August 5, 2021

AGRONOMY UPDATE...will be held **August 26** from 1pm to 4pm at Durbin Farms, 4227 Durbin Road SE., New Philadelphia. Program topics and speakers include:

- **Parts and Equipment Shortages are Real – Be Prepared: Thoughts on 2021 Harvest & 2022 Planting**  
  - Dr. John Fulton, OSU Food, Agriculture, and Biological Engineering

- **Are You Ready for Carbon Markets?**  
  - Mike Estadt, OSU Extension Educator, ANR, Pickaway County

- **OSU Extension Agronomy & Farm Management Resources**  
  - Chris Zoller, OSU Extension Educator, ANR, Tuscarawas County

- **Lessons Learned from Building a Farm Shop**  
  - Matt & Luke Durbin, Durbin Farms

There is no fee to attend, but pre-registration is requested by August 24. Registration can be done by email to zoller.1@osu.edu or by calling 330-339-2337.

**IF HISTORY IS ANY INDICATOR...** expect higher corn seed costs in 2022. The complete analysis is available in this University of Illinois Farmdoc newsletter [https://farmdocdaily.illinois.edu/wp-content/uploads/2021/06/fdd290621.pdf](https://farmdocdaily.illinois.edu/wp-content/uploads/2021/06/fdd290621.pdf). Figure 1 shows per acre seed costs for corn from two sources. The blue line provides seed costs for the entire United States and is prepared by the Economic Research Service (ERS), an agency of the U.S. Department of Agriculture. The green line shows per acre seed costs incurred by central Illinois farmers enrolled in Illinois Farm Business Farm Management (FBFM).

![Figure 1. Per Acre Seed Costs for Corn in the U.S. and Central Illinois](https://farmdocdaily.illinois.edu/wp-content/uploads/2021/06/fdd290621.pdf)
Three periods of seed costs are evident in Figure 1. From 1975 to 2005, per acre seed costs increased steadily, with an average per acre increase in the U.S. of $1.13 per year.

During the second period from 2006 to 2013, corn prices rose due to the increasing use of corn in producing ethanol. As a result, expected corn revenue reached higher levels, and per acre seed costs increased. In the U.S., seed costs increased from $44 per acre in 2006 to $102 per acre in 2015, an average yearly increase of $6.50 per acre.

The third period constituted a lower commodity price period, corresponding with leveling growth of corn use in ethanol. During the 2015 to 2020 period, seed costs declined slightly from $102 in 2015 to $92 in 2020.

Corn prices moved higher in late 2020 and have persisted through 2021. Historical relationships would suggest that those higher corn prices could lead to higher seed costs in 2022.

A statistical evaluation was conducted to determine the factors impacting per acre seed costs in the United States. U.S. data were used rather than central Illinois data because a longer time series exists for U.S. data. Two factors explained over 90% of the variability in per acre seed costs.

**Expected Gross Revenue:** Increases in expected gross revenue usually led to higher per acre seed costs. For this analysis, expected gross revenue equals the trend yield times the previous year’s corn price. Prices are time-dependent and last year’s result is a good projector of next year’s price.

The expected gross revenue of corn was highly statistically significant. Overall, results from the regression suggest that a $100 increase in gross revenue results in a $7 increase in seed costs; however, the increase (decrease) enters the relationship over time. The expected revenue difference between 2021 and 2022 would likely lead to a $6 to $7 increase in seed costs.

**Time:** Over time, seed costs have increased relative to expected gross revenue. Figure 2 shows per acre seed costs divided by expected gross revenue, thereby illustrating the upward trend in seed costs as a percent of expected gross revenue. Over the 1975 to 2020 period, seed costs on a per acre basis have increased an average of $2.70 per year.
A number of reasons can be given for increasing seed costs over time. Hybrids have continually increased in yield leading to a higher value for seed. Moreover, biotechnology traits in corn hybrids have led to management advantages over time, which could lead to reductions in pesticides and tillage costs. Over time, hybrids have become more specialized to a geographical area and soil type. For all these reasons, seed and genetic improvements in seed have become more valuable over time.

In addition, seed and crop genetics have become increasingly concentrated. Over time, many seed companies have consolidated and merged. Now three companies — Bayer, Corteva, and Syngenta — have a large share of biotechnology traits and have large investments in crop genetics. The role of competition in seed pricing is not well understood. Still, the consolidation trends reduce the number of firms competing with one another for a share of farmers’ purchases.

**Summary**

Over time, seed costs have been positively related to expected gross revenue for corn. In addition, seed costs have trended upward over time. Currently, gross revenue for corn is expected to be higher in 2022 than in recent years. As a result, seed costs for corn should be expected to increase. An increase in the $6 to $10 per acre range is expected on an average, national basis.

**SCOUT ALFALFA FIELDS**...for the presence of Potato Leafhopper (PLH). Sweep netting is the best way to scout for PLH. If alfalfa is more than seven days from a cut and plants are under normal stress, a good rule of thumb for an action threshold for treatment is when the number of PLH (nymphs+adults) in a 10-sweep set is equal to or greater than the height of the alfalfa. For example, if the alfalfa is 10 inches tall, and the average number of PLH per sample is 10 or higher, treatment is warranted. If the average is nine or lower, the grower should come back within a few days to see if the population is continuing to increase (treatment warranted), staying the same (come back again in a few days), or declining (treatment not warranted). Vigorous alfalfa can tolerate higher numbers, and stressed alfalfa can tolerate fewer, so you may need to adjust your action threshold based on the condition of the alfalfa. Keep in mind that an early cutting may also be an option.


**BEEF-DAIRY CROSSBREEDING**...calf death loss was examined in a case study, as described in this OSU Extension Buckeye Dairy Newsletter https://dairy.osu.edu/newsletter/buckeye-dairy-news/volume-23-issue-4/assessing-calf-death-losses-beef-dairy-crossbreeding.

The case study was developed for educational purposes; and the information may or may not be applicable to other situations. The overall objective was to assess calf death losses at calving for a 12-month period (March 2020 to March 2021). Therefore, the patterns of calf death losses were assessed on the following variables by:

1. Length of dry period (primarily cows with <44 days),
2. Gestation length and twin pregnancies,
3. Parity (first calf heifer and multiparous cows),
4. Sire (beef and Holstein bulls),
5. Calendar week, and
6. Calendar month.
The overall calf death loss at the maternity was 5.4% (340 out of 6,488 calvings). The pattern of calf death losses (n = 340) at calving were further analyzed to identify opportunities for improvement within the beef-dairy crossbreeding program (calving difficulty was not recorded). Please click the link above to learn about the outcomes of this case study.

**FALL CALVING PROFITABILITY**...can be achieved. Management considerations are highlighted below. Please see the full article in this OSU Extension Beef newsletter: [https://u.osu.edu/beef/2021/08/04/fall-calving-is-it-profitable/#more-11201](https://u.osu.edu/beef/2021/08/04/fall-calving-is-it-profitable/#more-11201).

**Seasonality of Cattle Prices** – As with most things in agriculture, supply and demand has a great impact on prices. Griffiths et al, 2017 from the University of Tennessee analyzed several studies comparing spring and fall calving systems. After comparing the systems on a 205-day weaning age and two separate feed resource scenarios they concluded that even though spring-calving cows had heavier calves at weaning and lower feed costs than the fall-calving cows, the higher prices of steer and heifer calves captured by fall-born calves were able to cover the higher feed expenses and lighter weaning weights by the fall-born calves.

During the spring when there is demand for calves to graze wheat in the plains, and grass here locally, prices on a per cwt basis are significantly higher due to a tighter supply of calves. That tight supply of fall born calves contributes to seasonality of the markets and our annual high for stocker calves and feeder cattle.

![Graph showing seasonality of cattle prices](https://example.com/graph.png)  

**Mud** – As rainfall patterns shift here in Ohio and the rest of the eastern Cornbelt, indications are that our springs are going to be warmer and wetter over time.

As mud becomes more of an issue, especially in the last trimester of gestation for a beef cow, research conducted at the Ohio State University has shown suggests that a cow in muddy conditions requires an additional 1.8 Mcal Net Energy/day to maintain adequate body condition, Nickles et al, 2020.

**Management Considerations** – Historically, one of the biggest drawbacks to fall calving has been the increased cost to feed and maintain a lactating cow over winter. That feed cost can be offset by higher calf values in the spring of the year.

In the past couple of years, hay quality and quantity have been limiting factors for some cattlemen. If forage is a at a premium and cow condition is being compromised with fall calving cows why not consider reducing the caloric needs of the cow by ending lactation around 120 days of age?
In addition to improving management of available forage, we can also better manage calf performance once they are weaned. Weaned calves can be fed a grower ration until marketing later in the spring. In order to do so, there is a transfer in feed cost from the cow to the calf.

**Final Thoughts** – Having a defined calving season is better than none at all. What works in other parts of the country may or may not work for your herd, however it always good to evaluate various management systems and current on farm practices.

**WESTERN BEAN CUTWORM**...trap counts declined in the last week. Ten counties remained above scouting threshold and include Ashtabula, Defiance, Fulton, Geauga, Huron, Lake, Lorain, Paulding and Trumbull.


**CARBON MARKETS**...are emerging and require a great deal of caution before entering into any agreements. This OSU Extension Ag Law Blog ([https://farmoffice.osu.edu/blog/tue-08032021-126pm/considering-carbon-farming-take-time-understand-carbon-agreements](https://farmoffice.osu.edu/blog/tue-08032021-126pm/considering-carbon-farming-take-time-understand-carbon-agreements)) explains a number of important legal considerations.

Highlights from the Ag Law Blog:

- **New terminology.** Carbon markets and carbon agreements speak a new language, containing many terms we don’t ordinarily use in the agricultural arena. The terms are not fully standardized, and their meanings may differ from one program to another. Understanding these new terms and their legal significance to the carbon agreement relationship is important.

- **Initial eligibility criteria.** Each carbon program has specific requirements for participating in the program. Common eligibility criteria are:
Location. The program may be open only to farmers in a particular geographic location, such as within a specified watershed, region, or state.

Acreage. A minimum acreage requirement often exists, although that can vary from 10 acres to 1,000 or more acres. Some projects may allow adjacent landowners to aggregate to meet the minimum acreage requirement, but that can raise questions of ineligibility should one landowner leave the program.

Land control. If the farmer doesn’t own the land on which carbon practices will occur, an initial requirement may be to offer proof that the farmer will have legal control over the land for the period of the agreement, such as a written lease agreement or certification by the tenant farmer.

• Payment. While the goal of a carbon agreement is often to generate carbon credits to be traded in the carbon market, there are varied ways of paying a farmer for adopting the practices that create those credits. One is a per-acre payment for the practices adopted, with the payment amount tied to the reduction of carbon resulting from the adopted practices. Another approach incorporates the carbon market—a guaranteed payment that can increase according to market conditions. Concerns about market transparency abound here. Yet another method is to calculate the payment after verification and quantification by a third-party.

• Acceptable carbon practices. Carbon practices are the foundation for generating carbon credits. An agreement might outline acceptable carbon practices a farmer must adopt as the basis for the carbon credit, such as NRCS Conservation Practices.

• Additionality. Many agreements require “additionality,” which means there must be new or “additional” carbon reductions that occur because of the carbon agreement, which would not have occurred in the absence of the agreement.

• Time periods. Two time periods might exist in an agreement. The first is the required length of time for participation in the program, which may vary from one year to ten or more years. The second relates to the concept of “permanence,” or long-term carbon reductions.

• Verification and certification. Here’s an important question—how do we know whether the carbon practices do generate carbon reductions that translate into actual carbon credits? Verification and certification help provide an answer. But verification is a testy topic because there is uncertainty about how to identify and measure carbon reductions resulting from different practices on different soils in different settings. Predictions that are based upon models are common, but there is disagreement over appropriate and accurate methodology for the models.

• Data rights and ownership. The verification question naturally leads us to a host of data questions. Data is critical to understanding and verifying carbon practices, and every agreement should include data sharing and ownership provisions. What data must be shared, who has access to the data, how will data be used, and who owns the data are questions in need of clear answers in the agreement.

• Legal remedies. There’s always the risk that a contract will go bad in some way, whether due to non-performance, non-payment, or disputes about performance and payment. A carbon agreement could include provisions that outline how the parties will remedy these problems. An agreement might define circumstances that constitute a breach, and the actions one party may take if breach conditions occur. An agreement could also list reasons for withholding payment from a farmer; one concern is that insufficient data or proof of carbon reductions or carbon credit generation could be a basis for withholding payment. There could also be penalties for early withdrawal from the program or early termination of the agreement. It’s important to decipher any legal remedies that are contained within a carbon agreement.
For more information on carbon agreements, see [this listing from the Ohio Soybean Council](https://tuscarawas.osu.edu) of programs available to Ohio farmers with a side-by-side comparison of those programs, and this report on [How to Grow and Sell Carbon Credits in US Agriculture](https://dairy.osu.edu/newsletter/buckeye-dairy-news/volume-23-issue-4/creeping-towards-harvest) from Iowa State University Extension.

**SILAGE HARVEST**...will be here sooner than we think and now is the time to prepare. This OSU Extension Buckeye Dairy Newsletter ([https://dairy.osu.edu/newsletter/buckeye-dairy-news/volume-23-issue-4/creeping-towards-harvest](https://dairy.osu.edu/newsletter/buckeye-dairy-news/volume-23-issue-4/creeping-towards-harvest)) provides detailed management recommendations. Important considerations include: moisture, chop length, and chop height.

**Moisture:**

Silage storage type and recommended moisture content for corn silage harvest:

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Moisture %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upright</td>
<td>60-65</td>
</tr>
<tr>
<td>Upright Oxygen Eliminating</td>
<td>50-60</td>
</tr>
<tr>
<td>Bunker</td>
<td>65-68</td>
</tr>
<tr>
<td>Bag</td>
<td>62-68</td>
</tr>
</tbody>
</table>

**Chop Length:**

The theoretical length of cut (**TLC**) ranges from ½ to ¾ inch. Shorter cut silage will pack better but will not be as effective of a fiber source if it were longer. If you use a kernel processor, TLC is around the ¾ inch recommendation because the plant is being crushed and compaction in the bunk will be greater. Using a kernel processor will then not only increase digestibility and fermentation capacity of the silage, but indirectly increases the amount of physically effective fiber through increased TLC.

**Chop Height:**

Average height of chop is between 7 and 18 inches and can alter the digestibility and yield of silage. According to Pennsylvania State University, raising the cutter bar from 7” to 19” will decrease neutral detergent fiber (**NDF**) content by about 8% and increase starch content by about 2 percentage points. However, the increase in cutter height decreased yield by about 7%.

**FARM SCIENCE REVIEW**...will be held in-person this year on September 21, 22, and 23. Additional information about the Farm Science Review is available here [https://fsr.osu.edu/home](https://fsr.osu.edu/home). Be sure to stop by the Extension office to purchase pre-sale tickets.
CORN LIVE...sponsored by OSU Extension, will air Thursday, August 12, at 8am. This week’s segment will feature Matt Reese, Ohio’s Country Journal, and several OSU Extension Educators discussing yield estimates for corn and soybean.

Soybean specialist Laura Lindsey will join to comment on the overall growing season and yield potential moving forward, along with corn and wheat pathologist Pierce Paul who will discuss disease pressure in corn and yield loss potential.

One hour of crop management CCA CEUs are available for attending this free online session. Register to attend at www.go.osu.edu/cornlive.

ADJOINING LANDOWNERS...may be responsible for clearing noxious weeds from fence rows. The Ohio line fence law does allow a township to step in and clear the fence row of noxious weeds, brush, briers and similar vegetation if a complaint is filed by one landowner against an adjacent landowner who refuses to clear the weeds. The costs for doing so are assessed back on the refusing landowner whose fence row was cleared. If the noxious weeds arise from both sides of the fence, are growing in the fence, and must be cleared from both sides of the fence, the township trustees would have the authority to assess the costs of removal back on both landowners. I've never heard of that happening, but it’s certainly one of those “be careful what you wish for” situations.
(Source: Peggy Hall, OSU Extension Ag & Resource Law Program)

OHIO EXPERIENCED...its 15th wettest July on record (1895-present). Even more interesting, daytime highs for July 2021 rank as the 33rd coolest, yet overnight lows rank as the 27th warmest, the 7th largest spread on record. Indeed, this was the result of numerous cloudy/rainy days that kept daytime temperature in check, not to mention, the occasional influx of wildfire smoke from active fires in the western states.

Forecast
Hot and humid conditions are taking over this week. The sultry air will provide the opportunity for scattered showers and storms each day through Friday. Highs will range from the mid-80s to the mid-90s, with overnight lows in the upper 60s to low 70s through Friday. The weekend is looking drier and a little more comfortable, with highs in the low to mid 80s. The Climate Prediction Center’s 6–10-day outlook for the period of August 15 – 19 and the 16-Day Rainfall Outlook from NOAA/NWS/Ohio River Forecast Center indicate near to above average temperatures and below average precipitation (Figure 2). Climate averages for this period include a
high temperature range of 82-86°F, a low temperature range of 60-65°F, and average rainfall of 0.70-0.90 inches.

Additional information is available in this OSU Extension C.O.R.N. newsletter: https://agcrops.osu.edu/newsletter/corn-newsletter/2021-26/weather-update-hot-and-humid-conditions-return.

FERTILIZER PRICES IN 2022...are expected to increase, as discussed in this University of Illinois analysis: https://farmdocdaily.illinois.edu/wp-content/uploads/2021/08/fdd060821.pdf. High fertilizer prices lead to projections of near record-high fertilizer costs in 2022 for both corn and soybeans, though short of the all-time high levels set in 2008.

USDA Index Values from 1990 to 2021
The U.S. Department of Agriculture (USDA) regularly calculates index values of prices paid for fertilizers. Figure 1 shows those indices for:

1. fertilizers – mixed, hereafter referred to as mixed fertilizers. The mixed fertilizer index is for fertilizers including nitrogen, phosphorus, and potash.
2. nitrogen fertilizers. Nitrogen fertilizers primarily are used to supply nitrogen, including anhydrous ammonia, 28% and 32% nitrogen solutions, and urea.

Since the beginning of reporting in 1990, indices exhibited variability, as one would expect with commodities. Both indices began in 1990 with values in the high 20s and then exhibited upward trends through the mid-2000s. From 1990 to 2005, however, several periods of higher prices followed by declines do exist, with more than 10% decline happening in early-2001 and again in 2006 (see Figure 1).
Many commodities prices, including fertilizers, increased dramatically from mid-2006 until late 2008. Both fertilizer indices hit all-time highs in 2008: mixed fertilizer was 145.9 in October and nitrogen was 135.6 in September (see Figure 1). Rising demand in emerging markets and long-term supply concerns contributed to the record-setting commodity prices. Later in the year, the 2008 financial crisis disrupted all markets, leading to falling commodity prices, including fertilizers. From 2008 highs, fertilizer indices fell and reached lows in late 2009; 70.1 index value for mixed fertilizers in November and 64.0 value for nitrogen in September. Then, indices rose again and spiked several times. For example, the nitrogen index increased and then declined in late 2011, mid-2012, and mid-2013. From 2013 through 2017, fertilizer prices generally decreased, reaching and maintaining low values through 2020.

Both indices increased in 2021. The mixed fertilizers’ index value was 65.1 in January, reaching 78.4 in June. The nitrogen index increased from 66.7 in January to 85.7 in June. The June values are much higher than year-earlier levels but are not at all-time highs. The last time these indices were at comparable levels was in December 2015. Historical prices suggest that continued price increases through 2021 and 2022 are possible. Of course, declines could occur as well.

Summary
Fertilizer prices currently are at high levels, increasing substantially from year-ago levels, but have not reached all-time highs. Fertilizer prices were the highest in 2008, with those prices then declining during the severe phases of the 2008 financial crisis. Fertilizer costs for 2022 likely will be well above average, with much of the overall cost level depending on fertilizer prices moving forward, as well as farmer behavior. History suggests that fertilizer prices can change rapidly, likely bringing modifications to fertilizer cost projections. Further note that several periods of sharp declines have occurred in history.

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HAZY DAYS...may impact corn and soybean yields, as described in this OSU Extension C.O.R.N. newsletter: https://agcrops.osu.edu/newsletter/corn-newsletter/2021-26/hazy-days%E2%80%A6how-does-light-influence-corn-and-soybean.

Capturing sunlight energy, which drives photosynthesis, is important to maximize crop yield. Typical plant canopy-level instantaneous light values (also known as photosynthetic photon flux density) on sunny days range from 1200 to 1800 µmol/m²/s while typical instantaneous plant canopy-level values for cloudy days are 100 to 400 µmol/m²/s. In general, sunny days (all else equal) are better for crops, especially if moisture is non-limiting.

For soybean, photosynthetic photon flux densities that exceed 700 µmol/m²/s produce minimal gains in leaf-level photosynthetic efficiency, which ultimately can translate into yield production. As the sun moves across the sky, leaves can orient themselves perpendicular to incoming direct light to increase interception or parallel to the light to decrease direct interception as too much direct light can be harmful for plants. Changing orientation in the upper canopy can also allow for more light to be intercepted by lower leaves allowing for more leaves to optimize photosynthetic rates at a time.

Corn (having a slightly different photosynthetic pathway) can continue to increase photosynthesis with increasing light and tends to benefit from more sun if temperatures and water levels are not limiting growth. Upper leaves in corn grow more vertically and are smaller but become larger and more horizontal lower in the canopy. This orientation works to increase light penetration into the canopy and optimize interception.

So, with the wildfire haze and just regular cloudy days, how have our average radiation values for June and July compared to past years? In 2021, the daily average photosynthetic photon flux density was lower for June and July as compared to the last 4 years (2017-2020) (Table 1). Given these are daily values, the cumulative effects of this reduction will likely equate to lower overall yield potential because of the additive nature of light loss. However, cooler temperatures could help extend the season and help crops gain yield from more days with active growth during the grain fill period. The levels of light seen in 2021 may still be sufficient if other factors end up being more limiting to yield production; factors like water stress, biotic factors, and adequate mineral nutrition still play a major role in yield gains during the season.

Table 1: Daily average photosynthetic photon flux density during daylight hours in Wood County, Ohio.

<table>
<thead>
<tr>
<th>Year</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>µmol/m²/s</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>679</td>
<td>694</td>
</tr>
<tr>
<td>2017 to 2020</td>
<td>730</td>
<td>738</td>
</tr>
<tr>
<td>Difference</td>
<td>-51</td>
<td>-44</td>
</tr>
</tbody>
</table>
RENTAL AGREEMENTS...that are written are always preferred, but there are often questions about what to include. Ag Lease 101 (https://aglease101.org/) was developed by the North Central Farm Management Extension Committee and provides several example documents for land and building rental arrangements.

Additionally, OSU Extension has the following publications that can be useful when developing lease arrangements:

- Law Bulletin - Creating an Enforceable Farm Lease
- Law Bulletin - Protecting Interests in a Verbal Farm Lease Situation
- Law Bulletin - Leasing Your Land for Hunting
- Crop Share Leasing in Ohio Fact Sheet
- Legal Aspects of Ohio Farmland Leases Fact Sheet

STEER-BULL PRICE DIFFERENTIAL...is discussed by Dr. Kenny Burdine, Livestock Economist, University of Kentucky, in this OSU Extension Beef newsletter: https://u.osu.edu/beef/2021/08/11/the-steer-bull-price-differential-a-historical-perspective/#more-11336. When examining historical prices, it is difficult to argue that there is not a price advantage to selling steers.

Going back to January of 2010, there has not been a single month when the average price of 550 lb bulls exceeded that of 550 lb steers in Kentucky. The figure above plots this data by month from January 2010 to July 2021. The bull discount got very wide at times during 2014 and 2015, but
otherwise has been running in a general range of $7 to $14 per cwt. Over that entire time period, the bull discount has averaged $11.12 per cwt.

A logical follow up question would involve the likely weaning weight differences between steers and bulls. In the figure above, I tracked the price differential at the same sale weight. On a 550 lb calf, that $11.12 per cwt historical price difference amounts to a little more than $60 per head, but also ignores potential weight differences between the two. I like to frame this discussion by asking how much more a bull calf would have to weigh at weaning to make up for that difference. To answer this question, we have to understand the value of additional lbs (value of gain) and not confuse this with sale price. Price slide refers to the decrease in price per cwt that occurs as the weight of cattle increases. Because of price slide, the value of additional lbs is typically less than the sale price. This is a key concept in cattle marketing that impacts most all decisions that producers make. I will walk through a quick illustration.

The average price of a 550 lb bull calf from 2010 to 2020 in Kentucky auction markets was $150 per cwt or $825 per head. If the price slide in the market were $10 per cwt, for each 100 lb increase in the bull’s weight, his price decreases by $10 per cwt. So, if a bull weighed 600 lbs, rather than 550 lbs, his price would have been $145 per cwt ($5 per cwt less) and his total value would be $870. This is $45 more dollars than the 550 lb bull, which means that those additional pounds were worth roughly $0.90 each. At that rate, the bull’s weight would need to exceed the weight of the steer by 67 lbs for their values to be similar. As price slide increases, the value of additional lbs decreases. So, if the price slide were $15 per cwt, rather than $10 per cwt, the value of those additional lbs would be even less. Using a larger price slide of $15 per cwt would make the value of those additional lbs worth only about $0.60, which would mean that the bull would need to outweigh the steer by roughly 100 lbs for his value to be comparable. Similarly, a smaller price slide would result in higher values of gain and fewer additional lbs needed to offset the price differential.

This discussion is quickly summarized in the table below. In the table, I work through these calculations for price slides of $5, $10 and $15 per cwt. The table below is largely for illustration purposes, but does provide a framework from which producers can make similar calculations based on calf prices and price slides in any market.

<table>
<thead>
<tr>
<th>Price Slides and Value of Additional Weight</th>
<th>$5 / cwt price slide</th>
<th>$10 / cwt price slide</th>
<th>$15 / cwt price slide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of 550 lb bull, initial price of $150 per cwt</td>
<td>$825 per head</td>
<td>$825 per head</td>
<td>$825 per head</td>
</tr>
<tr>
<td>Value of 600 lb bull</td>
<td>$885 per head</td>
<td>$870 per head</td>
<td>$855 per head</td>
</tr>
<tr>
<td>Value of additional 50 lbs</td>
<td>$60</td>
<td>$45</td>
<td>$30</td>
</tr>
<tr>
<td>Value of each additional lb</td>
<td>$1.20</td>
<td>$0.90 per lb</td>
<td>$0.60 per lb</td>
</tr>
<tr>
<td>Lbs needed to add $60 of value per head</td>
<td>50 lbs</td>
<td>67 lbs</td>
<td>100 lbs</td>
</tr>
</tbody>
</table>
Finally, I would mention that implants likely need to be considered as part of this discussion too. While I leave implant specifics to my animal science colleagues, implanted steers have the potential to see much better rates of gain and narrow that weight difference considerably. So, unless a producer is selling into a market that does not allow implants, they may offer the potential to receive steer prices, but see lower impacts on weight gain.

Every producer has to decide for themselves whether castrating bulls makes sense for their operation. I am fully aware that there is a cost to working calves and some producers may choose not to do this due to facility or time limitations. I have not attempted to delve into those additional costs in this article, but rather have focused on the value differences, so that producers can weigh those against the additional costs. There is pretty consistent evidence that bulls will sell at a discount to steers in the marketplace and the additional pounds needed for bulls to offset that discount can be significant. I would also point out that there are individuals in the market who make money by purchasing bulls, castrating them, backgrounding them for a period of time, and re-selling them. I just mention this as evidence that this is a common way that value is added to cattle. So, producers who typically sell bulls may want to consider the potential value that can be added to their calves through this practice as they look for ways to increase profitability in the future.

**BEEF QUALITY ASSURANCE**...training will be held August 25th at Sugarcreek Stockyards. The program will begin at 7pm and the TCCA will provide refreshments. Additional trainings will be scheduled following harvest.

**FARM SCIENCE REVIEW**...will be held September 21, 22, and 23 at the Molly Caren Agricultural Center near London. Pre-sale tickets are available from the Extension office.
AGRONOMY UPDATE... will be held August 26 from 1pm to 4pm at Durbin Farms, 4227 Durbin Road SE., New Philadelphia. Please RSVP to 330-339-2337 or zoller.1@osu.edu by August 24. Program topics and speakers include:

- **Parts and Equipment Shortages are Real – Be Prepared: Thoughts on 2021 Harvest & 2022 Planting**
  - Dr. John Fulton, OSU Food, Agriculture, and Biological Engineering
- **Are You Ready for Carbon Markets?**
  - Mike Estadt, OSU Extension Educator, ANR, Pickaway County
- **OSU Extension Agronomy & Farm Management Resources**
  - Chris Zoller, OSU Extension Educator, ANR, Tuscarawas County
- **Lessons Learned from Building a Farm Shop**
  - Matt & Luke Durbin, Durbin Farms

BEEF QUALITY ASSURANCE... will be held August 25th at 7pm at the Sugarcreek Stockyards. The Tuscarawas County Cattle Association will provide drinks. Please call 330-339-2337 to pre-register.

AGRICULTURAL WORKERS... are usually categorized in two ways. They are either an “employee” or an “independent contractor.” Depending on how an agricultural worker is labeled determines the duties and liabilities of the agricultural employer.

Generally speaking, if an ag employer has the right to control the work of an ag worker, then the ag worker is probably an employee. This means that the ag employer must abide by a whole host of federal and state laws that relate to labor and employment and can be found liable for any damages caused by their employees under the doctrine of vicarious liability. Vicarious liability is a legal doctrine that may hold an employer responsible for the actions of an employee -- so long as the employee was acting in the ordinary course of business. A good example of the vicarious liability doctrine in action is when a court decides to hold a farmer and/or farm business responsible for any spray drift damages resulting from an employee’s application of herbicide.

On the other hand, ag employers that use independent contractors are usually not liable for any damages that result from the actions of an independent contractor. This obviously makes the use of
independent contractors very appealing but comes at a higher cost than using an employee to do the work.

Simple enough right? Be careful with employees and spray drift or use independent contractors and be worry free. Not really. Although a big concern for ag employers are the liability issues that stem from employees’ actions, having employees requires ag employers to fulfill multiple obligations under state and federal labor and employment laws, obligations that otherwise would not exist if an ag employer used an independent contractor to complete the work. Those obligations can include wages, overtime pay, hour restrictions, migrant and seasonal worker protections, tax concerns, and others. So, you see, labeling a worker as an employee or independent contractor goes far beyond just preventing a lawsuit against the ag employer.

Ag employers often think they are using independent contractors to complete work around the farm. But innocently, the ag employer may actually be using an employee to complete work around the farm and is probably violating federal and state law and exposing itself to fines and lawsuits. An ag employer must be careful when determining who is an employee and who is an independent contractor when looking for help on the farm.

More information is available in this OSU Extension Ag Law Blog: https://farmoffice.osu.edu/blog.

SOYBEAN APHIDS...may be in your fields. Based on recent scouting, we have noticed increasing populations of soybean aphids. As we go into the critical growth stage of soybean, this is also the most important time to check your fields for soybean aphids and see if you have exceeded the threshold of an increasing population of 250 aphids per plant.

To scout for soybean aphid, walk at least 100 ft from the field edge and count the number of aphids from 5 plants in 10 different locations. If your average is greater than 250 per plant, you’ll need to come back and re-scout 3-4 days later. If the aphid population increased in that time, an insecticide application is recommended. Keep in mind that to accurately determine the threshold, scouting should be performed at least weekly and multiple times a week if aphids are active in fields.

SOYBEAN COST & RETURN DATA...from growers enrolled in the OSU Extension Ohio Farm Business Analysis and Benchmarking Program is described in this OSU Extension Ohio Ag Manager newsletter: https://u.osu.edu/ohioagmanager/2021/08/12/soybean-production-costs-returns-in-the-u-s-and-ohio/.

The table below summarizes gross returns, total expenses, net return per acre, and soybean price received for owned and rented soybean acres, Ohio Farm Business Analysis and Benchmarking Program, 2012 – 2019.

<table>
<thead>
<tr>
<th>Year</th>
<th>Owned Land</th>
<th>Rented Land</th>
<th>Owned Land</th>
<th>Rented Land</th>
<th>Owned Land</th>
<th>Rented Land</th>
<th>Owned Land</th>
<th>Rented Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$641</td>
<td>$422</td>
<td>$218</td>
<td>$14.09</td>
<td>$654</td>
<td>$452</td>
<td>$201</td>
<td>$13.88</td>
</tr>
<tr>
<td>2013</td>
<td>$599</td>
<td>$443</td>
<td>$156</td>
<td>$13.08</td>
<td>$594</td>
<td>$435</td>
<td>$158</td>
<td>$12.94</td>
</tr>
<tr>
<td>2014</td>
<td>$548</td>
<td>$446</td>
<td>$102</td>
<td>$10.07</td>
<td>$502</td>
<td>$423</td>
<td>$79</td>
<td>$10.29</td>
</tr>
<tr>
<td>2015</td>
<td>$428</td>
<td>$396</td>
<td>$32</td>
<td>$8.83</td>
<td>$426</td>
<td>$432</td>
<td>$-4.95</td>
<td>$9.37</td>
</tr>
<tr>
<td>2016</td>
<td>$510</td>
<td>$413</td>
<td>$97</td>
<td>$9.30</td>
<td>$508</td>
<td>$442</td>
<td>$66</td>
<td>$9.42</td>
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<tr>
<td>2017</td>
<td>$493</td>
<td>$401</td>
<td>$91</td>
<td>$9.54</td>
<td>$491</td>
<td>$462</td>
<td>$28</td>
<td>$9.55</td>
</tr>
<tr>
<td>2018</td>
<td>$546</td>
<td>$423</td>
<td>$123</td>
<td>$8.95</td>
<td>$554</td>
<td>$443</td>
<td>$110</td>
<td>$8.85</td>
</tr>
<tr>
<td>2019</td>
<td>$498</td>
<td>$445</td>
<td>$52</td>
<td>$8.87</td>
<td>$512</td>
<td>$454</td>
<td>$58</td>
<td>$8.90</td>
</tr>
<tr>
<td>Ave.</td>
<td>$532</td>
<td>$423</td>
<td>$108</td>
<td>$10.34</td>
<td>$530</td>
<td>$442</td>
<td>$86</td>
<td>$10.40</td>
</tr>
</tbody>
</table>

NOW IS THE TIME...to clean grain bins prior to harvest. If the grain bins are already empty, they need to be thoroughly cleaned on the inside and outside. The walls and the floors need to be swept clean. It would be best to use a shop vacuum to reach and remove all grain remnants that are tucked into cracks and crevices as well as the central feed out auger. Be sure to clean off ledges above hatch doors and if there is a ladder on the interior of the bin, be sure that hollow rungs are cleaned out. While working in the bin, look for holes and cracks to the outside are detected and fixed.

On the outside of the bins, clean up any spilled grain, remove or mow weeds from around the base of the bin, and if there is an aeration fan, check the plenum for any accumulation of grain and remove it.

Other areas that should be cleaned to remove any accumulations of grain include augers, grain pits, grain elevator belts, grain driers, grain carts and truck beds, and combines and combine heads. Grain accumulations in any of these pieces of equipment could have been infested during the summer months. The rule of thumb is, if you can look into any of these pieces of grain handling equipment and be able to tell what the last grain crop that was run through it, it is not clean enough.
If a bin has had a known insect problem in the recent past where a residual population of the insect(s) could be hidden under the perforated aeration floor, fumigation might be the only option to destroy these hidden insects. The most likely product to be used for this purpose is aluminum phosphide (phosphine gas) which is sold under a number of different trade names such as Phostoxin, Fumitoxin and Weevil-Cide. When determining the proper dosage for treating the empty bin, one has to remember that the dosage is based on the total volume of the area into which the fumigant is being released.

Additional information and safety precautions can be found in this OSU Extension C.O.R.N. newsletter: [https://agcrops.osu.edu/newsletter/corn-newsletter/2021-27/it%E2%80%99s-time-clean-your-grain-bins-and-everywhere-else-around-your](https://agcrops.osu.edu/newsletter/corn-newsletter/2021-27/it%E2%80%99s-time-clean-your-grain-bins-and-everywhere-else-around-your).

**BEEF CATTLE INVENTORY EXPECTATIONS...**in the next few years are discussed by Dr. Andrew Griffith, University of Tennessee Extension, in this OSU Extension Beef newsletter: [https://u.osu.edu/beef/2021/08/18/expectations-of-cattle-inventory-the-next-few-years/#more-11351](https://u.osu.edu/beef/2021/08/18/expectations-of-cattle-inventory-the-next-few-years/#more-11351).

Relatively low cattle prices the first half of 2021 and drought concerns in some major cattle producing regions will definitely result in a lower beef cattle inventory on January 1, 2022. This means a reduced supply of calves and feeder cattle, which should support prices in 2022. As prices increase, more heifers will be expected to be retained. This time of retention will further support feeder cattle prices. There is a chance that beef cattle inventory sees a slight increase in 2023 but certainly by 2024. However, the cattle market should be in a bull market at least through 2024 given the current situation.

These expectations could be disrupted by outside factors such as drought or supply disruptions. However, one cannot make decisions based on expectations of unknown disruptions.

**NEW INSECT IPM GUIDE...**now available from OSU Extension. This guide contains information on the biology and management of field crop insect pests in Michigan and Ohio. Content is available for many agronomic crops including field corn, soybean, wheat, alfalfa, and grass forages.


**USE SCIENCE-BASED PRACTICES...**when weaning beef calves. When calves undergo prolonged periods of stress they are predisposed to disease and a failure to thrive in later stages of the marketing chain. There is scientific evidence to indicate that multiple stressors at weaning is physically and psychologically stressful for calves and should be avoided.

There are several alternative weaning methods to choose from apart from abrupt weaning, including: fence-line, two-stage, and the use of a trainer cow. Fence-line weaning keeps the calf from nursing, but still allows for social contact between cows and calves through a fence-line. Calves are typically separated from the cows by a fence-line for anywhere from 3-7 days until the calf and cow adopt independent activities.
Exploratory behavior is common in cattle, and calves will commonly pace the fence-line at weaning. Weaning calves into a familiar pasture is one way to help reduce their pacing and walking behaviors.

Two-stage weaning utilizes anti-suckling nose-flaps that are placed in the nostrils of a calf and prevent nursing, while still allowing social contact with the cow. The nose flaps are usually left in the calf for 7-14 days and are then removed when the calf is completely separated from the cow. Two-stage weaning is a viable option, however, to insert the nose flaps you will need to process calves through the chute and then a second time when you are ready to remove the nose flaps. While it is not common, it is a possibility that some calves may lose their nose flaps. Nose flaps are approximately $2.25/unit, and these can be disinfected and used again the following year.

The use of a trainer cow at weaning is a method in which calves are abruptly weaned, but a mature, non-lactating cow is placed with the calves to help encourage calves to find the feed bunk and water faster, and to help decrease separation distress. The use of a trainer cow is a non-invasive, non-labor intensive management strategy that is a viable option for producers to implement. This method can easily be done in both pasture and feedlot settings, depending on availability of resources. This is also an ideal weaning method if a cull cow is used as the “trainer cow”, as it is an easy way to supplement the cull cow and add body condition before marketing this cow. There are, however, considerations that should be made prior to using a trainer cow as an alternative weaning method. If a cull cow or non-pregnant cow is used as the “trainer cow”, producers must control the cow’s estrus cycle in order to prevent her from displaying estrus as this can increase walking behaviors in calves, especially bull and steer calves. If weaning calves in a feedlot, or if supplementing calves and the trainer cow on pasture, producers must provide enough bunk space such that calves are not intimidated by the bunk in the early stages of weaning.

While weaning is inevitably stressful for calves, these alternative methods have been shown to minimize the amount of stress placed on calves during weaning. By using low stress handling techniques and decreasing the number of stressors simultaneously place on calves at weaning, you will be setting your calves up for success in the next phase of production.

Additional details are available in this OSU Extension Beef newsletter: https://u.osu.edu/beef/2021/08/18/science-based-weaning-methods-for-beef-calves/#more-11327.
USDA LAND VALUES...2021 survey has been released and is available here: https://downloads.usda.library.cornell.edu/usda-esmis/files/pn89d6567/5m60rq58k/zk51wf530/land0821.pdf.

The table below summarizes farm real estate, cropland, and pasture average values for Ohio from 2017 – 2021 and provides the percentage change from 2020 to 2021. Because these are averages, there are values above and below the number provided below. Many factors can influence these numbers.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Real Estate Value per Acre (OH)</td>
<td>$6,010</td>
<td>$6,200</td>
<td>$6,290</td>
<td>$6,350</td>
<td>$6,600</td>
<td>3.9%</td>
</tr>
<tr>
<td>Cropland Average Value per Acre (OH)</td>
<td>$6,150</td>
<td>$6,320</td>
<td>$6,400</td>
<td>$6,460</td>
<td>$6,800</td>
<td>5.3%</td>
</tr>
<tr>
<td>Pasture Average Value per Acre (OH)</td>
<td>$3,240</td>
<td>$3,370</td>
<td>$3,350</td>
<td>$3,370</td>
<td>$3,440</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

(Source: USDA Land Values Survey, 2021 Summary)

CONFINED SPACES...on farms can be dangerous and deadly. Three farmers at a dairy in Mercer County died last week after entering a manure storage area. Examples of confined spaces on farms include manure pits, silos, and grain bins.

There are four primary dangers for working in confined spaces, the major risk being chemicals and gases that displace or consume oxygen, causing breathing difficulty for the worker. Another danger is the presence of toxins that can damage the respiratory and nervous systems and even cause death. Each confined space has its own specific dangers as well. For example, hazards specific to manure pits include hydrogen sulfide gas, oxygen displacement by gases, and drowning. Meanwhile in silos, the specific hazard is displacement of oxygen by nitrogen dioxide gas. All other hazards of confined spaces can still occur in manure pits and silos.

The gases in manure pits and silos pose a particularly difficult hazard because they are invisible. We as humans have a hard time responding to dangers we cannot see or touch. If you were to map the gases in a manure pit, you would see they appear in layers; they stratify based on weight compared to atmospheric air. Heavier gases sink to the bottom, while those lighter than atmospheric air will be found at the top. Hydrogen sulfide, carbon dioxide, carbon monoxide, and methane are all gases found in manure pits. Going back to our air map, we would see hydrogen sulfide near the bottom, carbon dioxide between the hydrogen sulfide and air, carbon monoxide mixing with air because of their similar weights, and methane above atmospheric air.

Of the manure pit gases, hydrogen sulfide and carbon monoxide are the only truly toxic gases, whereas carbon dioxide and methane have displaced and used oxygen for their formation, depriving the “air” in a manure pit of oxygen for respiratory use. However, all have maximum concentration thresholds that can be found in the accompanying table.
Silo Gases, although different in chemical makeup, still pose the same invisible threat. Nitrogen dioxide gas causes respiratory distress and can cause death within minutes if present in great enough concentration. It is also heavier than air, so will settle near the silage surface.

Confined spaces are a necessity on grain farms and livestock operations. Maintenance of these spaces is also a necessity. The last necessity we also need to remember when working in confined spaces is the safety of ourselves, our families, and our workers. Talking and educating the members associated with the farm can be the first step in preventing confined space emergencies.

Hazardous Gases and Concentration Thresholds*

<table>
<thead>
<tr>
<th>Gas</th>
<th>Weight</th>
<th>Human Health Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>Lighter than air</td>
<td>Death at 500,000 PPM</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Similar to air</td>
<td>50 PPM</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>Heavier than air</td>
<td>1,500 PPM</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>Heavier than air</td>
<td>5 PPM</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>Heavier than air</td>
<td>5 PPM</td>
</tr>
</tbody>
</table>

*Created from Ohio State University Factsheet AEX-591.9.3 and Michigan State University Factsheet “Beware of Manure Pit Hazards.” (Source: Haley Zinda and Dr. Dee Jepsen, OSU Extension, for publication in Farm and Dairy, August 19, 2021)