
Economic Analysis of Foliar Fungicide Treatment on Corn

Research and experience have shown that treating corn with a foliar fungicide may result in an economic advantage in some cases. The net economic effect must take into account possible yield increases, the expected price of corn, possible reductions in Multiple Peril Crop Insurance (MPCI) payments, the cost of the fungicide, the cost of application and possible added yield-related costs for drying, handling and harvesting.

Just prior to tassel emergence, corn plants should be examined for disease symptoms. Current disease management guidelines suggest that a foliar fungicide application be considered under the following situations:

- **Susceptible hybrids:** If disease symptoms are present on the third leaf below the ear or higher on 50% of the plants examined.
- **Intermediate hybrids:** If disease symptoms are present on the third leaf below the ear or higher on 50% of the plants examined, AND the field is in an area with a history of foliar disease problems, the previous crop was corn, and there is 35% or more surface residue, and the weather is warm and humid through July and August.
- **Resistant hybrids:** Fungicide applications generally are not recommended. Note that these guidelines are targeted toward diseases caused by residue-borne pathogens such as gray leaf spot, northern leaf blight and tar spot, and NOT for diseases caused by airborne pathogens which have spores that can travel great distances such as common rust and southern rust. (Source: Foliar Fungicides for Corn: Targeting Disease, Carl Bradley, et al, October 2020)

Economic Analysis

The final page of this publication contains a worksheet that can be used to estimate the expected net economic value from treating corn with a foliar fungicide. A [Decision Tool](#) (electronic spreadsheet) is also available on Ag

Decision Maker, www.extension.iastate.edu/agdm/crops/xls/a1-81fungicidetreatmentanalysis.xlsx. The following information is needed for the economic analysis.

Yields

The most important factor affecting the economic result of treating corn with a foliar fungicide is the expected increase in yield from treating. References at the end of this publication show research results from recent years from fungicide treatments. Observed yield effects have varied from zero to about seven bushels per acre in recent years.

Prices

The value of any increased yield will depend on the market price of corn in a given year for a given location. A good predictor of the fall harvest price is the current price of a December corn futures contract, minus the expected basis at harvest. The current basis can be computed by subtracting a forward contracting price for harvest from the current December contract futures price.

Multiple Peril Crop Insurance (MPCI)

If potential yield losses are high enough to trigger an MPCI indemnity payment, increasing yields by applying foliar fungicides may actually result in a decreased payment. The proven yield (APH) for the farm, the average December contract futures price in the month of February and the level of guarantee (%) selected affect the revenue guarantee each year. For Revenue Protection policies, the average price in October is used to calculate the guarantee if it is higher than the average price in February.

Actual revenue is determined by the actual yield harvested and the average December futures price during the month of October. If the actual revenue is below the revenue guarantee, an indemnity payment is received. If the actual revenue is equal to or above the revenue guarantee, no indemnity payment is received.

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Fungicide Costs

The cost of the particular product to be applied will depend on the per unit cost of the product and the recommended application rate. The cost of applying the product may be a charge by a custom applicator (see Ag Decision Maker File A3-10 for the current [Iowa Farm Custom Rate Survey](http://www.extension.iastate.edu/agdm/crops/pdf/a3-10.pdf), www.extension.iastate.edu/agdm/crops/pdf/a3-10.pdf) or the variable cost per acre if the product is applied by the operator (see Ag Decision Maker File A1-20 [Estimated Costs of Crop Production](http://www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf), page 12, for estimates of current variable costs for machinery operations, www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf).

Drying, Handling and Hauling Costs

More bushels harvested means added costs for drying, handling and hauling (see [AgDM File A1-20](http://www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf), page 12, for estimates of current variable costs for machinery operations, www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf).

Summary

The overall change in net revenue will be the sum of the value of any added yield minus any decrease in MPC1 indemnity payments, minus the cost of purchasing and applying the fungicide, minus any additional drying, handling and hauling costs. The accuracy of this estimate, of course, depends on the accuracy of the values used to compute it, especially the expected yield effect.

The [Decision Tool version of this worksheet](http://www.extension.iastate.edu/agdm/crops/xls/a1-81fungicidetreatmentanalysis.xlsx), www.extension.iastate.edu/agdm/crops/xls/a1-81fungicidetreatmentanalysis.xlsx, allows for a risk analysis based on ranges of expected yields, yield increases and harvest market prices.

Further information can be found in the following publications:

[Foliar Fungicides for Corn: Targeting Disease](http://store.extension.iastate.edu/product/Foliar-Fungicides-for-Corn-Targeting-Disease), store.extension.iastate.edu/product/Foliar-Fungicides-for-Corn-Targeting-Disease

[Summary of Foliar Fungicide Application to Corn in Iowa, 2018](http://crops.extension.iastate.edu/cropnews/2019/02/summary-foliar-fungicide-applications-corn-iowa-2018), crops.extension.iastate.edu/cropnews/2019/02/summary-foliar-fungicide-applications-corn-iowa-2018

[Summary of Foliar Fungicide Application to Corn in Iowa, 2019](http://crops.extension.iastate.edu/cropnews/2020/01/summary-foliar-fungicide-applications-gray-leaf-spot-and-yield-corn-iowa-2019), crops.extension.iastate.edu/cropnews/2020/01/summary-foliar-fungicide-applications-gray-leaf-spot-and-yield-corn-iowa-2019

[Summary of Foliar Fungicide Application to Corn in Iowa, 2020](http://crops.extension.iastate.edu/search/content?f%5B0%5D=im_field_tags%3A720&retain-filters=1), crops.extension.iastate.edu/search/content?f%5B0%5D=im_field_tags%3A720&retain-filters=1

[Fungicide Efficacy Tables](http://crops.extension.iastate.edu/blog/ethan-stoetzer/fungicide-efficacy-tables-corn-soybean-and-soybean-seedling-diseases), crops.extension.iastate.edu/blog/ethan-stoetzer/fungicide-efficacy-tables-corn-soybean-and-soybean-seedling-diseases

[Should We Be Spraying Fungicides on Corn at V12?](http://crops.extension.iastate.edu/cropnews/2018/02/should-we-be-spraying-fungicides-corn-v12), crops.extension.iastate.edu/cropnews/2018/02/should-we-be-spraying-fungicides-corn-v12

[Would a Fungicide Benefit Hail-damaged Crops?](http://crops.extension.iastate.edu/blog/adam-sisson-alison-robertson-daren-mueller/would-fungicide-benefit-hail-damaged-crops?), crops.extension.iastate.edu/blog/adam-sisson-alison-robertson-daren-mueller/would-fungicide-benefit-hail-damaged-crops?

[Effect of Foliar Fungicides Applied at Silking on Stalk Lodging in Corn](https://doi.org/10.1094/PHP-08-19-0049-RS), doi.org/10.1094/PHP-08-19-0049-RS

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Yields	Value	Unit
A. Expected average yield without foliar fungicide treatment		Bushels/acre
B. Expected yield increase from foliar fungicide treatment		Bushels/acre
Prices		
C. Expected December corn futures price in October		\$/bushel
D. Expected futures price basis at harvest (futures minus cash)		\$/bushel
E. Expected cash price at harvest (C – D)		\$/bushel
Multiple Peril Crop Insurance (MPCI)		
F. APH (proven) yield for MPCI, if insured		Bushels/acre
G. Level of coverage chosen (65%, 70%, 75%, 80% or 85%)		%
H. MPCI indemnity price for corn this year (average futures in Feb.)		\$/bushel
I. MPCI revenue guarantee (F × G × higher of C or H)		\$/acre
J. Expected MPCI actual revenue without treatment (A × C)		\$/acre
K. Expected MPCI indemnity payment without treatment (I – J) (if negative, payment is zero)		\$/acre
L. Expected MPCI actual revenue with treatment (A + B) × C		\$/acre
M. Expected MPCI indemnity payment with treatment (I – L) (if negative, payment is zero)		\$/acre
Fungicide Treatment Costs		
N. Price of fungicide per unit		\$/unit
O. Units of fungicide to apply per acre		Units/acre
P. Cost of application (custom charge or variable cost if self-applied)		\$/acre
Q. Total cost of fungicide plus application (N × O) + P)		\$/acre
Drying, Handling and Hauling Costs		
R. Expected variable cost of drying per bushel		\$/bushel
S. Expected variable cost of handling per bushel		\$/bushel
T. Expected variable cost of hauling per bushel		\$/bushel
U. Total added yield-related costs per bushel (Q + R + S)		\$/bushel
Summary		
V. Value of increased yield from treatment (B × E)		\$/acre
W. Value of decreased MPCI indemnity payment if treated (K – M)		\$/acre
X. Cost of fungicide and application costs (Q)		\$/acre
Y. Added cost of drying, hauling and handling (B × U)		\$/acre
Expected change in net revenue from treatment (V – W – X – Y)		\$/acre
