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Yields Inconsistent with Fungicide-Treated Corn Plots, Study Finds

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WOOSTER, Ohio -- The jury is still out on the effectiveness and feasibility of using fungicides on corn, in the absence of diseases, to boost yields, and plant pathologists continue to recommend their use in an Integrated Pest Management (IPM) approach to dealing with foliar diseases.

In a study of 100-plus corn plots throughout the eastern Corn Belt, plant pathologists found that yields varied widely between fungicide-treated and untreated corn plots.

“For any given trial you could have a fungicide-treated plot out-yielding the untreated plot and an untreated plot out-yielding a treated plot,” said Pierce Paul, an Ohio State University plant pathologist with the Ohio Agricultural Research and Development Center. “For example, we found that in some cases an untreated plot out-yielded a treated plot by as many as 30 bushels per acre, but yet in other cases the fungicide-treated plot out-yielded the untreated plot by a similar margin. We are not sure when a positive or negative yield response is to be expected.”

Paul, who also holds an OSU Extension appointment, said researchers across the Corn Belt are trying to determine what could be driving the difference in yield response from one location to the next.

“With such high variability, there’s something going on at the level of individual farms. It could vary with the product. It could vary with the hybrid. It could vary with the weather conditions, or when the fungicide is applied relative to grain fill, and certainly with how much disease is present in the field,” said Paul. “Different combinations of these factors may have very similar or vastly different effects on the yield response. It’s not as clear cut as the word out there seems to suggest.”

Some growers have been using fungicides in the absence of diseases to boost yields or improve stalk quality, specifically when the corn crop appears to be stressed.

“The general thinking is that when corn is drought-stressed or stressed from other situations, then fungicides are likely to result in a positive yield response,” said Paul. “However, detailed, well-designed, replicated studies are needed to evaluate these claims.”

Plant pathologists continue to recommend that growers only use fungicides on the crop when warranted to

control for diseases, such as gray leaf spot and northern corn leaf blight.

“What we would tell farmers is that if they choose to use fungicides and make yield comparisons, then apply to multiple strips in the field or conduct full-blown replication trials. A lot of the information out there associating fungicide use with yield enhancement is coming in from of strip trials where one strip is treated and one is not,” said Paul. “It’s hard to tell what’s going on in the field with just two strips. The natural variation in a field tells us that if you harvest two strips from different locations within the same field, you will likely see differences in response between the strips, whether or not a fungicide is applied. For instance, yield response due to differences in soil properties between two strips may be confused with fungicide performance.”

OARDC researchers conducted studies over the past two years and found no consistent link between fungicide applications and an increase in yields under low disease pressures.

Researchers tested six hybrids with various levels of resistance to gray leaf spot and northern corn leaf blight at three Ohio locations: Apple Creek, South Charleston, and at the Northwest Agricultural Research Station in Custar, OH. Four plots of each hybrid were sprayed with a fungicide and another four were left untreated. Researchers compared disease levels and yield responses.

With disease levels low -- no higher than 12 percent for gray leaf spot and 6 percent for northern corn leaf blight -- researchers found minor differences in yield response to fungicide applications between treated and untreated hybrids.

“For some hybrids, the yield differences were positive while for others the differences were negative,” said Paul. “The hybrids showing a positive or negative response at Apple Creek did not always show the same response at South Charleston and vice versa, repeating the same level of variability seen across the Corn Belt.

Paul said that not only do growers have to consider the effectiveness of fungicides for the purpose of boosting yields, but they should also consider the economic feasibility of their use, despite the current high corn prices that might be driving growers to squeeze a few more bushels per acre at harvest.

“Corn prices might be a driving factor behind a grower’s decision, but is it worth it when you have application costs and fungicide costs,” said Paul. “It’s a game that some growers are buying into and some aren’t in terms of taking the risk of gaining yields or losing yields from one year to the next.”