



NOBLE NEWS & VIEWS

WILDLIFE

Hunter Observations Can Help Manage Deer Populations



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As deer season approaches, many hunters and managers set up trail cameras in hopes of learning the whereabouts of a trophy buck. Calculated deer managers may even use this technique and other survey methods to monitor deer population parameters and keep records as a basis for harvest recommendations.

We are often questioned on which survey techniques should be implemented in a management program for white-tailed deer. In fact, we have debated which techniques to use in our management of Noble Research Institute ranches. While many survey techniques offer some insight into deer populations, they all have inherent biases and weaknesses. Remember, deer surveys do not census the deer on your property. They only estimate population parameters.

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TWO COMMON SURVEY TYPES:

1. CAMERA SURVEYS

Camera surveys most commonly require pre-baiting of camera locations with a subsequent photo period to obtain sex ratios and recruitment of fawns. This technique can be time-consuming and expensive when performed appropriately as many cameras are needed to cover a variety of habitats used by bucks and does.

A major bias with this technique is it assumes all deer visit baited sites equally. We know that some deer become “corn junkies” and other deer do not visit baited sites. A higher percentage of bucks visit baited camera sites compared to does, and a higher percentage of adult deer visit baited camera sites compared to fawns.

WHILE ALL SURVEY TECHNIQUES HAVE THEIR INHERENT BIASES, SOME TECHNIQUES ARE IMPLEMENTED MORE EASILY THAN OTHERS.

2. SPOTLIGHT SURVEYS

Road-based spotlight surveys have long been the norm for many state wildlife agencies and are often a requirement for deer management assistance programs. However, one research study found the benefits of spotlight survey data for monitoring deer populations is limited and likely represents a waste of resources with no appreciable management information gained (Collier et al. 2013). This technique fails because of

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FIGURE 1

BUCKS, DOES AND FAWNS OBSERVED BY RANCH

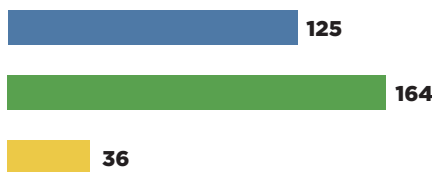
From 2019-2020 deer season

■ Bucks ■ Does ■ Fawns

OSWALT RANCH



COFFEY RANCH



RED RIVER RANCH

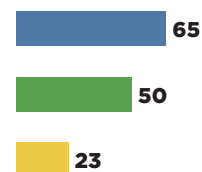
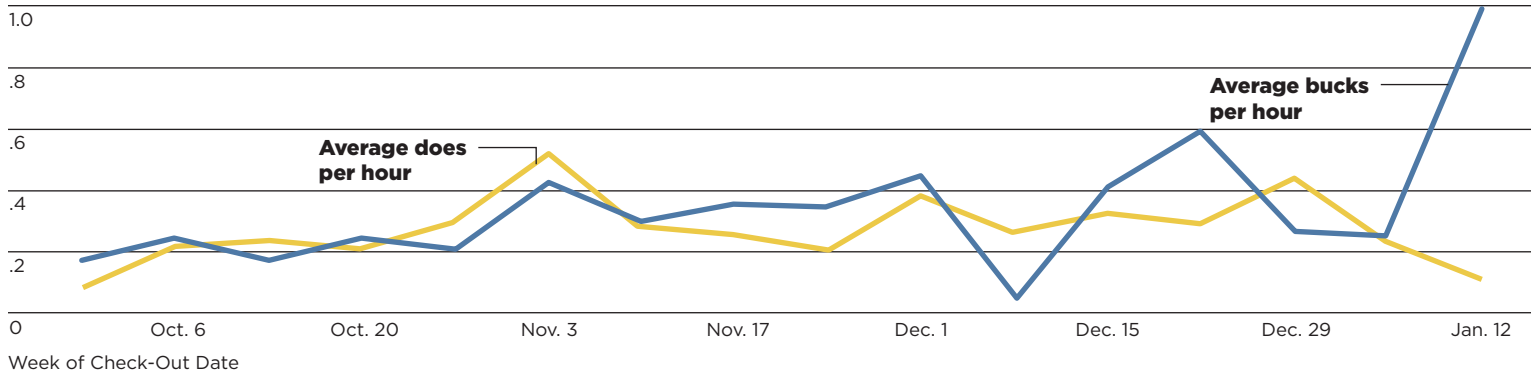


FIGURE 2

HUNTER OBSERVATION DATA (OSWALT RANCH)

From 2018-2019 and 2019-2020 deer seasons



highly variable detection rates.

While all survey techniques have their inherent biases, some techniques are implemented more easily than others. For instance, spotlight surveys require a lower investment in time and money than camera surveys. At Noble Research Institute, we have used both of these techniques for many years.

A NEW METHOD: CROWDSOURCING SURVEY

In early 2018, we realized that we could get a lot more data for a lot less effort by crowdsourcing the 30-plus hunters who recreate on Noble ranches. We built a cloud-based survey that each hunter completes on their smartphone each time they hunt. The survey collects observation and harvest data for deer and feral hogs.

Early discoveries from this more robust data set are promising, not to mention we didn't spend hours looking through photographs or late nights peeling spider webs from our faces and swatting mosquitoes while traveling the ranch roads.

WHAT WE'VE FOUND

Figure 1 illustrates total observed deer throughout the 2019-20 deer season on three different Noble ranches. Because baiting for hunting purposes is prohibited on Noble ranches and hunters are spread out and do not hunt the same location time after time, we feel this data provides us an opportunity to monitor population trends over time, and as a result, modify our harvest strategy to accomplish our goals. This technique is not immune to biases and weaknesses, such as inexperienced hunters who may mistake fawns for does during the hunting season.

For the hunter, Figure 2 offers a view of buck and doe exposure throughout the hunting season. The plotted data shows average number of bucks and does detected weekly from Oct. 1 through Jan. 15 on Noble's Oswalt Ranch. The result combines 2018-19 data with 2019-20 data to help account for yearly variability. Notice there are a lot of bucks being seen late in the season, so don't quit hunting in December.

What better way to pick your hunting spot than with data? Figure 3 highlights the total deer observed per man hour by hunting unit. It is a rough sketch of where deer detection probabilities can be expected to be higher geographically. Looks like Noble hunters may want to hunt the northwest corner this year.

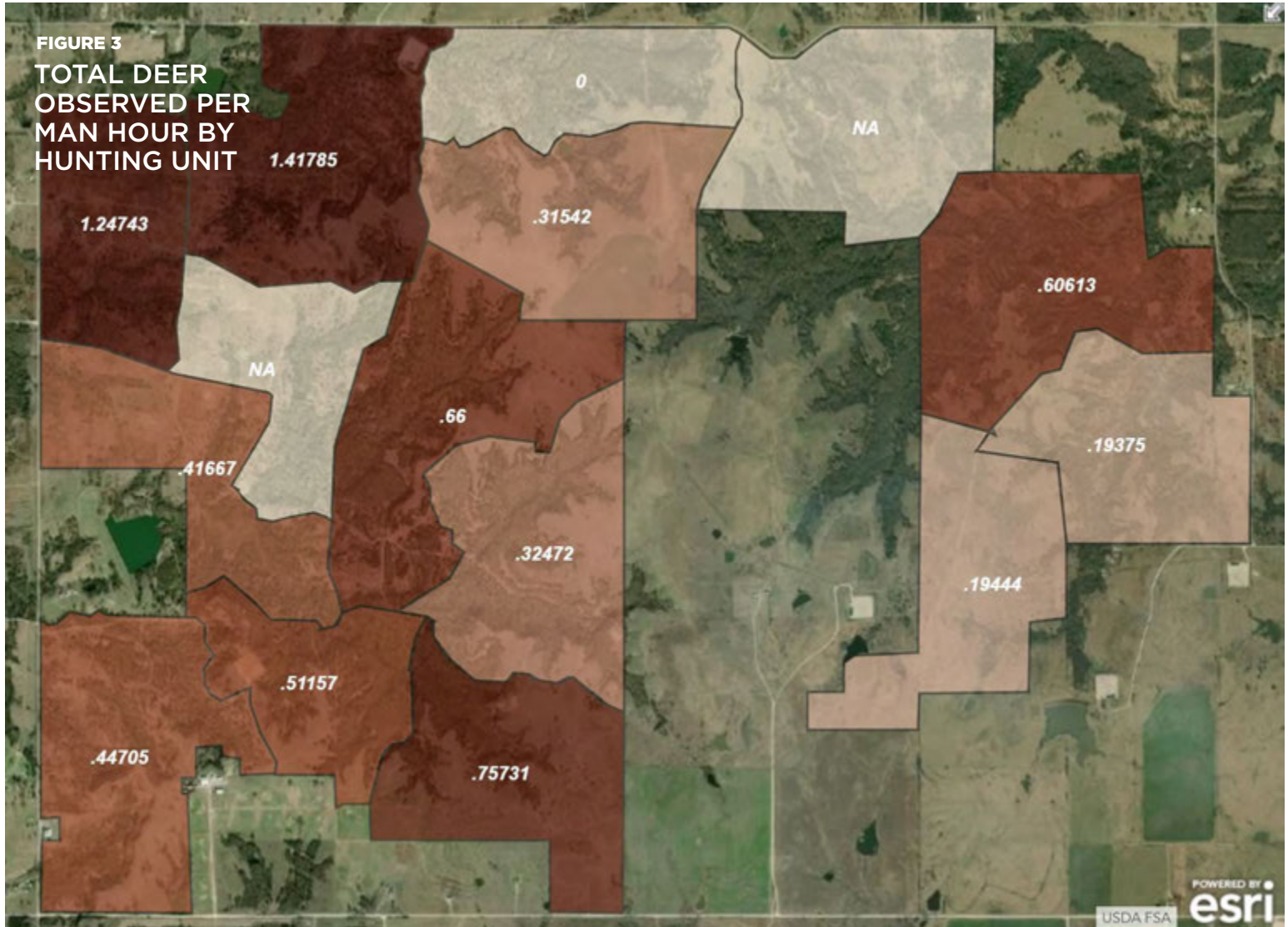
NOTE YOUR OBSERVATIONS

Hunter observation data is an easy way to learn a little bit about the deer you are trying to manage. It takes no extra time to conduct the survey other than writing down your observations.

This data is not a good method to track abundance of deer populations, but a manager can make better decisions about population harvest goals when used in conjunction with harvest data. Also, as biologists and land managers, we are not very concerned about data from individual years. We look at trends over time since years can be so variable.

The bottom line is that it is hard to manage what you don't measure. This is one easy method to collect useful data. 🐾

Source: Collier, Bret A., S.S Ditchkoff, C.R. Ruth, Jr., J.B. Raglin. 2013. Spotlight Surveys for white-tailed deer: monitoring panacea or exercise in futility? The Journal of Wildlife Management 77(1): 165-171.



RESEARCH

Model Plants and Why They Are Important for Ranch Research



by Kiran Mysore,
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Researchers realized as far back as 300 BC that studying one species of plant or animal could offer insight into another. “Model organisms,” or species commonly used to study another, are generally easier to obtain and maintain in laboratory and other experimental settings, which makes them desirable to use when studying basic biological functions of a more complex species.

For example, researchers have used small animals such as guinea pigs, mice and fruit flies to study humans and other animals for the past couple of centuries. Modern medicine would not be as advanced as it is today without these model organisms.

MODELS REVEAL FUNDAMENTALS

Similarly, plant research has also significantly benefited from the use of model organisms. Model plants have been used to understand the following topics, among others:

- Plant development
- Disease resistance
- Hormone regulation
- Nutrient-use efficiency
- Response to abiotic stresses like drought, extreme temperatures and salinity

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CHOOSING THE BEST MODEL

Plants that are used as model organisms are typically:

- Small in size
- Quick and easy to grow
- Small in genome size
- Self-crossing
- Responsive to genetic transformation

The use of plant models dates back to the 18th century, when Austrian monk Gregor Mendel used green peas as a model to study heredity. Based on experiments done in peas, Mendel discovered the fundamental laws of inheritance, which is the basis of genetic studies in humans, animals and plants.

Several model plant species have been developed and are widely used, however the type of plant must also be taken into consideration when choosing a model. Below I will describe three model plants used at Noble Research Institute, each representing a different type of forage we study: broadleaf plants (forbs), monocots (grasses) and legumes.



ARABIDOPSIS THALIANA

Arabidopsis thaliana (commonly known as thale cress) is a broadleaf eudicot plant belonging to the mustard family. It is one of the most popular and widely used models to study plant biology. Lately, it has even become a model to study biochemical and molecular processes involved in human diseases.

Excellent genomic and genetic resources have been developed for this model plant. In 2000, it became the first plant species ever to have its complete genome (set of genes) revealed.

One of the reasons *Arabidopsis* became popular is due to the availability of a large collection of gene knockout lines that is useful for determining gene function. This was mainly possible due to the establishment of a high throughput transformation system. More than 70,000 research articles published to date include experiments done in *Arabidopsis*.

Due to excellent resources available to study *Arabidopsis*, researchers at Noble Research Institute use *Arabidopsis* to study basic science pertaining to plant growth/development, plant disease resistance, abiotic stress, etc.

A STEP IN DELIVERING PRACTICAL SOLUTIONS

The use of model plants is critical to advancing plant research, which, for us at Noble, is ultimately about learning more about how plants interact with their environments and using that knowledge to develop new tools for ranchers to use when



BRACHYPODIUM DISTACHYON

Brachypodium distachyon (commonly known as purple false brome or stiff brome) is a monocot (grass) that uses C3 photosynthesis similar to cool-season grasses, such as wheat and tall fescue. When compared to other grasses that provide food and forage, *Brachypodium* is smaller and has a small/simple genome and short life-cycle. These factors make it an excellent model for cool-season grasses.

Since *Brachypodium* is a relatively new model species, many genomic and genetic resources are still being developed. Noble Research Institute is contributing to the development of these resources so that they can be used to study cool-season grasses more robustly.

regenerating the health of the land and to increase their profitability.

While most well-known forage and crop plants have very complex and big genomes, model species are simpler. This allows for easier, less time-consuming research that can be later translated into the plants grown by farmers and ranchers, enabling us to get practical solutions into their hands. 🐮



MEDICAGO TRUNCATULA

Medicago truncatula (commonly known as barrel medic) is a clover-like plant that has been developed as one of the models to study legumes. Legumes are plant species that can form symbiotic relationships with a bacteria called Rhizobia to fix atmospheric nitrogen. Growing legumes can decrease or eliminate application of nitrogen fertilizer, thus reducing nutrient runoff, greenhouse gas production and input costs while contributing to regenerative ranching.

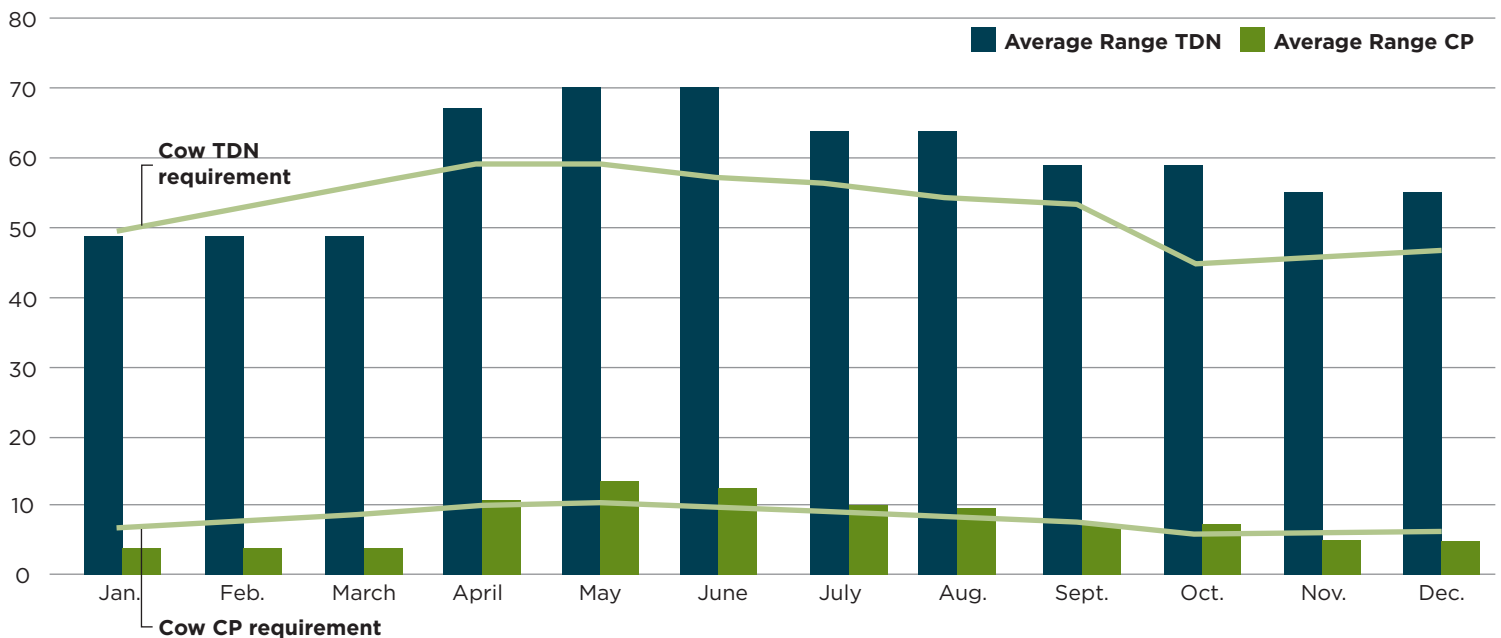
M. truncatula is closely related to alfalfa, which is referred to as the queen of forages. Noble Research Institute contributed significantly to developing *M. truncatula* as a successful model by initiating genome sequencing project and developing a large collection of gene knockout lines that are used by many researchers worldwide to study gene function.

Other legumes that could be studied using *Medicago* as a model include species used as cover crops or in multispecies grazing, such as hairy vetch, clovers and peas.

LIVESTOCK

Plan Your Winter Cattle Feeding Program and Save Money

Figure 1. Crude protein and TDN required by a 1,200-pound cow. Crude protein and TDN supplied by native range.



by Robert Wells, Ph.D., livestock consultant | rswells@noble.org

How would you like to save \$15 per cow on your winter feeding bill? What if I said you could easily do it by making one timely change to what you are feeding your cows grazing on native grass pasture? Many people only buy one feed type during the winter. This mindset may be costing a 50-head cow herd the equivalent of the value of a \$750 calf.

If you do a good job managing your native pastures and you are properly stocked, then the pasture should come close to meeting the cow's requirements most of the year without feeding supplemental hay (Figure 1). The feeding scenario developed below will only be valid if the cows have ample, good quality pasture ahead of them and are never limited.

With these assumptions, you can then develop a cost-effective winter feeding program. In this example, I will only compare the cost of feeding two common feed types: 20% or 38% crude protein range cubes. Figure 1 illustrates that good quality native grass pastures will meet a spring-calving (March 15- May 15 calving season) cow's requirement for protein until November and energy until January.

Table 1 lists the amount of actual protein and energy, or TDN, required by

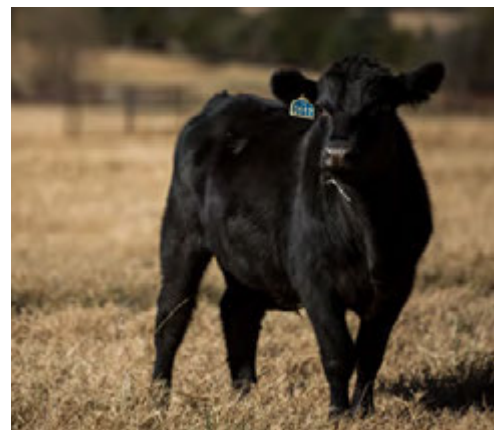


Table 1. Pounds of actual protein and TDN required on average for a 1,200-pound cow on native range pasture.

Month	Pounds of nutrient required	
	Protein (lbs)	TDN (lbs)
November	0.28	0.00
December	0.36	0.00
January	0.72	0.07
February	0.90	0.80
March	1.18	1.77

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the spring-calving cow. In November and December, the cow only needs additional protein in her diet; so she should be fed a high-protein supplement. In January and February, the cow now needs additional energy in her diet; but she still needs more protein, so you should keep her on a high-protein supplement. During her last month of gestation in March, the cow's energy requirements exceed her protein requirements. This is when it will pay to switch the type of supplemental feed to a lower protein/higher energy feed.



REMEMBER TO CONSULT WITH A BEEF CATTLE NUTRITIONIST PRIOR TO STARTING ANY FEEDING PROGRAM.

Table 2 demonstrates the amount of feed and associated cost of feeding a cow the two types of range cubes on a monthly basis along with the yearly total. The cost of feeding the high-protein feed in March is more than 50% that of feeding the lower protein/higher energy feed. The last line of the table lists a winter feed cost of \$61.14 if a switch in feed types occurs in the last month of the cow's gestation. The difference in feed cost savings is between \$13.64 and \$15.05, depending on if you were to only feed the 38% or 20% range cube all year long.

This is just an example of what can be done with a planned winter feeding program. Additional money could possibly be saved by looking at other feed sources such as alfalfa hay and commodity byproducts. Remember to consult with a beef cattle nutritionist prior to starting any feeding program to avoid any potential feeding problems. 🐄

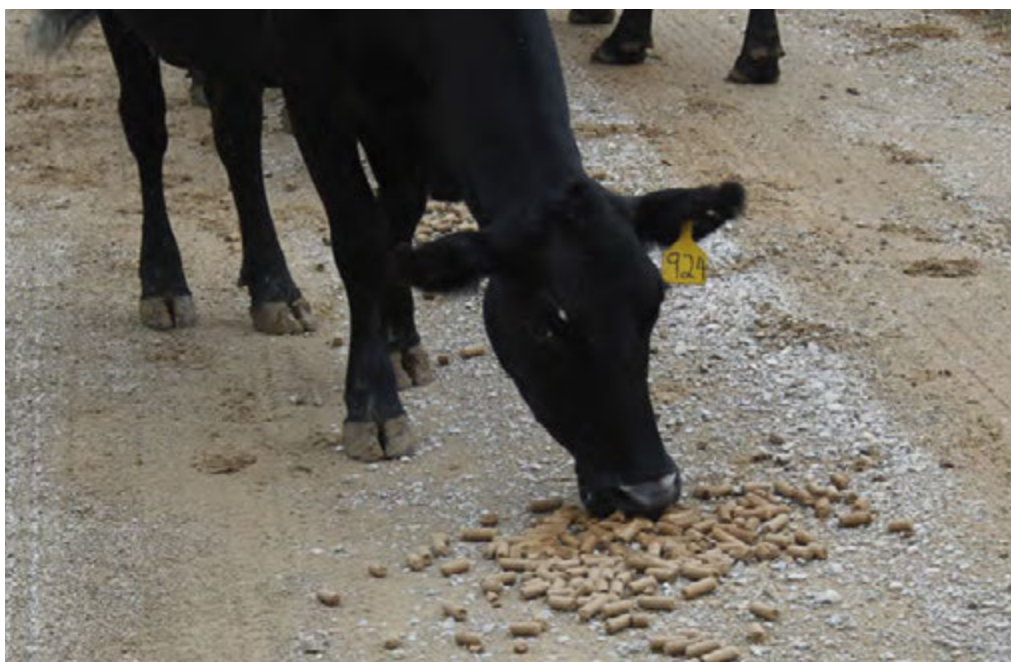


Table 2. Comparison of amount required and subsequent cost of two feed types.

Month	38% Range Cubes (\$300/ton)		20% Range Cubes (\$225/ton)	
	Pounds per head per day	Cost per day	Pounds per head per day	Cost per day
November	1.0	\$0.15	2.0	\$0.23
December	1.0	\$0.15	2.5	\$0.28
January	2.0	\$0.30	4.5	\$0.51
February	4.0	\$0.60	6.0	\$0.68
March	8.5	\$1.28	7.5	\$0.84
Total for winter feeding period		\$74.78		\$76.19
Alternate Total*			\$61.14	

*Total winter feeding program cost by feeding the 38% range cubes through February, and then switching to the 20% range cube for March.



LIVESTOCK

Junior Beef Excellence Program Continues With COVID-19 Changes



by Caitlin Hebbert, livestock consultant | cshebbert@noble.org

This year has certainly brought its fair share of challenges due to COVID-19. We all have made dramatic changes, cancellations and sacrifices, both within our personal lives and businesses. Agriculture has been no exception, from commercial and seedstock producers to the livestock show industry and the younger generation who support it.

One of the many activities that had to deviate from the norm was Noble Research Institute's Junior Beef Excellence Program, which recognizes area 4-H and FFA members for the carcass merit of the steers they show at junior livestock shows.

SHOWS CANCELED, BUT NOT HARD WORK

We all have had to do our part to help protect friends and neighbors this year, but doing so has at times resulted in less than ideal situations. Many youth were already deep into their commitments to raising show animals only to find out they would not be able to compete mere hours or days before their anticipated time in the ring. For me, it was especially difficult to stomach seeing high school seniors not be able to show their final animals.

Story continues on next page

However, it has been incredible to watch the industry pull together to help these kids and their families as shows across the country were canceled. Noble Research Institute, which has sponsored the Junior Beef Excellence Program since 1988, was determined to be part of this by continuing the program. We wanted to give students the best possible experience this year and to reward their hard work and determination regardless of the unique obstacles.

FINDING A HARVESTER

Typically, nominated steers are harvested at the Tyson facility in Amarillo, Texas. The Beef Carcass Research Center (BCRC) team from West Texas A&M University follows the steers through the facility and collects harvest and carcass data, which determine the winning steer.

Due to the onset of COVID-19, Tyson ceased to allow outside visitors inside their facility, and understandably so. The more packing plants that had to close due to outbreaks of COVID-19, the more our industry suffered. Tyson had to protect their employees and their service to the industry. They offered to send us camera data for our steers, but the BCRC team would not be able to follow the steers through the harvest process to ensure

data for all animals was collected.

Another facility — Caviness Packers in Hereford, Texas — did still allow outside visitors, so the BCRC team could collect the data. This gave us greater confidence that we would get a complete set of data for each animal, something I felt the participants truly deserved.

However, there was one catch: Caviness is primarily a cull cow/bull plant and doesn't harvest large numbers of fed cattle. Therefore, they do not operate on a grid basis.

FINDING OUR WINNER

The grid is what dictates the final dollar value for a carcass through specifying premiums and discounts for various yield grades, quality grades and carcass characteristics. Each packer formulates its own grid; there is no universal grid available. Not having the grid would make determining the winning steer more challenging, but I still felt more confident having the complete data set.

The original harvest date was postponed a few weeks (due to plant availability for our load of cattle), and the steers were harvested on April 17, 2020.

Once we had the harvest data, we created an algorithm in Excel to mimic the format of grid-basis pricing. Laney Hicks from Marietta,

Oklahoma, delivered the winning steer. Congratulations, Laney!

THANK YOU TO ALL

From the cattle buyer at Caviness to the BCRC team, several people went out of their way to make sure our program was able to deliver for the participants this year, for which I am grateful.

I am especially grateful for the participants' and their families' patience, cooperation and understanding as many aspects of the program were new and different this year. You all have been so kind and wonderful to work with. We are thankful for your participation in the program and your continued feedback, and we are honored to be a part of your year.

2020-2021 NOMINATIONS AHEAD

Now it's time to look forward to next season knowing that we will continue monitoring the situation and make adjustments as needed. The 2020-2021 program steer nomination will take place from 8 a.m. to noon Saturday, Nov. 7, 2020, at Noble Research Institute's Pasture Demonstration Facility (479 Noble Research Road in Ardmore, Oklahoma). 🇺🇸





SOIL TEST

How to Interpret a Soil Test Report



by Eddie Funderburg,
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Agricultural soil testing can be used for many purposes, but the primary use is to determine whether or not lime and/or fertilizer is needed, and, if so, how much.

The first step in soil testing is to collect the sample, but, for this article, let's assume you have collected your soil sample, sent it to the lab and received your results. The information on the report may seem pretty confusing, leaving you to ask how to make sense of the data and use it to help you in your operation.

INFORMATION ON A SOIL TEST

Not all labs report the same information, but most should report the basics: soil pH, lime recommendation (if needed), and soil test phosphorus and potassium. There may be other information on the report, such as soil test calcium, magnesium, sodium, CEC, nitrate-nitrogen, soluble salts and soil organic matter. These additional analyses can be very useful but are not reported by all labs or are considered optional tests with additional costs.

SOIL PH

Soil pH It is extremely important since it governs root growth and solubility of many nutrients. The pH range is from 1-14, with a pH of 1 being most acidic and 14 being

most basic. Most plants do best in a pH in the range of 5.5 to 7.5. There are exceptions since some plants prefer a more acidic soil and others do fine in a more basic soil. However, the vast majority of plants prefer a pH of 5.5 to 7.5. Soil pH is measured in distilled water and reflects the active acidity in the soil.

If the pH on your soil test report is less than 5.5, you may get a lime recommendation, depending on your crop. The lime recommendation is the amount of 100% effective calcium carbonate equivalent (ECCE) lime that is required to raise the pH to a level your crop prefers. The lime recommendation is calculated by analyzing the pH of your soil in a buffer solution, and it determines the amount of potential acidity in the soil. Some labs

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report the buffer pH and some do not. In either case, a lime recommendation is indicated on the report if lime is needed. The soil pH determines if you need to apply lime; the buffer pH determines the amount of lime needed.

PHOSPHORUS AND POTASSIUM

Soil test phosphorus and potassium levels are included on almost all agricultural soil test reports. These values reflect the concentration of these elements that is extracted by a chemical solution, called an extractant. The primary soil test extractant used in the United States is called Mehlich 3, but not all labs use Mehlich 3. If labs use different extractants, the soil test values between them cannot be compared.



TESTING

Go online to learn more about agriculture testing offered by Noble. www.noble.org/ag/services/testing/

The soil test values for phosphorus and potassium have no meaning unless research has been conducted to correlate these values with crop growth and yield. Fortunately, adequate correlation research exists for commonly used soil test extractants, and fertilizer recommendations can be made with confidence from tests using these extractants.

One thing to consider is that labs may not report soil test values in a similar fashion. Some labs report concentration of an element. The primary reporting value is

parts per million (ppm). Other labs report a weight, usually pounds per acre (lbs/a). An acre of soil 6 inches deep weighs about 2 million pounds. Thus, the conversion is $\text{ppm} \times 2 = \text{lbs/a}$, or $\text{lbs/a} / 2 = \text{ppm}$. The only problem with having two reporting systems is that it can cause confusion if you send samples to two labs. It would be possible in this case for one lab to report twice as much nutrient as the other lab, and for both labs to recommend the same amount of fertilizer.

BEST PRACTICES

Soil testing is the best way to determine how much lime and/or fertilizer is needed on your operation. For best results, collect samples properly, sample at least every three to five years, and collect samples at about the same time of year. 🐄

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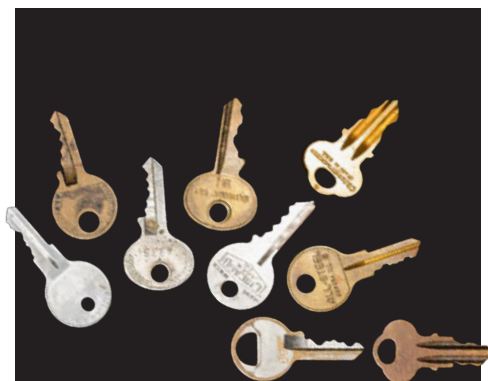
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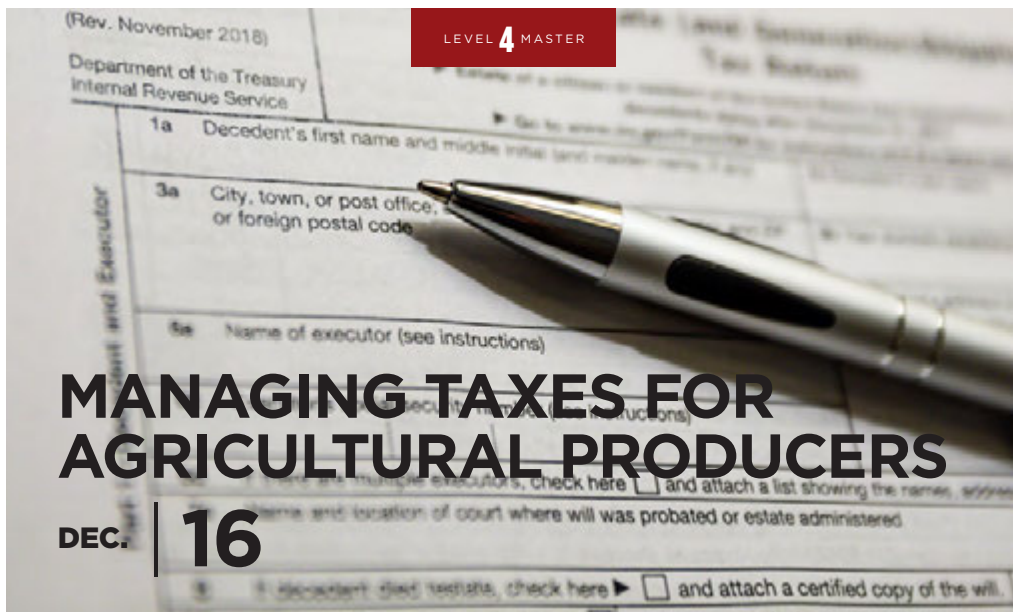
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CHECK NOBLE.ORG FOR EVENT CANCELLATIONS

All educational events will move to live online learning for the remainder of 2020. Please check www.noble.org/events for the most current information on times and dates and to register for log-in information.



LEVEL 4 MASTER

MANAGING TAXES FOR AGRICULTURAL PRODUCERS

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The Internal Revenue Service has issued many changes to certain regulations as a result of COVID-19. It is important for taxpayers to stay informed of these changes in order to do the best job of managing their taxable income. These details will be discussed at this seminar. Tax professionals will be present to help answer questions.

Check noble.org/ events closer to event date for times and registration



LEVEL 2 BUILDING

APPLYING BEEF QUALITY ASSURANCE PRACTICES

APRIL | 21

Beef Quality Assurance is going to the ranch. Beef producers looking to improve their best management practices and ensure quality beef products in the food chain should join us. During this workshop, you'll see various demonstrations and gain hands-on experience with practices vital to beef cattle production.

Check noble.org/ events closer to event date for times and registration