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## Fungicides: Others

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## Fungicides: Others

### **Abstract**

Other fungicides available for use on field crops in Iowa are in the benzimidazoles class or are contact fungicides. Benzimidazoles are widely used fungicides that first became available in the late 1960s; however, thiophanate-methyl is the only fungicide in this class labeled for use on field crops in Iowa. Benomyl also is in this fungicide class but is no longer commercially available. Benzimidazoles are effective against a broad range of fungi that cause leaf spots, root and crown rots, stem rots, and powdery mildew--but not rusts.

### **Keywords**

Plant Pathology

### **Disciplines**

Agricultural Science | Agriculture | Plant Pathology



## Plant Diseases

# Fungicides: Others

by Daren Mueller, Department of Plant Pathology

Other fungicides available for use on field crops in Iowa are in the benzimidazoles class or are contact fungicides.

**Fourth  
in a  
series**

### **Benzimidazoles**

Benzimidazoles are widely used fungicides that first became available in the late 1960s; however, thiophanate-methyl is the only fungicide in this class labeled for use on field crops in Iowa. Benomyl also is in this fungicide class but is no longer commercially available. Benzimidazoles are effective against a broad range of fungi that cause leaf spots, root and crown rots, stem rots, and powdery mildew—but not rusts.

#### **How do benzimidazoles inhibit fungi?**

These compounds interfere with fungal mitosis (normal cell division), so they affect the growth of fungi.

#### **When should benzimidazoles be applied?**

Preventively or as early as possible in the disease cycle.

#### **Where do benzimidazoles move in the plant and how long do they last?**

These fungicides cannot move down the plant, so they are effective only if there is complete coverage of the entire plant. Canopy penetration is essential to good control.

#### **Do we worry about fungicide resistance?**

Yes, these fungicides affect fungi at a very specific site in the metabolic pathway of target fungi and, therefore, resistance to these fungicides develops very easily. This was the first group of selective fungicides for which resistance in plant pathogens was found, and benzimidazoles are now not effective for many important diseases. See recommendations from product labels and the QoI and triazole articles in previous weeks for managing fungicide resistance.

### **Contact fungicides**

Contact fungicides are applied to the leaf and stem surfaces and are considered protective or preventive fungicides. Contact fungicides have a broad spectrum of disease control activity. Contact fungicides approved for use in Iowa include inorganic compounds (copper and sulfur), dithiocarbamates (mancozeb), and chloronitriles (chlorothalonil).

#### **How do contact fungicides inhibit fungi?**

They inhibit the fungi on the plant surface, usually spore germination, so the fungus will not be able to infect the plant. Contact fungicides affect multiple sites in fungi; they kill fungi by overwhelming them with poisonous materials.

#### **When should contact fungicides be applied?**

Preventively—these fungicides do not affect fungi once they have infected the plant.

#### **Where do contact fungicides move in the plant and how long do they last?**

These fungicides remain on the plant surface and do not penetrate into the plant. They remain active only as long as the fungicide remains on the plant surface in sufficient concentration to inhibit fungal growth, usually 7 to 14 days.

On plant surfaces, contact fungicides are sensitive to environmental conditions like rainfall and solar radiation. The strobilurin and sterol inhibitor fungicides are absorbed into the leaf after application (once the residue has dried) and are not affected by rain wash-off and solar radiation. A general rule of thumb for the effect of rain on washing off protectant fungicides follows:

- Less than one inch of rain since the last spray will not significantly affect residues.
- One to two inches of rain will reduce the residue by half.
- Over two inches of rain since the last spray will remove most of the spray residue.

#### **Do we worry about fungicide resistance?**

No, but contact fungicides are a part of fungicide resistance programs. If multiple applications of fungicides are needed, the benefit of including a contact fungicide is not to eliminate the resistant strain of the fungus but to reduce the number of systemic applications you make in any one year. This extends the number of years you can use the systemic fungicide, but it does not prevent the eventual development of fungicide resistance.

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