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Cornell Cooperative Extension

Central New York Dairy, Livestock and Field Crops

Quarterly Newsletter

IN THIS ISSUE

Considerations for Adoption of Automated Sensor Technology

By Betsy Hicks, Dairy Management Specialist, CCE

Automated sensor technology for dairy cattle is not only a trending option for dairy farms, but one that is starting to look more attractive as the dairy industry continues to evolve. This article strives to bring some considerations to mind when thinking about adoption of this technology before any purchases are made. Considerations shared are from conversation with Dr. Julio Giordano of Cornell University, who is an excellent resource on all aspects of automated sensor technology for dairy cattle.

Sensors

There are several options for companies to work with, as well as types of sensors available. Typically, sensors are available to be placed in the ear as a tag, or on the collar worn by the cow. Each has their pros and cons but thinking through which application is right for the herd and facilities is a good first step when considering adoption of a system. If the herd is considering moving towards robotic milking, setting up a collar system from the start may be the right move. If there are problems with using collars, but the herd has facilities that make applying ear tag sensors easy, it may be the better plan. With whichever application a farm chooses, know that there will be a learning curve for application of sensors and how they may be lost or damaged.

Number of Sensors Needed

The more sensors you utilize, the more expensive (in general) a system will be. By not doing 100% of cows, a herd can save a significant amount of money if they choose to only utilize sensors on half or slightly more of their cows. This scenario makes sense if a herd will be utilizing them for reproduction only, but realize that the poorer reproductive performance a herd has, the more sensors a herd will need, as they would typically stay on cows longer than a herd with excellent reproductive performance. In general, if a herd wants to improve reproductive performance, sensors will achieve about the same results as good visual observation two times a day for about a half hour each time.

If a herd wants to utilize sensor technology for both reproduction and health, a herd can still plan for sensors for a percent of cows, but this may be closer to 65-70% of the herd.

Integration with Dairy Comp

Be advised that all systems that are available don't necessarily integrate well or at all with Dairy Comp 305. Many companies are working on software to achieve this, but if it's a necessity for a herd to have their information integrated to their herd software, be informed on the choices available. For many herds, this isn't a deal breaker, and opt to flip between programs, or utilize a separate monitor for sensor information when using it to compare to herd information.

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Labor Savings & Investment

It is very important to keep in mind that a system won't necessarily save a herd labor. Like many technologies, it does change labor and make timing more flexible – such as receiving an alert for a cow in heat, rather than watching for heats. Some herds have been able to minimize their reproductive programs – utilizing only an Ovsynch program instead of an Ovsynch/Resynch program, which has minimized reproductive drug costs and labor associated with giving those shots. At any rate, though, a herd does have to factor in time and labor for applying the sensors and upkeep of the sensors, as well as time to learn and properly utilize the system.

Questions to Ask to Help You Decide on a System

- What's the ease of applying the tag or collar, and where would you accomplish this? If there are no headlocks, would you utilize the parlor, and what impacts does that have?
- What will the sensors get stuck on or hit on and damaged, or lost?
- What's the life span of the tags? What happens after that has expired?
- What's the company's tag loss rate? Ask about a clause in your contract that states how many they'll replace at no charge in a specified time period.
- If you graze – what the company's calibration for grazing cattle? Have they calibrated sensors for grazing herds?
- What are the best settings for your herd, and how much support is there for tweaking specificity and sensitivity?
- What are their tech services? Who does the updates, and how frequently are they done?

See the article at https://cals.cornell.edu/news/2022/03/julio-giordano-pushing-bounds-digital-agriculture-dairy

Late Postemergence Herbicide Applications to Field Corn: How Tall is Too Tall?

by Mike Hunter, North Country Regional Field Crops Specialist

It's early July and at a point in the growing season when this is your last chance to get the weeds controlled in your corn fields. Before a field of taller corn is sprayed you need to ask the question: "How tall can the corn be when you spray?" Postemergence corn herbicides have restrictions on the maximum height of the corn at the time of application. Once corn reaches 12 inches tall, atrazine and atrazine containing premixes are not an option. There is even a 30" corn height restriction for glyphosate applied to glyphosate tolerant (Roundup Ready) corn and a 24" corn height restriction for glufosinate applied to glufosinate tolerant (Liberty Link corn). Late postemergence herbicide choices for conventional corn are somewhat limited once the corn exceeds 20 inches in height. Most, if not all, late total postemergence conventional corn herbicide programs will require more than one product in the tank mix. Correctly identifying the weeds present and actually measuring the heights of both the corn and weeds will be critical. The heights of the weeds will often times dictate the rates of many of these herbicides. Pay close attention to the herbicide labels and the adjuvants necessary to add to the spray tank.

Here is a list of many postemergence herbicides and the over the top maximum corn heights as listed on the label for taller corn:

- Accent Q- 20" or V6
- Acuron Flexi- 30" or V8
- Acuron GT- 30' or V8
- Aim- V8
- Armezon Pro- 30"or V8
- Dicamba/Clarity- 36"
- Basagran 5L- None
- Buctril/Brox- Before tassel
- Callisto- 30" or V8
- Callisto GT- 30" or V8
- Capreno- V6
- Diflexx- V10 or 36" whichever comes first
- Diflexx DUO- 36" or V7 (7th leaf collar)
- Empyros- 20" or up to V6 stage
- Empyros Triad- up to 12"
- Empyros Triad Flex- up to 12"
- Halex GT- 30" or V8
- Harmony SG- 16" or 5 collars
- Impact/Armezon-up to 45 days before harvest
- ImpactZ- up to 12"
- Impact CORE- 11"
- Harness MAX- 11"
- Hornet WDG- 20" or V6
- Laudis- V8
- Katagon- V5 or up to 20" tall, whichever is more restrictive
- Peak- 30"
- Permit- Layby (about 36" tall corn)
- Permit Plus- 6 leaf corn (5 collars)
- Realm Q- 20" or V7
- Resolve Q- 20" or before V7
- Resource- V10
- Revulin Q- 30" or V8
- Shieldex 400SC- 20" or V6 whichever comes first
- Sinate- 24" to V7, whichever comes first
- Status- 36" or V10
- Steadfast Q- 20" but before V7
- Stinger- 24"
- Yukon- 36"

It is not an ideal situation when we are dealing with taller corn and weedy fields. It is difficult to control taller weeds and yield losses can be expected due to the early season competition with the corn. It is important to read and follow all label directions prior to the application of any herbicide.

Diagnosing Lameness in Pasture Cows

by A.J. Tarpoff, Extension Beef Veterinarian

During the summer grazing months, many producers run into issues with lame cattle. The effects of lameness may show themselves by decreased fertility and performance, weight loss, and increased labor and medicine costs.

It has been estimated that 88% to 92% of lameness in cattle stems from the foot. Dry conditions the Great Plains are experiencing may lead to an increase in foot issues. Below is a review of some of the common causes of such problems and the key differences between the clinical signs. It is a good idea to contact a local veterinarian to create a treatment plan for these conditions prior to the grazing season.

Lameness with swelling

The first way to determine the cause of lameness is to observe obvious swelling. The swelling most commonly affects the lower limb, indicating the area of inflammation just above the hoof. It is important to distinguish if the swelling is symmetrical (equal on both sides of the foot) or asymmetrical (only affecting one side). Swelling also may affect single or multiple joints in both calves and cows.

Footrot is a common disease that occurs in pasture cattle. It is a bacterial infection of the foot that manifests itself with symmetric swelling encompassing the lower limb just above the hooves. Upon closer inspection, producers will notice a crack in the skin between the hooves and a foul pungent odor. Chapping and cracked skin in the interdigital space often occurs during drought conditions. Injectable antibiotic treatment typically is very effective when used in the early stages of the disease.

With delayed or late treatment of cases, however, deeper structures of the foot (tendons, joints, even bone) may become involved. Delayed treatment often requires extended therapy and leads to increased cull rates from the herd.

It is always important to closely inspect symmetric swelling cases in pasture settings. Wire, bale wrap or other foreign bodies can wrap around and entrap the lower foot causing very similar symptoms as footrot. If the swelling has a well demarcated line horizontally across the foot, further investigation is warranted. The entrapping foreign body must be removed.

Single-sided or asymmetric swelling of the foot often indicates a more serious condition in cattle. This type of clinical sign often is the result of deep structural issues. Puncture wounds, sole abscesses, stone bruises or chronic infections can cause single-sided joint, bone or tendon infections. Extensive footwork on a tilt table or under sedation often is needed in these cases. Contact a veterinarian when these cases are identified.

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Single or multiple joint swelling with lameness also can be observed in pasture settings. In calves, this is often the result of septic arthritis, which is a bacterial infection of the joints. In very young calves, it can be the aftereffect of navel ill (infection entering through the umbilical cord) or from bacteria that get into the bloodstream. It is not uncommon to see this condition a week to 10 days following a bout of respiratory disease with some pathogens as well. Even with appropriate treatment, the inflammation in the joint often can take several weeks to resorb back into the body of the animal.

Joint swelling in mature animals also can occur. Many times this is a result of an orthopedic breakdown. Torn cruciate ligaments in the stifles of breeding bulls or hock damage from riding activity are examples of these conditions. Producers should consult with a veterinarian for potential treatment or course of action if these situations occur.

Lameness with no noticeable swelling

Obvious lameness to one or more limbs with no noticeable swelling often can be challenging to diagnose. One of these conditions is called hairy heel warts, also known as digital dermatitis or strawberry footrot. These animals often display obvious lameness and will attempt to walk on the “tippy toe” of the foot. Upon closer observation, wartlike growths or bright red scab lesions can be seen below the dewclaws and above the heel bulbs of the foot. Topical treatment with an astringent or antibacterial solution is warranted for this condition.

The last condition, toe tip necrosis, is seen more commonly in newly arrived stocker calves, especially in those sourced from high-moisture environments that cause soft soles. These animals often appear with shifting lameness of the back legs. They usually will stand in strange orientations to protect and get pressure off the damaged toe. The rear, outside hooves are most often affected. Treatment consists of picking up the feet and using hoof testers to confirm the condition. Then, the toes are slightly opened with hoof nippers to release the pressure. Healing will not occur without this step. This is followed by an injectable antimicrobial treatment.

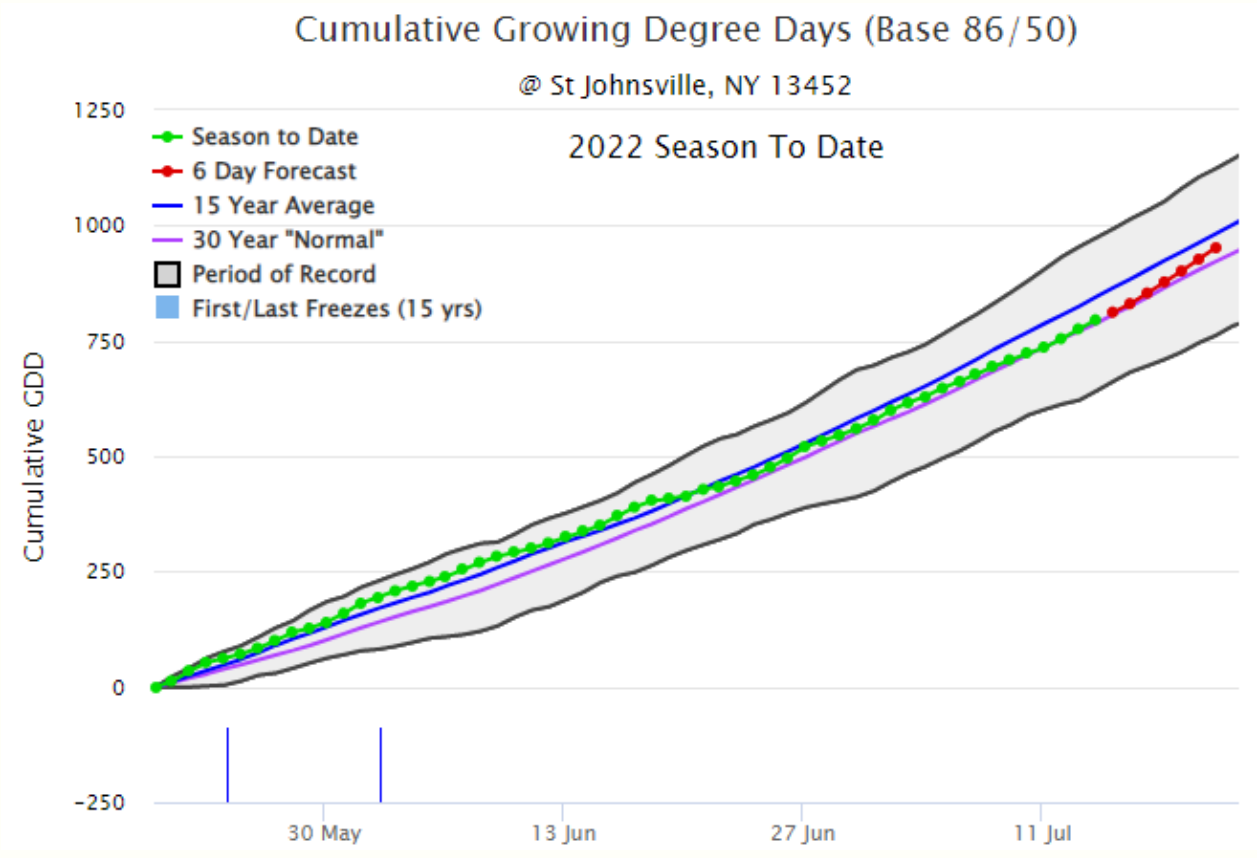
Lameness can be challenging to diagnose in field situations, but understanding the subtle differences will help with proper and timely treatment. Be sure to visit with a local veterinarian about any non-responsive lameness issues. Further diagnostics and treatment may be needed.

This is Normal

By Erik Smith, Regional Field Crop Specialist

If this growing season's weather feels cooler than usual to you so far, it's because it is. According to our cumulative Growing Degree Day units (GDD), the 2022 growing season in Central NY and the Mohawk Valley has been cooler than the 15-year normal. But we're actually right on par with the 30-year normal. Goes to show how much has changed in only a few years, and just how accustomed we've become to spring and summer temperatures always hovering near the record high.

Across the Central NY region, our weather has been remarkably... normal.



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But our precipitation from the last month (and earlier) has been less than "normal" in many places, and significantly less in some. And this has me especially concerned if summer begins to heat up the way it did last year. Even if it doesn't heat up, our crops are reaching growth stages where demand for moisture is highest, and we'll need to play catch-up.

If the heat does eventually arrive as expected, we need to keep a few things in mind:

- Watch your silage crop's post-silking GDD, as usual. Yes, we always stress this, but last year we were relatively cool and dry entering early summer (though still ~50-75 GDD above this year's totals), but GDD skyrocketed after silking, leading crops to reach harvest maturity ahead of what we'd expected only a few weeks prior. I would not be surprised to see a repeat of this, even though we're even cooler than we were last year. The pendulum always swings back, so if you're harvesting for silage, wipe the slate clean and forget what the weather did prior to silking.

- Watch the bugs! Dry weather and warm temperatures are prime conditions for aphid and leafhopper growth. We've had low populations thus far, but as I've said in recent Field Crop Updates, I am not confident whatsoever that those low numbers will last if conditions continue on their present course, let alone if temperatures increase dramatically like last year. And if the weather turns rainy like last year, we may see fewer aphids and leafhoppers, but more moth pests.

But if the pendulum doesn't swing back and wallop us with record high temps and the summer of '22 continues on its present course (maybe with a bit more rain in the dry areas...) - remember, corn doesn't grow above 86F anyways - then join me in enjoying this rare bit of "normal" in what is an ever more abnormal world!

Small Ruminant Production: Are CIDRs Reusable?

by Dr. Brady Campbell, Assistant Professor, OSU State Small Ruminant Extension Specialist; Time Barnes, OSU Extension Educator ANR, Marion County, & Dr. Alvaro Garcia-Guerra, Assistant Professor, OSU Reproductive Physiology

Whether it's at the state fair or local livestock auction, a conversation that commonly occurs among producers revolves around the success rate of their breeding programs. In New Zealand during the late 1980s, a controlled internal drug release (CIDR) was developed and released for intravaginal release of progesterone (P4). Since then, estrous synchronization has improved on-farm production efficiencies that can assist in grouping lambing dates, breeding ewes out-of-season, or can serve as a crucial step in the implementation of artificial insemination.

Let's Review the Basics

Progesterone (P4) is the major hormone used in most reproductive livestock protocols. In females, P4 is produced by the corpus luteum (CL) and is required to maintain pregnancy. In addition, P4 suppresses estrus ("heat") and ovulation, making it an important tool for estrous synchronization. So, the ewe's reproductive system responds as if she is pregnant, and she will not show signs of estrus until progesterone levels diminish.

A CIDR is an intravaginal insert impregnated with P4 (0.3 g). Depending upon the protocol used, CIDRs are maintained within the female for 5 to 14 days before removal. When removed, a rapid drop in concentration of systemic P4 occurs, thus allowing the animal to express estrus approximately 48 hours after removal.

Synchronization of estrus is accompanied by administration of a single dose of pregnant mare serum gonadotrophin (PMSG) at the time of CIDR removal for inducing estrus and increase prolificacy (lambs/pregnant ewe), primarily during out-of-season breeding. Furthermore, this practice is particularly useful when performing timed artificial insemination (TAI), both in and out-of-season to increase synchrony. Currently, PMSG alone is not available in the US, instead PG600®, which contains both PMSG and human chorionic gonadotrophin (hCG), is routinely used as an off-label substitute (refer to the comment about VCPR under the warning section below). In addition, using CIDRs for short periods (i.e., 6 days) requires, primarily in season, the administration of a luteolytic dose of prostaglandin (PGF2α) at CIDR removal to control the endogenous source of P4 and thus improve estrus response.

CIDR Design and Use

The CIDR is an intravaginal, plastic, T-shaped nylon insert molded with a silicone rubber "skin" impregnated with P4. The P4 is released at a controlled rate by diffusion and absorbed through the vaginal mucosa into the bloodstream after placement. As a result, P4 increases rapidly in the blood stream after CIDR placement and also drops rapidly after CIDR removal, allowing for precise control of circulating P4.

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Traditionally, synchronization of estrus in small ruminants involved insertion of CIDRs for prolonged periods (12 to 14 days). However, several reports indicate that fertility after prolonged periods could be reduced compared to natural estrus due to low levels of P4 towards the end of treatment, which in turn affects follicle development and oocyte quality (Gonzalez-Bulnes et al. 2020). As a result, short-term CIDR treatments (5 to 7 days) have been developed to overcome the negative effects of exposure to low P4 (Menchaca and Rubianes 2004). In fact, insertion of a CIDR for 5 days is the recommendation provided on the label for the EAZI-BreedTM CIDR® sheep insert sold in the US.

The use of CIDR inserts in short-term protocols, coupled with the physical characteristics of these inserts that allow them to be washed and disinfected, has fueled interest in their potential for reuse. Anecdotal evidence suggests that this is a common practice performed in the cattle industry, and thus multiple studies have investigated the implementation of this practice in cattle (Colazo et al. 2004; Sales et al. 2015; Melo et al. 2018; Sala et al. 2020). Similarly, the implementation of this practice has been extensively investigated in sheep and goats and therefore poses the question: can CIDRs be reused in small ruminant production?

Can CIDRs be Reused?

The cost of CIDRs may vary slightly regionally, but for the purpose of this discussion, a price of $6.00 per unit will be used. At this price, a single unit may not seem expensive, but when synchronizing an entire flock, herd, or multiple breeding groups, having the ability to reduce costs by reusing these inserts may be economical. Nevertheless, assessment of the effectiveness of CIDR reuse needs to be carefully considered in the context of breed, season (in or out-of-season), breeding method (natural mating vs. artificial insemination), and length of the synchronization protocol, as well as the method for cleaning and disinfecting.

Several studies have explored the practice of reusing CIDRs in sheep (Cox et al. 2012; Pinna et al., 2012; Bazzan et al. 2013; Ungerfeld et al. 2013; Vilariño et al. 2013; Silva et al. 2014; Swelum et al. 2018; Biehl et al. 2019; Swelum et al. 2019) and goats (Vilariño et al. 2011; Alvarez et al. 2013; Swelum et al. 2018). When evaluating CIDR reutilization, consider its impact on multiple parameters, including the amount of P4 provided, CIDR retention rate, estrous response, pregnancy rates, prolificacy, and animal health. For example, circulating P4 declines with CIDR reuse as observed in multiple studies in sheep (Cox et al. 2012; Pinna et al., 2012; Ungerfeld et al. 2013; Vilariño et al. 2013). The concentration of P4 obtained during treatment with an intravaginal P4 insert, however, is dependent upon several factors including insert surface area, initial P4 load, and physiologic status of the animal. Reuse of a CIDR modifies the initial P4 load, which will vary depending on the number and length of time the device was used previously. Furthermore, retention of CIDRs during treatment is critical for optimizing an estrous synchronization program. Interestingly, reuse of CIDRs does not affect retention rate, which is usually greater than 90 to 95%, regardless of the length of treatment and number of uses (Cox et al. 2012; Pinna et al. 2012; Biehl et al. 2019; Swelum et al. 2018; Swelum et al. 2019).

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Estrous response (percentage of animals detected in heat) is a primary outcome of synchronization protocols, particularly when used in combination with natural mating or artificial insemination after estrous detection. Results of multiple studies performed both in and out-of-season in a large variety of breeds indicate that the percentage of ewes displaying estrus is not affected when CIDRs are used up to three times in short intervals (5 to 7 days) in combination with PMSG and PGF2α at CIDR removal (Cox et al. 2012; Pinna et al. 2012; Bazzan et al. 2013; Silva et al. 2014; Swelum et al. 2018; Biehl et al. 2019). Typically, 70–100% of ewes will exhibit estrus at an average of 32 to 48 hr. after CIDR removal. On the other hand, reuse of CIDRs during long-term protocols may result in reduced estrous response (Ungerfeld et al. 2013, Swelum et al. 2019). For example, mature Corriedale crossbred ewes bred out-of-season using an 8-day CIDR protocol with twice-used CIDRs (previously used for 10 and 12 days) expressed estrus at a lower rate (26.7%) than those treated with a new CIDRs (56.7%; Ungerfeld et al. 2013). Similarly, Awassi ewes synchronized with new CIDRs for 12 days and PMSG at CIDR removal had a greater estrous response than ewes treated with reused (previously used once or twice for 12 days each) CIDRs and PMSG (Swelum et al. 2019).

The overarching goal of an estrous synchronization program is to achieve high pregnancy rates in a relatively short period of time. The use of CIDRs up to three times during short-term protocols (5 to 6 days) in combination with PMSG and PGF2α at CIDR removal resulted in similar pregnancy rates using natural mating in ewes bred out-of-season (Pinna et al. 2012; Silva et al. 2014). Likewise, pregnancy rates in Awassi ewes were similar between new and once-used CIDRs using a 6-day protocol in combination with PMSG; however, pregnancy rates decreased dramatically after the third use (Swelum et al. 2018). Conversely, utilization of previously used CIDRs (22 days total) in an 8-day protocol resulted in reduced pregnancy rates in ewes bred out-of-season using natural mating (Ungerfeld et al. 2013).

Reuse of CIDRs during synchronization for TAI in ewes has also been evaluated. Pinna et al. (2012) found that CIDRs could be used up to three times in a short-term (5 days) estrous synchronization protocol with PMSG and PGF2α without compromising pregnancy rates after laparoscopic TAI. Additionally, Biehl et al. (2019) reported similar pregnancy rates using transcervical TAI after synchronization with a new or used (11 days) CIDR during a short- (6 days) or long- (11 days) term protocol using PMSG and PGF2α followed by transcervical TAI. Alternatively, Vilariño et al. (2013) reported lower pregnancy rates in Merino ewes synchronized with CIDRs used three times compared with a new CIDR using a 6-day protocol with PMSG and PGF2α. Prolificacy (lambs/treated ewes) is not often reported; however, reuse of CIDRs has not been associated with a decrease in fecundity (Vilariño et al. 2013; Swelum et al. 2018; Swelum et al. 2019).

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In dairy goats, using CIDRs up to three times during a short-term (6 days) protocol in either timed artificial insemination (TAI) (Llanes et al. 2019) or natural mating (Souza et al. 2011; Souza-Fabjan et al. 2015) did not affect pregnancy rates. Conversely, cross-bred dairy goats treated with CIDRs used three times during a 5-day protocol had lower pregnancy rates after TAI when compared with those treated with new CIDRs, while those treated with CIDRs used two times had intermediate pregnancy rates (Vilariño et al. 2011). However, the authors also noted that pregnancy rates were still considered "acceptable" (> 60%) given that the does were bred out-of-season.

Summary

Although used CIDRs are efficient at synchronizing estrus in ewes and does, the duration of previous usage and length of time the CIDR is used can negatively affect reproductive parameters and thus economic profit. According to the current literature, new CIDRs and those previously used for a combined total of 12 days or fewer may provide the best fertility rate—and net profit—when implemented in a short-term protocol. However, maintaining flocks and herds that are free of reproductive disease is a must when considering the practice of recycling CIDRs. Currently, there is a lack of information on the potential risk for disease transmission when reusing CIDRs, and the effectiveness of different cleaning methods. Cleaning of CIDRs typically involves rinsing with water followed by disinfection. The challenge for most producers in moving forward with this management plan will be the ability to properly clean and store used CIDRs. Economically, it is not advisable to use CIDRs that have been previously used for more than 12 days (Souza et al. 2011; Pinna et al. 2012; Silva et al. 2014; Souza-Fabjan et al. 2015; Swelum et al. 2019). To ensure the greatest probability of reproductive success, be sure to consult with your veterinarian on which CIDR management program best fits your operation. Don't let upfront costs of reproductive technologies allow you to make poor decisions that may cost far more in the long run when it comes time to market lambs and kids.

Warning

The authors of this article do not support nor endorse the practice of reusing CIDRs in the reproductive management of sheep or goats. The intent of the current article is to present a summary of the current literature that investigates the practice of reusing CIDRs. The practice of reusing CIDRs is considered extra label use and therefore requires the approval of a licensed veterinarian. Producers are encouraged to establish a working veterinarian-client-patient relationship (VCPR) with their local veterinarian.

Final Dairy Farm Business Summary and Analysis Program Progress Report 2021

by Lauren Augello, PRO-DAIRY

As farm businesses across New York analyze their financial performance by utilizing the Dairy Farm Business Summary and Analysis Program that is supported by Cornell University, Cornell Cooperative Extension, and PRO-DAIRY, the changes that occurred from 2020 to 2021 can be reviewed. An important purpose of management is to compare how your farm changed from one year to the next, how this compares to your business goals, and how this compares to the industry. Understanding what changes occurred and determining why they changed can help in preparation for making business improvements in 2022.

The report consists of five sections:

- Average of all farms (136 farms)
- Less than 500 cows (34 farms)
- 500 to 999 cows (32 farms)
- 1,000 to 1,499 cows (37 farms)
- 1,500 cows and greater (33 farms)

Highlights from the progress report:

- Labor efficiency improved in 2021, with a 2.3 percent increase in cows per worker and a 4.9 percent increase in pounds of milk sold per worker. Hired labor costs per worker equivalent also increased 5.1 percent.
- Gross milk price per cwt increased 7 percent from $18.56 in 2020 to $19.77 in 2021.
- Hay dry matter tons per acre and corn silage tons per acres increased 19 percent and 5 percent respectively. This contributed to the increase of accrual crop receipts of 203 percent from 2020.

Read the full report at: https://bit.ly/DairySummary2021

Managing Your Earnings in 2022: Can We Impact 2023 and Beyond?

by Jason Karszes, PRO-DAIRY & Chris Wolf, Professor of Agricultural Economics

So far, 2022 is shaping up as a year where cash and profits may rebound within the dairy industry to levels that have not been seen for a few years. While inflation and supply chain issues are driving costs up on dairy farms, milk prices are strong and appear to have generated stronger cash positions through the first third of the year. With the strong cash positions, questions are starting to be asked about potential strategies to maximize the opportunity associated with the stronger positions this year. How long will the milk price stay strong enough to offset rising input costs? Will a smaller national heifer inventory and milk processing limitations slow the growth of milk production? Will supply chain issues continue to impact both farm production and processing capacity? With the uncertainty towards what earnings might be over the course of the year and into the next, there is the potential for earnings to decrease or turn negative.

Questions to ask

With an expectation for the earning levels to decrease at some point, whether driven by the increase of costs or lower milk prices, the key objective during times of strong earnings is to improve the financial health of the business, along with positioning the business to succeed when earnings decrease.

To meet this objective, two questions can be asked:

- What can be done over the remainder of this year that will increase profit generation through increased production or lower costs in 2022 and beyond?

- What can be done over the remainder of the year to increase the businesses' ability to meet cash commitment challenges during the next low earnings cycle?

To answer the first question, managers need to know the current state of their business. How is revenue being generated, and how much does it cost to do so? By analyzing your business, you may identify areas in which a few changes could lower your cost to produce milk or maintain the cost to produce milk while producing more hundredweights. Examples of this are changes that affect labor efficiency, feed efficiency, fertilizer use, and culling decisions. Start by analyzing your five largest expense items to determine if you are receiving the greatest return possible from those inputs.

Before making a change, carefully analyze it to determine if it meets your long-term goals. The decision must make sense for next year and beyond, or for when the returns may be significantly lower, not just now when returns may be higher than average. You don't want to make long-term cash commitments based on short-term cash excess or cash generation. Also, you don't want to make this change for tax savings only. If an investment does not make long-term sense for profitability, then the one-year tax savings is likely not enough to justify the investment.

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The second question: "What can I do now to maintain my ability to meet cash commitments throughout a low milk price cycle?" deals more strictly with cash flow budgeting and positioning your business. If you are not already projecting future cash needs, you may want to start. While they are not always accurate, budgeting future cash needs for the next twelve months allows you to identify times where you may need to generate additional income or minimize expenses.

With an accurate financial analysis of current performance and thorough monthly cash flow projections in hand, it is easier to determine the best use of cash within the business.

What should you do first?

With many different uses of profit, it can be difficult to prioritize. It can be tempting to pay for a capital project with cash, but this might not have the desired impact for improving the ability of the business to manage cash during a down cycle. When focusing on the use of profit within the business, it is important to think about how different investments fit into the business and how they can impact the business. There are two important objectives to keep in mind, the ability to increase the future earning potential of the business and the ability to allow the business to handle the next down cycle more efficiently. Depending on the choices made this year, you may impact one, both, or none of these areas. The following areas can help focus the decision making on where to use profits this year.

Five Uses of Profit/Cash Within the Business

To improve the financial health of the business there are five areas where cash can be invested. These areas are meeting critical needs, improving operations, building reserves, building borrowing capacity, and funding long term investments. Let's consider each use in turn.

1. Meeting Critical Needs

Low dairy farm profitability over the last few years have made it difficult for some farms to meet all their cash commitments. In 2021, some dairies may have delayed investments or postponed expenses, thus hindering the farm's ability to efficiently maintain day to day operations or operate at the lowest possible cost. Catching up on delayed investments and unpaid expenses should be the first use of profit. Paying down an open account with a supplier to qualify for cash discounts is one example. Another example is repairing or replacing essential equipment, such as a skid steer, that is not fully operational. If the business is at the limit of its borrowing capacity, repaying operating credit lines could also be a priority so the business can borrow again when a need arises. This also can lead to lower interest costs, resulting in lower operating costs.

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2. Improving Operations

A second area to consider is what could be done to improve the current operations by investing additional capital. Most farms have a long list of ideas for ways to increase milk production, improve labor efficiency and effectiveness, or lower costs. With the higher earnings cycle underway, you must determine investment priorities. From analysis of the current operations, where are the opportunities to improve operations? Improving cow flow leaving the milking parlor, updating ventilation systems, upgrading mixer wagons to improve mixing and reduce time spent feeding, providing additional training to boost employee performance, and implementing lean manufacturing concepts are all examples for improving operations. With so many options, the management challenge is to determine which improvements will have the greatest impact on performance.

3. Building Reserves

If the current operations are running smoothly, or the necessary changes are underway, the next use of profit can be to build reserves within the business. By building reserves, the business has something to draw against when the next low earning cycle comes along. Paying for inputs ahead of time, while also impacting taxes, is a primary way to build inventories which can be drawn down when cash flow becomes restricted. Another source of reserves is building cash balances that may be invested off the farm in accounts, such as money markets, that earn higher interest rates than savings and checking accounts but are available for use by the business when needed. This decision doesn't lead to a tax deduction for the current year, so the tax implications need to be considered when building cash reserves.

4. Building Borrowing Capacity

In conjunction with building reserves, accelerating principal payments to build borrowing capacity within the business is an alternative to consider. Making ongoing debt payments is a normal course of operations, but during high earning cycles, the business can choose to accelerate principal payments, therefore accelerating the reduction of principal and decreasing the amount of outstanding principal that requires interest payments. When the next low milk price cycle arrives, there will be less interest being paid due to lower principal, and there is also increased borrowing capacity that can be tapped into to help cash flow or take advantage of different opportunities. Depending on which loans are paid down, or paid off, the monthly cash commitment required to service principal and interest may also be decreased, which improves the ability of the business to meet cash commitments. It is important to remember that making principal payments is not a tax deduction and accelerating principal payments may impact the farm's future tax liability.

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5. We fail to properly value the cost of long-term inefficiencies that remain with the old facility. Even if it takes only five minutes per day that's over a half hour per week and 30 hours per year. However, it's rarely just five minutes or only one person. Add to this the potential reduction in animal performance.

Other Considerations

Space – Is there enough available space to install the new technology, allow it to work effectively, and be able to maintain it efficiently? Will there be room for upgrades and/or expansion? It is very short-sighted to shoehorn a system into an old facility with no room for future improvements. Moreover, local codes may specify space requirements and/or minimum separation distances.

Layout and number of units – Can we install the correct number of units required to service the current number of animals? Will the layout be logical and efficient? Many systems will use a common controller for multiple units, but they must be within a certain distance. For robotic milking systems will the units be in reasonable proximity to the collection point (milkhouse)? Will the units be able to clean and sanitize the system to meet health code regulations?

Ingress and egress – Livestock, especially large livestock, require certain minimum dimensions for passageways, turning radius, and head-to-head intersections. They also don't like apparent dead ends, mazes, dark areas, or shadows on the floor. Travel lanes should never require an animal to step up or down and change direction all in the same movement (i.e. – entering/existing a foot bath). Whenever possible, entry and exit should be straightforward. It should also allow for them to fully pass through a one-way gate before changing direction.

Ventilation – Whether the facility is naturally or mechanically ventilated, you will most likely have to provide some supplemental ventilation in and around the particular units. Circulation fans can boost air flow over a control room in tunnel and cross vented barns. Having a dedicated fan over a milking or feeding stall will keep fresh air moving in the confined space as well as deterring biting flies in the summer.

Ancillary Items

Footbaths – Footbaths should be placed where they are easy to access and easy to exclude. They also need to be narrow (24"- 32") and 10' to 12' long. This will keep animals moving while also forcing multiple submersions of all feet. At least one side should be able to open out should an animal go down and not be able to get back on their feet. Emptying, cleaning, and recharging must be easy to complete, or it may not be done in a timely manner. Drain Plugs and frostless hydrants need to be included in the design. Some farms elevate a tote of premixed solution over the footbath so that is can be quickly refilled.

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Work with your tax accountant and determine what impact different decisions will have on taxes and what your total tax bill will be. With this information, you can better plan your cash needs for next year. Waiting until February or March to determine what your tax bill will be can severely impact your cash flow and disrupt your ability to meet planned cash needs. While planning for taxes can minimize the cash needed to pay the income tax bill, it is important to remember your long-term business goals. Do not necessarily focus on paying no taxes. The only way to not pay any taxes in the long-term is to not make any money, so the focus needs to be on maximizing after-tax revenue, not minimizing taxes paid.

While the focus of these areas is on improving the business, profits can also be used in support of family goals. Taking a much-needed vacation, investing off the farm for retirement or in other family needs, or pursuing something that is of value to the family should be considered also. These types of uses of profit are generally after tax so tax implications need to be considered.

Coming off of what hopefully will be a good year is no time to rest on your laurels. Projections for next year are only projections and a financial crunch may not actually occur. But a good planner prepares for every eventuality to minimize its potential impact. By planning for financial stress, you also increase your business' ability to take advantage of opportunities that arise.

See article at: https://ecommons.cornell.edu/handle/1813/111354

To Retrofit or Not to Retrofit, That is the Question!

by Timothy X. Terry, PRO-DAIRY

Dairy farming is a constantly changing business. Farming for the long-term will require a facility that can change, as well. Expansion, new technology, and new enterprises may all be in every sustainable farm's future. Planning for a new, or remodeling and retrofitting an existing facility, is best done carefully and thoughtfully. We have all seen farms laid out in a chaotic array of buildings, and driveways that are inefficient now and make future improvements difficult or even impossible.

Figure 1. Robotic milking units retrofitted into an existing holding area.

The short answer to this question is often, "Efficiency." For the sake of production efficiency, the farm is trying to incorporate a new technology, for the sake of investment efficiency they are trying to do so in an existing structure. Most of the time this a sound business strategy, unfortunately, if all aspects are not carefully and dispassionately considered, this could lead to a false economy.

Regarding new versus retrofitting an existing facility consider first the condition of the facility. If it is not meeting expected standards in terms of animal comfort and ventilation or lacking in any manner of internal environment then that's a deal breaker. The only job of many of these new technologies (robotic milkers, calf feeders) is to perform rote tasks and collect data. So, then the question becomes: Do we remodel / renovate or build new?

A helpful guideline is: If the retrofit / remodel is 50% or more of a new facility, go for the new facility. The 50% is not a hard line and there can be a certain amount of discretion included in that, however, there are three reasons that support this:

1. We tend to overestimate the value of the existing structure. There is almost always the sentimentality factor, and it can be very hard to walk away from, let alone raze, the building Great Grandpa constructed with his own two hands from the raw materials he found on site. However, we need to see this as sunk capital. Just as if it were sitting on the bottom of the ocean, it is gone, the investment is unrecoverable, and throwing more good money after it is not a wise use of resources.

2. We tend to underestimate the cost of remodeling and/or upgrading the facility to accept the new technology. Quite often, we can't appreciate the full scope of the project until we start peeling back the layers and exposing the hidden structure. We may not even be able to install the new system without compromising the structural integrity of the facility. Many may feel they can reduce expenditures by doing it themselves but fail to consider the disparity in skill levels between themselves and the professionals, the amount of tinkering required to retrofit 21st century technology into a 19th century building, the availability of the necessary tools and materials, and lastly, how they're going to fit it in with daily chores, planting, harvesting, etc.

3. We fail to properly value the cost of long-term inefficiencies that remain with the old facility. Even if it takes only five minutes per day that's over a half hour per week and 30 hours per year. However, it's rarely just five minutes or only one person. Add to this the potential reduction in animal performance.

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Other Considerations

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Layout and number of units – Can we install the correct number of units required to service the current number of animals? Will the layout be logical and efficient? Many systems will use a common controller for multiple units, but they must be within a certain distance. For robotic milking systems will the units be in reasonable proximity to the collection point (milkhouse)? Will the units be able to clean and sanitize the system to meet health code regulations?

Ingress and egress – Livestock, especially large livestock, require certain minimum dimensions for passageways, turning radius, and head-to-head intersections. They also don't like apparent dead ends, mazes, dark areas, or shadows on the floor. Travel lanes should never require an animal to step up or down and change direction all in the same movement (i.e. – entering/existing a foot bath). Whenever possible, entry and exit should be straightforward. It should also allow for them to fully pass through a one-way gate before changing direction.

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Ancillary Items

Footbaths – Footbaths should be placed where they are easy to access and easy to exclude. They also need to be narrow (24"- 32") and 10' to 12' long. This will keep animals moving while also forcing multiple submersions of all feet. At least one side should be able to open out should an animal go down and not be able to get back on their feet. Emptying, cleaning, and recharging must be easy to complete, or it may not be done in a timely manner. Drain plugs and frostless hydrants need to be included in the design. Some farms elevate a tote of premixed solution over the footbath so that it may be quickly refilled.

Figure 2. Elevated totes of premixed footbath solution.

Segregation pens – Many may see this as wasted space since it is so infrequently occupied. However, when coupled with a robotic milking system (RMS) it allows for full use of the herdsman abilities of the RMS. Any cow requiring special attention can be redirected to this pen following milking. Then the herdsman, vet, breeder, etc. can find the animal without having to search the entire group pen. In the meantime, the animal still has access to feed, water, a stall in which to rest, with full access to the robot.

Treatment Stall – Even in the healthiest of herds, at some point all animals will need to be vaccinated, hoof trimmed, dry treated, etc. These activities cannot and should not be completed in the milking stall. The treatment stall is usually located in or near the segregation pen for easy access. Gating should be set up such that one person can move an animal quickly, quietly, and safely with little effort. Ideally, there should be a minimum of 6' of open space around the perimeter of the stall. This provides ease of access to the animal as well as an escape zone should an animal become unruly.

Straw: To Bale or Not to Bale?

by Andrew Frankenfield, PennState Extension Educator, Agronomy

With fertilizer prices at near record levels the nutrients removed by baling straw is much more significant than it was in previous years. What's your breakeven point for wheat straw?

Loading large wheat straw square bales on a a trailer
Photo: Andrew Frankenfield

Wheat harvest has started in southern Pennsylvania and balers will be running closely behind the combines to get the straw baled and soybeans planted. With the spike in fertilizer prices this growing season, the nutrient value in the straw is higher than ever. A nutrient analysis would be ideal for your farm but book values for wheat straw are estimated at 11 pounds of N, 3 pounds of P2O5, and 20 pounds of K2O per ton of straw. Using values of N=$1.10/lb, P2O5=$1.07/lb, and K20=$0.75/lb, that equals $30/ton in total value of nutrients removed per ton of straw. Add on to that the baling and transportation cost, the value of the straw will likely exceed $75/ton as large square bales. Also, don't forget about the storage and hauling cost, you may be close to $100/ton breakeven.

If wheat straw is spread and not baled, each ton will return 11 pounds of N, 3 pounds of P2O5, and 20 pounds of K20. The nitrogen will not be immediately available for uptake, the P2O5 is not too significant, but the K20 certainly is. If two tons of straw is left on the field 40 pounds of K20 is returned to the field. At $0.75 per pound of K20 that is $30 per acre plus the organic value of the carbon going back on the field.

Another way to recover some of the K20 from the straw is to spread the straw out the back of the combine, allow it to rain on it, and leach some of the K20 from the straw into the soil then rake it up and bale it. Is that worth recovering some of the $15 per ton of K20? Not likely if you are planning to sell your straw, you will likely take a larger loss on your price per ton you receive, compared to the other farmer with bright yellow straw.

The take-home message is whether you bale your straw or not, make sure you have enough K20 for the next crop. Extension Educators have reported across the state it is not too uncommon to see K20 deficiencies in corn and soybeans.

See article at:
https://extension.psu.edu/straw-to-bale-or-not-to-bale

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