MAPPING YOUR ROUTE TO THE FUTURE

Great Lakes Fruit, Vegetable & Farm Market EXPO
DeVos Place Convention Center
Grand Rapids, MI
December 7-9, 2004

Sweet Corn

Wednesday afternoon 2:00 pm

Where: Grand Gallery Room E-F (lower level)

Recertification credits: 1 (Private, 1B)

CCA Credits: IPM(1) CM(1)

Moderator: Bruce MacKellar, St. Joseph Co. MSU Extension

2:00 p.m. Polymer film in Sweet Corn Production
- John Warner, Agriculture and AgriFood Canada

2:25 p.m. Why use Cover Crops in Sweet Corn
- Ann E. MacGuidwin, Plant Pathology Dept., Univ. Wis

2:50 p.m. If You Grow it, They Might Take a Survey
- Hannah Stevens, Macomb Co. MSU Extension

3:10 p.m. Watching for Worms
- Beth Bishop, Entomology Dept., MSU

3:30 p.m. Common Rust and other Diseases
- Mary Hausbeck, Plant Pathology Dept., MSU

Sweet Corn: Common Rust and Other Diseases

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Common Rust

Common rust, a serious disease of sweet corn in the Midwest, is caused by the fungus, *Puccinia sorghi*. When common rust is severe, there can be significant losses in sweet corn yield and quality. The disease appears as oval spots or pustules (less than ¼ inch long) on the upper and lower surfaces of the corn leaves. The first 4-5 leaves produced by the corn plant are more susceptible to rust infection than leaves produced later, but pustules can also be found on ears and tassels when disease is severe. Infection usually begins in the leaf axils where moisture accumulates. Pustules are reddish-brown early in the season, when the repeating (uredospores) form and break through the epidermis of the leaf. Later in the season, pustules become brownish-black as overwintering spores (teliospores) form.

Puccinia sorghi has a complex disease cycle, which includes two different plant species and five different spore types. Only one host, corn, is grown in the Midwest and only two of the spore types occur here. The repeating spore (uredospore) is important to sweet corn growers. It is carried by winds from the south (Mexico) where the fungus overwinters, and these windblown spores cause the first infections in sweet corn. When the repeating spore (uredospores) arrives in the Midwest near the middle of the growing season, rust is a problem only on late-planted sweet corn. Recently, rust has been observed in the Midwest in early June, and in 2000, it was seen in late May on sweet corn in Illinois. This is probably due to earlier plantings and larger acreage of field corn grown in the southern United States.

The repeating spores (uredospores) need about 6 hours of moisture to germinate and infect the corn, but can remain viable for long periods under dry conditions. Although 65° to 75°F is optimal, they can germinate, infect and form more repeating spores at a wide range of temperatures (Pataky, 2001). Repeating spores form and can be released 7 days after the initial infection, causing additional infections. This cycle repeats throughout the growing season when the weather is favorable. Disease can increase quickly under ideal environmental conditions, which include cool, moist and humid (98 to 100% relative humidity) weather.

Sweet corn cultivars with resistance to rust are available. The effectiveness of the resistance depends on the type of the resistance, the amount of rust pressure and the weather. General rust resistance is effective against all corn rust, but control is not complete. Sweet corn cultivars are classified as resistant, moderately resistant, moderate, moderately susceptible and susceptible. When weather favors disease development, severity of rust on resistant cultivars usually is 20% or less, moderately resistant or moderate cultivars can have 20-30% severity which reduces yield 12-18%, and moderately susceptible or susceptible cultivars frequently have disease severity greater than 30%.

Fungicides are used when genetic resistance alone cannot control rust. The effectiveness of the fungicides depends on the genetics of the sweet corn cultivar, the time of application and the weather. Fungicides must be applied before rust becomes epidemic. Scouting for rust can help determine when to

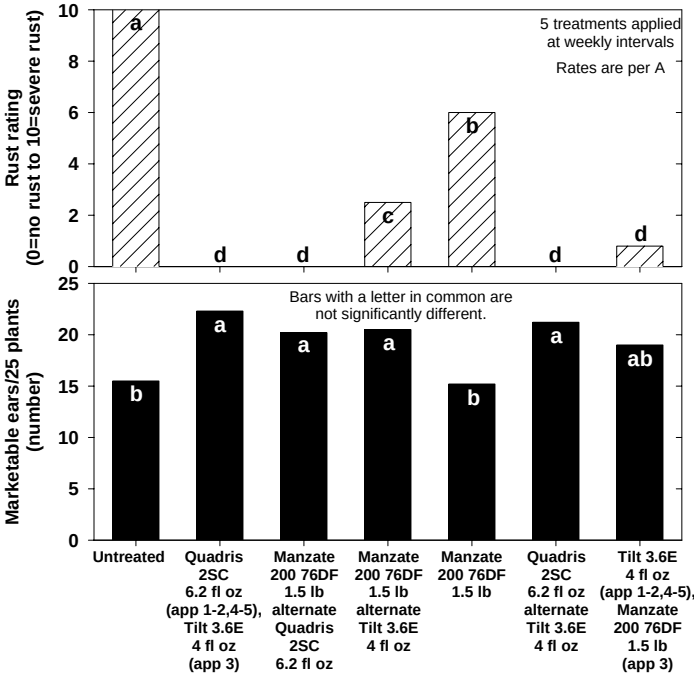
begin fungicide applications. Researchers found that improvements in moisture and sugar content and ear-tip fill occurred when fungicides were used to control rust. The amount of control provided by each level of general resistance is equivalent to one application of fungicide.

Fungicides registered for use on common rust in Michigan include azoxystrobin, chlorothalonil, mancozeb, maneb, and propiconazole (Table 1). Quadris (azoxystrobin), Manzate (mancozeb), and Tilt (propiconazole) were tested in Florida (Figs. 1 and 2). Programs which alternated these products were significantly more effective than Manzate alone at controlling rust and producing marketable ears.

Table 1. Fungicides registered for use on sweet corn in Michigan.

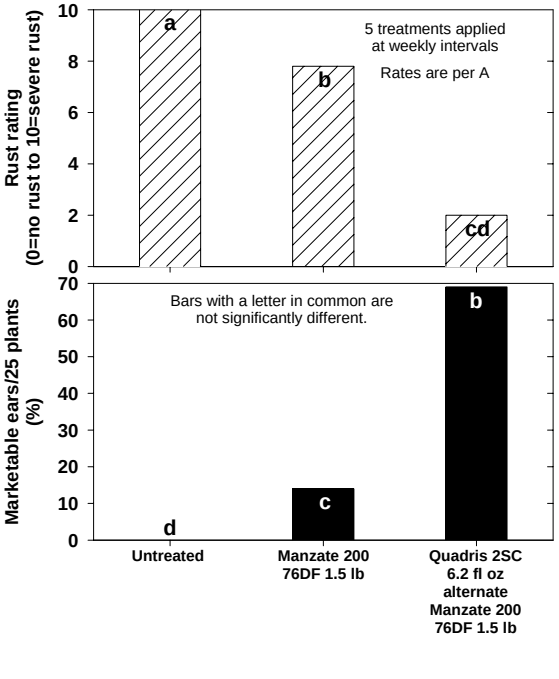
Disease	Active ingredient	Product
Common rust (*Puccinia sorghi*)	azoxystrobin	Amistar, Quadris
	chlorothalonil	Bravo, Echo, Equus, and others
	mancozeb	Dithane, Manzate, Penncozeb, and others
	maneb	Maneb, Manex, and others
	propiconazole	Propiconazole, Tilt, and others

Figure 1. Common Rust on Sweet Corn, FL 2001



Raid, R.N., and R.T. Nagata. 2002. Fungicide and Nematicide Tests 57:V031.

Figure 2. Common Rust on Sweet Corn, FL 2003



Raid, R.N. 2004. Fungicide and Nematicide Tests 59:V147.

Common Smut

The incidence and severity of this disease, caused by the fungus, *Ustilago zeae*, depends on genetic resistance, amount of smut spores, and weather conditions. Infection results in large (up to 5 inches), smooth, shiny, galls on all parts of the plant, but especially on the developing kernels. The fungus

overwinters in soil or crop residue. The disease is favored by dry conditions and temperatures between 79 to 93°F. High nitrogen or high organic matter and mechanical injury due to weather, insects or humans also favor smut development. Reduce the incidence of smut by planting tolerant cultivars, maintaining balanced soil fertility, avoiding injury during cultivation/spraying, and avoiding planting near wheat fields.

Bacterial Stalk Rot

Bacterial stalk rot, caused by the bacterium *Enterobacter dissolvens*, is favored by warm (above 86°F) and wet weather. Infected green plants fall over with collapsed, twisted stalks. Water-soaked, slimy and rotted tissue can be found in one or several internodes of the stalk above the soil surface. The bacteria live in crop residue and can infect through natural openings in the leaf. The disease can be spread by humans or animals moving through the fields, contaminated plants and soil, or splashing rain. Use resistant varieties and avoid excessively wet fields to control this disease.

Crazy Top

This disease is caused by the downy mildew fungus, *Sclerophthora macrospora*. Disease symptoms include excessive tillering and twisting of the upper leaves and the tassel. Crazy top occurs in low-lying areas of the field where water accumulates, because the spores are spread in water. Manage the disease by providing good soil drainage or avoiding low-lying areas when planting.