

# **Insect, Nematode, and Disease Control in Michigan Field Crops**

## **MSU Bulletin E-1582 2006 Field Season**

### **Contributors:**

#### Entomology

Chris DiFonzo & Michael Jewett  
Department of Entomology

#### Nematology

Fred Warner  
MSU Diagnostic Services

#### Plant Pathology

Diane Brown-Rytlewski & William Kirk  
Department of Plant Pathology

Michigan State University  
East Lansing, MI 48824

\*\*This bulletin contains information on the management of field crops insects, nematodes, and diseases, including recommendations for pesticide use. Every attempt is made to verify product names, formulations, use rates, and other important information, but products and labels may change before the field season begins. Always read the label of a product to reconfirm rates, precautions, PPE, and other important information before use.

## SMALL GRAIN DISEASES

Crop rotation is one of the most important means of managing disease in small grains. Rotate small grains with a broadleaf crop such as dry beans, soybeans, sugar beets or potatoes. Small grains such as wheat, barley and oats share several serious diseases with corn. The fungus that causes Gibberella (*Fusarium graminearum*) stalk rot of corn is the same fungus that produces head scab in wheat and barley. This fungus overwinters in corn residue, and can produce high numbers of spores to infect wheat and barley. Avoid planting wheat, barley or oats back into fields previously planted to corn. Wheat, barley and oats also share several root disease fungi in common with corn. See the tables on seed treatments for control of smuts and bunts.

### ***Fusarium* head blight of wheat and barley (Head scab)**

**Cause:** *Fusarium graminearum* (fungus)

**Symptoms:** After flowering, spikelets appear bleached or blighted. An orange or pink color may appear at the base of the diseased spikelets. Diseased spikelets may be sterile or contain shriveled seed. Infected grains are lightweight, and may be pinkish to chalky white in color.

**Disease cycle:** The fungus overwinters on corn residue, grass residue and wheat or barley stubble on the soil. The fungus can also survive on seed. Infection is most common and serious at flowering. Wind-blown spores are carried to flower parts, glumes and other portions of the spike where they germinate during warm, moist weather. Symptoms are visible within three days where temperatures are favorable (77-86°F) and there is continuous moisture from rain, heavy dew or irrigation.

**Conditions favoring the disease:** Epidemics of wheat scab occur when rain periods coincide with flowering and grain fill. Sprinkler irrigation may predispose plants to infection or create conditions that may make it more severe.

**Management:** Plant certified seed. Avoid planting wheat or barley after corn or grasses. Rotate away from corn or grasses for at least one year. Deep plowing to bury corn debris or grass debris should help reduce the inoculum on the soil surface if you must plant barley or wheat following a susceptible crop. Several fungicides are labeled for suppression of head scab on wheat in Michigan.

**Other concerns:** The fungus that causes head scab also produces mycotoxins. When harvesting, increase airflow in the combine to remove as many as possible of the shriveled, scabby kernels.

Check the label for additional information including re-entry intervals (REI) pre-harvest intervals (PHI), and plant-back restrictions.

**List of registered fungicides (rate per acre or as noted): Section 18 registration\* Section 24(c) registration\*\* These registrations are only for wheat (not barley).**

\*Folicur 3.6 F 4 fl. oz.

\*\*Tilt EC 2-4 fl. oz.

### **Powdery mildew**

**Cause:** On wheat- *Erysiphe graminis* f.s. *tritici* (fungus) On barley- *Erysiphe graminis* f.s. *hordei* (fungus) These fungi are host specific.

**Symptoms:** Powdery, white to light gray patches may appear on leaves and stems (especially upper leaf surfaces) any time after seedlings emerge. Black specks containing spores may form in the patches of mildew as the season progresses.

**Disease cycle:** The pathogen overwinters as resting spores on straw, stubble, volunteer or overwintering wheat.

**Conditions favoring the disease:** Cool temperatures (59 to 72°F) and high humidity (greater than 85%) are optimal for the development of the disease. Heavy nitrogen fertilization also enhances disease development.

**Management:** Select resistant varieties of small grains. Avoid heavy amounts of nitrogen, which can stimulate rapid growth. If the disease is present on lower leaves and the plants are approaching the boot stage, use a foliar fungicide. The flag leaf produces 60-70 % of the carbohydrates needed for the developing grain.

Check the label for additional information including re-entry intervals (REI) pre-harvest intervals (PHI), and plant-back restrictions.

**List of registered fungicides (rate per acre or as noted):**

Armcarb 100 2.5-5 lb.

Headline 6-9 fl. oz.

Propimax EC 4 fl. oz.

Quadris Flowable 12.3 fl. oz. (*barley only*)

Quadris Flowable 7.7-10.8 fl. oz. (*wheat only*)

Quilt 7-14 fl. oz.

Sonata 2-4 quarts (biofungicide)

Stratego 10 fl. oz. (*wheat only*)

Tilt EC 2-4 fl. oz.

## Septoria leaf and glume blotch

**Cause:** *Septoria* spp. (fungi)

**Symptoms:** The first symptoms are tiny chlorotic flecks on the lower leaves. Depending on the species of fungus, the flecks can expand to long, straight-sided lesions, or more lens-shaped lesions. Lesions can be found on leaves or leaf sheaths.

Lesions initially have a water-soaked appearance, turning dry, yellow and eventually reddish-brown. Older lesions turn ash brown and may develop black specks in the center. Leaves may be killed.

**Disease cycle:** Both of these fungi overwinter on straw, and can also overwinter on living plants or survive on seed. Spores are present in late summer and fall, and can germinate over a wide temperature range. Spores are produced during periods of wet weather and can cause infections throughout the growing season.

**Conditions favoring the disease:** Barley is generally less susceptible to leaf and glume blotch than wheat. Weather that is wet and windy favors the development of the disease. Planting small grains as successive crops allows inoculum to build up in the field, especially under no till or minimum tillage.

**Management:** Select varieties with resistance to *Septoria*. Use certified seed. Seed treatment may help limit seedborne disease. Rotate out of small grains for two years. If planting wheat in fields planted to wheat the previous year, incorporate crop residues with deep plowing. Monitor for disease in the field. Cool, wet weather during flag leaf emergence provides favorable conditions for severe outbreaks of this disease. Foliar fungicides applied at the boot stage will help protect the flag leaf.

Check the label for additional information including re-entry intervals (REI) pre-harvest intervals (PHI), and plant-back restrictions.

### List of registered fungicides (rate per acre or as noted):

Armcarb 100 2.5-5 lb.  
Champion WP 1.5-2 lb.  
Dithane DF Rainshield 2.1 lb.  
Dithane F45 1.6 quarts  
Dithane M45 2 lbs.  
Headline 6-9 fl. oz.  
Kocide 101 1.5-2 lb.  
Kocide 4.5 LF 1-1 1/3 pints  
ManKocide 2-2.5 lb.  
Manzate Flowable 1.6 quarts

Manzate Pro-stick 2 lbs.  
Penncozeb 4FL 0.8-1.6 quarts  
Penncozeb 75 DF 1-2 lb.  
Penncozeb 80 WP 1-2 lb.  
Propimax EC 4 fl. oz.  
Quilt 7-14 fl. oz.  
Quadris Flowable 6.2-12.3 fl. oz. (*wheat only*)  
Stratego 10 fl. oz. (*wheat only*)  
Tilt EC 2-4 fl. oz.