



## The correct use and application of fungicides

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Numerous plant pathogens attack plants and cause disease which plays a major role in crop damage. Fungi are the number one cause of crop losses worldwide. Fungicides are a specific type of chemical that control fungal disease by specifically inhibiting or killing the fungus causing the disease. Fungicides are mainly used to:

- Control disease during the formation and growth stages of the crop
- Increase productivity of a crop which affects the value of the crop
- Improve the storage life and quality of harvested plants and produce

Plant diseases are best managed by integrating a number of control practices that may include: crop rotation, selection of tolerant or resistant cultivars, planting times, micro-climate modifications, sanitation, and application of fungicides. The successful cultivation of many intensively grown crops requires the regular use of fungicides to ensure the production of a disease free product. In depth knowledge of fungicides and their properties is essential for effective disease control.

### Identify the problem

Before the application of fungicides one needs to diagnose the disease on the plant correctly. Incorrect disease diagnosis prevents one from selecting an appropriate fungicide, therefore obtaining accurate identification as well as the recommended registered control measure from a professional diagnostician is essential.

### Types of fungicides

Fungicides can be divided into protectant and systemic types.

- **Protectant fungicide:**

It is a fungicide that remains on the surface where applied. Protectant fungicides form a protective film on the plant surface and inhibit the germination of fungal spores. These fungicides have no after infection activity. Repeated applications are needed to protect new growth of the plant and to replace material that has been washed off by rain or irrigation. Protectant fungicides act by inhibiting several chemical reactions in the fungus and usually has a broad range of activity.

- **Systemic fungicide:**

It is a fungicide that is absorbed into the plant tissue and may offer after infection activity. Some systemic fungicides move very short distances from the site of application whilst some can move further from the application site. Most systemics move more extensively because they are mobile in the xylem tissue. Systemic fungicides are often used in association with disease warning services to eradicate infections after an infection period has occurred.

### Fungicide storage and loading

Fungicides stored for over two years or more begin to lose their efficacy and may fail to work when applied, practice caution when using old products. Fungicides should be loaded with water which has a pH of 7 into the sprayer. Water which is too acidic or alkaline can

reduce fungicidal activity. If the pH of the water is not optimal it can be corrected with pH buffers that are added to the water prior to the addition of fungicide.

### **Adhere to the correct rate**

In order to effectively manage disease, fungicides need to be used at the recommended rate. Calculation errors are generally made in determining the correct rate, treatment area or the amount of In order to effectively manage disease, fungicides need to be used at the recommended rate on the fungicide label. The treatment area needs to be known in order to determine how much fungicide is needed to be added into the spray tank. An error in any of these areas can result in misapplication of the fungicides.

### **Mixing and alternating fungicides**

Mixing multiple fungicides in a spray tank can save time but the fungicides need to be compatible. Incompatibility can result in the formation of insoluble precipitates in the tank which will prevent accurate spraying. Fungicide labels often contain information on mixing compatibility. The order in which fungicides of different formulations are added may affect compatibility. Fungicide activity declines the longer the tank mix stands. The loss of fungicide activity may begin 12 hours after mixing and is accelerated by poor water quality (e.g. pond water or high/low pH). With systemic fungicides, where possible, it is best to rotate between different chemical groups to decrease the problem of resistance.

### **Sprayer calibration**

One of the most common causes of fungicide application failure is due to incorrect sprayer calibration. Incorrect calibration can lead to too much or too little fungicide applied, which will result in fungicidal toxicity or uncontrolled disease. Sprayers need to be re-calibrated whenever modifications to the nozzle, pressure or speed is made. In addition to having the sprayer calibrated, the fungicides should be applied in the recommended volume of water, at a

constant speed and at the recommended pressure. Maintaining a constant speed when spraying is important as “speeding” up an application will lower the rate of fungicides applied. Calibrating and adjusting the sprayer takes time, effort and involves calculating the correct amount of fungicide needed, which is extremely important.

### **Timing of fungicide spray application**

Before spraying consider the environmental conditions. Be aware of the weather forecast when planning to spray. Avoid spraying during rainy or windy conditions.

### **Resistance to fungicides**

Resistance is one of the first things that is assumed when fungicides fail to control diseases. It is one of the least likely explanations because resistance occurs when fungal populations develop that are not so sensitive to certain fungicides, it also occurs when the same class of fungicides are applied at high rates over an extended period.

When fungicide application fails to provide the correct disease management, it is important that the application practices be examined to identify the reason for failure. Remember it is important to correct the mistake responsible for fungicide application failure in order to prevent it from occurring in the future.

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