

## Integrated Pest Management Program - IPM Manual for Home & Garden Pests in B.C. - Chapter 9

### Integrated Pest Management

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### IPM Manual for Home and Garden Pests in British Columbia

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### Chapter 9: Fungicides

#### Learning Objectives

When you have completed this chapter, you should be able to:

1. Describe the properties of common fungicides available for yard and garden use, including:
  - fungi controlled
  - areas of use
  - activity and residual effects
  - toxicity to people, wildlife or pets
2. Describe 'preferred' fungicides recommended for yard and garden use.
3. List higher risk fungicides and describe precautions for using them.

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### Introduction

Most products available for controlling plant diseases are fungicides, meaning they control the various species of fungi that attack plants. This chapter lists the key characteristics of three commonly used fungicide active ingredients (according to a survey of BC pesticide vendors). The active ingredient is shown on every pesticide product label after the word **Guarantee**. Dispensers should have a good understanding of these pesticides because they are so frequently used around yards and gardens.



Dispensers should be able to explain how each fungicide works, the diseases they control, and safety precautions that should be taken while using them.



**Preferred Fungicides:** Dispensers should know which fungicides are 'preferred' for use by home and garden customers and why. These should be the first choice for yard and garden customers because they include products that:

- present the least short- and long-term health risk to humans
- have the lowest environmental impact primarily due to short residual effects

**Other Fungicides:** Products containing more toxic or persistent chemicals are listed in this chapter under Other Fungicides. In general these are products of last resort due to the toxicity, risk of harming non-target organisms, and persistence or problems with storage and disposal. It is essential that customers know what safety equipment is recommended for using these fungicides.

There are other less frequently used fungicides and other plant disease products than those described here. Dispensers should be able to look up information on these in other reference resources as needed. If a customer has not selected a fungicide and wants to know what to use for a particular disease problem, see Section III, Pest Management, in this manual.

**Information in this chapter is intended only as a guide.  
Always apply pesticides according to directions on the label.**

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## Preferred Fungicides

### Lime Sulphur

#### General Description

- calcium sulphur compound
- broad-spectrum control of fungi, also mites and some insects
- sold as liquid concentrates
- no residual effects

#### Pests Controlled

- **Plant diseases:** black knot, black spot, brown rot, powdery mildew, rusts, apple and pear scab, and peach leaf curl
- **Insects and mites:** scales, spider mites, rust mites, aphids, mealybugs, peach borers  
Dormant sprays control overwintering eggs of insects.

#### Areas of Use

- Use lime sulphur outdoors as a dormant spray on fruit trees, bushes, and woody ornamentals and during the growing season on foliage of certain woody plants.

### **Application Notes**

- dormant sprays are more concentrated than growing season sprays, which are diluted to reduce phytotoxicity
- spray in early morning or cool of evening to prevent burning

### **Precautions**

- Do not apply when temperatures are above 26°C.
- Do not combine with oil sprays or any other product except as directed on label.
- Do not use liquid lime sulphur and dormant oil spray within 30 days of each other during the growing season.
- Phytotoxic to dormant apricots, hazelnuts, Delicious apples, Viburnum spp., and others.
- Phytotoxic to most actively growing plants.
- Use growing season spray only on plants listed on label and at the correct dilution.
- Do not spray painted woodwork, stone or bricks as staining may result.

### **Health and Environmental Information**

- moderate toxicity to mammals
- irritating to eyes, skin and mucous membranes
- non-toxic to bees, but toxic to beneficial mites
- non-toxic to fish, birds, bees, and other wildlife and not persistent

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## **Sulphur**

### **General Description**

- a naturally occurring element
- broad-spectrum control of fungi, also a miticide
- binds with fungal spores to prevent their germination
- sold as ready-to-use and concentrated liquids, dusts, and wettable powders
- no residual effects

### **Pests Controlled**

- controls black knot, black spot, leaf spots, powdery mildew, rusts, apple and pear scab
- controls russet and rust mites

### **Areas of Use**

- Use sulphur outdoors on foliage of vegetables, roses, flowers, other ornamentals and fruit trees.

### Application Notes

- Phytotoxic to some pears, apricots, grapes, raspberries, cucumber, melon or squash, Boston fern, and others (check labels).

### Precautions

- Do not apply when temperatures are 24°C or higher.
- Do not combine with oil sprays.
- Do not apply within 30 days of dormant or summer oil sprays.
- Use only on plants listed on labels as tolerant to sulphur or extreme injury may result.

### Health and Environmental Information

- low toxicity to mammals
- irritating to eyes and skin
- non-toxic to bees, but toxic to beneficial mites
- non-toxic to fish, birds, bees and other wildlife
- non-persistent (product labels state may be used up to one day before harvest on most edible crops)

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## Other Fungicides

### Benomyl

#### General Description

- synthetic fungicide with broad-spectrum effects
- systemic and residual activity
- prevents establishment of and controls disease-causing fungi
- sold as wettable powders
- sold also mixed with other fungicides, such as captan
- moderately long residual effects

#### Fungi Controlled

- **Controls:** apple scab, brown rot, black spot, Botrytis, brown patch, cherry leaf spot, dollar spot, Fusarium, powdery mildew, stem rots, and other diseases.

#### Areas of Use

- Use benomyl outdoors on some vegetables, flowers, other ornamentals, fruit and nut trees and bushes, and lawns.

#### Application Notes

- used as a foliar, seed, soil, and turf treatment
- generally non-phytotoxic (with some exceptions)

### **Precautions**

- Phytotoxic to some sensitive apple varieties (check labels).
- Do not allow benomyl to become damp during storage as it loses effectiveness.

### **Health and Environmental Information**

- low mammalian toxicity (product labels state it may be applied up to day of harvest on fruit trees), but a suspected endocrine disrupting chemical
- may cause irritation to eyes, skin, and mucous membranes
- highly toxic to fish and earthworms, moderately toxic to birds, non-toxic to bees
- long persistence of several months in plant tissue, 3-12 months in soil

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## **Triforine**

### **General Description**

- synthetic fungicide with systemic and residual activity
- prevents establishment of and controls disease-causing fungi
- sold as liquid concentrate
- moderate residual effects

### **Fungi Controlled**

- black spot and powdery mildew

### **Areas of Use**

- Use triforine outdoors on roses and other ornamentals (not on edible crops).

### **Precautions**

- Wear eye protection during handling and application as triforine can cause eye damage.

### **Health and Environmental Information**

- low to moderate toxicity to mammals
- low toxicity to fish and bees, earthworms and other wildlife
- low persistence in soil

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## STUDY QUESTIONS

Answers are provided [here](#).

1. a) Which fungicide described is the most toxic to fish, birds and wildlife and the most persistent?  
b) Which fungicides described have systemic effects?
2. List three precautions for using a fungicide product containing elemental sulphur.

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