There is an increased need for foliar disease management for several reasons including increased use of reduced or no-till practices and increased acreage of continuous corn. These factors result in more corn residue that can serve as a source of disease inoculum. Producers are also prone to select hybrids to maximize yield instead of disease resistance, then depend on fungicides to limit losses from foliar diseases.

Research on foliar fungicide application in the absence of disease pressure has shown that fungicide applications have resulted in a positive yield response although not a statistically significant increase. Data from numerous trials in the corn belt (Plant Disease Management Reports) suggests the yield increase per acre needed to break even with a fungicide application in 2009 and 2010 was 6 bu./ac. at a $4.00 per bushel corn price. The 6 bu./ac. was achieved 45% of the time when a single fungicide application was made between the V15 and R2 growth stages. This research indicates that fungicide applications in the absence of disease may not be profitable.

The profitability of fungicide use in the presence of corn disease pressure is well-established.

**FUNGICIDE USE FOR DISEASE MANAGEMENT**

The best chance that a fungicide application will result in net economic gain occurs when disease conditions exist which justify making an application. Deciding which fields have significant disease risk can help a producer allocate fungicide applications to fields most likely to benefit from such an application.
FACTORS THAT INCREASE THE RISK FOR DISEASE

• **Susceptible hybrid** (primarily GLS and NCLB) – Corn hybrids vary in their susceptibility to major foliar diseases. Hybrids with susceptibility to disease respond better to fungicides, disease resistant hybrids do not.

• **Continuous corn** – Corn diseases overwinter in infected residue. Fields with heavy corn residue will be at the most risk for severe disease outbreak.

• **No-till or reduced-tillage** – Minimum tillage fields are at most risk because of the residue remaining on the soil surface.

• **Late planting** – Infection that occurs at an earlier stage of development will result in greater yield loss. Late planted fields have a greater potential for yield loss.

• **High plant population and/or yield potential** – High plant populations create a thicker canopy and a favourable environment for disease. High fertility fields favour fungal growth.

• **Disease pressure at tasselling** – If disease symptoms are found on plants at tasselling, there is a high possibility of yield loss.

• **Disease-favourable weather forecast** – Rain and high humidity levels favour disease development. Extended wet periods increase disease potential, and extended dry periods reduce disease potential.

• **Field history of disease** – Some disease spores are windborne, others are spread from the soil up into the canopy. If disease has been present in the past on a field, there is a good chance the disease is still in the field.

FACTORS TO INCREASE FUNGICIDE EFFECTIVENESS

• **Good spray coverage** – Achieving good results with fungicides requires excellent spray coverage.

• **Timing** – Fungi have certain life stages that are vulnerable to fungicides. Plants have vulnerable stages where the plant needs protection from the fungi. Fungicide applied too early or late will not produce the desired results. The greatest benefit for fungicide applications on corn comes from a single application at tasselling (VT) through silking (R1). Fungicides provide protection for 14 to 21 days, so it is critical that the application timing coincide with the presence of the disease.

Fungicides containing strobilurin trigger physiological responses in addition to disease control, such as improved nitrogen efficiency, more chlorophyll retention, antioxidant activity and delayed senescence. These physiological responses are associated with stress tolerance and improved stalk quality. Yield advantages from physiological responses are difficult to measure, but research is ongoing to understand this response.

FUNGAL DISEASE SCOUTING

Scout corn fields in the week before tassel emergence – the time when one fungicide application is most effective. Look for lesions and signs of foliar disease. Foliar diseases commonly show up first on lower leaves and progress upwards.

Fungicides control grey leaf spot, northern corn leaf blight, southern leaf blight, northern leaf spot, common rust and eyespot. Goss’s wilt is a bacterial disease and fungicides have no effect on it.

WHEN TO SPRAY

**Susceptible hybrids** – If lesions are on 50% of the plants or more, an application may be justified.

**Moderately susceptible hybrids** – If lesions are on 50% of the plants or more and if any of these high risks are present – high risk field and history of disease, corn residue on surface, weather expected to be warm and humid – an application may be justified.

**Resistant hybrid** – Fungicide application is not warranted.

SUMMARY

Fungicide application can provide a return on investment. The decision to use a fungicide should consider hybrid susceptibility to target diseases, field history, risk factors related to surface residue, and future weather patterns for disease development.

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