

Corn Disease Loss Estimates From the United States and Ontario, Canada — 2015

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 in each of 22 corn-producing U.S. states and Ontario, Canada estimated the percent yield loss from corn disease in their states. These reports account for 13.6 billion bushels (97.2 percent) of the total corn produced in the United States and Ontario in 2015 (Figure 1). Root rots, seedling blights, foliar diseases, crazy top, ear and head smuts, stalk rots, and ear rots are included in the yield loss estimates.

This publication documents the impact of major diseases on corn production during 2015. 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:

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

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

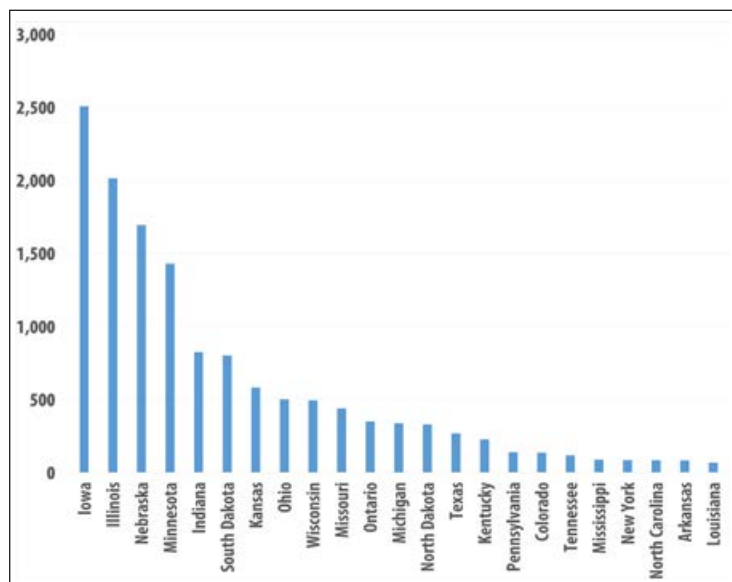


Figure 1. 2015 corn production (in millions of bushels) in 22 U.S. states and Ontario, Canada.

Members of the Corn Disease Working Group are university scientists from many institutions, including: University of Arkansas, Colorado State University, Cornell University, 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, Penn State University, Purdue University, South Dakota State University, Texas A&M University, University of Wisconsin

2015 Conditions and Production

The United States and Ontario produced more than 13.9 billion bushels of corn in 2015, and many areas reported record yields. Overall, temperatures were very mild across most of the Corn Belt, which contributed to an increase in diseases like northern corn leaf blight. The late summer and fall were hot and dry across much of the United States and Ontario, which facilitated a timely harvest, but led to an increase in stalk rot diseases compared to 2014.

2015 Disease Losses

In all, 13.5 percent of the total estimated corn bushels were lost in 2015 due to disease in 22 corn-producing states and Ontario, which is up from a 10.8 percent loss in 2014. Table 1 provides yield loss estimates for all diseases.

Table 1. Estimated corn yield loss (millions of bushels) from diseases in the top 22 U.S. corn-producing states and Ontario, Canada, in 2015.

Disease	2015 Yield Loss (millions of bushels)
Root Rot and Seedling Blights	
Nematodes	72.2
Root rots	59.3
Seedling blights	48.0
Leaf and Aboveground Diseases	
Northern corn leaf blight	551.1
Goss's wilt	139.8
Gray leaf spot	258.7
Common rust	18.2
Physoderma leaf spot	56.3
Southern rust	138.8
Eyespot	68.8
Anthracnose leaf blight	11.2
Common smut	7.4
Carbonum leaf spot (previously Northern corn leaf spot)	4.2
Virus (maize dwarf mosaic)	2.4
Other virus & virus-like diseases	2.4
Other leaf & aboveground diseases	1.4
Holcus spot	0.7
Southern corn leaf blight	6.2
Head smut	0.2
Crazy top	0.5
Stewart's disease	< 0.1
Stalk Rots	
Fusarium stalk rot	173.8
Gibberella stalk rot	90.5
Anthracnose stalk rot & top dieback	236.1
Diplodia stalk rot	34.7
Charcoal rot	2.8
Bacterial stalk rot	0.6
Other stalk rots	34.0
Ear Rots	
Gibberella ear rot	25.8
Diplodia ear rot	52.5
Fusarium ear rot	18.9
Other ear rots	0.8
Aspergillus ear rot	0.1
Mycotoxins	
Loss from mycotoxin contamination	0.9% of harvested grain contaminated

Diseases in the Northern United States and Ontario

Northern corn leaf blight was the most damaging disease in the northern United States and Ontario in 2015 — nearly 550 million bushels lost. This is more than twice the number of bushels than the second most damaging disease, anthracnose stalk rot.

Mild conditions through most of this area favored northern corn leaf blight development. Foliar diseases (such as gray leaf spot) were also prevalent, but Goss’s wilt was less damaging than in previous years. Southern rust and stalk rots caused more yield loss in the Midwest than in past years.

Table 2. Disease losses from the 12 northernmost states* and Ontario, Canada, in 2015.

Disease	2015 Yield Loss (millions of bushels)
Northern corn leaf blight	547.7
Anthracnose stalk rot and top dieback	233.2
Gray leaf spot	224.4
Goss’s wilt	139.6
Southern rust	129.2
Fusarium stalk rot	116.8
Gibberella stalk rot	89.3

*Illinois, Indiana, Iowa, Minnesota, Nebraska, Ohio, Michigan, New York, North Dakota, Pennsylvania, South Dakota, and Wisconsin.

Diseases in Southern States

Fusarium stalk rot caused the greatest damage in the southern United States in 2015. Nematodes were second. Gray leaf spot, southern rust, and northern corn leaf blight were the primary foliar diseases present (Table 3). Seedling blights and root rots were more damaging in this area in 2015 compared to previous years.

Table 3. Disease losses from the 10 southernmost states* in 2015.

Disease	2015 Yield Loss (millions of bushels)
Fusarium stalk rot	57.0
Nematodes	36.0
Gray leaf spot	34.3
Southern rust	9.6
Seedling blights	4.7
Root rots	4.3
Northern corn leaf blight	3.4

*Missouri, Arkansas, Colorado, Kansas, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee, and Texas.

Mycotoxin Losses

In 2015, ear rots also caused minor losses through mycotoxin-contaminated corn grain. Plant pathologists estimated that 0.9 percent of the harvested grain in the United States and Ontario was contaminated in 2015.

Summary

Environmental conditions varied across the United States and Ontario in 2015, which affected the presence of and damage from many diseases.

The foliar disease northern corn leaf blight was most prevalent across northern states and Ontario in 2015, likely due to mild weather. Stalk rots and seedling blights continue to be important diseases across the United States and Ontario.

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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Authors

Daren Mueller Iowa State University
 Adam Sisson Iowa State University
 Kiersten Wise Purdue University

Contributors

The following individuals contributed to this publication:

Arkansas Travis Faske
 Colorado Bruce Bosley, Ron Meyer
 Illinois Carl Bradley
 Indiana Kiersten Wise
 Iowa Alison Robertson
 Kansas Doug Jardine
 Kentucky Paul Vincelli
 Louisiana Clayton Hollier
 Minnesota Dean Malvick
 Michigan Marty Chilvers
 Mississippi Tom Allen
 Missouri University of Missouri Extension
 Nebraska Tamra Jackson
 New York Gary Bergstrom
 North Carolina Steve Koennig

North Dakota Andrew Friskop
 Ohio Pierce Paul
 Ontario Albert Tenuta
 Pennsylvania Greg Roth, Alyssa Collins
 South Dakota Connie Tande
 Tennessee Heather Kelly
 Texas Tom Isakeit
 Wisconsin Damon Smith

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 crop disease resources at CropProtectionNetwork.org.

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