# Virtual Beef

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# 2017 Cow Calf Production Survey

**Dr. Jessica Gordon, Assistant Professor - Ruminant Heath Management, University of Guelph**

Our job as faculty and extension specialists is to assist producers in their chosen industry. Some ways we can assist them are by improving animal health, decreasing costs, increasing productivity, and helping them stay sustainable in an ever-changing global market. The challenge comes when much of the industry is a mystery. It can be hard to know where to focus efforts to have the most impact and what areas the industry is already ahead of the ball game without concrete data on what producers are doing. We can make assumptions from our interactions with producers and make inferences from research completed in other locations. But until we know the true details of our industry, we can never optimize our impact.

In the spring of 2017, my research group at the University of Guelph undertook a survey of the Ontario cow-calf industry for just this reason. It had been decades since a concerted effort had been made to collect extensive data on the cow-calf industry in Ontario. We were making assumptions, but we couldn't be sure if we were right. So, we decided to ask.

The survey was available in spring 2017 and was advertised through producer meetings, social media, and internet and print publications. The survey asked about general demographics of the farm and producer, specifics about the 2016 calf crop, culling and death loss, reproductive management, grazing and feeding practices, animal health, and economics and production. There were just under 400 clicks on the survey, 192 people started the survey, and 83 individuals completed the full survey. Most respondents that did not complete the survey dropped out after the basic demographics when specific numbers were being asked. Respondents commented that it would be easier to collect those numbers in advance, then attempt to fill them in after the fact.

The average herd size of respondents is 61 females. A majority of producers have some commercial cattle (49% commercial only, 29% commercial and purebred) on their farm and 20% of respondents have only purebred animals. Most respondents are male, 45-60 years old, and have an average of 26 years of experience with beef cattle. Fifty-seven percent of producers work off the farm at least part-time.

Surveyed producers have an average breeding season of 118 days. The average weaning rate in cows is 91% and 76% in heifers. Sixty-six percent of producers have their animals preg checked, 41% use AI, and 29% use embryo transfer. It is important to note that a producer may not preg checked or use AI on all females.

On average, 54% of cows and 65% of heifers calve in the first 21 days of the calving season. Ninety percent of cows and 95% of heifers calve within 63 days or 3 heat cycles. Ninety-six percent of cows and 82% of heifers calve unassisted according to survey respondents. The average birth weight is 38 kg(84 lbs), but many producers report that they do not have a scale, so these are mostly estimates. Eight percent of cows and 7% heifers lost their calves between birth and weaning.

**Figure 1** - Percent of respondents who use a given intervention on calves within in 24 hours of birth

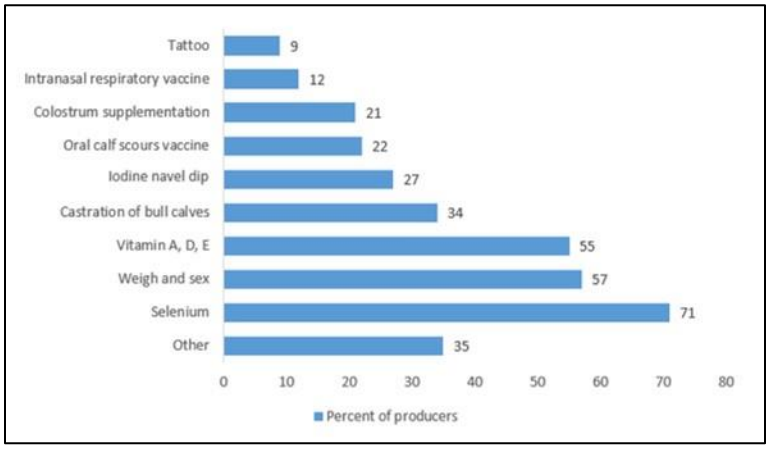


Figure 1 illustrates the interventions provided to calves within the first 24 hours of birth. Selenium, vitamin ADE, and weigh and sex were the most common. Producers could choose all of the interventions they used on farm, thus the total is more than 100%.

**Figure 2** – Reasons for calf losses

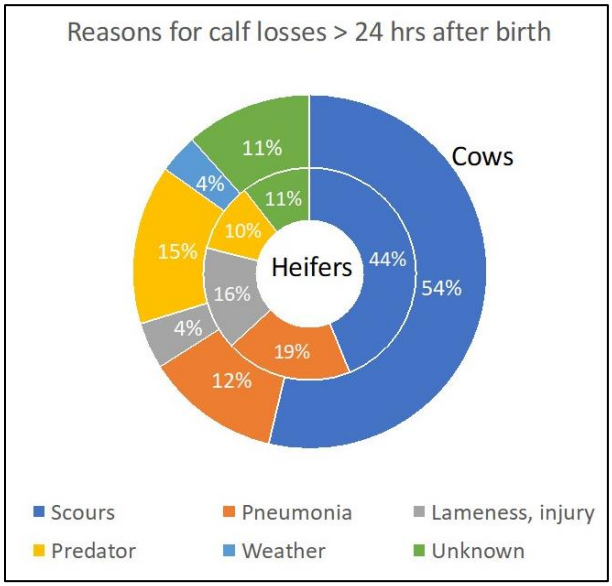


Figure 2 shows the reason for calf losses from 24 hours after birth to weaning for cows (outside ring) and heifers (inside ring). Scours and pneumonia are the most common causes of calf death loss after birth. It is important to note that although most farms have low death loss from predators, one of the farms has a high predator death loss, increasing the average.

Most calves are weaned in October and November. Fifty-four percent of producers use traditional separation, whereas 22% use fence line weaning and 15% use nose flaps. The average (non-adjusted) weaning weight is about 301 kg(663 lbs), but 50% of producers estimated weights, so this number may be inaccurate.

Most calves are castrated shortly after birth and 26% of producers use pain control. On average 86% of animals in surveyed herds are polled. If dehorning is used, about 26% of producers use hot iron/disbudder, 23% paste, and 29% gouge/spoon. Pain control is always used by 36% of producers and 15% of respondents use pain control based on the animal's age and dehorning method. If pain control is used, 35% of producers use local only, 41% use local and a pain killer (i.e. meloxicam), and 17% just use a pain killer.

Managed intensive or rotational grazing is the most common feeding method during the growing season and baled hay is most common over winter. Seventy-nine percent of producers use minerals at some point during the year, but many producers have times during the year where they don't offer mineral. A majority of producers (66%) never test feeds for quality.

Most producers treat for lice (87%) and internal parasites (64%) and vaccinate for bovine viral diarrhea(BVD) and lepto (88%). The diseases producers are most concerned with are BVD and Johne's, though most producers report they do not currently have an issue with either.

**Table 1** - Selected results from the Ontario, Atlantic and Western production surveys. Values marked with a "-" were not measured in that survey. C = cow, H = heifer.

| | Ontario | Atlantic | Western |
|---|---|---|---|
| **Recommended Management Practices** | | | |
| Creep feeding | 66% | 45% | - |
| Females preg checked | 66% C / 64% H | 49% C / 47% H | 62% C / 71% H |
| % calving in first 21 days | 54% C / 64% H | 35% C / 57% H | (87 d C / 57 d H) calving season length |
| Vaccinate pre-breed | 52.5% | 45% | - |
| Low stress weaning | 46% | 38% | 47% |
| Pain control for dehorning | 36% | 27% | 46% |
| Pain control for castration | 26% | 10% | 28% |
| BCS (hands on) | 26% | 17% | 77% |
| BSE bulls | 17% | 7% | 72% |
| Calves implanted | 2.4% | 0% | 27% |
| Lab tested feeds | 34% | 25% | 60% |
| Water tested in last 5 years | 30% | - | 40% |
| **Performance Measures** | | | |
| Open rate | 9% C / 14.5% H | ~ 10% C / Unknown H | 8% C / 12% H |
| Calf death loss | 8.2% C / 7.5% H | 17% C / Unknown H | 5.4% All |
| Breeding season length | 118 C / 107 H | 136 C / 112 H | 91 C / 86 H |

Most people are curious about how they stack up against their neighbours. Though these are not our direct neighbours, the industries in the western and Atlantic provinces were surveyed around the same time. You can see comparisons of key values in *Table 1*.

So, what did we learn in the survey? As we think about this, we must keep in mind that these are producer reported values and because we were asking after the fact, we are relying on memory for some measures. Even so, we were able to gain valuable insight on the industry. We can see we have some areas we can improve (such as weaning methods, breeding season length, and pain control for dehorning), there are areas where we are doing well, and there are many areas where we need more accurate data. We have gleaned a fair bit of information about the industry and where we need to focus in the future. Using this information, we can work to help the industry survive and thrive well into the future.

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# The Value of Special Calf Sales

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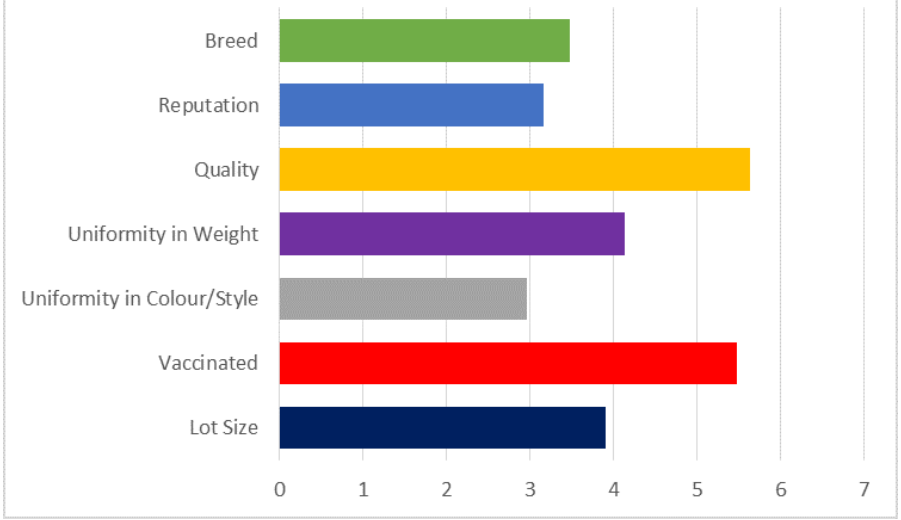
The benefits of adopting best management practices associated with vaccinations, early disbudding/dehorning and castration, and other preconditioning criteria are well known. Castrating and dehorning at a younger age helps to reduce stress and pain to the animal, while an effective vaccination program is a critical component of disease prevention and overall herd health. These practices are necessary to set calves up for success in feedlots.

Over the summer, OMAFRA Agriculture Development Branch staff developed a set of questionnaires to seek insight into the buying preferences of cattle buyers (including feedlot producers) and the marketing and management practices of cow-calf producers within Ontario (Special Sales Analysis: Ontario Calf Buyers Questionnaire and Ontario Cow-Calf Producer Questionnaire, 2018, unpublished). In the cattle buyer questionnaire, respondents were asked to rank the factors that were most important with respect to making purchasing decisions (*Figure 1*). Out of the options presented in the questionnaire, calf quality came out on top, with vaccination status coming in a close second. Ninety-five percent of survey respondents indicated that they pay less for non-vaccinated cattle and 82% either strongly agreed or agreed that having the history of the performance of cattle makes accurate pricing easier.

**Figure 1** – Factors affecting purchasing decisions of cattle buyers




Respondents (n=27) were asked to rank the listed factors according impact on purchasing decisions. The scale is based on a score calculated according to the ranking by questionnaire respondents. Special Sales Analysis: Ontario Calf Buyers Questionnaire, 2018, unpublished.

Preconditioning is a term that, generally speaking, refers to a set of management practices that help calves transition to a feedlot environment. By having calves dehorned, castrated, bunk trained and vaccinated prior to sale, calves are set up

for better performance at the feedlots by being better able to cope with stress associated with transportation, co-mingling and the new environment. In the Special Sales Analysis: Ontario Cow-Calf Producers Questionnaire (2018, unpublished), 72% of cow-calf respondents indicated that they pre-wean their calves prior to sale. Some presale programs may not require calves to be weaned, but will still typically include vaccination, castration, and dehorning as a requirement of sale. A number of studies have demonstrated that preconditioned calves have lower treatment rates, reduced mortality, higher rates of gain and better feed efficiency compared to non-preconditioned calves. Results from a study conducted by Macartney et al. (2003) in Ontario suggest that conditioned and vaccinated calves have reduced risk of treatment for BRD (bovine respiratory disease) in the feedlot. In the study, the researchers found that vaccinated calves purchased through special calf sales were 0.68 times as likely to be treated for BRD in the feedlot as control calves purchased through conventional auctions.

Special calf sales in Ontario target consignors who adopt preconditioning/presale programs and buyers who are looking for those specific attributes in calves. In the aforementioned study, Macartney et al. (2003) found a $0.06/lb premium for calves sold at special sales compared to conventional sales through the Keady Livestock Market. There are differences between each special calf sale in the province. Some sales may require specific protocols of consignors with respect to calf management. Others may catalogue lots of calves, advertising specific presale practices adopted by the consignor(s) for each lot. Some sales will pre-sort calves for like attributes in an effort to create consistent and uniform lots, while others will maintain owner-specific lots. Thus, there is greater opportunity at special calf sales to realize better returns on preconditioning or presale programs.

Price discovery will be impacted by different conditions at each sale. Each sale has a unique set of consigners and buyers and each sale has different management requirements for consigners, which are typically advertised with the sale. Depending on the special sale, any combination of vaccination protocols, dehorning, castration, age verification, breed influence, and bunk training will be required for consigners to sell calves through the special sale. Individual auction venues should be contacted for more information on sale details and consigner requirements. With the known health and performance benefits of preconditioning practices and lot uniformity, is there an economic benefit to marketing calves through special calf sales?

**Table 1** – A comparison of market data between special calf sales and regular sales in 2018

| | Sale Location 1 | | | | | Sale Location 2 | | | | | Sale Location 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Special Calf Sale Average ($/cwt) | Same Week Local Sale Average ($/cwt)* | ON Weekly Market Average ($/cwt) | % Difference to same week local sale average* | % Difference to same week ON weekly market | Special Calf Sale Average ($/cwt) | Same Week Local Sale Average ($/cwt) | ON Weekly Market Average ($/cwt) | % Difference to same week local sale average | % Difference to same week ON weekly market | Special Calf Sale Average ($/cwt) | Same Week Local Sale Average ($/cwt) | ON Weekly Market Average ($/cwt) | % Difference to same week local sale average | % Difference to same week ON weekly market |
| 400-499 lbs | 234.88 | 230.08 | 222.25 | 2 | 6 | 238.09 | 196.90 | 218.81 | 21 | 9 | 221.22 | 203.39 | 209.74 | 9 | 5 |
| 500-599 lbs | 234.26 | 214.61 | 218.67 | 9 | 7 | 224.29 | 189.79 | 214.24 | 18 | 5 | 213.52 | 183.65 | 203.93 | 16 | 5 |
| 600-699 lbs | 218.10 | 194.35 | 210.76 | 12 | 3 | 215.39 | 183.49 | 201.12 | 17 | 7 | 212.76 | 176.75 | 199.69 | 20 | 7 |
| 700-799 lbs | 214.68 | 178.79 | 192.71 | 20 | 11 | 199.50 | 162.20 | 190.98 | 23 | 4 | 213.20 | 159.41 | 192.38 | 34 | 11 |

Note: Steer pricing only. Where more than one special sale occurred in a week, special sale pricing was averaged. Market data obtained from BFO Market Reports and expressed in CAD.
*Local same week price summary unavailable. Following week pricing used alternatively.

Table 1 provides sale data from three different auction locations across Ontario for 2018 fall calf sales. The data was obtained from Beef Farmers of Ontario Market Reports between October 1st and November 30th, 2018 and highlight the differences between prices at each auction for special sales and regular sales, and average prices across Ontario market during the same timeframe. In most cases, calves between 400 and 800 lbs marketed through special calf sales sold

stronger compared to those sold through regular sales at the same location and, on average, across other auctions during the same week.

**Table 2** – Impact of average market prices at special calf sales versus regular sales

| | | Special Calf Sale | Regular Local Sale - Same Week | Difference | Difference on 50 Calves Sold |
|---|---|---|---|---|---|
| Sale Location 1 | Price/lb ($) | 2.34 | 2.15 | 0.20 | $5,403.75 |
| | Price/calf @ 550 lbs ($) | 1288.43 | 1180.36 | 108.08 | |
| Sale Location2 | Price/lb ($) | 2.24 | 1.90 | 0.35 | $9,487.50 |
| | Price/calf @ 550 lbs ($) | 1233.60 | 1043.85 | 189.75 | |
| Sale Location 3 | Price/lb ($) | 2.14 | 1.84 | 0.30 | $8,214.25 |
| | Price/calf @ 550 lbs ($) | 1174.36 | 1010.08 | 164.29 | |

Table 2 shows the financial impact of marketing strategies (special calf sales vs regular sales) for individual calves sold at 550 lbs (on average) when marketing 50 steers. While special calf sales generally bring stronger prices for calves, there are other factors that will impact prices received for calves between sales and between lots (discussed further below). In 2018, premiums received on 550 lb calves marketed through special calf sales ranged (on average) between $0.20-$0.35/lb.

What do the trends look like year over year? As part of a Special Calf Sale Study (2018, OMAFRA, unpublished), an analysis of premiums received at special calf sales over a 10 year period was conducted. Special calf sales, for the purpose of the study, were defined as “sales that have requirements for health and management protocols and/or have a unique label on calves”. The study looked at prices received for calves at special calf sales at four different locations across Ontario. Some sales were pre-sort sales, while others sales catalogued lots of calves and auctioned them in owner-lots.

**Figure 2** – Premiums received at Ontario special calf sales and regular sales over a 10 year market cycle, expressed as percent difference to average Ontario sale data for the same time period

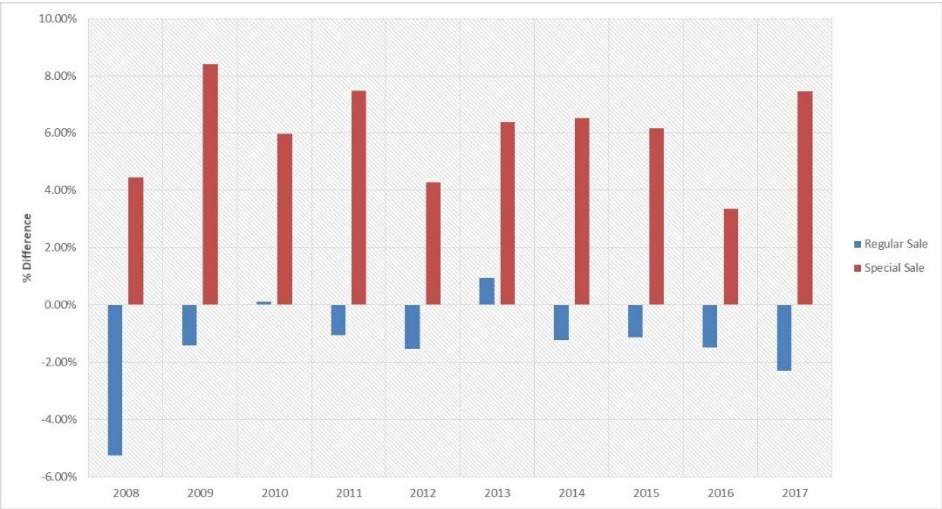
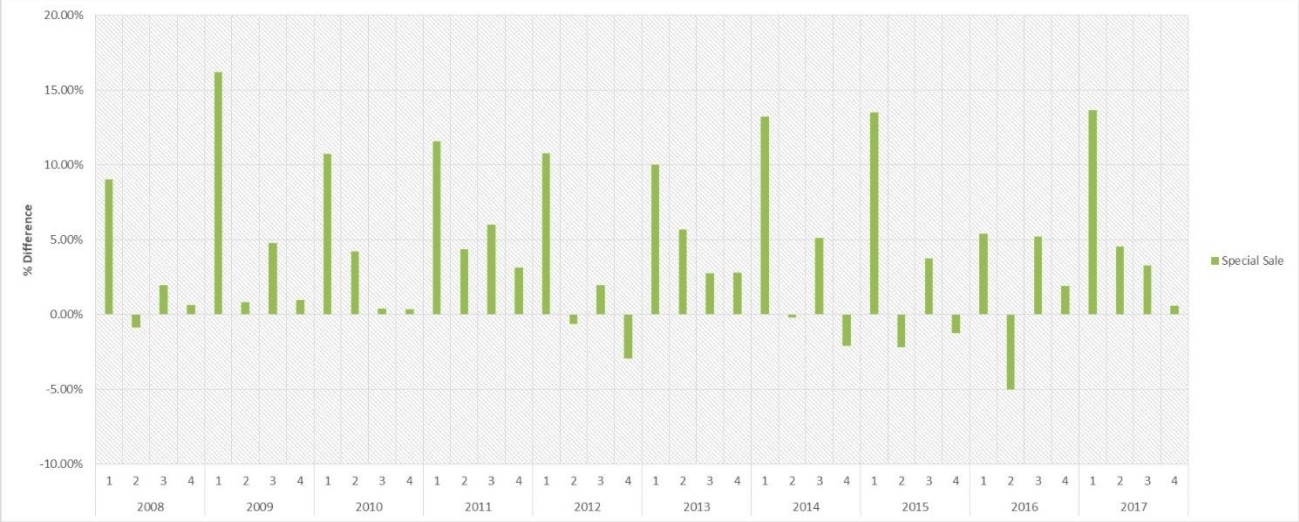



Figure 2 shows market data over a 10 year market cycle, comparing special calf sales and regular sale data from 4 different auctions across Ontario. The dataset covers 9 weeks during the fall calf run (September and October each year). The x-axis represents the average sale data (including special calf sales) in a given year across all sales in Ontario over the 9 week period. The red bars represent the percent difference on prices received for calves marketed through special calf sales through the four auctions within the 9 week period of a given year, compared to the average market data across the province. The blue bars represent the percent difference on price received for calves marketed through regular sales at the same auctions, compared to the average market data across the province.

While the data generally show a positive trend for special calf sales in the province, *Figure 3* demonstrates that conditions differ between sales, and these conditions will affect price discovery at each auction. The data in *Figure 3* show the percent difference between special calf sales at each of the four sale locations and the average sale data across Ontario over the 9 week period in a given year. Price discovery will be impacted by different conditions at each sale. Each sale has a unique set of consigners and buyers, and further to that, each sale has different management requirements for consigners, which are typically advertised with the sale. Any combination of vaccination protocols, dehorning, castration, age verification, and bunk training will be required for consigners to sell calves through the special sale and these requirements will influence the buyers and the sellers that attend the sale. Individual auction venues should be contacted for more information on sale details and consigner requirements.

**Figure 3** – Premiums received at Ontario special calf sales over a 10 year period at four different auction locations, expressed as percent difference to average Ontario sale data




The potential financial benefit of a preconditioning or presale program can be assessed by considering the costs of a preconditioning or presale program and potential increased revenue from calf sales. Preconditioning or presale program returns can be measured by the following equation: **revenues from preconditioned calf less revenues from calf sold without preconditioning less costs of preconditioning** (Canfax Research Services, 2015). In addition to price premiums on preconditioned calves sold through special marketing channels, economic benefits can also potentially come through the additional weight gain calves attain between date of weaning and date of sale. However, returns on preconditioned calves must be balanced against costs of preconditioning and potential price slides due to seasonal decline that can off-set any increase in calf weight. The Beef Cattle Research Council has a tool available online to help producers determine the costs and revenues of preconditioning programs: www.beefresearch.ca/research/preconditioning.cfm. Additionally, Beef Farmers of Ontario has a cost of production calculator tool available and resources are also available on OMAFRA's website.

In summary, there are a number of marketing options for Ontario calves. Special calf sales can benefit both cow-calf and feedlot producers. Depending on the sale, feedlots owners can purchase lots of calves that have been reared under specific preconditioning protocols to attain better uniformity in lots and health of calves. There is opportunity for cow-calf producers to receive premiums on calves through special calf sales. Producers must do some research to understand sale-specific requirements for consigners and observe price discovery dynamics at each sale.

*The authors would like to thank James Byrne and Steve Duff with OMAFRA for their assistance on the analysis.*

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# DON in Corn – What Does It Mean for Feeding Cattle?

**Megan Van Schaik and James Byrne, Beef Cattle Specialists, OMAFRA**

*This article was previously published in Ontario Beef, December 2018*

Parts of the province, particularly south western Ontario, are seeing above average levels of DON in corn this year. This has left livestock producers raising questions about the risks of mycotoxins and safe levels for feeding livestock.

**What is DON?**

Deoxynivalenol, commonly known as DON or vomitoxin, is a type of mycotoxin, which is a compound produced by mould. While moulds themselves can reduce the quality of feedstuffs and can affect palatability, intake, and performance, mycotoxins have toxic effects on the body and at high levels in feed can impair growth, lactation, and reproductive performance in livestock. Although hundreds of mycotoxins have been identified, the physiological impact of only a handful is known. Mycotoxins are only produced by certain mould species and under specific environmental conditions. Although the presence of moulds is a good indication that mycotoxins may be present, laboratory test results may not always reveal a high level of mycotoxins. Similarly, mycotoxins may be present without visual indicators detected by the naked eye. Laboratory testing is warranted in both cases.

Why all the attention to DON this year? DON is mainly produced from *Gibberella/Fusarium* ear moulds. High levels of both ear mould and DON in Ontario's corn crop have been detected through OMAFRA's 2018 Grain Corn Ear Mould and Vomitoxin (DON) survey and have been observed in the field in parts of the province. DON is often considered an indicator mycotoxin because the environmental conditions conducive to the development of fusarium and DON are also ideal for the growth of other types of moulds and mycotoxins important to livestock such as zearalenone, fumonisin, and T-2 toxin. The prevalence, potency, and biological effects of mycotoxins vary across mycotoxin types and symptoms of mycotoxin problems can range from reproduction issues, to health issues such as diarrhea and hemorrhaging, and to performance issues such as reduced average daily gain, dry matter intake, and feed efficiency.

Corn Ear Mould. Photo credit: Ben Rosser, Corn Industry Program Lead, OMAFRA

**How do feedstuffs become contaminated by mycotoxins?**

Moulds and mycotoxins can develop pre-harvest and in storage. They are produced in the field every year; however, the extent to which moulds and mycotoxins develop is dependent on growing conditions within a season. Generally speaking, mould needs a specific combination of moisture, oxygen, temperature, and substrate to grow. Ultimately, high humidity and hot days coupled with cool nights make ideal conditions for mould growth in field crops. There are a couple of ways in which mould spores can enter grain. One way is during pollination where mould spores enter the seed through silk channels. The other is through the seed coat when it becomes damaged by insects, wildlife or by means of other types of physical damage. Moulds and mycotoxins can also develop in other vegetative parts of the corn plant, with mould spores entering the plant through the plant's root system or through physical damage to the plant. This means that mycotoxins can also be present in corn silage, shredlage, cobmeal, etc.

When mycotoxins levels are high in grains, it is also important to pay attention to mycotoxin levels in their related byproducts. This year it means being aware of mycotoxin levels in corn byproducts and co-products such as corn screenings, dried distillers grains with solubles, wet distillers grains, and corn gluten meal. Mycotoxin concentrations increase by two- to threefold in DDGs compared to the grain inputs.

Keep in mind that while the dry conditions during the growing season that resulted in low fungal disease pressure and low levels of mycotoxins in this year's small cereal crops, small grains such as wheat and barley are also vulnerable to mycotoxin contamination when the conditions are right. Fusarium head blight, or scab, is a fungal disease with spores that can produce DON in small cereals. The risk is particularly high when conditions are wet during flowering and grain fill periods.

**What are the maximum levels for DON in cattle rations?**

The big question for producers is "at what level of DON can I feed cattle without seeing adverse effects"? Unfortunately, the answer to this question is not exactly straight-forward. It is well understood that cattle have a lower sensitivity to DON and other mycotoxins than monogastric species, hogs in particular. This is largely thanks to some level of detoxification of DON by rumen microorganisms. In studies conducted in the American Midwest, feeder cattle were fed rations ranging from 13 to 21 ppm DON without any impact to ADG, feed intake, feed efficiency, carcass characteristics, or cattle health. However, it is important to bear in mind that an animal's response to mycotoxins is dependent on a number of factors, including type of mycotoxin, presence of other mycotoxins, immune status of the animal, and time of exposure. Mycotoxins can have additive or synergistic effects, so variability in response to DON may be attributed to the presence of other mycotoxins in the feed, especially considering DON is less toxic than some of the other known mycotoxins. Younger cattle tend to be more susceptible to the effects of mycotoxins than older cattle.

The regulations in relation to DON in animal feed are primarily based on known toxic effects. In Canada the legislated maximum tolerated levels of mycotoxins is based on the "Worldwide regulations for mycotoxins, FAO Food and Nutrition Paper 64, 1997". The Canadian Food Inspection Agency, (CFIA), has set the maximum DON inclusion levels at 5 ppm of the total diet for beef cattle over 4 months of age and at 1 ppm of the total diet for calves less than 4 months of age. The Food and Drug Administration, (FDA), in the US has set DON advisory levels for beef cattle over 4 months of age at 10 ppm on grains and grain by-products and 30 ppm in distillers grains, brewers grains, and gluten feeds and gluten meals derived from grains provided that the total diet for ruminating beef and feedlot cattle older than 4 months not exceed 10 ppm DON. For calves less 4 months the FDA DON advisory level is 1 ppm of the total diet. These advisory levels follow a 2010, Center for Veterinary Medicine (CVM) review of the scientific literature which demonstrated that higher levels of DON in feed for cattle would not appear to present an animal or public health hazard.

A unique lens must be applied when considering the effects of mycotoxins on reproductive cattle because certain mycotoxins can affect reproductive performance. Zearalenone, for example, is linked to reproductive problems in cattle including infertility when it appears in the ration at high levels. While levels of grain corn and byproducts tend to be lower in beef cow rations compared to feedlot rations, consideration must be taken for level of contamination of any grains/byproducts in the ration and mycotoxins that may exist in in corn silage and/or mouldy hay.

**What are some important considerations for monitoring and managing DON in cattle rations?**

Although it is important to monitor for mycotoxins every year, it is especially important to be vigilant about monitoring and managing mycotoxins in corn and corn byproducts this year, given the high levels of DON detected in this year's corn crop. The first important step in monitoring mycotoxin contamination is taking a representative sample. Because "hot spots" of mycotoxins in a crop, load, or bin can exist, taking spot samples won't give you a good idea of the overall level of mycotoxin contamination in a feed source. A representative sample, taken from a number of subsamples, will provide a better idea of mycotoxin contamination of the greater feed source. Send samples away to an accredited lab for accurate results. Samples can be tested for individual mycotoxins or can be tested as a panel for a number of mycotoxins. A listing of accredited laboratories can be found on OMAFRA's website: www.omafra.gov.on.ca/english/livestock/swine/facts/mycolabs.htm.

Under ideal circumstances, only clean grain and grain by-products would be fed to beef cattle but this rarely happens under practical conditions. Options for managing high levels of mycotoxins in feed include blending, reducing inclusion rates, and/or using a mycotoxin binder to help mitigate the negative effects of mycotoxins in feed. The effectiveness of mycotoxin binders to bind to a mycotoxin depends largely on the chemical structure of both the mycotoxin and the binder. The shape of the mycotoxin binder must match the shape of the mycotoxin in order that both can "lock" together. Once

locked together both binder and mycotoxin are harmlessly excreted in the faeces. Examples of binders include activated charcoal, hydrated sodium calcium aluminosilicate, (HCAS), absorbent aluminum phyllosilicate clay, (bentonite), and large organic polymers such as yeast cell wall. The difficulty in choosing a binder is that binders are very specific to the type of mycotoxin they will bind to. The safety of sodium bentonite and yeast cell wall products as animal feed additives was evaluated by the European Food Safety Authority, (EFSA), and in 2012 delivered its opinion that both products are safe for all animal species, consumers and the environment when used at a maximum level of 20,000 ppm of the total diet.

With higher than average DON in corn and corn byproducts this year, it's important to be on the lookout for mycotoxins in feedstuffs and use appropriate management strategies to avoid any adverse effects of mycotoxins on livestock. Work with your nutritionist or feed representative to help you interpret laboratory results and develop feeding solutions for feedstuffs with high mycotoxin levels.

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# Reducing Hay Storage Waste

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As we look forward to the upcoming forage season, late winter is a good time to plan forage harvest and storage options. Perhaps you are feeding hay and having to remove a crusted outer layer from hay stored outside. What is the amount of potential forage intake you are wasting?

According to a previous OMAFRA article, if 7.6 cm(3 in) around the outside of a 1.52 m(5 ft) bale is spoiled, then 19% of the dry matter will be lost. This means that for every 10 bales of hay you feed, 2 would be thrown out. Or you may need to feed 12 bales instead of 10 per cow to get you through the winter. Wastage varies depending on the storage method and

climatic conditions in your area. This article will look at various ways to reduce hay spoilage in large round bales, including:

1. Store hay under roof
2. Cover hay stored outside
    - tarp
    - plastic wrap
3. Other options for hay stored outside

Large square bales need to be covered as they do not shed rain very well. Leaving them outside and uncovered will result in a significant amount of spoilage.

**1. Store hay under roof**

While an initial capital expense, building long term inside hay storage can be one of the best on-farm investments. When storing hay inside, make sure the hay is dry. A gravel floor can reduce sweating of hay on the bottom versus hay stored on a cement floor. As well, once the hay has been fed, the structure could be used for livestock, perhaps as a calving facility.

**2. Cover hay stored outside**

*Tarp cover*

Covering bales with tarps can reduce spoilage. The work to cover the hay with tarps can be daunting. A well-drained base reduces moisture seepage for the bottom row. Keeping the tarps on through the winds of winter is a challenge. Make sure the tarps are tied down well so the wind does not shred them. Some producers tie down the tarps to the bales themselves. Others may use tires or sand bags to secure the tarps. Feeding bales from a tarped stack can be more time consuming as the tarp will need to be rolled back as you feed the bales out.

*Wrapping dry hay*

Many producers use bale wrappers to preserve haylage. This technology can be used to wrap dry hay as well. Some producers use one to two wraps, while others use up to 6 layers, similar to haylage. There are some important considerations when wrapping dry hay:

- The hay should be dry and needs to have breathed or be stored inside prior to wrapping.
- The wrapped hay should be on higher or drier ground, or on a gravel base to stop ground moisture from seeping in.

If you wrap and the hay is still damp, then you will still get spoilage on the outside of the bales. Even wrapping with more plastic will not stop spoilage of damp hay. This method is useful, whether you use a wrapper or use a plastic hay sleeve which is open on both ends.

Hay that has been wrapped showing little spoilage.

Row of wrapped dry hay. Wrapping methods used are similar to those of wrapped haylage, but with only one or two wraps of plastic

### 3. Other options for hay stored outside

The most effective way to store dry round bales is in covered storage with proper management. If bales must be stored outside, net wrapped bales tend to be wound tighter and held together more firmly than twine wrapped bales. Therefore, net wrapped bales shed rain more effectively with less spoilage. University of Wisconsin researchers set out to measure moisture levels in the outside hay rind of net wrapped alfalfa bales and twine wrapped bales. They found that net wrapped alfalfa bales shed rainfall better than twine wrapped bales. Nutrient composition was significantly higher in the outside hay rind and losses were lower for bales wrapped with net wrap compared to bales wrapped with twine. The core of the bale was generally unaffected by wrap type. Average overall total dry matter losses were 11.3% and 7.3% for plastic twine wrapped bales and net wrapped bales, respectively. It is important to consider that, in either situation, bales that are not stored on a well-drained surface can absorb moisture at the bottom of the bales.

Another method to reduce spoilage is to leave space between each bale as they are stored. This means the rain water does not collect between the bales and the bales do not tend to spoil as much.

Bales set out with a gap between them, so moisture is not trapped between bales.

When you are storing hay outside, it is important to have a dry base for those bales to rest on. Having a gravel base lets any rain water drain away, rather than collect into the bottom of the bales.

Another study by the University of Wisconsin Forage Research Team looked at typical dry matter losses associated with various storage methods. Table 1 shows that even the best system suffers some losses, and there is a range of loss in each system depending on weather and climate. However, spoilage decreases if the bales are covered in some manner.

**Table 1** – Storage losses associated with various storage methods

| Storage Type | Dry Matter Loss (%) |
|---|---|
| Under roof cover | 2-10 |
| Plastic wrap - on ground | 4-7 |
| Bale Sleeve - on ground | 4-8 |
| Covered - elevated or rock pad | 2-17 |
| Covered - on the ground | 4-46 |
| Uncovered - elevated or rock pad | 3-46 |
| Uncovered - on ground with net wrap | 6-25 |
| Uncovered - on ground | 5-61 |

Adapted from Holmes, B. 2004. Round Bale Hay Storage Losses and Costs. Cooperative Extension Service, University of Wisconsin Team Forage

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