult the product label for the most effective time to spray. The optimal time is not always the same year to year, and can change depending on weather and crop stage. Often, the optimal application time is when a pathogen population is small and contained. However, it could also be when weather conditions make the pathogen susceptible to fungicide, or when the crop is at a key growth stage.<sup>3</sup>

For example, in cereals, research shows that applying at head timing versus flag leaf results in greater yields. Know the rain fastness of your fungicide – wash off can greatly reduce fungicide effectiveness. Routine crop scouting or predictive modeling will allow for better decision making.

Use registered rates on the product label, and do not use lower rates in favour of plant vigor. More pathogens will survive if a lower spray rate is used, and resistance is more likely to develop.

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### **Sprayer setup is a critical component to fungicide efficacy**

Be sure to calibrate your sprayer annually to ensure accurate and even application. Double-check that all nozzles are flowing, free from blockages, and properly calibrated to your sprayer, which will guarantee uniform coverage. Be sure to check the product label for information about spray drift and be aware of provincial regulations and guidelines related to maximum wind speed when spraying.

Consult with a certified crop adviser or trusted agronomist to determine the best rate of speed based on field conditions. Also, refer to the manufacturer's recommendations based on crop, geography, weather and product information.

### **Water and speed make a big difference in fungicide applications**

When there is more foliage, spraying will require a greater water load to ensure adequate coverage and control disease. Coarser droplet sizes and a slower rate of speed are also required to penetrate a dense canopy.<sup>4</sup> Follow fungicide label directions for the most effective disease control.

**Consult the product label for the most effective time to spray. Often, the optimal application time is when a pathogen population is small and contained. However, it could also be when weather conditions make the pathogen susceptible to fungicide, or when the crop is at a key growth stage.**

For more information on best management practices to manage resistance, please refer to additional factsheets on **[ManageResistanceNow.ca](https://www.manage-resistance.ca)** or consult with your crop advisor.

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

This information is brought to you by CropLife Canada.



<sup>1</sup> <https://iwilltakeaction.com/diseases/principles-of-resistance>

<sup>2</sup> Fungicide Resistance Action Committee

<sup>3</sup> <https://www.cornandsoybeandigest.com/fungicide/do-i-need-fungicide-tips-help-make-fungicide-decisions>

<sup>4</sup> <https://sprayers101.com/fungicide-application-basics/>