



# Do you have concerns about Fusarium impact in the northern Grain harvest?

## Consider Elitox as a high Efficacy, highly cost effective tool if needed!

### Summary:

- Old winter cereal crop is impacted by Fusarium fungi, and likely has a real mycotoxins risk, particularly DON (also called vomitoxin).
- **ELITOX** from Feedworks has great supporting data on DON infected Feed from replicated trials in the USA, along with wide USA field experience against DON in USA grain in recent seasons.
- **Elitox** has been recognised for several years as the most cost effective of the reputable toxin management alternatives.
- Alternate products are thick on the ground, but we feel that **Elitox** offers the best combination of supporting data at affordable pricing.
- **Elitox** is the product of choice in managing the risk of Fusarium impacted grain.

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Recent news has revealed the real risk and likelihood that the Northern harvest of winter cereals will be widely impacted by Fusarium sp fungi.

Fusarium sp are common mycotoxin producing fungi. Three of the common mycotoxins that Fusarium sp may produce are:

- DON (also known as vomitoxin) from the trichothecene group
- Zearalenone (ZEN)
- T-2 ( another trichothecene)



## Mould Identification. Note Pinky white colour of fusarium

MOLD IDENTIFICATION			
MOLD	COLOR	TOXIN PRODUCER	COMMENTS
Penicillium	Green to green-blue	Yes - Ochratoxin, Citrinin, Patulin	Several potential toxins associated with certain species. Most common toxin producer in silage.
Aspergillus	Yellow-green	Yes - Aflatoxin, Ochratoxin	Found in drought, heat-stressed conditions or insect infested fields.
Fusarium	White to pinkish-white	Yes- Zearalenone, Vomitoxin (DON), T-2 Toxin, Fumonism	Common in cold, wet seasons. Certain strains produce extremely potent toxins.
Mucor	White/gray	None	Found especially in sealed corn. Grows at low temperatures. Also found in manures and soils.
Rhizopus	Black/white	None	Requires high moisture and an advanced decay mold. Common bread mold.
Cladosporium	White	None	Produces yeast like symptoms. Grows at low temperatures.

Reference: Dr. Bill Mahanna, "Prevention And (If Necessary) Management of Moldy Silage."

DON (vomitoxin) is probably the most likely local risk from Fusarium. It causes feed refusal, vomiting (as the name suggests), immunosuppression and loss of productivity.

The "pink mould" typical of fusarium has already been noticed recently.

ZEN exhibits its impacts largely via suppressed reproductive outcomes and physical changes in reproductive organs. It has strong oestrogenic properties.

T-2 is less likely, but comes from same broad tricothecene group as DON.

Generally it is accepted that monogastric species are more susceptible to mycotoxins than ruminants. Ruminants seem to get some deactivation of toxins from the microbes within the rumen.

This does not mean ruminants are immune however, as it is the protozoal fraction of the microbial population that is the most active in this toxin deactivation, and animals with sub acute or clinical acidosis, and also animals on ionophores, will have suppressed protozoal numbers and thus a more limited capacity to denature and protect the animal from the toxins.

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“...the protozoal fraction of the rumen microbial ecosystem seems to be more effective in mycotoxin metabolism than the bacterial fraction...”

Yiannikouris & Jouany  
INRA – FRANCE 2002

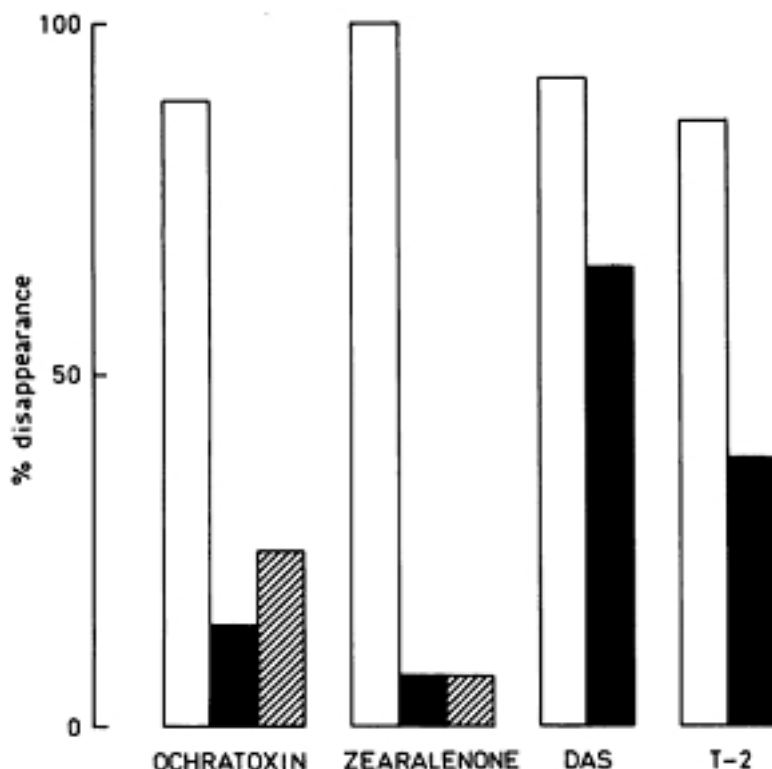


FIG. 2. Disappearance of ochratoxin, zearalenone, and trichothecenes in protozoa (□), bacteria (■), and rumen fluid treated with OT (▨). Rumen fluid from sheep was used. The results are expressed as the percentage of the disappearance in intact rumen fluid. Incubation times and initial concentration were as follows: ochratoxin A, 4 h and 0.2 mg/liter; zearalenone, 3 h and 2.8 mg/liter; DAS, 0.5 h and 5 mg/liter; and T-2 toxin, 0.5 h and 20 mg/liter.

Basically, all animals will have some risk from the *Fusarium* sp toxins. Ruminants should not be ignored .

As such, it may be wise to consider implementing a cost effective tool that can assist in managing the risk that such grain / toxins can present.

Solid replicated research on DON affected feed stuff is not easy to come by.

We at Feedworks have undertaken extensive trial efforts recently on DON impacted Feedstuffs in the USA via our comrades in the states (presented at Feedworks Coolum 2010 conference).

Ironically this followed on from a USA corn harvest that revealed widespread DON contamination, much as we are facing locally this season.

As such we have a great experience in recent times to fall back on regarding managing fusarium affected feed stuffs in real commercial application in the USA.



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> Global News

Categories: Corn

E-mail Print

### Vomitoxin Threat Adds to US Corn Harvest Woes

Source: Reuters  
(dated 23/11/2009)

Chicago, Nov 23 - Ethanol plants and grain elevators in the eastern U.S. Midwest have ramped up efforts to test incoming corn for vomitoxin, the byproduct of a plant disease that spread through this year's crop, industry officials said this week.

# Wheat in Ohio being hit by toxin

The Associated Press

TROY, Ohio - A toxin found at high levels this season in wheat has meant lower income for some Ohio farmers.

Levels of vomitoxin are the worst in seven to 10 years in some areas, said Pierce Paul, a plant pathologist and small-grains specialist with the Ohio State University Extension Service. He says the toxin has thrived in parts of the state due to a cool, wet May that allowed fungus to grow.



Distillers' Dried Grain Futures (DDG)  
Frequently Asked Questions

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#### CONTRACT SPECIFICATIONS

1. What is the deliverable product?  
100 Short tons of corn distillers' dried grains with solubles (DDGs).
2. What are the trading hours?  
6:00 p.m. to 7:15 a.m. and 9:30 a.m. to 1:15 p.m. Chicago Time, Sunday night through Friday afternoon.
3. What trading platform will DDG futures be available for trading on?  
Exclusively on Globex, the CME Group electronic trading platform.
4. What is the ticker symbol?  
DDG
5. What are the contract specifications for quality?  
Corn DDGs with minimum 26% protein; minimum 8% fat; maximum 12% fiber; and maximum 11.5% moisture.
6. To what extent, is vomitoxin levels a part of the DDG futures quality specifications?  
Buyers may request DDGs containing no more than 5 parts per million vomitoxin; however, vomitoxin testing shall be at buyer's expense.

Large integrator clients across monogastric and ruminant sectors recognised they faced an issue with the DON levels in the USA grain crop, but quite reasonably were seeking reputable data on which to base a decision on what tool or product to implement in a control strategy.

They were being overwhelmed with hear-say marketing, backed by little solid evidence.



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Feedworks determined to carry out sound research work to support our Product Elitox (ETX). We engaged Virginia Diversified research to carry out this work, as a professional but independent institution of high repute

This trial outcomes are shown below. Clearly DON infected feed has considerable impacts on animal performance. When the same DON impacted rations were offered with Elitox inclusion in this trial, we saw a statistically significant correction in animal performance.

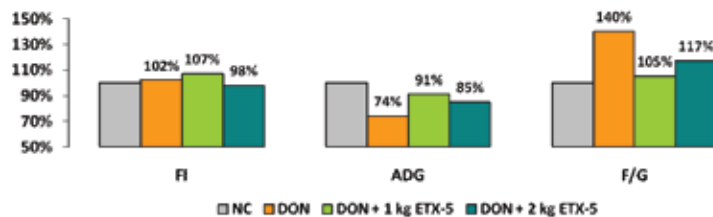
The high quality of this work was recognised by its acceptance for inclusion at the combined American Society of Animal Science – American Dairy Science Association meeting at Des Moines IA in March 2011



### Trial: DON Challenge Piglets - USA

ETX-5 (kg/MT)	0	0.5	0	0.5	1	2
DON (ppm)	0	0	1.25	1.25	1.25	1.25
FI **, kg	13.29 a	13.56 a	13.61 a	13.29 a	14.28 a	13.02 a
ADG, g/d	860 ab	884 a	638 b	663 b	783 ab	734 ab
F/G	2.23 a	2.23 a	3.13 c	2.86 bc	2.34a	2.61 ab

\*\* Challenged pigs tended to go off feed followed by gorging.



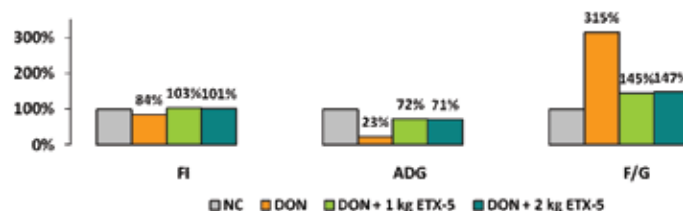
Coolum Nutrition Workshop, 2010



### Trial: DON Challenge Piglets - USA

ETX-5 (kg/MT)	0	0.5	0	0.5	1	2
DON (ppm)	0	0	2.5	2.5	2.5	2.5
FI **, kg	13.29 a	13.56 a	11.09 a	11.21 a	13.71 a	13.36 a
ADG, g	860 abc	884 a	201 d	500 bc	620 bc	610 ab
F/G	2.235 a	2.230 a	7.036 c	3.171 b	3.230 b	3.286 b

\*\* Challenged pigs tended to go off feed followed by gorging.



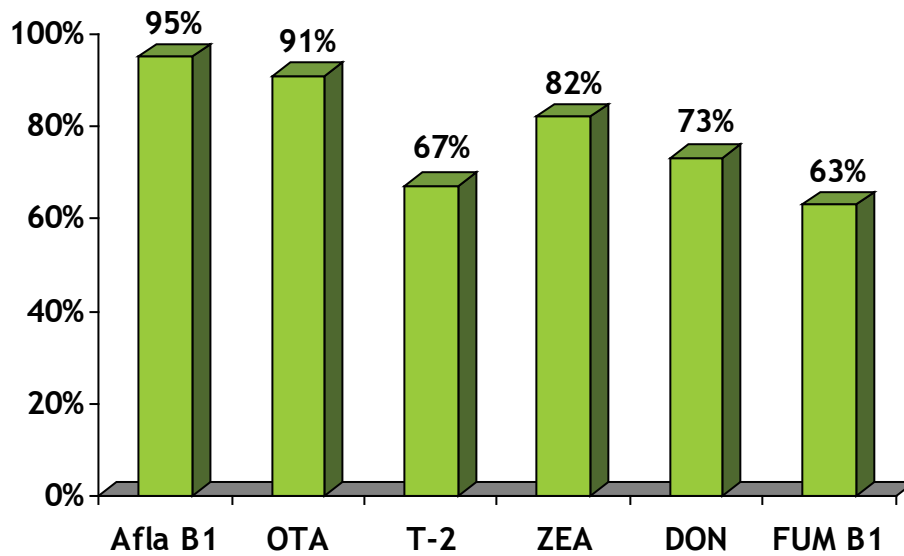
Coolum Nutrition Workshop, 2010



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These results support the previous work carried out by the Belgium based producers of Elitox via their biological simulator model. This model suggested that about 75% of DON in Feeds could be rendered safe by Elitox.

I personally find that the results shown below give me confidence that outcomes that are very effective, can be achieved in the field in real conditions.



Results above offer realism in what they suggest, without false promise.

Our Virginia Tech work supports the DON outcome above, so I suggest that the other positive outcomes on other toxins in Feed are also likely to be real, including the ZEN as another likely culprit from *Fusarium* sp.

Inevitably you will be faced with a range of products offered to you in the face of the current grain challenges.

We at Feedworks feel we have a sound basis for confidence in our product Elitox.

I would highlight to you the table below that shows that not all products offer the same efficacy against DON infected Feedstuffs that is suggested in the above Virginia Tech trials.

### 6.2.3. Microbiological methods

Certain strains of lactic acid bacteria, *propionibacteria* and *bifidobacteria* have cell wall structures that can bind mycotoxins [1, 19, 97] and limit their bioavailability in the animal body. Mycotoxins are then eliminated in the faeces without significant detrimental effects on the animals or any risk for toxic residues to be found in edible animal products. Research is currently underway to develop new classes of natural organic mycotoxin binders. Glucmannans extracted from the external part of the cell wall of the yeast *Saccharomyces cerevisiae* are able to bind certain mycotoxins (Tab. V). Their great binding capacity results from the large area available for exchange. Thus, 500 g of glucmannans from yeast cell-wall have the same adsorption capacity as 8 kg of clay [14]. This binder reduces the AFM1 content of milk by 58% in cows given a diet contaminated with aflatoxin B1 at a concentration of 0.05% of dry matter [94].

**Table V.** Capacity of glucmannans from *Saccharomyces cerevisiae* to bind to mycotoxins (adapted from [14]).

Mycotoxins	% Binding
Aflatoxins (total)	95.0
Fumonisin	67.0
ZEN	77.0
T-2	33.4
Citrinin	18.4
DAS	12.7
DON	12.6
OTA	12.5
NIV	8.2
Fusariotoxin	7.9

This table is from the paper:

*“Mycotoxins in feed and their fate in animals”*  
 Yannikouris and Jouany  
*Animal Res. 51 (2002) 81-99*  
 INRA sciences 2002.



“Do you have concerns about *Fusarium* impact in the northern Grain harvest?”

Many toxin binding products that operate only via binding are quite effective against toxins like aflatoxin, but may not be as effective against some of the more challenging toxins like DON.

Elitox is a product that gives you that flexibility and confidence to manage the effects from a wide range of toxins in grain/feed.

The excellent value offered by Elitox is further supported by its economic pricing. For several years now Elitox has been the most cost effective product in the toxin management sector.

**We urge you to talk to us about the great combination of efficacy and price that makes Elitox the product of choice in managing the current challenges with Fusarium impacted grain.**



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**FEEDWORKS**  
*"Performance through Science"*

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