



How Does Corn Disease Affect Silage Quality?

Midwest

The major components of corn silage as a forage are yield or tons per acre with the highest quality. For dairy producers, quality refers to milk produced per ton of corn silage and for beef producers it is the rate of gain per ton of corn silage. Several factors can impact yield and quality, but the focus of this article is on the impact of various corn diseases on yield and quality of corn silage.

Corn diseases attack the leaf, stalk, and ear. Most of the diseases are caused by fungi; however, there are two bacterial diseases, Goss's wilt and bacterial leaf streak, that attack the leaves and bacterial stalk rot that attacks the stalk.

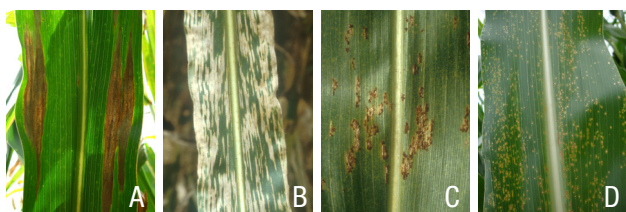


Figure 1.
(A) northern corn leaf blight (B) grey leaf spot (C) common rust (D) eye spot

// **Leaf diseases** include northern corn leaf blight, grey leaf spot, common rust, and eye spot (Figure 1). The lesions associated with these diseases can impact the amount of photosynthetic surface area on the leaf, leading to a reduction in the amount of energy produced, which will ultimately reduce grain fill. Additionally, if severe, early plant death can lower kernel quality and possible disease entry of root and stalk rots.

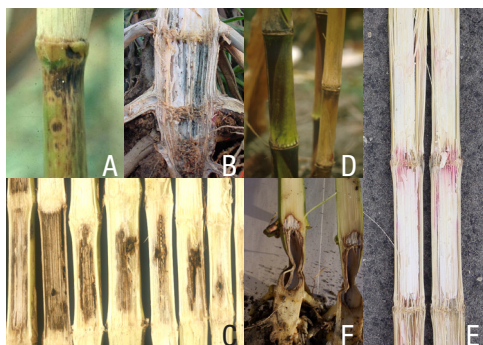


Figure 2.
(A) anthracnose stalk rot, (B) charcoal rot (C) Fusarium stalk rot (D) Diplodia stalk rot (E) Gibberella stalk rot (F) Pythium stalk rot (Pythium image courtesy of Dr. Alison Robertson, Iowa State University)

// **Stalk rot diseases** include anthracnose stalk rot, charcoal rot, Gibberella stalk rot, Fusarium stalk rot, Diplodia stalk rot, and Pythium stalk rot (Figure 2). Stalk rots may impact harvestability, yield, dry weight, and kernel quality.

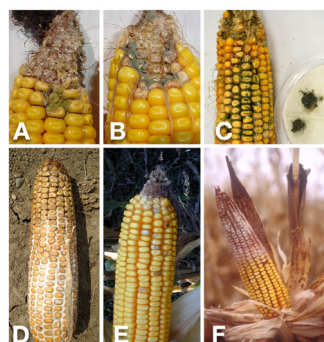


Figure 3.
(A), *Aspergillus* ear rot (B) *Penicillium* ear rot, (C) *Trichoderma* ear rot, (D) *Diplodia* ear rot, (E) *Fusarium* ear and kernel rot, and (F) *Gibberella* ear rot

// **Ear diseases** can cause the greatest concern with silage producers as they can impact quality and result in contamination of the silage with mycotoxins. Common ear diseases include *Aspergillus* ear rot, *Penicillium* ear rot, *Trichoderma* ear rot, *Diplodia* ear rot, *Fusarium* ear and kernel rot, and *Gibberella* ear rot. Possible mycotoxins can be associated with *Aspergillus*, *Fusarium*, and *Gibberella* ear rots.

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// How should I manage corn diseases when I am using corn for silage?

Many Bayer corn products have resistance or tolerance to many of the common diseases that attack corn.

If you are concerned about a certain disease or diseases consult with your seed provider for an appropriate silage product for your farm that has tolerance or resistance to the disease. Providing adequate plant nutrients may also help manage the impact of the diseases. Fungicides can also be beneficial particularly for leaf diseases but may have limited benefits for ear and stalk diseases.

// When should I apply a fungicide to protect silage corn from leaf diseases?

Protecting the ear leaf and leaves above the ear is critical as they provide most of the energy for the developing kernels. Research on grain corn has shown the highest grain yield response when the fungicide is applied at VT (tasseling). While treatment thresholds are not developed for every leaf disease, some diseases have treatment guidelines. For example, Iowa State University Extension recommends a fungicide should be considered when northern corn leaf blight is found on 50% of the plants within a field with one or more lesions per plant at tasseling.¹ University of Wisconsin Extension recommends a fungicide if northern corn leaf blight is present on 50% and severity is at least 5-10% on the plants and weather is forecasted to be rainy and cool.² While a fungicide applied to the foliage may not have a direct impact on stalk pathogens, it can indirectly impact stalk infection. By maintaining leaf health, it prevents early plant death or cannibalization of the stalk to fill the kernels, thereby reducing the risk of root and subsequent stalk infection. Fungicides will have no impact on the bacterial diseases.

// What is the timing for a fungicide application directed towards ear diseases?

Using a fungicide to protect the ear from ear rots has yielded inconsistent results.^{7,8} Research conducted by the University of Wisconsin found that the application of triazole-containing fungicide at R1 (silking) to 10 days post silking reduced the vomitoxin levels, while yield and overall silage quality were not impacted.³ In an additional study, some fungicides reduced Gibberella ear rot, but it was not consistent across different corn products.³ The authors of this report did point out that in years of high infestation a fungicide alone may not adequately reduce vomitoxin levels and resistant corn products may be needed.

// Does a fungicide influence silage quality?

A study at the University of Wisconsin found that a fungicide containing pyraclostrobin decreased leaf disease by 5% and stalk rot by 16%; additionally, neutral detergent fiber was reduced by 1% with increases in starch and neutral detergent fiber digestibility, thus possibly impacting silage quality.⁴ A study conducted at the University of Illinois found that cows that consumed corn treated with a pyraclostrobin fungicide had lower dry matter intake but similar milk production as cows that consumed silage from untreated corn, demonstrating higher feed conversion for cows consuming the fungicide-treated corn silage.⁵ Further studies conducted at the University of Illinois indicate that the application of a fungicide containing pyraclostrobin to corn reduced fiber content and increased dry matter digestibility in the silage, thus increasing feed conversion efficiency. Additionally, the researchers concluded that fiber content of both leaves and stalks was changed by reducing neutral detergent fiber, acid detergent fiber, and lignin.⁶

Sources

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²Smith, D. 2018. To spray or not to spray fungicides on corn for grain or silage? University of Wisconsin Extension. <https://badgercropdoc.com/2018/07/09/spray-not-spray-fungicide-corn-grain-silage/>

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⁸Luna Romero, M.P. and Wise, K.A. 2015. Timing and efficacy of fungicide applications for diplodia ear rot management in corn. Plant Health Progress. 16:123-131.

(Sources Verified 7/11/2019)

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