

Corn Disease Loss Estimates From the United States and Ontario, Canada — 2017

Corn diseases annually reduce yield in the United States and Canada. Diseases of importance vary from year to year, and diseases that affect yield are based on many factors, including weather conditions, crop production practices, and hybrid selection and susceptibility to disease.

Plant pathologists representing 25 corn-producing U.S. states and Ontario, Canada, estimated the percent yield loss from corn disease in their states. These reports account for 14.7 billion bushels (98.1 percent) of the total corn produced in the United States and Ontario in 2017 (Figure 1). The yield loss estimates include root rots, seedling blights, foliar diseases, crazy top, smuts, stalk rots, and ear rots.

This publication documents the impact of major diseases on corn production during 2017. The Corn Disease

Working Group (CDWG) revises disease loss estimates annually. It is important to note that methods for estimating disease loss vary by state or province. The estimates may be based on statewide disease surveys; feedback from university extension, industry, and farmer representatives; and personal experience with disease losses.

The CDWG determined disease loss values based on yield before estimated losses for each state or province using this formula:

$$\frac{(100 - \text{percent estimated disease loss}) \div 100}{\text{bushels harvested}}$$

The CDWG then formulated total bushels lost per disease (percent loss x yield before estimated losses) for each state or province.

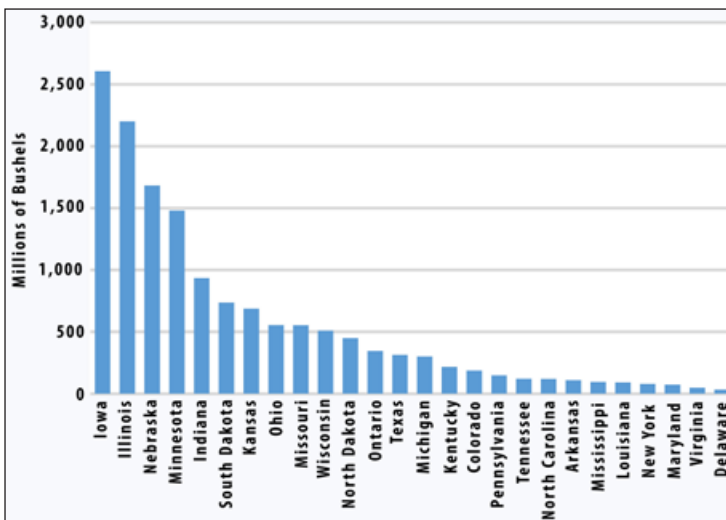


Figure 1. 2017 corn production (in millions of bushels) in 25 U.S. states and Ontario, Canada.



Figure 2. Gray leaf spot is a common foliar disease of corn. It was estimated to have reduced yields by more than 187 million bushels in 2017 — more than any other disease that season.

Members of the Corn Disease Working Group are university scientists from many institutions, including: University of Arkansas, Colorado State University, Cornell University, University of Delaware, University of Guelph, University of Illinois, Iowa State University, Kansas State University, University of Kentucky, Louisiana State University, Michigan State University, University of Minnesota, Mississippi State University, University of Missouri, University of Nebraska, North Carolina State University, North Dakota State University, Ohio State University, Penn State University, Purdue University, South Dakota State University, University of Tennessee, Texas A&M University, University of Virginia, and University of Wisconsin-Madison

2017 Conditions and Production

The United States and Ontario produced more than 14.9 billion bushels of corn in 2017, and many areas reported near-record yields. Conditions were abnormally dry for parts of the Corn Belt. Coupled with hot temperatures during the growing season, this contributed to less disease than in previous years.

2017 Disease Losses

In all, 6.7 percent of the total estimated corn bushels were lost in 2017 due to disease in the 25 corn-producing states and Ontario. This is down from 10.8 percent losses in 2016 and 13.5 percent losses in 2015. Table 1 provides yield loss estimates for all diseases.



Figure 3. Fusarium stalk rot was the second greatest cause of estimated yield loss due to disease in 2017.

Table 1. Estimated corn yield losses (millions of bushels) due to diseases in 25 U.S. corn-producing states and Ontario, Canada, in the 2017 growing season.

Disease	2017 Estimated Yield Loss (millions of bushels)
Root Rots and Seedling Blights	
Nematodes	69.7
Seedling blights	67.6
Root rots	26.9
Leaf and Aboveground Diseases	
Gray leaf spot	187.7
Southern rust	107.4
Goss's wilt	70.5
Northern corn leaf blight	43.8
Physoderma leaf spot	31.3
Stewart's disease	23.9
Bacterial leaf streak	23.0
Common rust	20.8
Eyespot	2.8
Anthracnose leaf blight	2.0
Carbonum leaf spot	1.6
Common smut	0.6
Southern leaf blight	0.4
Other leaf and aboveground diseases	0.3
Head smut	0.2
Crazy top	<0.1
Holcus spot	<0.1
Other viruses and virus-like diseases	<0.1
Stalk Rots	
Fusarium stalk rot	128.7
Anthracnose stalk rot and top dieback	81.4
Gibberella stalk rot	24.0
Charcoal rot	8.9
Other stalk rots	1.4
Diplodia stalk rot	0.6
Bacterial stalk rot	0.1
Ear rots	
Fusarium ear rot	52.1
Diplodia ear rot	49.4
Gibberella ear rot	25.6
Other ear rots	2.6
Aspergillus ear rot	1.3
Mycotoxins	
Loss from mycotoxin contamination	0.82 % of harvested grain contaminated

Diseases in the Northern United States and Ontario

Gray leaf spot was the most damaging disease in the northern United States and Ontario in 2017 — more than 167 million bushels lost. Southern rust was the second most damaging disease (see Table 2).

Overall, estimated disease loss in 2017 was much less than in 2016. Foliar diseases (such as gray leaf spot, Goss’s wilt, and southern rust) continued to reduce yield, but seedling blights and stalk rots also contributed to yield reduction in 2017.

Table 2. Estimated corn yield losses due to diseases in the 12 northernmost U.S. states and Ontario, Canada, in 2017¹

Disease	2017 Estimated Yield Loss (millions of bushels)
Gray leaf spot	167.3
Southern rust	84.9
Anthracnose stalk rot and top dieback	80.4
Seedling blights	67.4
Goss's wilt	65.3
Fusarium stalk rot	59.7
Diplodia ear rot	48.0

¹ U.S. States include Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, and Wisconsin.

Diseases in Southern States

Fusarium stalk rot caused the greatest damage in the southern United States in 2017 and nematodes were second, continuing a trend observed in both 2016 and 2015. Southern rust, gray leaf spot, and northern corn leaf blight were the primary foliar diseases present (Table 3).

Table 3. Estimated corn yield losses due to diseases in the 13 southernmost U.S. states in 2017¹

Disease	2017 Estimated Yield Loss (millions of bushels)
Fusarium stalk rot	69.0
Nematodes	36.7
Southern rust	22.6
Gray leaf spot	20.4
Fusarium ear rot	11.3
Charcoal rot	8.7
Northern corn leaf blight	7.2

¹ Arkansas, Colorado, Delaware, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Tennessee, Texas, and Virginia.

Mycotoxin Losses

In 2017, ear rots also caused minor losses through mycotoxin-contaminated corn grain. Plant pathologists estimated that 0.8 percent of the harvested grain in the United States and Ontario was contaminated in 2017.



Figure 4. Fusarium ear rot was estimated to be the most damaging ear rot in 2017. The disease reduced yields by more than 52 million bushels.

Summary

Environmental conditions varied across the United States and Ontario in 2017, which affected the presence of and damage from many diseases.

The foliar disease gray leaf spot was most prevalent across northern states and Ontario in 2017, continuing the trend from 2016. Stalk rots continue to be important diseases across the United States and Ontario. Bacterial

leaf streak, a new disease in the United States, continued to establish itself and resulted in an estimated 23 million bushels lost.

Disclaimer

The disease loss estimates in this publication were provided by members of the Corn Disease Working Group (CDWG). This information is only a guide. The values in this publication are not intended to be exact estimates of corn yield losses due to diseases. The members of the CDWG used the most appropriate means available to estimate disease losses and assume no liability resulting from the use of these estimates.

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Find out More

The Crop Protection Network (CPN) is a multi-state and international collaboration of university and provincial extension specialists, and public and private professionals who provide unbiased, research-based information to farmers and agricultural personnel. Our goal is to communicate relevant information that will help professionals identify and manage field crop diseases.

Find more resources at CropProtectionNetwork.org.

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