Agrarian® SOLUTIONS

On-Farm Trials: Mycotoxin Strategies in Action

Real data. Real herds.

Feeds containing mold-produced spores are a growing concern for dairy herds. Mold spores reduce the nutrient quality of grain and produce secondary metabolites, known as mycotoxins. These poisons affect the digestive, immune and reproductive functions of the dairy cow and can allow other diseases to invade from an already depleted immune system.

While there are hundreds of mycotoxins, only a few can be adequately identified for further study. Researchers now understand that these toxins, even at low levels and in combination with others, are far more debilitating than high levels of individual toxins due to a cumulative effect.

The following case studies share real, on-farm examples of addressing mycotoxins on dairy herds and the nutritional solutions used to support herd reproduction, milk production and ultimately overall health.

THE CHALLENGE

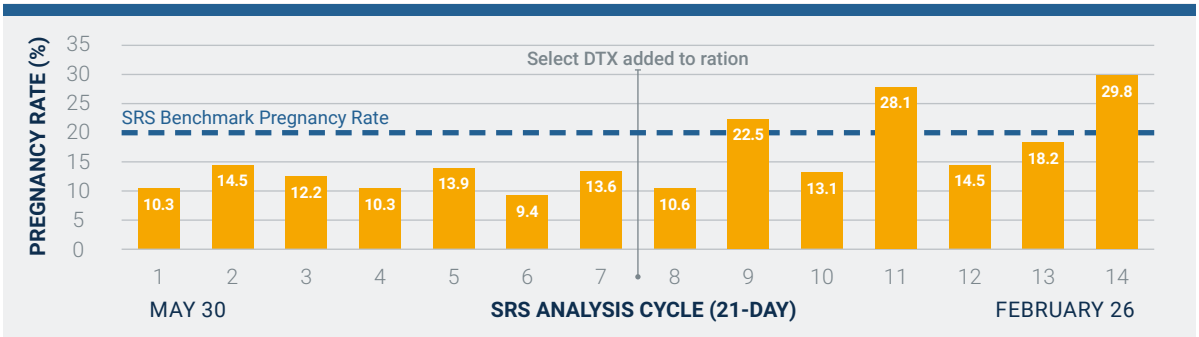
Mycotoxins wreak havoc on herd pregnancy rates

The Situation

A 400-cow herd was experiencing reproductive failure. The culprit? Recurring moderate-to-high levels of mycotoxins.

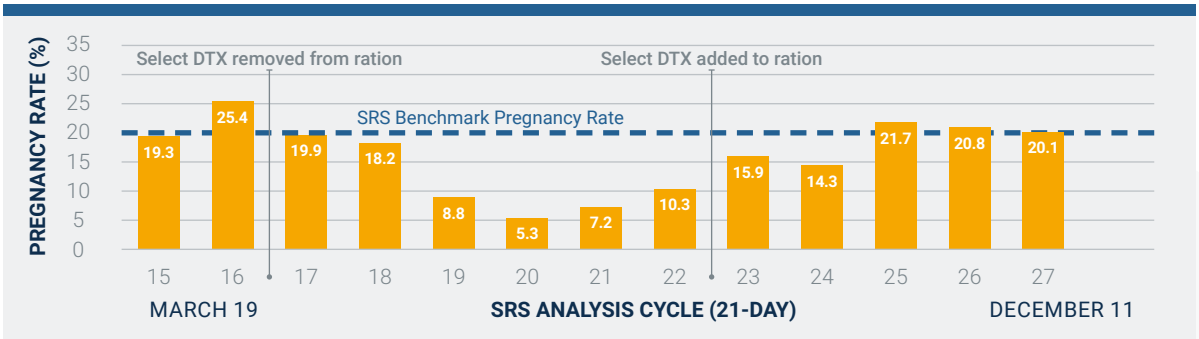
Over the course of 4 months, reproduction took a hit from mycotoxin presence and the pregnancy rate dropped to 12%. In October, Select DTX™ was introduced. Within 6 weeks, the pregnancy rate stabilized at 20% and the average elevated. Reproductive numbers remained strong into the fall.

The following spring, despite the success of Select DTX™, the farm decided to try an alternative product. While on the alternative product, the pregnancy rate dropped to an average of 11.6%.



The Result

Learning from the past, the herd added Select DTX™ back into the ration. Pregnancy rates jumped back to an average of 18.6% within 6 weeks.



From the initial value, the herd gained 8.2 points of pregnancy rate with Select DTX™. According to Dr. John Fetrow, College of Veterinary Medicine at the University of Minnesota, a one percent improvement in pregnancy rate is worth $15 to $35 per cow per year. For this farm, on an annualized basis, Select DTX™ potentially added $49,200 - $114,800. That same value was “lost” when feeding 1x of the alternative product or even 2x of the alternative product plus bentonite.

For one year, the farm could pay $35,900 for a binder treatment that failed to correct mycotoxin-derived problems and lose the potential benefit of pregnancy rate for a total loss of $85,100 - $150,700. Or the dairy could select a product with a higher initial purchase price but with a beneficial return on investment. This farm chose to use a single dose of Select DTX™ daily for a product cost of $17,257 which was offset by the gained value in pregnancy rate for a potential net profit of $40,500 to the farm using those pregnancy rate valuations.

THE CHALLENGE

Herd challenged by a mycotoxin for which no binder product claims efficacy

The Situation

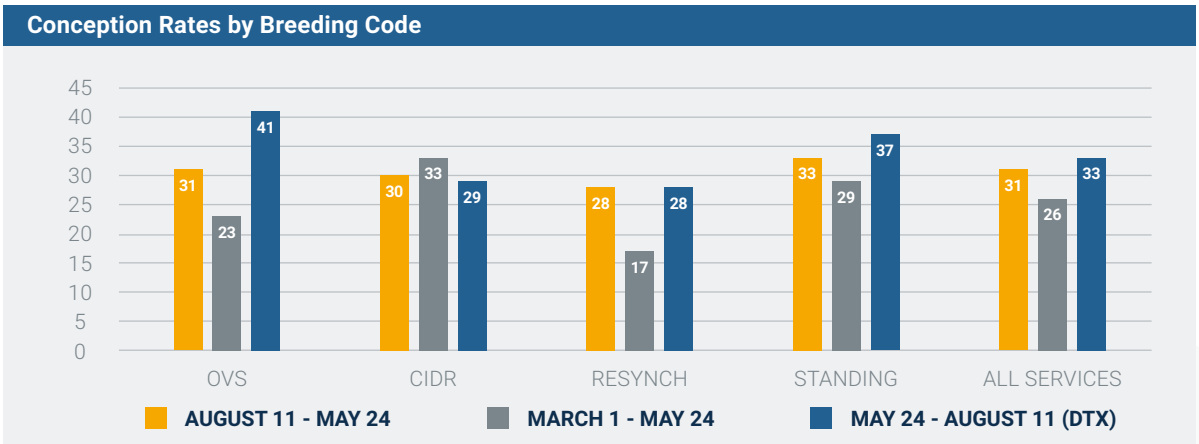
A 1,300-cow dairy herd experienced an annual pregnancy rate average of 17%. Seeking to find the culprit, the farm tested the TMR periodically and failed to find DON or zearalenone using a lab that was testing by ELISA. In the spring, TMR samples were sent to a new lab providing a 16-toxin screening by liquid chromatography-tandem mass spectroscopy. DON was detectable at <300ppb. No aflatoxin, T-2, zearalenone, fumonisins or ochratoxin were detected. Citrinin was found at 909ppb. Citrinin can cause major damage to the kidneys of affected animals.

Based on the findings, the herd added Select DTX™ for the next three months. Following the inclusion in the ration, data was collected and compared to the historical record for the herd.

The Result

Based on inclusion of Select DTX™, the herd saw:

- First lactation animals showed the strongest response, although all lactations improved over the 3-month period prior. (Data not shown)
- Cows at both 50-69 and 70-89 DIM had substantially higher conception rates than those cows in either the immediate prior three months or in the nine months preceding the beginning of treatment. These cows were consuming the treated ration during post-fresh transition.



Analysis of conception rates by breeding code at a dairy challenged by 900 ppb citrinin in the TMR. Comparisons are made for 3-month Select DTX™ treatment (May 24 – August 11) vs. the prior 3- and 9-month periods.

Finally, when breeding codes were evaluated there was a significant conception rate improvement in both the first service timed AI program and in the cows that were bred after a standing heat was observed. The former was attributed to fewer anestrus cows in the population as a result of Select DTX™ feeding. For those cows undergoing resynchronization, there was a return to the prior 9-month average after a major drop in conception in the immediate 3-month prior period. Overall, the entire herd improved after the feeding of Select DTX™.

Taken as a whole, the herd showed gains over both the prior 3- and 9-month periods. These results were obtained from a farm challenged by a mycotoxin for which no binder product claims efficacy. And while citrinin occurrence may be infrequent in dairies, it demonstrates that the biological activity of Select DTX™ primes the cow to deal with any foreign toxin.

THE CHALLENGE

Herd challenged by DON faced extremely high abortion rates and HBS

The Situation

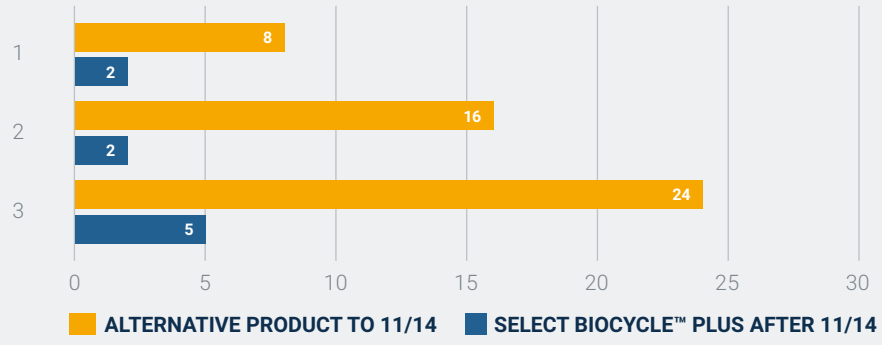
A 600-cow herd was facing reproductive failures and hemorrhagic bowel syndrome (HBS). Testing analysis uncovered the farm had confirmed DON concentrations of 600 to 1200 ppb and the herd was using an alternative product for both mycotoxin and HBS control.

The Solution

In November, having failed to control either issue the herd chose to include Select BioCycle™ Plus in the ration. At the time Select BioCycle™ Plus was added, the DON test value was 1,100ppb and abortion rates were at levels above what is considered acceptable. The herd saw 1st parity cows had the best rate at 8%. Abortions rose linearly with each successive parity.

After the addition of Select BioCycle™ Plus, abortions fell to 5% or lower in all parities.

Effect of Select BioCycle™ Plus on Abortion Rate by Parity on a Dairy Challenged with DON



This figure shows the change in abortion rate and by parity of the cows.

Anecdotally, the herd shared that since the inclusion of Select BioCycle™ Plus the pregnancy rate improved and is consistent, their conception rate improved steadily, and somatic cell counts have gone down. They also experienced less ketosis and metritis.

What is DON?

Deoxynivalenol is a Group-B trichothecene produced by several species of Fusarium. It tends to occur in high quantities under natural conditions; it is, however, less toxic than T-2 toxin to most species. In species affected, feed consumption is reduced, daily gain is reduced, somatic cell counts are elevated, milk production is lowered, reproductive performance is affected, loose and inconsistent manure (considerable cow-to-cow variation), and immune response is dysfunctional.

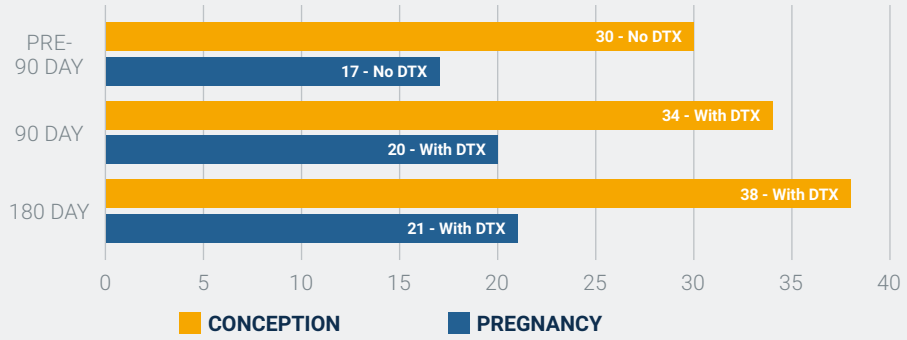
In dairy cows, milk production has been shown to begin declining around 300 ppb DON and milk fat can be depressed. A survey of 100 Dairy Farms conducted by North Carolina State University showed a relative milk production loss of over 3 lbs. per day at DON levels of 500 ppb. While there is evidence for some deactivation of DON by rumen microbes, there is also evidence to show that enteric (gut) microbes can convert the deactivation product back to the parent DON molecule.

Select DTX™: Standard Dosing Rate Case Study

A 930-cow herd gave our team access to its records before and after their decision to use Select DTX™ in their ration. This farm's mycotoxin exposure was variable and typical for Midwest dairies. Nonetheless a program using a single dose of Select DTX™ returned value to the farm in terms of pregnancy rate and milk production.

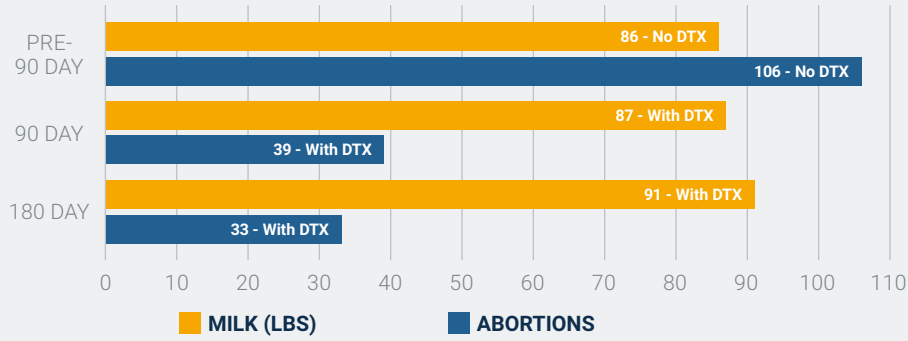
Data for 90 days preceding introduction of Select DTX™ are given followed by Select DTX™-associated response at 90 and 180 days.

Effect of Select DTX™ on Conception and Pregnancy Rates (%)



Ninety days after the introduction of Select DTX™, conception and pregnancy rates increased, reaching the industry benchmarks at the time of the trial.

Effect of Select DTX™ on Milk Production and Abortions



Over the six months of Select DTX™ feeding:

Production rose
from 86 lbs to 91 lbs of milk

Abortions dropped
from 11% to 4%

Select DTX™: Impact of removal from a ration

A 4,200-cow herd was using Select DTX™. Despite the good performance the dairy opted to remove Select DTX™.

In the following graphs, the pre-90-day columns represent the statistics for the herd for the last 90 days of Select DTX™ use, and the subsequent columns are the 90- and 180-day values after Select DTX™ was dropped.

The Results

While on Select DTX™...
The herd showed reasonable values for conception and pregnancy rates.

34% Conception Rate

21% Pregnancy Rate

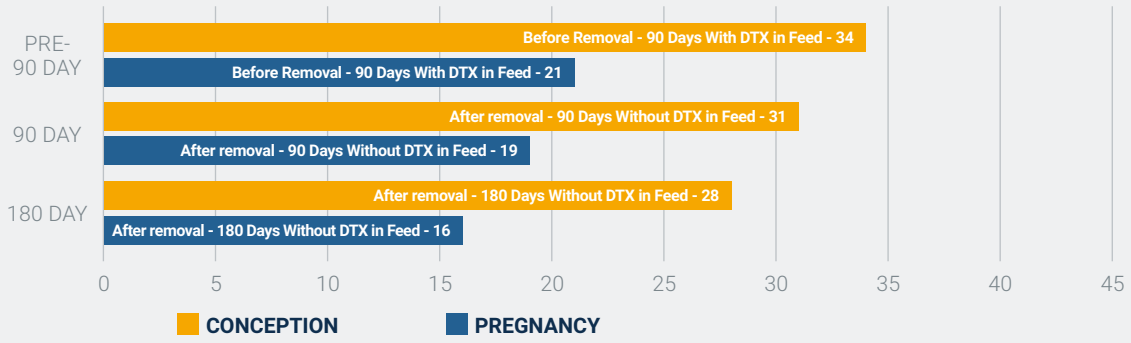
After Select DTX™ was removed...
Both values declined, with the major disruption occurring in pregnancy rate dropping to 16% in 180 days.

Conception Rate **DECREASED 6%**

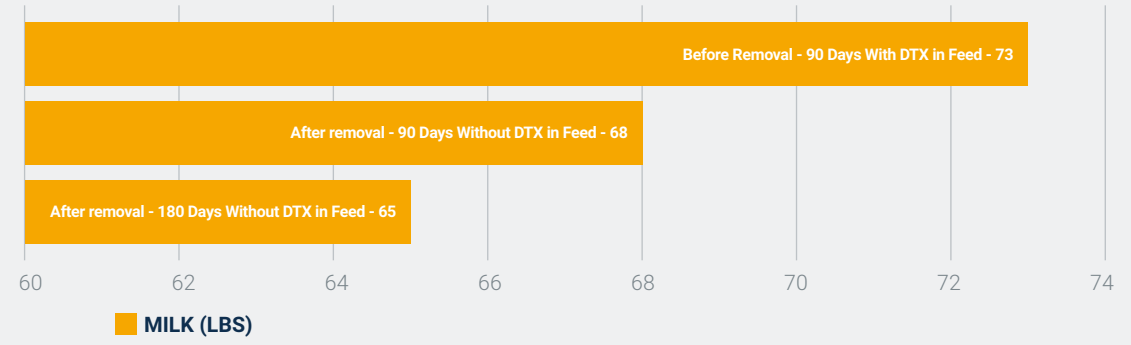
Pregnancy Rate **DECREASED 5%**

There was nearly a 7% drop in milk production in the first 90 days without Select DTX™.

Effect of Removing Select DTX™ on Conception and Pregnancy Rates (%)



Effect of Removing Select DTX™ on Milk Production (lbs)



The herd results and data shared in this piece reveal responses in dairy herds to both mixed mycotoxins and an effective anti-mycotoxin strategy with Select DTX™ and Select BioCycle™ Plus. These results were obtained consistently on commercial farms, not sterile, fully controlled research facilities.

Prosperity for a dairy is based on healthy cows yielding high quantities of milk with good constituents, effective reproductive functioning to grow the herd and improve and maximize its genetics, and on retention of healthy calves to supply the growth and replacements needed for reliable income.

For more than 20 years, our products have provided such success-relevant responses to commercial dairies, large and small, in the US and abroad.

Contact our team today to learn how our mycotoxin solutions can support the herds you serve.

SECURITY. ECONOMY. CONVENIENCE.
A Dairy Farmer's Dream.

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[1] 39.0, 39.5, and 41.3 kg for pre-90, 90, and 180 days, respectively

[2] 90 days to 4% and continued to decline into the 180 day data recording

[3] Data base does not designate breed(s) on farms. Since Holsteins represent more than 90% of the US national herd, it is likely these were mid-producing Holsteins during the DTX feeding period but dropped to low producers after DTX was taken out of the ration.

Select DTX™

™ Select DTX is a trademark of Select Sires Inc. Product listed is manufactured by Agrarian Marketing Corporation® a registered trademark of Agrarian Marketing Corporation, Middlebury, IN. Product listed is merely distributed by Select Sires Inc. and manufactured or processed by the company indicated. All claims, representations, and warranties, expressed or implied, are made only by the manufacturer and not by Select Sires Inc.

Updated: August 2017

A NEW APPROACH TO MANAGING FEED CHALLENGES

Currently additives focused around feed quality challenges can be grouped into two categories: binders and probiotic solutions. Clays and mannaoligoasacchariedes are the binders available on the market. Clays are the oldest of all treatments. Their effectiveness is limited both by the amount and number of different compounds they bind. Some products may bind important minerals and generally have a high inclusion rate in the diet. Some may aid milk production; however poor quality feeds continue attacking the cows lower gut and internal organs. Ultimately the damage is still happening and will take its toll on health, production, reproductive and immune system failure. Increasing the nutritional plane is a solution that will only mask the real problem and can be quite expensive.

Select DTX™ is a unique direct-fed microbial product that is more effective than other DFMs because of the presence of L-form bacteria. Select DTX is designed specifically for feed challenges caused by molds and their metabolites. Select DTX should be fed when: feed ingredients are in poor condition; when symptoms are present and when feed assays show problems. Common signs of these problems are: loose manure, low or erratic feed consumption, reduced milk production, elevated somatic cell count, and poor reproductive performance including weak heats, cystic cows and even abortions. Select DTX enhances the immune system to assist the cow when faced with these challenges.

RESEARCH Purdue University, University of Wisconsin

USE DIRECTIONS Mix Select DTX into dairy feeds at a rate of one-half (½) ounce (14g) per head per day.

PACKAGING 50 lb. box. (#9097)

STABILITY Stable for two years. Store in cool, dry place.

INGREDIENTS Montmorillonite clay, Calcium Carbonate, Silicon Dioxide, Sugars, Malic Acid, Tartaric Acid, Citric Acid, Benzoic Acid, Niacin, Propionic Acid, Dried *Bacillus subtilis* fermentation product.

GUARANTEED ANALYSIS
(per 1/2 ounce dose)

Calcium (Min) 10.0%
Calcium (Max) 12.0%
Malic acid (Min) 0.45%
Bacillus subtilis (Min) .....50 x 10^6 cfu/g

Select DTX™ Concentrate

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RESEARCH Purdue University, University of Wisconsin

USE DIRECTIONS Mix Select DTX into dairy feeds at a rate of (9g) per head per day.

PACKAGING 50 lb. box. (#1025)

STABILITY Stable for two years. Store in cool, dry place.

INGREDIENTS Montmorillonite clay, Calcium Carbonate, Silicon Dioxide, Dried *Bacillus subtilis* Fermentation product, Glucose, Fructose, Malic Acid, Tartaric Acid, Citric Acid, Benzoic Acid, Niacin.

GUARANTEED ANALYSIS

Calcium (Min) 3.1%
Calcium (Max) 4.1%
Malic acid (Min) 0.6%
Bacillus subtilis (Min) .....50 x 10^6 cfu/g