

Corn Disease Loss Estimates From the United States and Ontario, Canada — 2013

Each year, corn diseases reduce yields in the United States and Canada. The most important diseases vary from year to year depending on many factors, including weather conditions, crop production practices, hybrid selection, and susceptibility to disease.

Plant pathologists in each of 21 corn producing U.S. states and Ontario, Canada, estimated the percent yield loss from corn disease in their states (Figures 1 and 3). These reports account for 13.3 billion bushels (93.3 percent) of the total corn produced in the United States and Ontario in 2013. Root rots, seedling blights, aboveground (foliar) diseases, stalk rots, and ear rots are included in the yield loss estimates.

Although plant pathologists around the North Central region have noted the prominent diseases in their states or provinces for years, there has been no coordinated effort to document disease-related losses in corn yields across the region — until the 2012 growing season. This publication documents the impact of major diseases on corn production during the 2013 growing season — future publications will document the years to come.

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. These percent loss estimates are converted to total bushels lost per disease (percent loss multiplied by total bushels of corn produced) for each state or province.

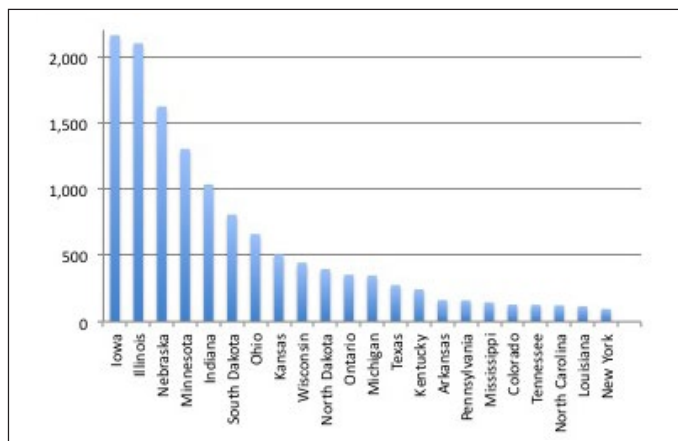


Figure 1. 2013 corn production (in millions of bushels) in 21 U.S. states and Ontario, Canada.



Figure 2. Northern corn leaf blight is a consistent source of yield loss in corn-producing areas.

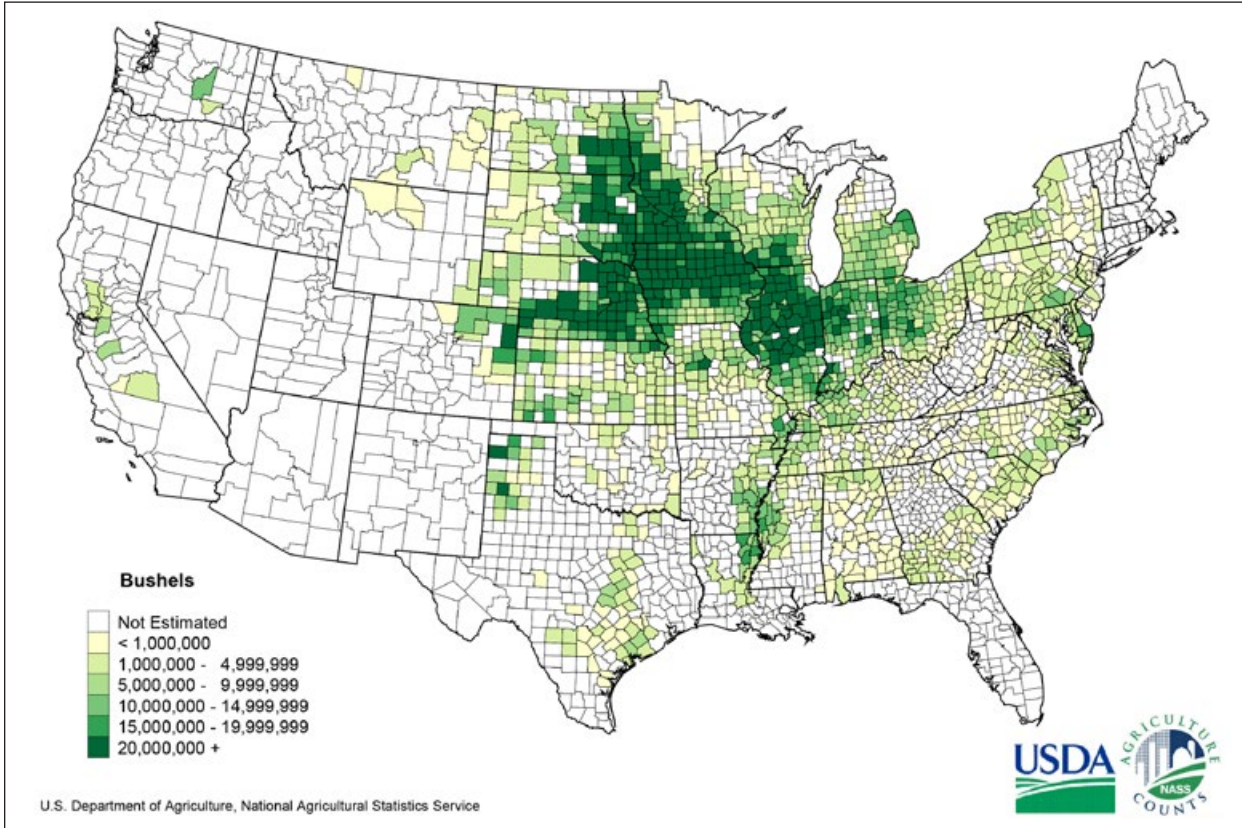


Figure 3. Map of 2013 corn acres and production (in millions of bushels) in the United States.
 Source: USDA-National Agricultural Statistics Service.

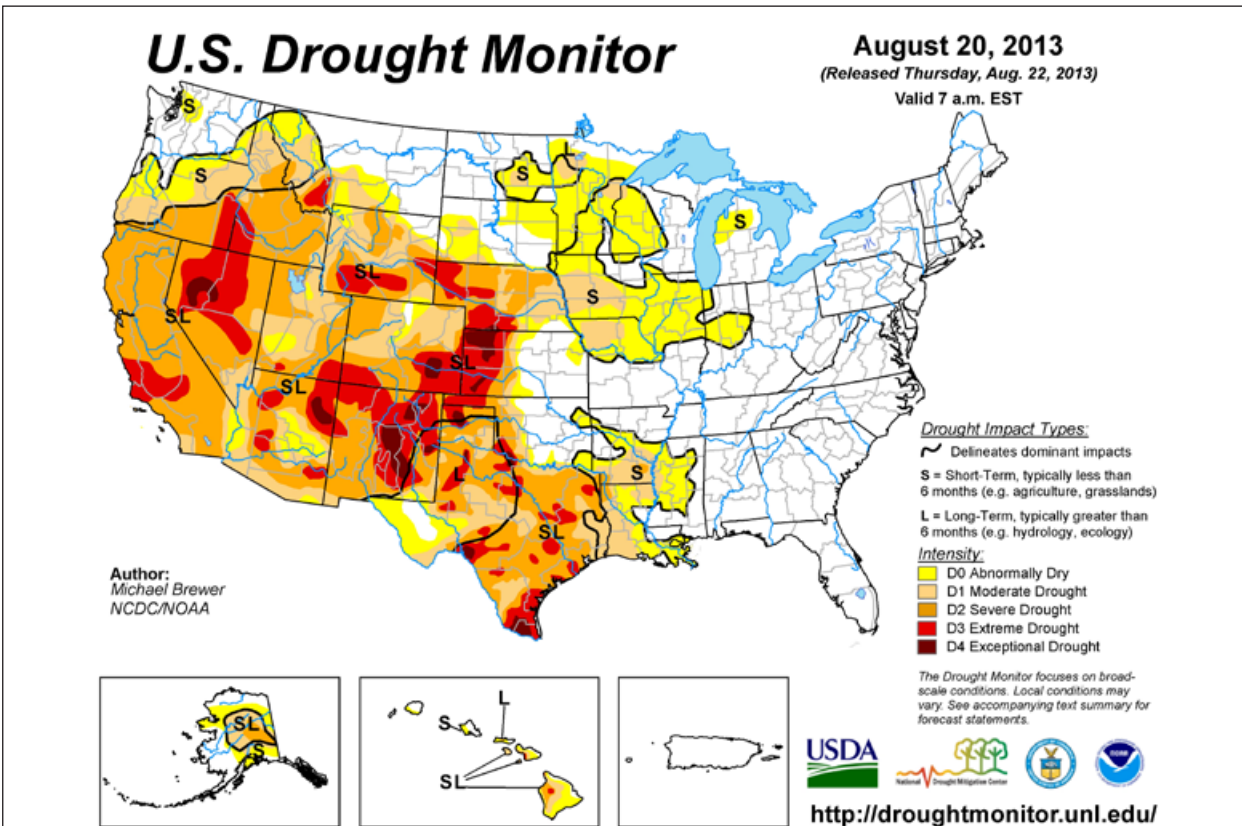


Figure 4. This map shows the intensity of drought conditions in the United States in mid-August, 2013.
 Source: U.S. Drought Monitor, droughtmonitor.unl.edu.

Table 1. Estimated corn yield loss from diseases in the top 21 U.S. corn-producing states and Ontario, Canada, in 2013.

Disease	2013 Yield Loss (millions of bushels)
Root Rot and Seedling Blights	
Seedling blights	149.8
Nematodes	81.3
Root rots	71.6
Leaf Diseases	
Northern corn leaf blight	132.3
Goss's wilt	103.4
Gray leaf spot	85.5
Southern rust	57.6
Common rust	52.9
Physoderma leaf spot	13.1
Eyespot	12.8
Anthracoze leaf blight	7.4
Viruses (maize dwarf mosaic, sugarcane mosaic virus, and maize chlorotic mottle)	7.1
Carbonum leaf spot (northern corn leaf spot)	4.1
Diplodia leaf streak	2.3
Holcus spot	0.6
Stewart's disease	0.1
Southern corn leaf blight	<0.1
Other Aboveground Diseases	
Common smut	25.1
Head smut	0.4
Crazy top + sorghum downy mildew	0.4
Stalk Rots	
Fusarium stalk rot	90.3
Anthracoze stalk rot + top dieback	47.9
Gibberella stalk rot	30.1
Diplodia stalk rot	7.9
Charcoal rot	7.3
Bacterial stalk rot	0.4
Other stalk rots	<0.1
Ear Rots	
Fusarium ear rot	52.5
Gibberella ear rot	13.8
Diplodia ear rot	12.0
Aspergillus ear rot	4.2
Other ear rots (Penicillium, Trichoderma, and Cladosporium)	0.2
Mycotoxins	
Mycotoxin contamination (estimated percent of harvested grain contaminated)	12.5%

2013 Conditions and Production

During the 2013 growing season many corn-producing states experienced dry conditions that followed a wet spring (Figure 4). These conditions can contribute to root rot losses because plants can be infected early in the season, and then limited water and underdeveloped or injured root systems can stress them later in the season. However, the United States and Ontario still produced more than 14.2 billion bushels of corn — a 3 billion bushel increase from 2012.

2013 Disease Losses

In all, 7.5 percent of the total estimated corn bushels were lost in 2013 to disease in 21 corn-producing states and Ontario. In 2012, losses were nearly 11 percent. This means that almost 1.1 billion bushels were lost to disease in 2013. Seedling blights caused the greatest disease-related losses, with more than 149 million bushels lost. Northern corn leaf blight, Goss's wilt, Fusarium stalk rot, and gray leaf spot followed in total losses. Table 1 provides yield loss estimates for all diseases.



Figure 5. Seedling blights were estimated to have reduced yields by nearly 150 million bushels in 2013 — more than any other disease that season.

Diseases in the Most Productive States

Illinois, Iowa, Minnesota, and Nebraska combined to produce 50.3 percent of the total corn production in the United States and Ontario in 2013. Disease losses reported in these states greatly influenced the overall importance of these diseases. Diseases in these four states caused an estimated 691 million bushels yield loss in 2013, which is approximately 8.8 percent of the total corn production from these states (Table 2).

Table 2. Disease losses from the top seven corn diseases in Illinois, Iowa, Minnesota, and Nebraska in 2013 .

Disease	2013 Yield Loss (millions of bushels)
Seedling blights	126.5
Goss's wilt	75.7
Northern corn leaf blight	72.6
Root rots	60.3
Southern rust	54.1
Fusarium stalk rot	47.3
Fusarium ear rot	41.0

Diseases in Northern States

In the north, the greatest yield losses were from seedling blights, Goss's wilt, and northern corn leaf blight (Table 3).

Table 3. Disease losses in the 12 northernmost U.S. states* and Ontario, Canada, in 2013.

Disease	2013 Yield Loss (millions of bushels)
Seedling blights	149.6
Northern corn leaf blight	131.4
Goss's wilt	100.5
Gray leaf spot	81.4
Root rots	71.4
Fusarium stalk rot	61.2
Southern rust	54.8

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

Diseases in Southern States

In the South, the greatest yield losses were from nematodes that feed on corn, Fusarium stalk rot, and charcoal rot (Table 4).

Table 4. Disease losses from the 9 southernmost states* in 2013.

Disease	2013 Yield Loss (millions of bushels)
Nematodes	30.1
Fusarium stalk rot	29.1
Gray leaf spot	4.0
Charcoal rot	3.8
Anthracnose stalk rot + top dieback	3.0
Goss's wilt	3.0
Southern rust	2.8

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

Mycotoxin Losses

In 2013, ear rots also caused losses through mycotoxin-contaminated corn grain. Plant pathologists estimate that 12.5 percent of U.S. harvested grain was contaminated in 2013. Most of the contamination was from aflatoxin, which is produced by the fungus that causes *Aspergillus* ear rot.

Summary

Seedling blights and foliar diseases caused a great deal of crop loss in 2013. Seedling blights were favored by the wet spring in many states. Foliar diseases (such as northern corn leaf blight and Goss's wilt) were more problematic because of the susceptibility of certain hybrids. Therefore, the environment was a primary factor in disease prevalence and impact on corn production in 2013.

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 reports 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.

Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Individuals using such products assume responsibility for their use in accordance with current directions of the manufacturer.



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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 crop disease resources at
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