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# AG NEWS & VIEWS

## SOILS

### Container Gardening: Here's What You Need to Know

by Steve Upson, senior soils and crops consultant | [sdupson@noble.org](mailto:sdupson@noble.org)



During my professional career, I have witnessed the emergence and adoption of several production philosophies and technologies that continue to have a significant impact on both hobby and commercial fruit and vegetable production. Some I consider to be of primary importance include organic and sustainable farming practices, plasticulture growing systems including the use of micro (drip) irrigation, high tunnel hoop houses, and permanent raised bed gardening.

One trend I see growing rapidly in popularity is container gardening. More and more commercial growers, as well as home gardeners, are choosing to grow annual and perennial crops, including small fruit trees, in containers.

Just as cold frames (e.g., hoop houses) were used primarily in the nursery industry until they were demonstrated effective in producing vegetables, containers were used primarily

*continued on next page*

**More and more commercial growers, as well as home gardeners, are choosing to grow annual and perennial crops in containers.**

*Many fruit and vegetable crops, from peppers to small fruit trees, can be grown in containers. Consider container type, growing medium and watering needs before investing in a container growing system.*





in the nursery industry to grow ornamental plant materials until they were demonstrated effective in growing food. The dramatic increase in container production we are currently witnessing constitutes a major paradigm shift in how we grow fruit and vegetable crops.

If you have no experience growing in containers, I recommend visiting with a successful grower before investing in a growing system, especially if you plan on growing commercially. With any new growing system, there is more to it than meets the eye. To assist you in your decision-making process, consider the following.

#### TYPE OF CONTAINER

Every container should have drainage holes (preferably along the bottom edge) and be of sufficient size to accommodate a crop's growing requirements. The larger the container, the stouter it will need to be especially if it is to be moved on a regular basis. For growing fruiting vegetables, 5-gallon containers will suffice. Smaller containers are appropriate for leafy greens, herbs and root crops. Dwarf fruit trees are commonly grown in 15-gallon containers. If your goal is to grow a semi-dwarf apple or a standard-size peach tree, a 30- to 50-gallon container would be a better choice. The biggest concern when growing in large containers is weight. A 15-gallon container, including the growing medium, can weigh more than 70 pounds. If in doubt about the container size to use, it's always better to be too big than too small. The larger the container, the less frequent it will require watering.

If you plan on installing a trellis system, consider selecting cylindrical or square-shaped containers. Stakes and cages are more easily attached to a container having a vertical side versus a tapered side. Tapered containers are also more vulnerable to blowing over in a wind storm. Container shape also affects drainage. As a general rule, container height should be equivalent or greater than container width to ensure adequate internal drainage.

For the money, plastic pots offer the best value and are available in multiple sizes. However, not all plastic containers are created equal. Some are made using UV-resistant plastic which gives them a longer service life. Used five-gallon paint buckets and 30-gallon livestock mineral buckets are popular choices for the cost-conscious grower. However, these break apart after a few years of sunlight exposure because the plastic is not UV resistant. Also, when exposed to direct sunlight, plastic containers can generate excessive levels of heat which can result in plant stress.

Two nontraditional container systems on the market are Smart Pot® and



## KNOW BEFORE YOU GROW

### + ADVANTAGES

- More efficient utilization of growing space due to container portability.
- Opportunity to grow on sites with poor, contaminated or no soil. Need for tillage equipment is eliminated or significantly reduced.
- Elevated growing surface for easier crop management and harvest.

### - DISADVANTAGES

- Installation costs, such as containers, growing medium, weed barrier, etc.
- Frequent watering needs.





Air-Pot®. These containers are available in a myriad of sizes to accommodate any crop, including fruit trees. What sets them apart from standard containers is the ability to generate increased rooting capacity. Another advantage the Smart Pot offers is decreased soil temperature, which can reduce plant stress during the summer months. This cooling effect is the product of water evaporating from the porous sides of the container.

**Not all plastic containers are created equal. Some are made using UV-resistant plastic which gives them a longer service life.**

#### GROWING MEDIUM

An ideal growing medium should be well drained while also able to retain sufficient water to reduce the frequency of watering. It should also be free of weed seed and diseases, and it should be heavy enough to prevent frequent tipping over but not too heavy as to limit handling. For this reason, garden soil should not be used exclusively as a container growing medium.

A good growing medium for both vegetable and fruit production should consist of inorganic and organic components. Some of the inorganic components include perlite, vermiculite, builder's (coarse) sand and weathered granite. Some of the more popular organic components include peat moss, coir (coconut fiber), pine bark and compost. Pine bark used in a growing mix should be small with the particles measuring no larger than a 3/8-inch diameter. The proportion to use in a mix can vary depending on the availability, cost, crop to be grown and container size.

Packaged growing mixes are a good choice when only a few containers are involved. Avoid purchasing mixes containing only peat and vermiculite or perlite, aka "peat-lite." These seedling mixes are not a good choice for use in large containers as they don't have the bulk to support large plants. Packaged growing mixes containing a large proportion of composted pine bark are a better choice for use in large containers. These denser mix types are commonly

advertised as nursery mix, planting mix or potting soil. For more extensive container gardens, the expense of prepackaged mixes may be quite high. A growing medium for vegetables can be made by mixing equal volumes of peat moss, aged pine bark, perlite and washed builder's sand. A good container mix for growing fruit trees consists of four parts aged pine bark, two parts builder's sand, two parts perlite and two parts compost.

Most packaged growing mixes come with enough fertilizer blended in to get a crop off to a good start. Some growers choose to add a slow release fertilizer at planting, based on label recommendations. A supplemental liquid fertilizer can be applied on a weekly basis if needed.

Growers making their own mix will need to submit a sample for testing. Ideally, the mix will have a pH between 5.5 and 7.0, and a salinity reading between 1 and 5 millimhos. Mixes containing a high percentage of bark or peat tend to be acid in reaction. Lime can be added to reduce acidity. Mixes containing a high percentage of compost, especially manure-based compost, will tend to have high levels of soluble salts. The addition of fertilizer to compost-based growing medium can increase the salinity level. Therefore, a growing medium registering excessive soil salinity should be leached heavily prior to planting and fertilizer application. Soil testing will also reveal any nutrient deficiencies.

#### WATERING

Expect to water more frequently if you choose to grow in containers made with porous materials such as wood, clay or fabric. With each irrigation, apply water until it begins to exit the bottom of the container. Overwatering wastes water and nutrients via leaching. The growing medium should always be moist but not soggy. Hand watering is fine for a few containers, but a micro-irrigation system is recommended for a commercial system. For containers with a capacity of 5 gallons or less, a single dripper per container will suffice. For larger containers, drip rings or spray stakes enable more uniform coverage. If you choose to automate your irrigation system, the timer will need to be adjusted on occasion to match the water requirements of a maturing crop and changing weather conditions. Most container-grown plants will require daily watering during the summer.

There are plenty of things to consider before deciding to install a container production system. Hopefully, this overview has provided enough basic information to help you decide if container production is something you want to pursue. 🇺🇸



## Welcome to the Redesigned *Ag News and Views*

Happy New Year! We hope you all had a great 2016.

*Ag News and Views* may look a little different to you, but do not worry. We have the same helpful information from the agricultural consultants and researchers. Now we'll be able to provide you with more content thanks to the new layout our graphic designers have created. Some articles may be shorter and have more photos than others, and you may see new types of information such as management tips, recipes and plant characteristics.

We welcome any feedback you may have about the new design. Is there something different you would like us to include? Let us know by emailing [feedback@noble.org](mailto:feedback@noble.org) or connect with us on social media.

We look forward to a successful 2017 and wish you the same.

## Looking for a past article?

Use the search function at [www.noble.org](http://www.noble.org) to find information about a specific topic or browse articles from previous *Ag News and Views* issues at [www.noble.org/news/publications/ag-news-and-views](http://www.noble.org/news/publications/ag-news-and-views).



## FORAGE

# How to Use Exclusion Cages to Better Manage Cattle Stocking Rates

by Rob Cook, pasture and range consultant | [rwcook@noble.org](mailto:rwcook@noble.org)



Developing a proper stocking rate is among the most important practices a manager can accomplish. No fertilization plan, brush management plan, rotational grazing plan or herd genetic selection can overcome overgrazing from a continually high stocking rate. While short-term financial gains might be seen from overstocking pastures, long-term financial and ecological sustainability is not feasible while overgrazing.

Stocking rates are developed by balancing livestock numbers with the forage available for the animals to consume. There are several ways this is accomplished. A range and pasture consultant will use production estimates from clip sampling forages, the soil's production potential, species composition, plant health and vigor, and grazeable acres in each pasture to determine the amount of forage available in



## GRAZING EXCLUSION CAGES: A TOOL FOR MONITORING FORAGE PRODUCTION

Grazing exclusion cages are one of the most effective tools for observing grazing utilization within a monitoring plan. The cages exclude grazing animals from a small representative area so that grazed vegetation outside the cage can be compared to ungrazed vegetation inside.

### WHY USE CAGES:

Cages give timely and intuitive information on grazing use that can be used to adjust stocking rates or make changes to a rotational grazing plan. Overutilization is an indication that a pasture could be overstocked. For more in-depth monitoring, forage production can be measured inside the cage and compared to production outside.

### CAGE SIZE:



Cages should be large enough that forage production measurements can be collected at multiple times during the growing season and then again after frost. A 2-meter-by-2-meter cage will give enough room to sample at least four times during the year.

### HOW TO CONSTRUCT CAGES:



The cages can be constructed by bending welded wire cattle panels at 90 degree angles and combining two panels to form a square. A T-post can be driven at all four corners and attached to the panels to anchor them in place. For a simpler cage, one panel could also be bent around on itself and a T-post used as an anchor where the two ends meet with another post on the opposite side of the ring. This will result in a teardrop shape.

### HOW TO REUSE FOR NEXT YEAR:



Cages should be moved to a new area within the key site every winter. Previous season growth should be removed inside the cage to ensure it is not included in sampling the upcoming growing season's production.



addition to animal demand to estimate an initial stocking rate. This estimated stocking rate is based on the current health of the grazing land and a normal year of rainfall. It attempts to balance animal demand with the forecasted forage production for the upcoming growing season.

As you can imagine, this forecast is very dependent on the weather and thus very dynamic. The stocking rate will also need to be dynamic. Adjustments will need to be made to match the actual forage production. Implementing a monitoring plan gives grazing managers the information they need to make timely decisions on stocking rates. Timely decision-making is a trait shared by the most successful grazing managers.

Grazing exclusion cages are just one component of an effective monitoring plan. A monitoring plan gives timely information to manage a grazing plan and also helps the grazing manager learn how vegetation, grazing animals and rainfall interact with one another, and what changes those interactions will cause across the landscape. Managers must monitor and document changes to ensure management is not causing damage to soil and plant communities and to evaluate whether or not past actions are producing desired results.



Managers who are dedicated to improving the quality of their pastures will ultimately see results in profitability, with economic and environmental changes that benefit the sustainability of their business.

## WHERE TO PLACE CAGES:

Cages should be placed on key sites that are representative of the entire pasture. Make sure they are not in high-use areas or so far away from water that use is limited.

## HOW TO GAIN INFORMATION:

Visually monitor the cages periodically to determine grazing utilization. In native rangeland pastures, no more than 50 percent of the leaf area of plants available for grazing should be consumed, stomped down, urinated on or otherwise utilized. Compare the monthly or seasonal forage production to forecasted production to make timely decisions to balance forage production and animal demand. The ungrazed/unsampled forage inside the cage after frost is the total production for the growing season. Compare total yearly production to the expected production and to production from previous years, relative to rainfall amounts, to help determine if grazing land health is increasing, decreasing or stable. 🇺🇸

## UPCOMING EVENT

### TEXOMA CATTLEMEN'S CONFERENCE

# The Future of Sustainable Beef

**T**he beef industry continues to improve efficiencies and enhance production within each sector of the industry, which results in a more sustainable product for consumers. Attendees will hear from leaders in each sector of the industry as they describe their contributions toward the future of sustainable beef. Noble Foundation researchers will provide an update on current research and technologies being implemented on the Foundation's research and demonstration farms.

Special pricing is available for students and government personnel.

9 a.m.-4 p.m.  
Feb. 24, 2017

Ardmore Convention  
Center

\$40 registration fee,  
includes lunch





# Improve Safety on the Farm with Preventative Maintenance

by Rodney Pierce, inventory and equipment supervisor | [rlpierce@noble.org](mailto:rlpierce@noble.org)



**M**y department's responsibility is to maintain and repair more than 400 pieces of farm-related equipment, including utility ATVs, lawnmowers, tractors and multiple implements. We also maintain numerous pieces of research plot equipment. Equipment reliability in relation to research projects is important. Preventative maintenance is the key to our success.

The term "preventive maintenance," commonly refers to the practice of regularly servicing equipment on a predetermined schedule so that it does not develop catastrophic failures and performs better over its useful lifecycle. Safety is the upmost benefit of preventative maintenance. A poorly maintained piece of equipment can result in an unsafe

work environment and increased risk of injury or loss of life. Preventative maintenance is an important aspect of owning equipment and not one to disregard.

A properly implemented maintenance program ensures increased family and employee safety, increased equipment efficiency, decreased unexpected downtime and increased equipment value at trade-in.

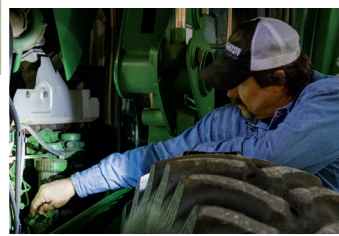
Preventative maintenance should be performed on a daily and seasonal basis.



**Proper storage is another**

**important aspect of preventative maintenance. Exposure to weather elements can lead to premature failure of your equipment such as tires, seals, hoses and exterior appearance.**





## Routine Maintenance

All routine maintenance should be properly documented and easily accessible to all people responsible for maintaining equipment. Such documentation should include equipment hours/age, length of service intervals, frequently used part numbers with associated cost, and dates with type of service performed.

## Off-season Maintenance

Off-season preventative maintenance is usually more involved. This is when equipment should be partially or completely disassembled for inspection and more detailed cleaning. At the Noble Foundation, we use this time to thoroughly inspect our equipment to ensure efficient and reliable performance.

## Daily Maintenance

Daily preventative maintenance can be as simple as cleaning, lubricating and inspecting equipment like abnormal wear patterns around moving parts, proper belt/chain tensions, safety guard placement and function, leaking fluid, and proper lubrication.

## Preventative Maintenance

Preventative maintenance is less stressful than reactive maintenance, which results in a more efficient operation while contributing to profitability. When performing any preventative maintenance or equipment repair, always refer to the model-specific owner's manual and/or technical manual. 🐄





LIVESTOCK

# Artificial Insemination Adds Value to Cow Herd

by Evan Whitley, Ph.D., CAAST manager | [ewhitley@noble.org](mailto:ewhitley@noble.org)



**D**ue to the considerable herd expansion that has occurred over the last three years, forecasters predict that 2017 and 2018 cattle markets will be considerably lower than even the transition that took place during the latter half of 2016. Only time will tell,

but cattle producers are pretty resilient, and most have seen this market transition before.

A silver lining to keep in mind about this one is that we are transitioning from all-time record calf prices in 2014-2015. Hopefully, cow-calf producers took advantage of those market conditions to identify areas of opportunity to address as prices soften and are willing to implement measures that can either reduce costs or increase revenues in the event that we do need to buckle down due to choppy markets.

One such area that has potential to add value to a cow-calf operation is the implementation of an artificial insemination (AI) program. This topic is not a new one, but I find very few





commercial producers, regardless of size, actually implement AI as a management tool to improve herd performance and revenue generation. The reasons are varied and in many instances ultimately appropriate. However, the sentiment of “I have never done it,” or “It looks too hard,” oftentimes rules the overall decision-making process and the potential benefits are left untapped.

Depending upon the individual situation, arguably the biggest benefit in utilizing AI is access to superior genetics as AI studs are selected. Electronic databases, available through many of the breeding services suppliers, can be easily sorted based upon a prioritized list of genetic traits that are specific to your operation. Oftentimes, this results in access to AI studs that wouldn't otherwise be available with greater genetic predictability than is available when purchasing younger, relatively unproven natural service sires.

Doing so leads to another important

**Depending upon the individual situation, arguably the biggest benefit in utilizing AI is access to superior genetics as AI studs are selected.**

potential benefit of AI, which is the possibility for the AI event to target specific traits in subsequent offspring such as replacement quality and/or carcass merit, and the cleanup event to target paternal endpoints such as weaning and/or yearling weight. The result will be heifer calves that are born early in the calving season and possess the maternal traits desirable to either go back in the herd or market as replacements as well as later born calves that possess the growth potential to overcome their lack of age and still wean at an acceptable weight.

Accompanying the AI program, consider whether to inseminate based upon standing heat or at a timed interval. The vast majority of commercial operations elect to implement a synchronization program and inseminate at a specified interval within the

resulting heat cycle. Realistically, only expect around 50 percent conception from the timed AI event. But, by synchronizing you

should get more females bred earlier during the cleanup period.

Keep in mind there are several different synchronization programs; they are specific to whether mature cows or heifers are the target animal and whether they are English or Brahman influenced. Implementing the appropriate estrus synchronization program and not synchronizing more animals than you can breed at any one interval are important points to learn from others' mistakes as opposed to making them yourself. An extremely helpful tool in implementing an AI program/protocol is the “Estrus Synchronization Planner” offered through Iowa State University at [www.iowabeefcenter.org/estrussynch.html](http://www.iowabeefcenter.org/estrussynch.html).

Although there are other potential reasons (e.g., costs, labor availability, AI technician access, desire, etc.) that would yield AI infeasible, in my estimation there is really only one true deal breaker: if an individual operation doesn't have access to working facilities that are safe to both personnel and animals. AI technicians are similar to many veterinarians in that they can do a lot with very few resources in the form of fancy pens, yet if the basic functionality of your working pens is in question then definitely use the adequate number of bulls. It will make everybody happier, including the bulls. 🐮

## INNOVATIONS

# Determine Land Area and Distance With Your Smartphone

by Austin Miles, cattle and technology research associate | [ramiles@noble.org](mailto:ramiles@noble.org)



**H**ow big is that pasture? How long is this fence line? How far is it to the nearest water point? All of these questions and more can be answered using the GeoMeasure application, a free download for both iOS and Android smartphones.

Knowing the area of a pasture or field is very useful information, especially when calculating application rates of a sprayer or determining stocking rate. GeoMeasure allows you to assess area in a multitude of units including square feet and acres. Users have two options to retrieve the area of a determined space: manual measurement, which entails dropping markers on your device's screen, or measurement by GPS, which simply means the device tracks your movement as you walk the perimeter of

the given area. I have found the second option to be more precise because I cannot achieve the same level of accuracy dropping markers with my finger on the phone's screen. Much like Google Maps or the built-in map function on your phone, users can also choose from four map layouts: normal, satellite, hybrid or terrain.

The app also measures distance with remarkable accuracy. Once again, users can choose from a variety of units including feet, meters and miles. As with area calculations, users can choose from either a manual or GPS measurement. After you are done dropping markers on the map or walking the distance in question, the application totals the distance and displays the final reading at the bottom of the screen. From there, you can clear the measurements and start over; save the measurements as a photo on your phone; or share them via email, text message or through social media. This information can be quite handy to have when estimating the cost to build a fence or road, lay a waterline,

or simply calculate how far livestock have to travel to water. GeoMeasure also tracks and provides elevation change along a given route or in a certain area.

I really like the functionality and overall design of the app, as well as the built-in tutorial and ability to offer suggestions to the developer for future features and updates.

One interface I have not used is the ability to import a Keyhole Markup Language (KML) file, a format used to display geographic data in an Earth browser such as Google Earth.

While there is no charge to download or use the application, users will notice an abundance of advertisements around the border of their screen as well as the occasional pop-up ad. There is an option to remove ads for \$2.99. While nominal, I choose to look past the ads and continue to use the free version.

The next time you need to measure something, leave the tape measure in the toolbox and use your phone. 🐮



*Burning during the growing season can extend the burning season, creating more opportunities to conduct prescribed burns.*

WILDLIFE

# Why You Should Consider Prescribed Burning Throughout the Year

by Will Moseley, wildlife and fisheries consultant | [wamoseley@noble.org](mailto:wamoseley@noble.org)



For most prescribed fire practitioners in the Southern Great Plains, burns are conducted during winter and early spring (December to March). This burning season has become commonplace because most of the fuels (grasses and leaf litter) are dead and burn easily, and a large portion of prescribed burns are conducted close to spring

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**Burns conducted during summer and fall have different impacts on the plant community than burns conducted during winter and spring.**

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green-up to improve forage quality. However, historically, the land was burned during all seasons of the year. A short burn season makes it difficult to successfully accomplish land management goals. We should consider burning during the entire year to create more opportunities for land managers to conduct prescribed burns.

It is common for burns to be postponed to another year because a short burn season and weather limitations make it difficult to conduct burns in a timely manner. Postponement allows more brush encroachment on rangelands that could negatively impact wildlife habitat and grazing quantity. The seasonality of a prescribed burn depends on fuel type and the goals for the land. As for any prescribed burn, extending the burn season requires planning.

For burns conducted during summer and fall, grasslands and mixed shrublands burn better than woodlands. To carry a fire during the growing season, the previous year's grass and forb growth is needed. This requires planning to ensure grazing does not remove too much plant material so burns can be conducted and are effective. Wooded areas are usually best burned during winter because wooded areas need leaves to carry fire; the longer leaves are on the ground after leaf-drop, the more difficult they are to burn. It is harder

## UPCOMING EVENT

### DORMANT SEASON PRESCRIBED BURN FIELD DAY

8:30 a.m.-3 p.m.  
Jan. 19, 2017

Noble Foundation Oswalt Road Ranch  
18414 Dixon Rd.  
Marietta, OK 73448

Registration Fee: \$20, includes lunch

to carry a fire through wooded areas during the growing season than in December or January.

Burns conducted during summer and fall have different impacts on the plant community than burns conducted during winter and spring. Burns during the growing season typically have a bigger impact on brush species. If brush control is a land management objective, consider burning during the growing season. It also is beneficial to wildlife to have

burned areas at different times of the year to increase plant diversity, which is imperative for good wildlife habitat. Burning multiple times of the year creates a mosaic of various plant communities in different plant successional stages to benefit many wildlife species.

Typically, weather conditions are most volatile during winter and early spring in the Southern Great Plains. Days with low humidity and high winds are not uncommon. In summer and fall, weather conditions tend to be more stable with lower wind speeds and higher humidity. Due to more consistent and safer weather conditions during summer and fall, some people prefer to burn outside the typical burn season. Burns during the growing season also tend to have fewer escapes than burns in the dormant season because green vegetation mixed with dead fuel slows down the fire.

Prescribed fire is an important ecological process for the Southern Great Plains. Our plants are adapted to and require fire, regardless of the burn season. We should consider using fire at all times of the year to accomplish our land management goals. The Noble Foundation typically offers a dormant season prescribed burn field day and a growing season prescribed burn field day to help fire practitioners learn how to use fire in different seasons. We shouldn't limit ourselves to just a few months out of the year to burn. 🇺🇸



## TOOLS YOU NEED FOR A SUCCESSFUL BURN

As part of the prescribed burn planning process, managers should secure the appropriate equipment. Following are some basic tools and equipment for conducting a prescribed burn. For more information about prescribed fire and other essential tools needed for a successful burn, please visit [www.noble.org/fire](http://www.noble.org/fire).

### POWER EQUIPMENT

All power equipment should be checked and serviced prior to a burn. Remember to have extra fuel and oil.

- Sprayers
- Water pump
- Chainsaw
- Blower

### HAND EQUIPMENT

- Drip torch
- Drip torch fuel
- Ax
- Fire rake
- Fire swatter
- Shovel
- Wire-cutting pliers



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## UPCOMING EVENTS

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



JANUARY | **17**

### Pecan and Fruit Orchard Establishment

9 a.m.-Noon  
 Noble Foundation  
 Kruse Auditorium  
 No registration fee



FEBRUARY | **9**

### Integrity Beef Alliance Meeting

5 -8:30 p.m.  
 Ardmore Convention Center  
 Registration fee:  
 \$20 for nonmembers



FEBRUARY | **24**

### Texoma Cattlemen's Conference

8 a.m.-4 p.m.  
 Ardmore Convention Center  
 Registration Fee: \$40,  
 includes lunch



MARCH | **9**

### Beef Quality Assurance (BQA) Workshop

1:30 -4:30 p.m.  
 Noble Foundation  
 Kruse Auditorium  
 No registration fee