

## Corn Disease Loss Estimates From the United States and Ontario, Canada – 2018

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, 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 14.5 billion bushels (98.0 percent) of the total corn produced in the U.S. and Ontario in 2018 (Figure 1). The yield loss estimates include root rots, seedling blights, foliar diseases, crazy top, smuts, stalk rots, and ear rots.

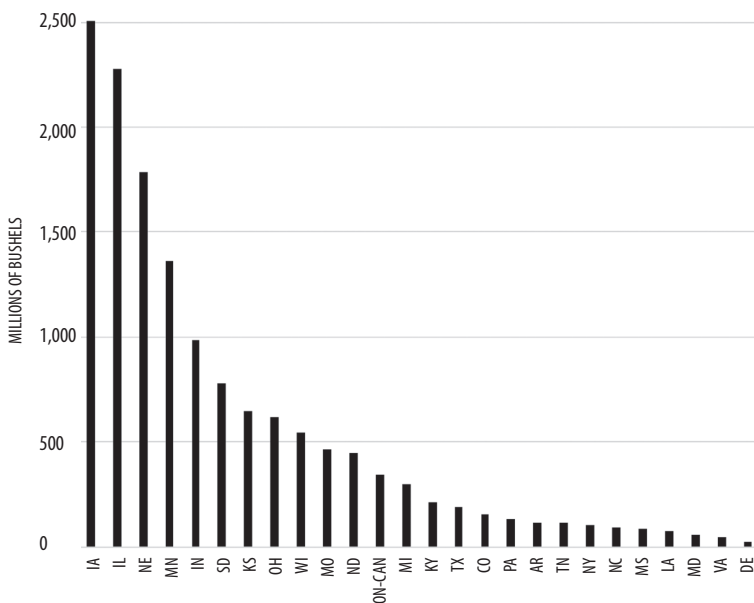
This publication documents the impact of major diseases on corn production during 2018. The Corn

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:

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

The CDWG then formulated total bushels lost per disease [(percent loss/100) x yield before estimated loss] for each state or province.



**Figure 1.** 2018 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 484 million bushels in 2018 – more than any other disease that season.

## 2018 Conditions and Production

The U.S. and Ontario produced more than 14.7 billion bushels of corn in 2018. Much of the U.S. had a wet spring, a dry summer, and a very wet fall. Excessive moisture during the fall contributed to high risk of ear rots and associated mycotoxins.

## 2018 Disease Losses

In all, 10.9 percent of the total estimated corn bushels were lost in 2018 due to disease in the 25 corn-producing states and Ontario. This is up from 6.7 losses in 2017 and similar to the 10.8 percent loss experienced in 2016. Table 1 provides yield loss estimates for all diseases.



**Figure 3.** Tar spot is a new disease in the U.S. and caused the second greatest estimated yield loss due to a foliar disease in 2018.



**Figure 4.** Fusarium ear rot was estimated to be the most damaging ear rot in 2018. The disease reduced yields by more than 90 million bushels.

**Table 1.** Estimated corn yield losses (millions of bushels) due to diseases in 25 U.S. corn-producing states and Ontario, Canada in the 2018 growing season.

Disease	2018 Estimated Yield Loss (millions of bushels)
<b>Root Rots and Seedling Blights</b>	
Nematodes	76.3
Seedling blights	23.9
Root rots	18.9
<b>Leaf and Aboveground Diseases</b>	
Gray leaf spot	484.3
Tar spot	184.9
Goss's wilt	68.4
Bacterial leaf streak	51.9
Northern corn leaf blight	43.6
Physoderma leaf spot	34.2
Eyespot	9.1
Carbonum leaf spot	5.0
Common rust	4.6
Southern rust	3.1
Anthracnose leaf blight	0.8
Southern leaf blight	0.6
Common smut	0.4
Head smut	0.3
Stewart's disease	0.3
Holcus spot	<0.1
Other leaf and aboveground diseases	<0.1
Crazy top	<0.1
Virus –Maize Dwarf Mosaic	<0.1
Other virus and virus-like diseases	<0.1
<b>Stalk Rots</b>	
Fusarium stalk rot	301.8
Anthracnose stalk rot and top dieback	130.7
Gibberella stalk rot	72.1
Others stalk rot	8.0
Diplodia stalk rot	7.7
Charcoal rot	1.4
Bacterial stalk rot	0.1
<b>Mycotoxins</b>	
Loss from mycotoxin contamination	17.1% of harvested grain contaminated



## Diseases in the Northern United States and Ontario

Gray leaf spot was the most damaging disease in the northern U.S. and Ontario in 2018 – more than 468 million bushels lost. Fusarium stalk rot caused the second greatest loss while tar spot, a relatively new disease in the U.S. caused the next greatest yield loss (see Table 2).

Overall, estimated disease loss in 2018 was much greater than in 2017. Foliar diseases (such as gray leaf spot and tar spot) continued to reduce yield, but stalk rots and ear rots contributed to yield reduction in 2018.

**Table 2. Estimated corn yield losses due to diseases in the 12 northernmost U.S. states and Ontario, Canada in 2018<sup>1</sup>**

Disease	2018 Estimated Yield Loss (millions of bushels)
Gray leaf spot	468.5
Fusarium stalk rot	236.2
Tar spot	184.9
Anthracoze stalk rot and top dieback	127.3
Gibberella ear rot	88.1
Fusarium ear rot	77.1
Gibberella stalk rot	70.8

<sup>1</sup> 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 U.S. in 2018 and nematodes were second, continuing a trend beginning in 2015. Gray leaf spot, bacterial leaf streak, and northern corn leaf blight were the primary foliar diseases present (Table 3).

**Table 3. Estimated corn yield losses due to diseases to in the 13 southernmost states in 2018<sup>1</sup>**

Disease	2018 Estimated Yield Loss (millions of bushels)
Fusarium stalk rot	65.6
Nematodes	41.8
Gray leaf spot	15.8
Fusarium ear rot	13.7
Bacterial leaf streak	9.4
Anthracoze stalk rot and top dieback	3.4
Northern corn leaf blight	3.2

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

## Mycotoxin Losses

In 2018, ear rots were common in the Midwest and contributed to a large percentage of grain contaminated by mycotoxins. Plant pathologists estimated that 17.1 percent of the harvested grain in the U.S. and Ontario was contaminated in 2018.

## Summary

Environmental conditions varied across the U.S. and Ontario in 2018, 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 2018, continuing the trend from both 2016 and 2017. Stalk rots continue to be important diseases across the U.S. and Ontario. Bacterial leaf streak and tar spot continued to become established and resulted in increasing amounts of yield loss.

## 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 estimate

## 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 [www.CropProtectionNetwork.org](http://www.CropProtectionNetwork.org).

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