

## RESEARCH CENTERS

# Magnets can help prevent hardware disease in cattle herds

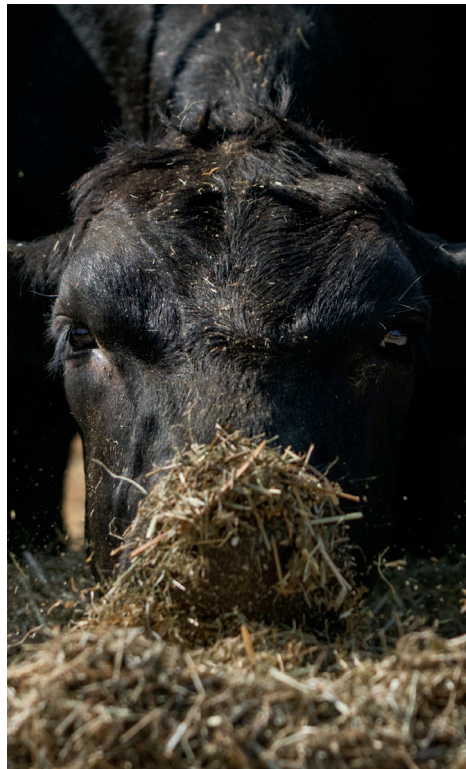
by Curt Larson / [crlarson@noble.org](mailto:crlarson@noble.org)



**Cattle** commonly swallow foreign objects, such as nails and wire, found in the field or their feed. These objects do not always cause problems, but they

can cause a disease commonly known as hardware disease. Foreign objects ingested by cattle make their way into the animal's rumen and reticulum. Sometimes, the animal's body will push the objects into the peritoneal cavity, causing severe inflammation (hardware disease). In extreme cases, a sharp, metal object can damage the animal's abdomen wall and pierce the heart sac, causing pericarditis. Typical signs of hardware disease are poor appetite, lack of movement and indigestion. If the animal's heart is damaged, fluid can build up and cause abnormal heart sounds.

It is unlikely that an animal will fully recover from hardware disease, and slaughter may be suggested. If the animal is a dairy cow or highly valuable for breeding purposes, there are a couple treatment options. The animal's front legs may be raised 6 to 8 inches off the ground to stop the object from moving further into the abdomen. This needs to be done continuously for 10 to 20 days. Antibiotics can be given to slow the



infection. It is also possible to manually remove the foreign objects by making an incision into the rumen wall.

The best way to deal with hardware disease is prevention.

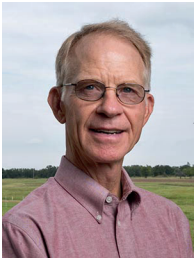
Most grain elevators and feed dealers run their feed under magnets to catch any hardware. However, some objects may not be picked up. Cow magnets, which are administered like a pill, are also used to collect metal in the reticulum.

Here at the Noble Foundation, we use a grinder and feed boxes to feed cattle. We decided to do a test to see how much, if any, hardware is found in our feed. We placed three magnets on two feed box chutes and poured two types of feed, a pelleted receiving ration and a commodity mix in pellet form. These feeds were put in the feed box and poured directly into a feed bunk. No prior mixing was done on our part after purchasing. Our initial findings showed magnets picked up some pellets that contained metal flakes. The magnets also picked up metal not from the feed, including metal pieces from inside the rusted feed box, bolts, nails and welding rods.

The cattle magnets on the feed box chutes work but can easily fall off during use. We are working to mount permanent magnets to the chutes, so they will be more stable and have a better chance of catching more unwanted objects. We are also in the process of installing magnets on our mixer wagon. While grinding hay, we did our magnet test and found pieces of rake teeth, fence posts and wire that was picked up by the hay baler. When feeding without the magnets, we weren't finding many objects in the feed bunks. This tells us the objects we are catching now were going somewhere else – more than likely into the cattle's stomach. ■

# Consultant offers strategies for cattle marketing decisions

by Dan Childs / mdchilds@noble.org



## The cattle

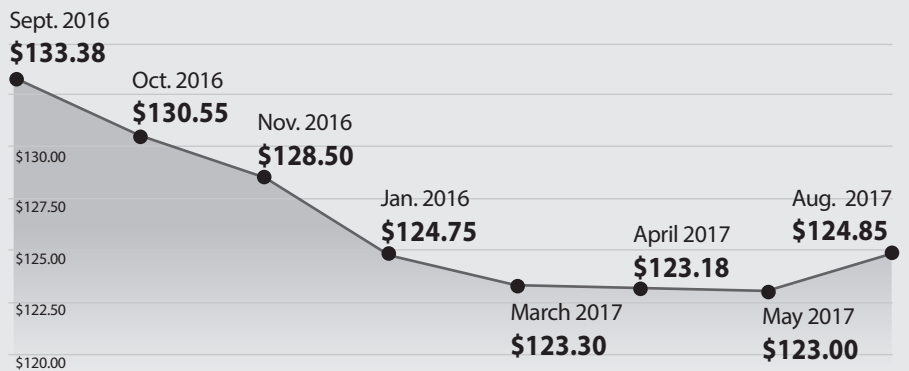
industry has experienced plenty of grief since the market started its downward spiral in June 2015. Feeder cattle prices declined

nearly 40 percent during the six-month period, ending just before Christmas 2015, resulting in a roughly \$600 per head lower price for a 750-pound feeder steer. Today, many cattle producers' balance sheets indicate a lower net worth than a year earlier. What is the best strategy going forward to regain profitability or at a minimum stop the bleeding of balance sheets?

Cow-calf producers who have spring-calving herds are facing decisions on what to do with the calves. Many options are available. A selected list include 1) strip and sell, 2) precondition 45 to 60 days and sell, and 3) retain ownership through spring. Currently, the March 2017 Feeder Cattle futures contract is trading at a \$10 per hundredweight discount to the September 2016 Feeder Cattle futures contract. It is difficult to gain cattle cheap enough to overcome that kind of price decline. Without getting too deep in the weeds discussing assumptions, my calculations reveal that a bawling 5-weight steer will net roughly \$750 per head in early October. If that calf was preconditioned, gained 1.67 pounds per day for 60 days and was sold in early December, the value increases to more than \$900 per head. Again, that is based on current Feeder Cattle futures quotes. Does that strategy make a producer any more money? It depends, but likely turning a bawling calf into a yearling, then selling it will

## Feeder Cattle Futures Contracts

650-850 lb. steers



Source: CME Group, Inc.

generate a favorable rate of return.

What about retaining ownership of the animal until early March and selling the calf at 850 pounds? Turning a profit from this strategy is a bit more of a stretch, but it is doable assuming one can keep the cost of gain in check. Futures quotes indicate a value of gain near 60 cents per pound. If you have your own small grain pasture or access to 30-cents-to-35-cents cost of gain, it can work. The key to making money on retained ownership to 850 pounds is keeping cost of gain much lower than the 60 cents per pound value of gain.

Purchasing calves this fall for a winter stocker enterprise also has fairly thin margins projected. It appears a strategy worth considering is waiting until late 2016 or early 2017 before buying the calves. Most of the \$10 per hundredweight adjustment from September 2016 to next March through May 2017 is completed by year end. Therefore, by waiting, a stocker producer can buy and sell on a nearly flat market, which allows for a

much higher value of gain. The higher value of gain provides more potential margin if cost of gain is monitored and kept relatively low.

In summary, if you have home-raised calves to market this fall, the best strategy is to turn the bawling calf into a yearling and sell immediately. Marketing the calf through a value-added sale would be even better. If you are buying stocker calves, plan to acquire them later in the year or early next year to minimize the negative buy/sell price spread. Individuals with unique situations and/or conditions could experience different outcomes than discussed here. Risk management should be a consideration when contemplating retained ownership. And as always, market conditions can change, sometimes quite rapidly, that could positively or negatively impact the result of these strategies. Calf prices have experienced considerable volatility in recent months. There is no reason to think volatility will lessen in the future. Astute producers will want to monitor markets closely as marketing decisions draw closer. ■



# Common ag practices key for pollinators, grassland birds

by Russell Stevens / rstevens@noble.org



## Discussions

and media coverage about the addition of the lesser prairie chicken (LPC) to the U.S Fish and Wildlife Service (USFWS)

List of Threatened

and Endangered Species have decreased since the September 2015 court order for its removal. However, monarch butterflies, some bee species and grassland birds are facing trouble caused by loss of habitat. The general public readily takes note of wildlife species reportedly in trouble. This is especially true for any species regarded as showy or pretty. While honey bees are not necessarily considered pretty by most, they are very important to humans. According to the Natural Resources Conservation Service (NRCS), one out of every three bites of food in the U.S. depends on honey bees and other pollinators. This, too, garners the attention of the general public. Consider the following statements:

“The monarch butterfly is one of the most recognizable species of wildlife in all of America.” (USFWS)

“North American monarch butterflies are in trouble. Unless we act now to help the monarch, this amazing animal could disappear in our lifetime.” (USFWS)

“The state of monarchs reflects the health of the American landscape and its pollinators.” (USFWS)

“Each winter since 2006, about 30 percent of beehives collapsed because of disease, parasites, poor nutrition, pesticide exposure and other issues.” (NRCS)

“Managed honey bees are important to American agriculture because



*A diversity of grasses and forbs two weeks after a prescribed fire. Under proper management and adequate rainfall, this site will be dominated by grasses in three to four years and will be ready to burn again.*

they pollinate a wide variety of crops, contributing to food diversity, security and profitability.” (NRCS)

Whether the trouble for pollinator species and grassland birds will worsen or improve depends on many variables. For example, annual and seasonal weather patterns can have direct effects on survival and reproduction of these species, and an indirect effect through their influence on plant communities. Habitat loss caused by human development and poor farming and grazing practices also create indirect effects to these species manifested through loss of or changes to plant communities.

Arguably, the common thread of trouble for these species is loss of plant diversity, particularly forbs, which are flowering plants often regarded as weeds. Loss of milkweed that monarch butterflies need to lay

their eggs and for their caterpillars to eat is thought to be negatively impacting their populations and migration. Monarch butterflies, honey bees and all other pollinators rely on the nectar from forbs and other flowering plants. Northern bobwhite quail, LPC, and many songbirds and neotropical migrant birds also rely on forbs for seeds, forage and insects.

Most farming and forage production management attempted to create uniformity and monocultures of plants for production purposes. For the long-term benefit of pollinators and grassland birds, the application of tools and processes that encourage a diversity of flowering plants on an extensive scale will be required. Perhaps it's time for more extensive use of prescribed fire and grazing management in a systems approach to create a greater diversity of plants on our grazing lands. Cover crops and the establishment of native plants in buffer areas and field edges on our croplands is also a systems approach to increase plant diversity. Properly applied, all of these practices improve overall health of the ecological system.

Ultimately, the trouble pollinators and grassland birds face may be indicative of future problems we will face for water quality and quantity, food production, and our health and well-being. People in agriculture are and always have been in the driver's seat when it comes to the health of our land, but perhaps we do not always take the correct route. More research is needed to develop ways to maintain production, while creating a diverse plant community for our pollinators and grassland birds. ■

# Herbicide choices affect cover crop options, management

by James Locke / jml Locke@noble.org



**In recent years,** the use of cover crops has seen a significant resurgence. Cover crops can provide many benefits to pasture and cropping systems. They can

provide additional grazing outside the primary growing season, weed suppression and a living mulch to protect the soil from erosion. Depending on the cover crop species, they can add nitrogen to the soil and recycle nutrients from deeper layers of the soil profile. They can also improve soil health, structure and water holding capacity. While cover crops have the potential for all these benefits, they also add another layer of complexity to the production system. Cover crop plant selection, establishment, residue management, water use and weed management must all be taken into consideration when adding them to the production system.

Unfortunately, many herbicides used in pasture and crop production have soil residual activity that can carry over to cause damage or stand failure for the subsequent cover crop. The primary resource for knowing if a herbicide may have activity on the intended cover crop is the Rotational Crop or Replanting section of the herbicide label. The wide variety of species used for cover crops presents a particular challenge since there is a good chance the label will not specifically address the cover crop(s) being considered. In lieu of specific label guidance, a general rule of thumb is: if an herbicide has soil activity on weeds that are similar to the cover crop, it will likely have activity on the cover crop. In some situations, performing a soil bioassay is the only way to be reasonably sure it is safe to plant the cover crop. Many



*Multispecies cover crop blend in wheat stubble at the Noble Foundation Headquarters Farm.*

herbicide labels include specific instructions for how to conduct a soil bioassay, or a general method is available at <http://extensionpublications.unl.edu/assets/pdf/g1891.pdf>.

While the herbicide label provides a good starting point for estimating the risk of carry-over to the cover crops, several factors affect whether the herbicide may break down faster or slower. Microbial activity is a primary driver of breakdown for many herbicides, so rainfall and temperature are often the most important factors. Warm, moist soil conditions favor enhanced microbial activity and faster breakdown; cool, dry conditions reduce microbial activity, resulting in longer herbicide persistence. Soil pH may also affect length of persistence. Some herbicides, particularly the sulfonylureas (Ally, Glean, Finesse, etc.), persist much longer at higher pH levels. Soil type and organic matter can also affect herbicide persistence. Soils with a high clay or organic matter content can bind with herbicides and prevent microbes from breaking them down.

The herbicides may then be released over a longer time period and affect subsequent crops. Consider all these factors when estimating how long your herbicide may persist.

So, how do you use this information to make decisions about your cover crop options? First, determine if the expected benefit of the cover crop is worth more than not using the ideal herbicide in the preceding cash crop. If the expected cover crop benefits are more valuable than the expected weed control from the planned herbicide, change the weed management plan to use herbicides with no, or shorter, soil residual so you can use the cover crops of choice. If the expected weed control from the planned herbicide is more valuable, choose species for the cover crop blend that will be tolerant of the herbicide residue.

Cover crops have the potential to be a valuable component of production systems. Do not let the wrong herbicide and cover crop combination diminish that opportunity. ■



# Ag Tools places online calculators in producers' pockets

by Austin Miles / ramiles@noble.org



## The Noble

Foundation provides producers with numerous free calculators online ([www.noble.org/ag/tools](http://www.noble.org/ag/tools)) to help determine a variety of production and

enterprise costs. These include calculating hay waste, inputs required to change a cow's body condition score and how to evaluate pecan trees. While these tools are very helpful, a limiting factor has always been mobile accessibility. Until recently, the format did not make them accessible on mobile devices. In August, a free application called "Ag Tools" was made available for both iOS and Android devices to provide the much-needed mobile functionality that the website simply could not deliver. You can download "Ag Tools" from the App Store and Google Play.

While not all of the 38 calculators from the website are currently available in the app, those that most producers would use on a day-to-day basis are represented, including body condition score change, breeding season, calving season, frame score, lime application, pond fish stocking, supplement conversion (cost of gain) and value of gain. While these eight may not currently fit every producer's needs, more calculators will be added in the future to make it even more useful in the field for a much broader audience.

Users will find the design and functionality of the app very appealing. I found no problem navigating through the menu or understanding what I was viewing. Each calculator has a brief description under the title, making it easy to know exactly what information would be provided. Once a calculator is selected, users are asked to enter basic information. For example, in the value of gain calculator, enter purchase weight



and cost per hundredweight as well as sell values. Next, the tool calculates the gain in pounds of the animal, the appropriate profit/loss in amount per head, the value of gain and rollback, or price slide. Once a producer knows the value of gain, the supplement conversion calculator can generate the cost of gain for that scenario once feed consumption, average daily gain and feed cost is entered. Knowing those two economic values (value of gain and cost of gain) is vital when deciding whether or not to retain ownership of calves into the stocker-phase. Further information related to retaining ownership and cost/value of gain can be found at [www.noble.org/ag/economics/costofgain](http://www.noble.org/ag/economics/costofgain) and [www.noble.org/ag/economics/retainedownership](http://www.noble.org/ag/economics/retainedownership).

The frame score calculator is a great way to project and predict an animal's mature weight, slaughter weight and assign a frame score value. Another calculator producers will appreciate having is the body condition score (BCS) change calculator. Users are asked to in-

put an animal's current BCS, the desired BCS, and a desired start and end date. The tool generates the total amount of days the animal has to gain or lose the cover requested, and what the required average daily gain (ADG) is necessary to achieve the producer's goals for that animal. This information is irreplaceable when calculating performance values for cattle moving into the correct BCS score for breeding, calving or any stage of the production cycle for that matter.

By making information more accessible and on-demand to producers, more informed decisions can be made faster and with greater confidence. While the app does many great things, additional functionality through the addition of more calculators will only improve this tool. In my opinion, future revisions could also list basic contact information so further assistance can be reached if needed. Additional resources, such as photos, an event calendar or links to current publications may be beneficial to users of the app. In today's fast-paced, data-driven world, accessibility to reliable information and tools is a necessity. The Ag Tools app delivers the information producers need when they need it, and it is a must-have for any land steward, farmer or rancher.

### Likes

- Simple and easy-to-use format
- Concise calculator descriptions
- Instructions readily available to assist the user input data

### Dislikes

- More calculators need to be and will be made available in future updates to the app
- No contact information provided for additional assistance
- Possibility for additional resources

# Regional ranchers should reconsider default fall-calving

by Clay Wright / jcwright@noble.org



**When I was** in the Texas Christian University Ranch Management Program, long-time program director John Merrill referred to the unchanging absolutes in cow-calf production as “hitching posts.”

## Hitching Post One (HP1)

A cow's primary purpose is to bring a live calf to the weaning pen every 365 days. It is more economically important than the calf's weaning weight or subsequent performance. The producer must provide the right environment for the cow to meet that expectation, which includes providing adequate nutrition, a comprehensive herd health program and bull management. In my experience, inadequate nutrition is the most common cause of failure in reproductive performance.

## Hitching Post Two (HP2)

A thin or underfed cow will not rebreed until she is in adequate body condition and/or on a nutrition plan that meets her nutritional needs.

## Hitching Post Three (HP3)

Grazing is the most economical means of providing a cow's nutritional needs. The less supplemental feed and hay needed, the more potential for profit in the long-run.

## Hitching Post Four (HP4)

The first three hitching posts are intricately linked with a fourth. A cow's nutritional requirements vary during the year and are driven mainly by her reproduction stage, from her lowest needs after weaning and in mid-gestation to her highest needs after calving when she reaches peak lactation. A cow's protein needs likely double and energy needs can in-



crease one-and-a-half times between these two periods.

An operation is most successful when it matches the cows' nutritional needs to the quality and quantity of the forage base through appropriate stocking rate and grazing management. The interconnectivity and applicability of these “hitching posts” apply to all operations, regardless of calving season.

Most of the producers I've worked with calve in the spring. They understand the “hitching posts” and that the warm-season perennial forage base in the Southern Great Plains fits that timing best (HP3). Despite the potential for lower conception rates in the heat of summer and the traditional decline in calf prices at weaning in the fall, these producers maintain profitability primarily by minimizing winter feed costs (HP4). They also manage calf marketing to mitigate the low, seasonal calf prices.

Fall-calving producers fall into one of two scenarios. First are those who deliberately and successfully manage for a fall-calving herd. Often, they are top-level, low-cost, efficient producers with warm-season forages, or they have a cool-season perennial forage base that reduces winter feed costs for a lactating cow (HP4). These producers capitalize on the several advantages

to fall-calving. Fall-born calves are old enough to take advantage of the high-quality forage flush from early spring to weaning in early summer and usually wean heavier. A second advantage is the price for weaned calves is historically higher in early summer than in the fall for spring-born calves.

Then, there are producers who spring-calve for all the right reasons but manage a fall-calving herd to slide in open cows. Historically, the advice has been to sell open cows, which I usually still recommend. There are value-added practices to marketing cull cows that should be considered. Even when the economics support giving an open cow another chance to breed versus replacing her, there's rarely any consideration given to the possibility she will fail to breed again. If a cow is open due to poor management, sliding her to a fall-calving herd won't make a difference until management improves. If the producer did his/her part, the cow could be too big or produce too much milk or she could simply be infertile. Regardless, if she misses once she gives up 15 to 20 percent of her lifetime production potential, and it'll take up to three of her contemporaries to pay her way. Give careful consideration to the economics of a default fall-calving herd. ■

# Producers make important contributions to useable science

by Chad Ellis / [crellis@noble.org](mailto:crellis@noble.org)



## Never before

has the agriculture industry faced as many challenges as we do today, and they are not expected to subside anytime soon. We have all seen

the statistics: 9 billion people by 2050. Feeding this increased population will require at least a 60 percent increase in agricultural productivity. This must be done in the face of climate change and other land use changes. Further complicating agricultural production are landowner rights and management goals on how to operate farms and ranches, which also influence productivity and profitability.

As an industry, we don't face these challenges in a vacuum. We have to get ahead of the curve in order to address these challenges. Don't despair because the agricultural field and community are innovative in the face of challenge, but it will not be an easy task. Working together and building on innovation may have the greatest effect when "usable science" is the approach by which change is made.

So what is usable science? How do we know we are doing "the right science" to address the challenges facing land managers, practitioners, policy makers and the public working to ensure the future sustainability of agriculture? And how do we make that science usable to those addressing these problems?

The Samuel Roberts Noble Foundation and the Sustainable Rangelands Roundtable and Consortium for Science, Policy and Outcomes at the Arizona State University partnered to convene a workshop for the future directions of usable science for rangeland

sustainability. The workshop brought together ranchers, landowners, non-governmental organizations, scientists and agencies into one room to discuss the concept of useable science. The goal was to move science forward by helping define research questions that would be most useful to the end user on rangelands. The full record of the conference is available at [http://sustainableangelands.org/projects\\_usable\\_science.shtml](http://sustainableangelands.org/projects_usable_science.shtml).

## Usable science

- Useable science adapts to meet the changing needs of decision-makers and includes those decision-makers throughout the scientific process.
- Traditional research can be thought of as research questions driven by scientists, whether applied or not, versus designing the end user into the decision-making process to facilitate usable outcomes.
- Usable science is not new science but rather an integrated approach to science that informs decision-making and responds to societal capabilities and goals.

More times than not, decision-makers and end users are at the mercy of traditional science where scientists do their research, publish their results, and those outputs go into the "vat of knowledge" from which we expect potential users to draw from to answer the questions they face. Science can best meet the users' needs when those needs are considered throughout the institutions, policies and processes of the scientific process. Science is more likely to be usable if knowledge producers (researchers) are informed by the needs and practices of science consumers (land managers, practitioners and policy makers) so that the intended use of the science is understood and

developed accordingly.

The usability of science will be a function of the context of its potential use and the processes to produce the scientific knowledge. The process of identifying usable science should start with a defined problem to be answered rather than identifying an interesting research question. At this stage, cooperative planning between producers and users of scientific knowledge is critical to developing the questions and approaches that result in usable science and outcomes. Usable science is successful when scientists and decision-makers take ownership in building relationships and mechanisms that foster the co-production of knowledge.

We, as farmers, ranchers and land managers, have a working knowledge of agriculture, natural resources and livestock operations. The perspectives from users who deal with the daily management of the resources are equally relevant to addressing a scientific question. "Science" can be an intimidating or misunderstood word, especially for people who don't see themselves in that arena. As agricultural producers, engage in the conversation and in usable science projects. Clearing that hurdle is critical to developing working relationships and conversations with scientists who may not have the level of working knowledge as the on-the-ground practitioners. The primary tenet of usable science is that the end users, the producers, are involved in the evolution of the project design, data analysis and interpretation, meaning the entire process is partially shaped by end-user input. This is truly the epitome of the coevolution of knowledge, and what we strive for at the Noble Foundation. ■



## Address Service Requested

## CONTENTS

### Page 1

Magnets can help prevent hardware disease in cattle herds

### Page 2

Consultant offers strategies for cattle marketing decisions

### Page 3

Common ag practices key for pollinators, grassland birds

### Page 4

Herbicide choices affect cover crop options, management

### Page 5

Ag Tools places online calculators in producers' pockets

### Page 6

Regional ranchers should reconsider default fall-calving

### Page 7

Producers make important contributions to useable science

## UPCOMING EVENTS

For more information and to register, please visit [www.noble.org/events](http://www.noble.org/events) or call 580-224-6376 or 580-224-6375. Preregistration is requested.

### Basic Beekeeping Course Part 1: Beekeeping Basics

9 a.m.-5 p.m., Nov. 5, 2016  
Registration Fee: \$20,  
includes lunch



### Basic Beekeeping Course Part 2: Honey Bee Production

9 a.m.-5 p.m., Nov. 12, 2016  
Registration Fee: \$20,  
includes lunch

### Managing Taxes for Agricultural Producers

1:30-4:30 p.m., Dec. 2, 2016  
No Registration Fee

