The corn plant is susceptible to many diseases that affect yield and quality of the crop. These diseases are caused by both infectious and noninfectious causal agents. Infectious causal agents are biological organisms that increase their population on diseased plants and then are spread to healthy plants, causing disease. They include fungi, bacteria, viruses, nematodes, and other organisms that are commonly thought of as plant pathogens. Noninfectious causes of disease include nutrient deficiency, herbicide injury, and other factors that do not increase on diseased plants and then spread to healthy plants and cause disease. The losses due to diseases cannot be adequately estimated because diseases are found on virtually all corn plants, and it is impossible to create conditions where the plant is completely free from disease. The greatest losses caused by disease are probably from those diseases that occur annually with little or no variation and where the effect on the crop is not recognized.

The purpose of this field guide is to assist with recognition of the common diseases of corn that occur in the United States. Several minor diseases that are not often encountered also are included. Accurate disease diagnosis is important for optimal understanding of when and where diseases occur and how they are best managed. Unfortunately, diagnosis on the basis of symptoms alone is often not reliable. The best diagnoses are made on the basis of symptoms and subsequent laboratory identification of the pathogen associated with the symptoms.
Control of Corn Disease

Corn diseases may be controlled by several methods. Cultural practices that bury or mix previously diseased crop residue with soil by tillage are a very effective control. However, in recent years, deep tillage is not used to the extent possible because of concerns with soil erosion and cost. Crop rotation may provide some control of some diseases; however, it generally is not effective against many diseases, including rust, Stewart's wilt, and viral diseases. Corn can be grown continuously in many areas without much loss in yield due to plant disease as long as soil fertility, weed control, and insect control are maintained. Most commercial corn seed in the United States is treated with fungicides and, more recently, often with an insecticide. Chemical seed treatments provide some control of seedling blights and in some areas head smut and downy mildew diseases. Foliar fungicides are widely used to protect inbreds in hybrid seed production fields and sweet corn against foliar diseases. They also are occasionally used for control of foliar diseases on commercial hybrids grown for grain. Chemical control has been used in the past for control of nematodes. However, it is not currently used to any extent because many of the compounds that provided good control of nematodes in the past are no longer registered for use.

Disease resistance is the most cost-effective and widely used means of controlling corn diseases. Often, resistance is not recognized by growers because corn hybrids in the United States are tested extensively, and very susceptible hybrids are rarely marketed. Seldom is a hybrid highly resistant to all diseases, and some minor diseases become important as a result of the extensive use of a particular hybrid that may be susceptible. Also, the parental inbreds used to produce most corn hybrids are second cycle lines that are produced by crossing two elite inbreds. If elite inbreds are susceptible to a particular disease, then that disease may become a problem. In recent years, gray leaf spot, northern corn leaf blight, and Diplodia ear rot have become problems because many elite hybrid germplasm pools do not have resistance to either of these two diseases.

Often, the relative susceptibility or resistance of particular hybrids to most minor diseases is not known. Corn hybrids are not screened for resistance to many of these diseases, such as crazy top, yellow leaf blight, and some ear rots that occur infrequently. Monogenic resistance is available for the control of some diseases and is used to various degrees. It provides very good control of northern corn leaf blight and rust. Usually, however, monogenic resistance is not known. Much of the emphasis of modern corn breeding programs is on the use of polygenic, partial resistance. This resistance is selected over decades of corn breeding and is often available in many hybrids. It has been estimated that as many as 500,000 new F1 crosses are evaluated as potential hybrids in the United States each year. The primary emphasis is yield and other agronomic characteristics; however, crosses also are evaluated for the diseases that occur in the areas where they are tested. Hybrids that are very susceptible are not selected for advancement to commercial sales. The exception is a hybrid that has extremely high yield, even though it is susceptible to a particular disease. Sometimes, even when the hybrid has lowered yield due to disease,
yield still may be higher than that of other commercial hybrids.

Due to the efforts of plant pathologists and plant breeders in both public and private sectors, widespread and significant damage to corn crops due to diseases in the United States rarely occurs. Change in cultural practices, the constantly changing hybrids and evolving pathogen populations, not to mention the introduction of pathogens, require constant vigilance for detection of new diseases.

Special thanks to BASF Corporation for supporting this Guide, to Gretchen Wieshuber for the design, and Christine Humm for scanning and editing.