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Laura E. Sweets
Pillsbury/Green Giant

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THE IDENTIFICATION AND MANAGEMENT OF SWEET CORN DISEASES

Laura E. Sweets
Plant Pathologist and Senior Scientist
Pillsbury/Green Giant

Diseases can and do cause losses in sweet corn production. Various sweet corn diseases may result in germination and stand establishment problems, losses in yield and reduction in quality. Because of the extreme importance of quality in sweet corn production for either fresh market or processing along with the higher value of sweet corn, disease management in sweet corn production is an excellent opportunity to employ integrated pest management tactics. Sweet corn fields should be scouted on a regular basis to identify diseases present and to assess the severity of these diseases. Emphasis is certainly placed on preventing sweet corn disease problems through the use of resistant hybrids, proper crop rotation, residue management, etc. When scouting indicates disease problems during the season, decisions can be made on additional control measures such as pesticide applications.

In general, the most common disease problems on sweet corn might be divided into the early season seed decay and seedling blight problems, foliage diseases, maize dwarf mosaic virus, Stewart's wilt and common smut. Brief summaries of the symptoms caused by these diseases, the conditions favoring each and management strategies currently available for each are given below.

Seed Decay and Seedling Blight

The seed may rot and decay prior to germination, the seed may germinate but the seedling turns brown and dies before it can emerge from the soil or the seedling may emerge and then yellow, wilt and die. Diseased plants may occur singly, in circular patterns (particularly in low spots or poorly drained areas of the field) or over the entire field.

Seed decay and seedling blights can be caused by a number of soil-borne and seed-borne fungi. The seedling blight complex is found wherever corn is grown. Seedling blights are more severe on wet soils in low lying areas in a field or soils that have been compacted or remain wet for extended periods of time. Low soil temperatures (50-55°F) and wet soil conditions favor seed decay and seedling blights.

Disease severity may also be affected by planting depth, soil type, seed quality, mechanical injury to the seed, crusting, herbicide injury or other factors which delay germination and emergence of corn. Residues left on the soil surface may influence the incidence and severity of seed decay and seedling blight through their effect on soil temperature and soil moisture.

The best approach to managing early season seed decay and seedling blights is to plant seed with good germinability and seedling vigor when seed bed and weather conditions are favorable for corn growth and development. In addition, almost all sweet corn seed is treated with some combination of seed treatment fungicides to minimize losses due to seed decay and seedling blights.

Foliage Diseases

There are about a dozen foliage or leaf spot diseases that may occur on sweet corn in the Midwest. The prevalence of these leaf diseases varies from field to field and year to year, depending largely on environmental conditions, but also on tillage practices, crop rotations and hybrid susceptibility. Most of the pathogens which cause foliage diseases of sweet corn also affect field corn, seed corn and popcorn. Many of these pathogens survive from season to season on infested residues left on the soil surface. A few, such as common rust and southern rust, do not overwinter in the Midwest but are introduced each year when spores of the rusts are blown up from southern corn production areas. Most of these foliage diseases are favored by warm, wet or humid weather. More than one foliage disease may be present in a field or even on the same plant.

Generally, foliage diseases do not become widespread until after tasseling and yield losses are minimal. However, infection may occur earlier in the season. Yield reduction depends on severity of the diseases and the stage of growth when the disease becomes prevalent. If foliage diseases become established before silking or become severe within 2-3 weeks after silking, losses in yield up to 50% may occur.

Management of sweet corn foliage diseases should include the use of resistant hybrids, crop rotation and residue management. In addition, several foliar fungicides are labeled for use on sweet corn. Fields should be scouted on a regular basis up through silking to determine if levels of foliage diseases warrant fungicide application.

Stewart's Wilt

Although Stewart's wilt is frequently mentioned in connection with sweet corn, the disease is not that prevalent or severe on sweet corn in the northern Midwest. This disease is caused by a bacterium that is spread by the common corn flea beetle. The causal bacteria overwinter in corn flea beetles. Beetles then spread the disease as they feed on corn leaves throughout the season. Infected seedlings of susceptible hybrids may wither and die. The most common symptom of Stewart's wilt is linear, pale green to yellow streaks that tend to follow the veins of the leaves. These lesions are irregular and variable in size and shape. In a few very susceptible hybrids, a systemic phase of the disease referred to as bacterial wilt may occur early in the season. In these cases, brown cavities may form in the stalk pith and plants wilt and die.

Warm winter weather favors the survival of the corn flea beetle and thus disease development the following season. If the sum of the mean monthly temperatures for December, January and February totals 100°F or more, it is likely that the beetle will survive and Stewart's wilt may be a potential threat the coming season. Cold winters reduce beetle populations and limit disease development and spread.

Management of Stewart's wilt on sweet corn is primarily through the use of resistant hybrids. In years when the mean monthly temperatures for December, January and February is above 100°F, susceptible hybrids may benefit from insecticide treatments to reduce corn flea beetle feeding.

Maize Dwarf Mosaic Virus

Maize dwarf mosaic virus (MDMV) is a virus disease of corn that is most common in areas where Johnsongrass overwinters well- such as the southern United States. There was a serious outbreak of MDMV throughout the Midwest in 1976. Since then it has been present in most years. Although it may be severe in individual fields, it has not been widespread or epidemic.

Symptoms of MDMV are highly variable. Symptoms are most severe on plants that become infected when young; plants infected at pollination or later may appear normal. Initially, plants have a stippled mottle or mosaic of light and dark green that may develop into narrow streaks on the youngest leaves. There may be a shortening of the upper internodes that gives the plants a stunted, bushy appearance. As plants mature and the ambient temperature rises, mosaic symptoms often disappear. Fields with MDMV tend to be quite uneven with stunted, bushy, yellowish virus infected plants intermingled with normal height, healthy plants. Infected plants may be barren.

MDMV is spread by aphids. The disease is not common in the upper Midwest. It is most likely to be a widespread or serious problem when weather patterns are such that large numbers of virus-infected aphids are carried from the south or southwest to the Midwest by storm fronts.

The best approach for managing MDMV in sweet corn is through the use of resistant hybrids. Insecticide applications aimed at aphid control are not successful in preventing MDMV.

Common Corn Smut

Common corn smut is usually recognized by the conspicuous galls that form on leaves, stalks, ears and tassels of corn plants. Young galls are covered with a white or silvery membrane. The interior of the gall is white and spongy but quickly becomes black and dusty as the smut spores mature. Galls on leaves remain small, becoming hard and dry. Smut is usually not present in extremely high levels in a given field. However, smutted ears are not marketable as fresh sweet corn and can cause serious problems in processing plants.

Common smut is believed to be favored by mechanical and/or chemical injury to plants. Injuries from cultivating or spraying equipment as well as hail, wind and wind blown soil or sand may increase the amount of smut. The relationship of weather to incidence of smut is not clear but dry weather is often suggested as being favorable for disease development.

Hybrids do vary in their susceptibility to common smut so if common smut is a continual problem, selecting hybrids with more resistance to smut may be advantageous.