



Dairy Briefs

The Latest Information on Dairy Cattle Nutrition



Mycotoxins: What's the Big Deal

Laura Martin, M.Sc

The wheat crop is coming off and the corn is tasseling. This combination makes farmers start to worry about toxin levels in the corn crop. This year's weather conditions of hot days, cool nights and lots of moisture make for a potential bumper year for toxins, but if you're feeding dairy cows does it even matter?

With more and more research highlighting the effects of mycotoxins in the last 20 years most farmers know that mycotoxins are toxins produced by mould on grain and forage crops. But only a few species of mould actually produce these toxins and they are only produced when the

mould is "stressed". So the presence of mould on the crop, while potentially causing other problems, does not necessarily mean that mycotoxins are present.



While it has been estimated that approximately 25% of the world's crops are affected by mycotoxins every year, different mycotoxins affect different parts of the world. In Ontario, the Fusarium mould species are the most prevalent. These moulds produce

deoxynivalenol (DON, or vomitoxin), zearalenone, and sometimes T-2 toxin and fumonisin. The really scary mycotoxins, the ones that have carcinogenic effects, like Aflatoxin, are more likely to be found in the Southern US and are typically only a concern in imported feeds.

According to SGS Agrifood Laboratories, 50% of the wheat samples tested from June until August of this year are between 1.0 – 4.0 ppm DON. In 2013, with similar toxin levels in wheat, many farmers worried how this would affect the corn crops. SGS Agrifood Laboratories put out a toxin summary from samples tested from August to December 2013 (Table 1 and 2), along with mycotoxin level guidelines for cattle and swine (Table

Cont. >>

Inside this Issue...

Mycotoxins: What's the Big Deal

By: Laura Martin, M. Sc, Nutritionist

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- Helps replenish lost electrolytes
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- Helps improve milk production during hot weather.
- May help reduce breeding problems during heat stress conditions.



Volume 7, Issue 9
August 2014

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3). From the tables you can see that although the wheat did test high for DON the majority of the corn crop tested below 1.0 ppm of the toxin. Zearalenone levels were less than detectable for the majority of samples tested.

Table 1: Range of Deoxynivalenol in Feeds August – December 2013

Feed Type	# of Samples	Deoxynivalenol (ppm)					
		<0.2	0.2-1.0	1.0-2.0	2.0-4.0	4.0-6.0	>6.0
Corn Silage	86	18.6%	62.8%	11.6%	7.0%	0%	0%
Grain Corn	665	29.8%	46.8%	17.7%	4.8%	0.8%	0.2%
High Moisture Corn	55	20.0%	47.3%	23.6%	9.1%	0%	0%
Wheat	318	8.2%	17.3%	18.6%	32.7%	16.4%	6.9%
Barley	71	21.1%	26.8%	8.5%	31.0%	7.0%	5.6%

Table 2: Range of Zearalenone in Feeds August – December 2013

Feed Type	# of Samples	Zearalenone (ppm)				
		<0.05	0.05-0.1	0.1-0.2	0.2-0.4	>0.4
Corn Silage	38	65.8%	13.2%	0%	7.9%	13.2%
Grain Corn	75	89.3%	1.3%	6.7%	2.7%	0%
High Moisture Corn	31	64.5%	22.6%	0%	12.9%	0%
Wheat	83	60.2%	22.9%	12.0%	3.6%	1.2%

Table 3: Mycotoxin Guidelines in Livestock Feeds

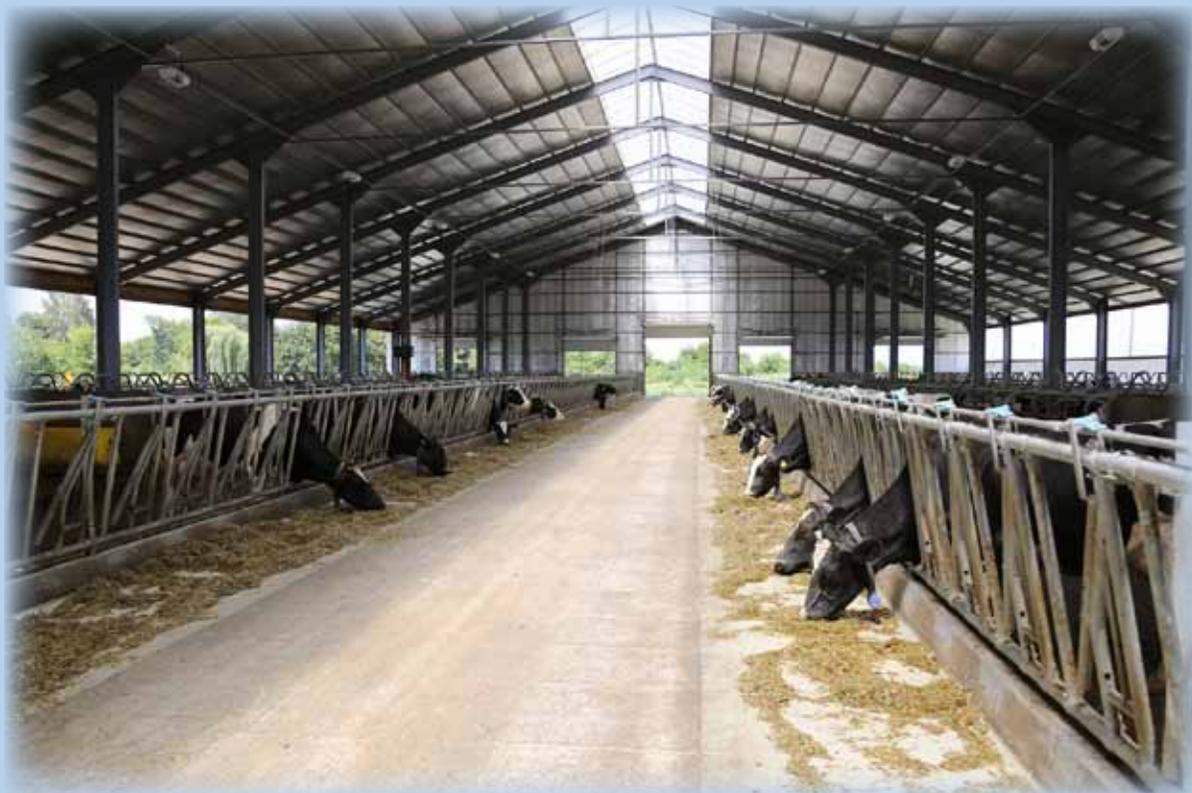
Mycotoxin	Potentially Harmful	
	Cattle	Swine
Deoxynivalenol (DON)		
Ingredient DM	5.0-12.0	0.8-1.4
TMR	2.5-6.0	0.6-1.0
Zearalenone		
Ingredient DM	5.6-10.0	1.1-5.6
TMR	3.9-7.0	0.6-3.9

There are mycotoxins present in crops in Ontario, but what does this mean for dairy cows? DON is one of the most prevalent mycotoxins found in feeds. This toxin can cause feed refusals and vomiting in swine, but research trials show very little impact of DON on milk cows. Even cows fed relatively high levels of DON, 4 – 6 ppm in the TMR, showed no effect on feed intake or milk production. Zearalenone (ZEA), an estrogen-like mycotoxin, can severely impact breeding and even cause abortions in sows. A trial done with non-lactating cows fed almost 25 ppm of ZEA showed no obvious effects of the toxin. As these levels of ZEA are next to impossible to find naturally they had to feed an encapsulated purified form of the toxin. The researchers also did a trial with heifers fed the same level and did note a reduction in conception rate. While some field trials show that these toxins may impact cattle under certain conditions, the “symptoms” (decreased feed intake, milk production, poor body condition and reproductive issues) can be attributed to many different things on a farm, and might not be related to mycotoxins at all.

Other mycotoxins that can occur in Ontario, like T-2 toxin and fumonisin, have the potential to be more toxic to dairy cattle. T-2 toxin has the ability to cause hemorrhagic lesions in the gut under certain conditions; however, this toxin is present in less than 10% of samples. Cows fed diets containing 100 ppm of fumonisin showed reduced milk production, most likely stemming from reduced feed intakes, with possible liver damage. While this sounds serious, a USDA survey of mid-west corn found that even though fumonisin was present in 60% of samples tested, the highest value was only 37.9 ppm and only 6.9% of samples tested over 5 ppm.

While mycotoxins can have harmful effects on monogastric species, most mycotoxin research shows little effect on dairy cows or beef cattle. How can something that will stop a pig from eating have very little effect on a cow? The answer, of course, is the rumen microbes. Just as the microbes get first crack at any nutrients that the cow consumes, they also get first crack at any toxins that the cow consumes. In most cases the microbes take the mycotoxin and transform it into a compound that is less toxic for the cow. This allows for ruminants to consume feed that may be contaminated with mycotoxins and show very little response. Table 3 shows the difference in levels that can potentially cause harm in swine compared to those in cattle. In fact some researchers have suggested that the impact on production seen in dairy cows may be due to the mycotoxin contaminated feed having lower nutrient value than non contaminated feed. If that is the case then rations can be balanced to take this into account and correct any potential problems.

I'm not suggesting that you should go out and buy all the mycotoxin contaminated feed from the neighbouring pig farms to feed to your dairy herd, but maybe this year when harvest time comes around you will have one less thing to worry about. Ruminants have proven, again, that they are superior to the monogastric species with their ability to take feed that nothing else can eat and turn it into a profit for the farmer.





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