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## Preventative vs. Curative Fungicides

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## **Abstract**

We have received several questions about selection of fungicides, especially with regards to deciding between “curative” and “preventative” fungicides. People want to know if they should be applying a strobilurin fungicide, triazole fungicide, or a premix of both.

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## Preventative vs. Curative Fungicides

By Daren Mueller and Alison Robertson, Department of Plant Pathology

We have received several questions about selection of fungicides, especially with regards to deciding between "curative" and "preventative" fungicides. People want to know if they should be applying a strobilurin fungicide, triazole fungicide, or a premix of both.

To fully understand how a fungicide reduces disease development, we need to understand the disease cycle of a foliar pathogen. Foliar pathogens are polycyclic, which means that many disease cycles can occur in a single season. A disease cycle consists of the following steps: infection, colonization, symptoms and spore production. The period from infection until symptoms are first seen is known as latent infection.

In southeast Iowa, we usually start to see gray leaf spot (GLS) lesions on the lower leaves of the corn plant starting in mid-July. These lesions will produce spores that will infect leaves higher up the plant, cause lesions and produce more spores. Under favorable conditions, the first symptoms of GLS occur approximately 12 days after infection. So in a single growing season there may be three or four disease cycles of GLS. Fungicides reduce disease development by breaking the disease cycle.

Strobilurin and triazole fungicides are both considered "locally systemic", meaning they are absorbed into plant tissue and do not remain on the outer plant surfaces exposed to the elements. While both fungicide groups are systemic, they break the disease cycle at different points and thus differ in their role in protection of plants from infection.

**Preventative activity** occurs when a fungicide is present on or in the plant before the pathogen arrives or begins to develop. The fungicide acts as a protective barrier and prevents infection from occurring. This is also referred to as a protective activity.

**Curative or early-infection activity** occurs when the active fungicide ingredient is present within plant tissue and stops early growth of the pathogen (colonization) in the plant tissues. This type of fungicide is usually most effective 24 to 72 hours after infection occurs, depending on the fungicide. Most fungicides that prevent early-infection also have preventative activity and thus are most effective when applied before infection occurs.

Therefore, it is important to remember that "curative" fungicides will NOT cure a plant from a disease. They are effective if applied prior to infection or in the first 72 hours after infection, but they are not effective against more advanced latent infections.

Furthermore, preventative fungicides can still be used if the disease is present at low levels, since they will prevent new infections from occurring on the remaining leaf tissue with no infection.

### Putting it into practical terms

- In July, most of the corn and soybean fields in Iowa do not have

disease pressure at levels that will cause yield losses, although this seems to be when most people consider applying fungicides.

- Typically, disease levels do not increase until August. So, when choosing fungicides, the number one factor should be choosing a product that is most effective against diseases that are likely to occur in your field.
- If disease is present at low levels, protecting the remaining green tissue should suffice for protecting yield.
- Remember it is only the ear leaf and leaves above the ear leaf that contribute to grain fill – these are the leaves that need to be protected. It is also okay to have a few spots on these leaves before a fungicide is applied, since it is unlikely that these lesions will impact yield.

For tentative guidelines for estimating yield loss for GLS, see pages 3 and 4 of [Kentucky Pest News](#).

*Alison Robertson is an assistant professor of plant pathology with research and extension responsibilities in field crop diseases. Daren Mueller is an extension specialist with responsibilities in the Corn and Soybean Initiative.*

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