

Oxford SCIA 2017 Tier 1 Project: Impact of Fungicide + Insecticide on DON Vomitoxin Levels

Some foliar fungicides are labelled for suppression of corn ear moulds, while insecticide applications targeting Western Bean Cutworm (WBC) may reduce ear feeding injury which can predispose ears to greater ear mould infection. Members were interested in evaluating the effects of combined use. Six corn fields were compared with strips of a tassel timing fungicide + insecticide application and check strips with no applications to evaluate WBC feeding and DON vomitoxin levels in both. Prior to harvest, treated and untreated strips were visually evaluated for the presence of WBC ear feeding. A total of 100 ears were evaluated in each plot. A subsample of 20 ears were randomly collected, dried, shelled and submitted for DON vomitoxin analysis from each plot.

The amount of WBC feeding varied by field (Table 1). In most cases, feeding damage was minor and limited to a small number of kernels at the ear tips. In fields with a higher incidence of feeding (Fields 1 and 4), a portion of affected ears also showed elevated levels of feeding damage such as side entry holes and feeding. The fungicide + insecticide application appeared to reduce WBC feeding damage at fields where feeding was present in the untreated plots. From a visual ear mould perspective, most fields appeared relatively clean with the exception of Field 1 where some ear mould development was evident (Figure 1). DON vomitoxin levels were relatively low across the six fields, with all samples testing below 2.00 ppm. In the three fields where the control plots tested positive for DON, the fungicide + insecticide applications appeared to reduce DON vomitoxin levels. In three fields, both the treated and untreated plots were below the detectable limit of vomitoxin analysis (<0.2 ppm).

Table 1. Ear feeding injury rates and DON vomitoxin analysis results for untreated and treated (insecticide + fungicide) plots in 6 fields in 2017.

Field	% of Ears with WBC Feeding		DON Vomitoxin (ppm)	
	Untreated	Treated	Untreated	Treated
1	16%	2%	0.89	0.22*
2	8%	0%	0.40*	BDL
3	4%	0%	0.35*	BDL
4	14%	2%	BDL	BDL
5	10%	2%	BDL	BDL
6	1%	0%	BDL	BDL

BDL = Below Detectable Limit (<0.20 ppm)

* average included samples at BDL, BDL was assumed to be 0 for averaging purposes



Figure 1. Symptoms suggestive of *Giberella* Ear Rot

Scouting is recommended for WBC management. The control threshold for WBC is when 5% of plants have either WBC larvae or eggs present and the field is near or at tassel or silking. If a field is at threshold near tassel timing, the ideal insecticide application timing is considered to be at 95% tassel emergence, or close to when fresh silks will be present. This is when larvae migrate to the developing ears to feed on silks. Generally, once a corn field is in tassel, WBC moths will prefer to lay eggs in other non-tasseling corn fields or edible bean fields. Those that have already entered the ear will be protected from an insecticide application.

Fungicides are just one of many tools available for helping to manage ear moulds. Others include good crop rotation, selection of tolerant hybrids, and timely planting. The two fungicides labelled for *Fusarium* and *Gibberella* ear mould suppression in the 2016-2017 Pub 812: Field Crop Protection Guide include Proline and Caramba. Proper application timing (at fresh silk emergence but prior to silk browning) and good silk coverage are important, and this would also be the preferred timing for combination fungicide + insecticide applications as well.

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